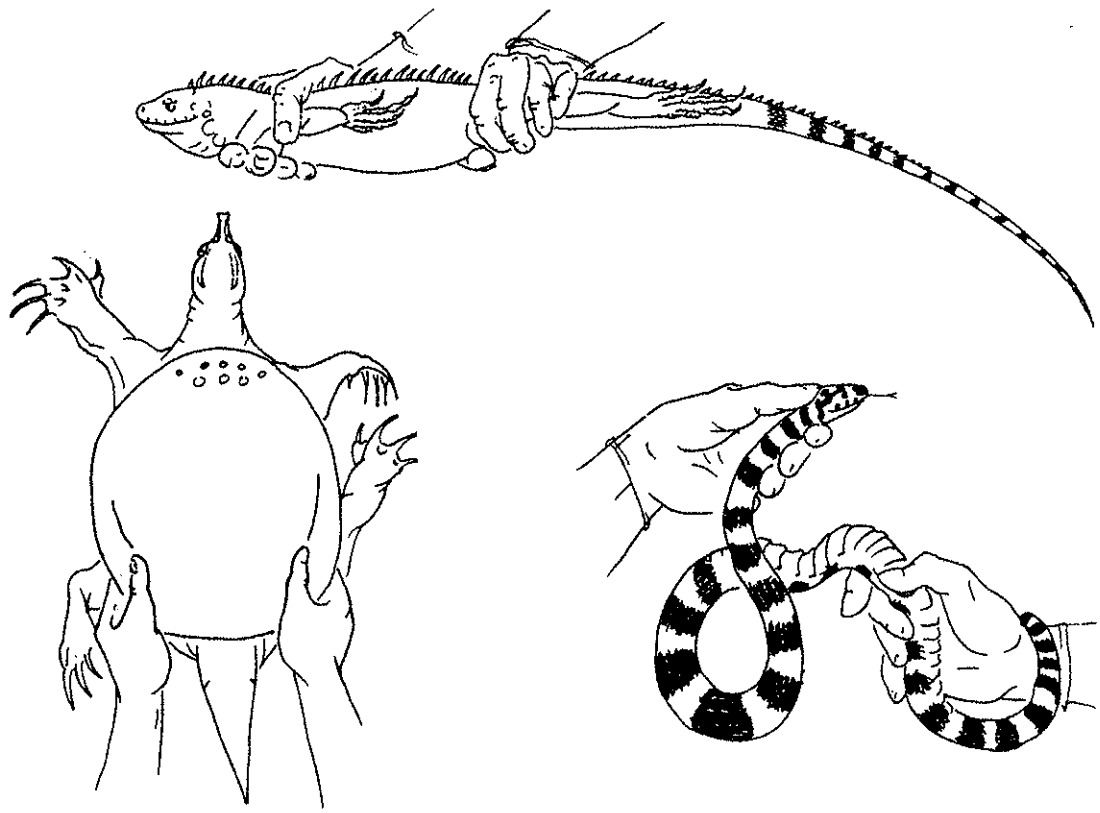
INTERNATIONAL WILDLIFE REHABILITATION COUNCIL

FALL 2000
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JOURNAL OF WILDLIFE REHABILITATION



RESTRAINT TECHNIQUES FOR LIZARDS, WATER TURTLES, SNAKES

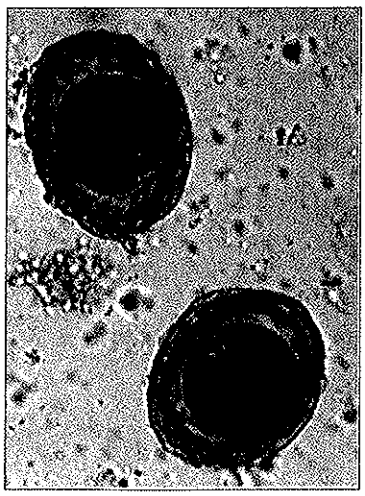
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ABOUT THE JOURNAL . . .

THE JOURNAL OF WILDLIFE REHABILITATION is designed to provide useful information to wildlife rehabilitators and others involved in the care and treatment of native wild species, with the ultimate purpose of returning them to the wild. The *Journal* is published by the International Wildlife Rehabilitation Council (IWRC), which invites your comments on this issue. Through this quarterly publication, rehabilitation courses offered in numerous locations, and an annual conference, IWRC works to disseminate information and improve the quality of care provided to wildlife.

ON THE COVER: Proper restraint techniques are critical when conducting a physical examination. How to hold lizards, water turtles, and snakes [illustration: Patricia J. Latas]. BELOW: Photomicrograph of two embryonated *Baylisascaris procyonis* eggs from raccoon feces. [©Dr. William Murray, San Jose State University, San Jose, California].



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EDITORIAL

Keeping Helping Hands Busy

"Every aspect of our lives is a vote for the kind of world we want to live in."
—Frances Moore Lappe

People can be extraordinarily generous, and one of the clearest manifestations of this is their willingness to donate their time to a worthy cause. Most nonprofits simply couldn't do their work without the support of dedicated volunteers. And this is as much true for wildlife rehabilitation organizations as any other helping agency.

A 1995 study, commissioned by the Prudential Insurance Company and conducted by The Wirthlin Group, found that about two-thirds (67 percent) of the more than 500 adults surveyed think it is very important for people to be involved in their communities by volunteering their time. Fifty-eight percent of respondents reported they are currently giving time to a service activity; of these, 12 percent are highly involved, 29 percent are moderately involved, and 59 percent are less actively involved.

Prudential's concurrent survey of nearly 1,000 high school students found yet more reason for optimism. An impressive 95 percent of respondents believe it important for people to be involved in their community through volunteer work. While 67 percent said their schools do not require community service for graduation, an identical percentage believe they should.

"Snowflakes, leaves, humans, plants, raindrops, stars, molecules, microscopic entities all come in communities. The singular cannot in reality exist."
—Paula Gunn Allen

While there's great potential for the help that volunteers can bring to your organization, harnessing that potential can be tricky. Busy lives filled with work and family responsibilities often leave little time for a serious volunteer commitment: the Association of Volunteer Administrators reports that the average life expectancy of a volunteer is just two years. It's wise and prudent to develop an ongoing volunteer recruitment and training program.

There are plenty of other things you can do, as well. Rehabilitation organizations of all stripes and sizes need to think creatively about *who* to recruit and *how*.

Many volunteers will be attracted to your organization by the desire to work directly with animals. But think how you could benefit also from the assistance of volunteers with clerical, computer, fundraising, public relations, accounting, newsletter preparation, photography, carpentry, and myriad other skills. By looking beyond the usual sources of volunteers you can free up more of your own time for the hands-on work.

Rehab organizations also need to reassess how we "use" the volunteers we already have. A major 1998 survey on volunteerism by the UPS Foundation found that fully 40 percent of people stopped volunteering simply because their time was not used wisely.

> The primary reasons for no longer volunteering—demands on time and no longer involved—are beyond the control of most volunteer groups. What concerned us, however, was the number of people leaving because of poor management practices: two out of five volunteers stopped volunteering for one of more of these reasons (i.e., not good use of time; poor use of talents; tasks not clearly defined; not thanked). The best way to build the number of volunteers and their hours is to be careful managers of the time already being volunteered.

If you've had some good experiences securing and harnessing volunteer help—or if you are or have been a volunteer and know what works and what doesn't—I invite you to share what you have learned. The new "Up For Discussion" case (page 31) centers on this important issue; manuscripts on any aspect of volunteer management are also encouraged.

And if you'd like to gain more information about the why's and wherefore's of volunteerism and volunteer management, start with the Association of Volunteer Administrators' website at www.avaintl.org. They have a host of useful links to a range of surveys and studies, as well as other valuable resources, whether you're just initiating a volunteer program or seeking to refine one you already have. Another useful site is www.idealist.org, an international project of Action Without Borders.

Marianne Skoczek, Editor

PARASITOLOGY

Host Lists of Ecto- and Endoparasites Common to North American Raptors, Along with Useful Scientific Literature

by Stephen J. Taft

Introduction

Raptor rehabilitators and veterinarians encounter a number of ectoparasites on raptors and, at autopsy, additional endoparasites that are sometimes difficult to identify. The parasitological literature on raptor parasites is scattered. In an attempt to aid professionals in identifying parasites, this annotated list has been written. It consists of a host list, a listing of organs infected, and mainly those literature citations having line drawings and/or photographs useful for identification purposes. The taxonomy of the parasites includes vernacular adjectives for higher categories except genera, which are italicized.

Host List

FALCONIFORMES

American kestrel (*Falco sparverius*). **Protozoans:** *Haemoproteus, Leucocytozoon, Plasmodium, Trichomonas, Trypanosoma.* **Trematodes:** *Brachylecithum, Lyperosomum, Platynosomum, Prosthogonimus.* **Nematodes:** *Cyrnea, Microtetrameres Syngamus, Tetrameres.* **Acarines:** *Ptilonyssus, Bicentralges* (accidental?). **Siphonapterans:** *Echidnophaga.* **Mallophagans:** *Colpocephalum, Degeeriella, Kurodaia, Laemobothrion, Nosopon.* **Dipterans:** *Icosta (=Lynchia), Protocalliphora.*

Bald eagle (*Haliaeetus leucocephalus*). **Protozoans:** *Haemoproteus, Leucocytozoon, Plasmodium, Sarcocystis*-like sp, *Trichomonas.* **Trematodes:** *Clinostomum, Neodiplostomum, Neogogatea, Mesostephanus, Microparyhium, Plagicola Posthodiplostomum, Renicola, Strigea.* **Acanthocephalans:** *Centrorhynchus, Polymorphus.* **Nematodes:** *Capillaria, Chandleronema, Contracaecum, Cosmocephalus, Cyrnea, Desportesius, Eucoleus, Eustronglylides, Gnathostoma, Paracuaria, Physaloptera, Serratospiculum.* **Acarines:** *Ixodes.* **Mallophagans:** *Colpocephalum, Craspedorrhynchus, Degeeriella, Falcolopeurus, Kurodaia, Laemobothrion.* **Dipterans:** *Protocalliphora.*

Broad-winged hawk (*Buteo platypterus*). **Protozoans:** *Eimeria, Plasmodium.* **Trematodes:** *Echinoparyphium, Echinostoma, Neodiplostomum, Parastrigea, Platynostomum, Ribeiroia, Strigea.* **Cestodes:** *Cladotaenia.* **Acanthocephalans:** *Centrorhynchus.* **Nematodes:** *Cyrnea, Dispharynx, Microtetrameres, Porrocaecum, Physaloptera.* **Mallophagans:** *Kurodaia.* **Dipterans:** *Icosta (=Lynchia), Ornithoctona, Protocalliphora.*

Cooper's hawk (*Accipiter cooperii*). **Protozoans:** *Eimeria, Haemoproteus, Leucocytozoon, Plasmodium, Trichomonas.* **Trematodes:** *Neodiplostomum, Ophiosoma.* **Cestodes:** *Cladotaenia.* **Acanthocephalans:** *Centrorhynchus.* **Nematodes:** *Cyathostoma, Cyrnea,* microfilariae, *Physaloptera, Porrocaecum, Serratospiculum,Synhimantus.* **Siphonapterans:** *Echidnophaga.* **Mallophagans:** *Colpocephalum, Craspedorrhynchus, Degeeriella, Philopterus.* **Dipterans:** *Ornithomyia, Protocalliphora.*

Ferruginous hawk (*Buteo regalis*). **Tremadodes:** *Strigea.* **Nematodes:** *Porrocaecum.* **Dipterans:** *Protocalliphora.*

Golden eagle (*Aquila chrysaetos*). **Protozoans:** *Haemoproteus, Leucocytozoon, Sarcocystis/Frenkelia.* **Mallophagans:** *Colpocephalum, Craspedorrhynchus, Degeeriella, Falcolipeurus, Kurodaia.* **Siphonapterans:** *Ceratophyllus.* **Dipterans:** *Protocalliphora.*

Gyrfalcon (*Falco rusticolus*). **Protozoans:** *Caryospora.* **Siphonapterans:** *Ceratophyllus.* **Mallophagans:** *Degeeriella.* **Dipterans:** *Protocalliphora.*

Merlin (*Falco columbarius*). **Protozoans:** *Haemoproteus, Trypanosoma, Leucocytozoon.* **Nematodes:** microfilariae, *Porrocaecum.* **Siphonapterans:** *Ceratophyllus.* **Mallophagans:** *Colpocephalum, Degeeriella, Laemobothrion.* **Dipterans:** *Ornithoctona.*

Northern goshawk (*Accipiter gentilis*). **Protozoans:** *Haemoproteus, Leucocytozoon, Plasmodium, Trichomonas, Trypanosoma.* **Trematodes:** *Nematostrigea.* **Cestodes:**

EDITORIAL NOTE: While the format of this paper is somewhat different from other offerings in the *Journal of Wildlife Rehabilitation,* we felt it was important to include. There have been relatively few surveys on raptor parasites, and the literature is particularly dispersed. A list of this sort pulls some literature together, providing reference points to useful publications for anyone attempting to identify a parasite.

ABSTRACT: This is an annotated list of ecto- and endoparasites from 38 species of North American birds of prey (i.e., hawks, eagles, falcons, owls). The paper includes a listing of organs infected and literature citations useful for identifying these parasites.

KEY WORDS: Ectoparasites, Endoparasites, Raptors

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Cladotaenia. **Nematodes:** *Cyathostoma*, microfilariae, *Physaloptera*. **Mallophagans:** *Colpocephalum*, *Craspedorrhynchus*, *Degeeriella*, *Laemobothrion*. **Dipterans:** *Protocalliphora*.

Northern harrier (*Circus cyaneus*). **Protozoans:** *Haemoproteus*, *Leucocytozoon*. **Trematodes:** *Neodiplostomum*, *Strigea*. **Cestodes:** *Cladotaenia*. **Nematodes:** *Contracaecum*, *Cyrnea*, *Physaloptera*, microfilariae. **Mallophagans:** *Colpocephalum*, *Degeeriella*, *Nosopon*. **Dipterans:** *Icosta (=Lynchia)*, *Protocalliphora*.

Osprey (*Pandion haliaetus*). **Protozoans:** *Haemoproteus*, *Hepatozoon*, *Leucocytozoon*. **Trematodes:** *Ascocotyle*, *Cryptocotyle*, *Diasiella*, *Echinochasmus*, *Mesophorodiplostomum*, *Mesorchis (=Stephanoprora)*, *Microparyphium*, *Nematostrigea*, *Neogogatea*, *Pandiontrema*, *Plagicola*, *Pygorchis*, *Renicola*, *Scaphanocephalus*. **Cestodes:** *Cyclustera*, *Paradilepis*. **Acanthocephalans:** *Andracantha*. **Nematodes:** *Cardiofilaria*, *Contracaecum*, *Sexansocara*, *Tetrameres*. **Acarines:** *Bonnetella*. **Mallophagans:** *Kurodaia*. **Dipterans:** *Olfersia*, *Protocalliphora*.

Peregrine falcon (*Falco peregrinus*). **Protozoans:** *Caryospora*, *Haemoproteus*, *Plasmodium*, *Trichomonas*, *Trypanosoma*. **Trematodes:** *Parastrigea*. **Cestodes:** *Cladiotaenia*. **Nematodes:** microfilariae, *Physaloptera*, *Serratospiculum*. **Mallophagans:** *Colpocephalum*, *Degeeriella*, *Kurodaia*, *Laemobothrion*. **Dipterans:** *Ornithoctona*, *Protocalliphora*, *Icosta (=Lynchia)*.

Prairie falcon (*Falco mexicanus*). **Protozoans:** *Babesia*, *Caryospora*. **Trematodes:** *Plagiorchis* (new host record). **Cestodes:** *Cladotaenia*. **Nematodes:** *Physaloptera*, *Serratospiculum*. **Acarines:** *Ornithodoros*. **Siphonapterans:** *Oropsylla*, *Thrassis*. **Mallophagans:** *Degeeriella*. **Dipterans:** *Protocalliphora*.

Red-shouldered hawk (*Buteo lineatus*). **Protozoans:** *Haemoproteus*, *Leucocytozoon*, *Plasmodium*, *Trypanosoma*. **Nematodes:** *Gnathostoma*, *Physaloptera*. **Mallophagans:** *Colpocephalum*, *Craspedorrhynchus*, *Degeeriella*, *Kurodaia*. **Dipterans:** *Ornithoica*, *Protocalliphora*.

Red-tailed hawk (*Buteo jamaicenis*). **Protozoans:** *Hepatozoon*, *Haemoproteus*, *Leucocytozoon*, *Plasmodium*, *Sarcocystis/Frenkelia*, *Trypanosoma*. **Trematodes:** *Neodiplostomum*, *Ribeiroia*, *Strigea*. **Cestodes:** *Cladotaenia*. **Nematodes:** *Cyathostoma*, *Porrocaecum*. **Acarines:** *Bubophilus*. **Siphonapterans:** *Echidnophaga*. **Mallophagans:** *Colpocephalum*, *Craspedorrhynchus*, *Degeeriella*, *Kurodaia*, *Laemobothrion*. **Dipterans:** *Icosta (=Lynchia)*, *Ornithoctona*, *Protocalliphora*.

Rough-legged hawk (*Buteo lagopus*). **Protozoans:** *Haemoproteus*, *Leucocytozoon*. **Trematodes:** *Nematostrigea*, *Strigea*. **Nematodes:** *Contracaecum*, *Microtetrameres*, *Porrocaecum*, *Physaloptera*. **Mallophagans:** *Colpocephalum*, *Craspedorrhynchus*, *Degeeriella*, *Kurodaia*, *Laemobothrion*.

Sharp-shinned hawk (*Accipiter striatus*). **Protozoans:** *Haemoproteus*, *Leucocytozoon*, *Plasmodium*, *Trypanosoma*. **Trematodes:** *Neodiplostomum*. **Cestodes:** *Cladotaenia*. **Nematodes:** *Cyrnae*, microfilariae, *Physaloptera*, *Porrocaecum*. **Siphonapterans:** *Echidnophaga*. **Mallophagans:** *Degeeriella*, *Nosopon*. **Dipterans:** *Icosta (=Lynchia)*, *Ornithomyia*.

Snail kite (*Rostrhamus sociabilis*). **Protozoans:** *Eimeria*. **Trematodes:** *Bothrigaster*, *Echinostoma*, *Notocotylus*, *Prionosoma*. **Acarines:** *Ornithonyssus*. **Mallophagans:** *Colpocephalum*, *Columbicola*, *Craspedorrhynchus*, *Degeeriella*, *Falcolipeurus*, *Menacanthus*, *Neocolpocephalum*.

Swainson's hawk (*Buteo swainsoni*). **Protozoans:** *Caryospora*, *Haemoproteus*, *Leucocytozoon*, *Sarcocystis/Frenkelia*. **Cestodes:** *Idogenes*. **Nematodes:** *Serratospiculum*, *Thelazia*. **Siphonapterans:** *Cediopsylla*, *Oropsylla*. **Mallophagans:** *Craspedorrhynchus*, *Degeeriella*, *Kurodaia*, *Laemobothrion*. **Dipterans:** *Protocalliphora*.

Turkey vulture (*Cathartes aura*). **Protozoans:** *Caryospora*, *Trichomonas*. **Mallophagans:** *Cuculiphilus*, *Colpocephalum*, *Falcolipeurus*, *Laemobothrion*. (Author's Note: Turkey vultures have been kept with the Falconiformes, although they are now placed with the Ciconiiformes).

STRIGIFORMES

Barn owl (*Tyto alba*). **Protozoans:** *Eimeria*, *Haemoproteus*, *Leucocytozoon*, *Sarcocystis/Frenkelia*, *Trichomonas*. **Trematodes:** *Platynosomum*. **Mallophagans:** *Kurodaia*, *Strigiphilus*.

Barred owl (*Strix varia*). **Protozoans:** *Eimeria*, *Haemoproteus*, *Leucocytozoon*, *Plasmodium*, *Trichomonas*, *Trypansoma*. **Trematodes:** *Strigea*. **Cestodes:** *Paruterina*. **Nematodes:** *Capillaria*, *Cyrnea*, *Porrocaecum*. **Acarines:** *Haemaphysalis*. **Mallophagans:** *Kurodaia*, *Strigiphilus*. **Dipterans:** *Icosta (=Lynchia)*, *Ornithoica*.

Boreal owl (*Aegolius funereus*). **Nematodes:** *Porrocaecum*. **Mallophagans:** *Kurodaia*, *Strigiphilus*.

Burrowing owl (*Speotyto cunicularia*). **Cestodes:** *Choanotaenia*. **Nematodes:** *Cyathosoma*. **Siphonapterans:** *Aetheca*, *Echidnophaga*, *Foxella*, *Megabothris*, *Meringis*. **Mallophagans:** *Kurodaia*, *Strigiphilus*.

Eastern screech owl (*Otus asio*). **Protozoans:** *Leucocytozoon*, *Plasmodium*, *Trypanosoma*. **Nematodes:** *Cyathostoma*. **Acarina:** *Argas*. **Siphonapterans:** *Ceratophyllus*, *Ctenophthalmus*, *Megabothris*, *Orchopeas*. **Mallophagans:** *Kurodaia*, *Strigiphilus*. **Dipterans:** *Icosta (=Lynchia)*, *Protocalliphora*.

Great-gray owl (*Strix nebulosa*). **Mallophagan:** *Strigiphilus*.

Great-horned owl (*Bubo virginianus*). **Protozoans:** *Eimeria Haemoproteus*, *Leucocytozoon*, *Plasmodium*, *Trypanosoma*. **Trematodes:** *Alaria*, *Brachylecithum*, *Echinoparyphium*, *Echinostoma*, *Hysteromorpha*, *Neogogatea*, *Notocotylus*, *Plagiorchis Ribeiroia*, *Strigea*, *Zygocotyle*. **Cestodes:** *Paruterina*. **Nematodes:** *Capillaria*, *Cyrnea*, *Porrocaecum*. **Acarines:** *Bubophilus*, *Knemidocoptes*, *Pandalura*, *Pneumophaguss*. **Siphonapterans:** *Aetheca*, *Anomiopsyllus*, *Ctenocephalides*, *Echidnophaga*, *Foxella*, *Hectopsylla*, *Orchopeas*, *Oropsylla*. **Mallopagans:** *Colpocephalum*, *Kurodaia*, *Strigiphilus*. **Dipterans:** *Icosta (=Lynchia)*, *Ornithoica*, *Ornithomyia*, *Protocalliphora*.

Hawk owl (*Surnia ulula*). **Mallophagan:** *Strigiphilus*.

Long-eared owl (*Asio otus*). **Protozoans:** *Eimeria*, *Haemoproteus*, *Leucocytozoon*, *Plasmodium*, *Trypanosoma*. **Cestodes:** *Paruterina*. **Nematodes:** *Capillaria*, *Cyathostoma*, microfilariae, *Porrocaecum*. **Siphonapterans:** *Ceratophyllus*, *Oropsylla*. **Mallophagans:** *Strigiphilus*. **Dipterans:** *Ornithomyia*.

Saw-whet owl (*Aegolius acadicus*). **Protozoans:** *Haemoproteus*, *Leucocytozoon*, *Trypanosoma*. **Cestodes:** *Paruterina*. **Nematodes:** *Cyathostoma*, microfilariae. **Siphonapterans:** *Cetratophyllus*, *Echidno-*

phaga, Orchopeas. **Mallophagans:** *Kurodaia, Strigiphilus.* **Dipterans:** *Icosta (=Lynchia), Ornithoica, Ornithomyia.*

Short-eared owl (*Asio flammeus*). **Protozoans:** *Haemoproteus, Leucocytozoon, Plasmodium, Trypanosoma.* **Trematodes:** *Platynostomum.* **Nematodes:** *Porrocaecum,* microfilariae. **Mallophagans:** *Colpocephalum, Kurodaia, Strigiphilus.* **Dipterans:** *Ornithoica.*

Snowy owl (*Nyctea scandiaca*). **Protozoans:** *Plasmodium Trypanosoma.* **Cestodes:** *Paruterina.* **Nematodes:** *Capillaria, Cyrnae, Microtetrameres.* **Mallophagans:** *Colpocephalum, Philopterus, Strigiphilus.* **Acarines:** *Ixodes.*

Spotted owl (*Strix occidentalis*). **Protozoans:** *Atoxoplasma, Haemoproteus, Leucocytozoon, Trypanosoma.* **Nematods:** microfilariae. **Acarines:** *Euschoengastia, Dermacentor.* **Mallophagans:** *Kurodaia, Strigiphilus.* **Siphonapterans:** *Opisodasys.* **Dipterans:** *Icosta (=Lynchia), Ornithoica.*

Western screech owl (*Otus kennicotti*). **Dipterans:** *Protocalliphora.*

Location In/On the Host

Blood: *Atoxaplasma, Hepatozoon, Haemoproteus, Leucocytozoon,* microfilariae, *Plasmodium.*

Eye or orbit: *Thelazia.*

Oral cavity: *Trichomonas, Clinostomum.*

Pharynx and esophagus: *Clinostomum.*

Proventriculus: *Ribeiroia, Dispharynx, Tetrameres, Microtetrameres, Synhimantus.*

Gizzard: *Physaloptera, Capillaria.*

Intestine: *Caryospora, Eimeria, Sarcocystis/Frenkelia, Alaria, Scaphanocephalus, Stephanoprora, Neogatea, Mesostephanus, Posthodiplostomum, Diasiella, Hysteromorpha, Pandiontrema, Nematostrigea, Notocotylus, Mesophorodiplostomum, Neodiplostomum, Phagicola, Plagiorchis, Ascocotyle, Echinochasmus, Cryptocotyle, Pygiodopsis, Echinoparyphium, Echinostoma, Strigea, Parastrigea, Zygocotyle, Centrorhynchus, Idogenes, Cladotaenia, Paruterina, Cyclustera, Paradilepis, Andracantha, Centrorhynchus, Choanotaenia, Sexansocara, Porrocaecum, Contracaecum, Ascaridia, Gnathostoma.*

Cloaca: *Microparyphium, Prosthogonimus.*

Oviduct: *Prosthogonimus.*

Liver, bilary ducts, and gall bladder: *Brachylecithum, Lyperosomum, Metorchis, Platynostomum.*

Kidneys: *Renicola.*

Oviduct and bursa Fabricii: *Prosthogonimus.*

Trachea and bronchi: *Cyathostoma, Syngamus.*

Air sacs or body cavity: *Bothrigaster, Cardiofilaria, Serratospiculum.*

Ears: *Protocalliphora, Ornithoica* (sometimes).

Feathers: Siphonapterans, Mallophagans, Dipterans.

Leg scales: Acarines.

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The Exotics Dilemma: A Case Study in Progress

PART 3: PARASITES AND DISEASE

by Mary Catharine Kuruziak, Astrid MacLeod, and Philip Dragoumis

The Case So Far...

In Part I of this case study, Miko, a captive-born raccoon, was admitted to the Hellenic Wildlife Hospital. Veterinarian Dr. Kostas Demetriades determined that the four-year-old raccoon was suffering from intestinal impaction and that his heart and digestive tract were weakened as a result of obesity. In Part II, Miko's diet was analyzed to determine the severity of his nutritional deficiencies and a diet was devised to wean him onto healthier foods.

Miko was initially admitted to the Hellenic Wildlife Hospital (HWH) after he had not taken food and water or defecated for four days. HWH staff administered two doses of milk of magnesia and paraffin oil. Eight days after the raccoon had last defecated, the treatment took effect. Philip Dragoumis, codirector of the HWH, checked the fecal sample and found what appeared to be small white eggs.

This was cause for great concern, as the introduction of a non-native species presents the possibility that parasites and/or diseases have been introduced as well. Species dispersal is a natural process, and when organisms extend their natural range without intervention, the immigrants are not viewed as exotics. Species that enter ecosystems beyond their natural range through deliberate or inadvertent introduction by humans can create problems within the established ecosystem through species displacement, disease, parasitism, hybridization, predation, or habitat destruction.

Natural History: Diseases Common to *Procyon lotor*

A study published by the Department of Veterinary Pathobiology at the College of Veterinary Medicine in Urbana, Illinois, examined a large number of raccoons in west-central Illinois from 1989 to 1993. The animals were live-trapped and blood samples were collected to determine serologic titers to four infectious organisms (Table 1). The study indicated a correlation between seroprevalence (the presence of antibodies against a pathogen, which indicates prior exposure and/or infection) and increasing age.

The Illinois study does not include seroprevalence of the three main parvovirus strains that affect raccoons commonly found in other areas of North America. In southern Ontario, during the fall of 1980 and 1981, Barker et al. (1983) found 22.3 percent positivity in 112 raccoons tested for antibody titers to all three strains.

Rabies, of particular concern to human health officials, is an acute infectious disease of the central nervous system (CNS) caused by a lyssa virus. It is generally acquired from the bite of an infected animal; however, transmission is also possible by ingestion of infected tissue, aerosol inhalation, or from corneal transplants (Burridge, Sawyer, and Biggler 1986). The virus usually enters muscle tissue via saliva, traveling along the nerves to the CNS by the movement of cytoplasmic fluids. The virus undergoes considerable replication in the brain, but can also replicate in non-nervous tissues (Kaplan 1985). Replication also may take place in muscle cells at the site of infection, or be present in saliva or salivary glands for several days before clinical signs appear.

The incubation period for rabies is variable and depends on the particular strain of virus. Signs usually occur 2–6 weeks after infection in domestics and wildlife, however, in humans, incubation periods may range anywhere from 1–3 months and have in fact been documented at more than a year (Charlton and Casey 1979, 1981; Smith et al. 1991). Incubation period can also depend on the amount and virulence of the transmitted virus, as well as the site of the inoculation.

Canine distemper virus, a paramyxovirus, causes a disease of carnivores. It is widespread in some areas, and is endemic in raccoon populations across North America (Hoff et al. 1974; Roscoe 1993). Transmission is through direct contact, via the upper respiratory tract and aerosolized droplets. The virus can be transmitted by contact with objects that contain the virus, but the virus is very unstable outside the main host: it desiccates when exposed to air. Dilute bleach solutions (1:30) (Merck 1998), heat, formalin, and Roccal® will inactivate the virus.

ABSTRACT: This case study examines the introduction of alien organisms into a new environment and centers on a pet raccoon in Greece. The diseases and parasites commonly seen in raccoons, their management, and the introduction of *Baylisascaris procyonis* into Europe are discussed.

KEYWORDS: Wildlife Rehabilitation, Wildlife in Captivity, Wildlife Pets, Raccoon, Disease, Parasites, Rabies, Distemper, Parvovirus, Nematode, Raccoon Roundworm, *Baylisascaris procyonis,* Raccoons in Germany, Raccoons in Europe; *Baylisascaris procyonis* in Europe

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Once the virus enters the upper respiratory tract, it spreads to the tonsils and lymph nodes, where it replicates. It then enters the bloodstream and is transported to epithelial cells throughout the body, including the intestinal and respiratory tract.

Because affected animals in the second stage of the disease often show the same clinical signs as rabies, caution is urged when handling them, as the two diseases are difficult to tell apart through visual clues. Most often, infected animals present with neurological signs: aggressiveness, disorientation, lack of alertness, convulsive movements of the head and paws, facial twitches, chewing motions, and aimless wandering. There is no treatment for distemper; once secondary CNS signs appear, they are irreversible.

Parvoviruses cause a highly contagious disease, primarily because they are robust, even outside of the host organism. Parvovirus is shed in all body secretions and excretions of affected animals. The route of infection is either ingestion or inhalation. Parvovirus may affect all rapidly growing and dividing cells, including cells of the intestinal mucosa, bone marrow, and reticulo-endothelial system (Michigan Department of Natural Resources).

Parvovirus incubates in the host for 2–7 days, and in young animals it has a very high mortality rate with losses of 25–90 percent. The course of disease is very short, rarely lasting more than one week. Animals that recover may shed virus for months, but in low viral loads (Merck 1998).

Raccoons are affected by and susceptible to feline panleukopenia (a.k.a. feline parvovirus, or FPV), mink virus enteritis (MVE), and raccoon parvovirus (RPV). There is no evidence of raccoons becoming infected with canine parvovirus (CPV); although some have produced titer to it when challenged they did not develop the disease (Barker, Povey, and Voight 1983). A unique "raccoon" parvovirus, differing from FPV and MVE and resembling CPV-2, has been isolated from raccoons with parvovirus enteritis (Nettles et al. 1980).

Parvovirus virus can be killed using a solution of bleach as dilute as 1:30 (Merck 1998), but it is difficult to eradicate every virus particle from every surface, and it can survive in the environment for up to a year. There is no treatment available other than supportive care.

Natural History: Parasites Common to *Procyon lotor*

Raccoons can be host to any number of ectoparasites, depending on the prevalence of ectoparasites in the geographical area. Ectoparasites include fleas, lice, ticks, and mites. Endoparasites common to the raccoon include *Baylisascaris procyonis*, (small intestine), *Crenosoma goblei* (lungs), *Gnathostoma procyonis* (stomach), *Dracunculus insignis* (under the skin), and *Physaloptera spp* (stomach). Many of the parasites found in raccoons and other wildlife are comparable to parasites in domestic animals, including hookworm, whipworm, and giardia (Foreyt 1994). The most zoonotically important endoparasite that occurs in raccoons is *Baylisascaris procyonis*.

A Canadian study on metazoan parasites in raccoons looked at a sample of 82 animals, and 15 parasite taxa were found. All 82 young and adult raccoons were infected with anywhere from 1 to 8 different taxa (Table 2, page 10). Interestingly, this study concluded that 10 of the parasites found constituted "new host records" for raccoons. *Baylisascaris procyonis* had infected 61 percent of the raccoons studied . The researchers concluded that this high rate of infection pointed to a high possibility of contamination of the environment and subsequent possible exposure to eggs of *Baylisascaris procyonis* by both animals and humans (Ching, Leighton, and Stephen 2000).

Baylisascaris procyonis (Nematoda, Family Ascaridae) is a large roundworm parasite common to the raccoon, which is its only obligate host. Young raccoons are infected after ingesting eggs from their mother's body or the local den environment; mature raccoons become infected after ingesting larvae from intermediate hosts. The larvae mature into adults in the small intestine of the raccoon.

The adult roundworm can grow to a length of 12–23 cm (Kazacos 1996). The oval eggs have a pitted outer shell and finely granulated surface (Kazacos et al. 1989). Infected raccoons shed an average of 20,000 to 26,000 eggs per gram of feces. (Rowley et al. 2000). As one might expect, most eggs are deposited in latrine sites—areas favored by raccoons for defecation (Marshall and Kazacos 1998; Page et al. 1999). Large numbers of eggs accumulate in the feces and in the soil of raccoon latrines, and these eggs can remain viable and infective in the environment for years. (Kazacos 1983; Kazacos and Boyce 1989). The eggs are some of the most resistant parasite eggs known. In laboratories, embryonated *Baylisascaris procyonis* eggs have been kept in refrigeration for as long as 12 years without any significant loss of infectivity (Kazacos and Boyce 1989).

Numerous small vertebrates that inadvertently ingest the eggs while foraging in and around raccoon latrines, or by grooming themselves after foraging, serve as the intermediate hosts of

TABLE 1. SEROLOGIC TITERS TO FOUR INFECTIOUS ORGANISMS IN WEST-CENTRAL ILLINOIS RACCOONS

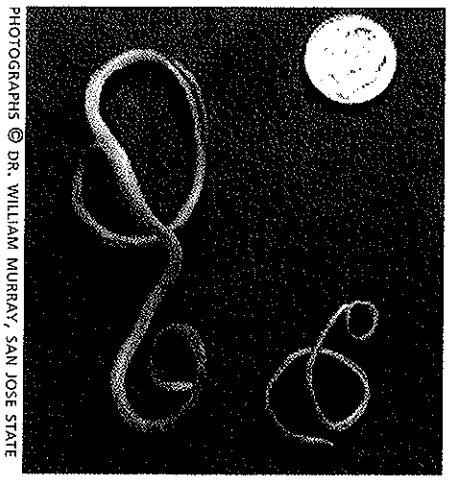
Organism	Sample Tested	% Positive	Comments
Canine distemper virus	368 raccoons	23	* * * * *
Leptospira interrogans	459 raccoons	48	43% of the raccoons from state park showed seroprevalence, as compared to 52% from farm areas
Pseudorabies virus	479 raccoons	17	* * * * *
Toxoplasma gondii	379 raccoons	49	73% of the raccoons tested in spring showed seroprevalence; fall samples showed 33%

Mitchell, et. al 1997

TABLE 2. PREVALENCE OF COMMON PARASITES IN YOUNG AND ADULT RACCOONS

Nematoda (round worms)	**Prevalence**
Baylisascaris procyonis	61.0%
Arthrocephalus lotoris	95.2%
Capillaria	24.0%
Acanthocephala (thorny-headed worms)	**Prevalence**
*Prosorhynchus cylindraceus**	7.2%
*Profilicollis botulus**	9.6%
Cestoidea (tape worms)	**Prevalence**
Procercoid	2.4%
Digenea (flukes)	**Prevalence**
*Brachylaima fuscatum**	18.1%
Neodiplostomum cratera	14.5%
*Alaria (Paralaria) taxideae**	4.8%
Notocotylus sp.	1.2%
*Plagiorchis verpertilionis parorchis**	2.4%
*Asorhytis chradridriformis**	18.1%
*Microphallus simills**	18.1%
*Cryptocotyle jejunum**	9.6%
*Pricetrema zalophi**	12.1%

**indicates new host record*
(Ching, Leighton, and Stephen 2000)



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***Baylisascaris procyonis* is a large roundworm parasite common to the raccoon. Adult roundworms can grow to a length of 12–23 cm.**

The oval eggs have a pitted outer shell and finely granulated surface; they are among the most resistant parasite eggs known. In laboratories, embryonated



***Baylisascaris procyonis* eggs (such as those in the photomicrograph above) have been kept in refrigeration for as long as 12 years without any significant loss of infectivity.**

Baylisascaris procyonis (Kazacos and Boyce 1989; Sheppard and Kazacos 1997). Eggs found at raccoon latrines are at various stages of development. The rate at which the eggs reach infectivity depends on ambient temperature. At 22°–25°C, *Baylisascaris procyonis* eggs become infective in 11–14 days (Sakala et al. 1989).

In most mammals and birds, *Baylisascaris procyonis* larvae undergo aggressive somatic migration, often entering and damaging the CNS, producing clinical CNS disease (Kazacos and Boyce 1989). This parasite is the most commonly recognized cause of clinical larval migrans in animals, having produced fatal or severe neurologic disease in more than 90 species of mammals and birds (Kazacos 1999; Rowley et al. 2000).

In humans, the damage roundworm larvae can cause depends on how many eggs have been ingested and where the larvae migrate to in the body. While an adult may not notice any symptoms from a minor infection of few eggs, a small child who has consumed many eggs can suffer a great deal of neurological trauma, causing illness or death. Fatal or severe neural larval migrans (NLM) has been documented in 10 children and 1 adult, and the parasite has been diagnosed in over 6 dozen cases of ocular larval migrans (OLM). While the potential for human infection is high, severe infections are rare, as they are easily prevented by avoidance of raccoon latrines (Kazacos 1995; Marshall and Kazacos 1998).

The Introduced Raccoon in Germany

The raccoon occurs naturally only in North America, but it was introduced to Germany in 1934. The original release site was in northern Hesse, and the first urban raccoon litter was recorded in 1951 in Fritzlar, 20 km from the original release site (Müller-Using 1959). The adaptable raccoon thrived; today, the densest populations are found in the states of Hessia, North Rhine-Westphalia, and Lower Saxony. Less dense populations are found in Bavaria, Thuringia, Brandenburg, and Mecklenburg-Vorpommern.

While the raccoon is not considered a problematic species even within urban areas, cases of rabies in Germany have been documented. Rabies occurs less frequently in raccoons than it does in native populations of foxes, martens, and deer. German raccoons are known to carry canine distemper, parvovirus, and

adenovirus, as well as panleucopenia and Aujesky's Disease (Lutz 1996).

In 1991, a 48-year-old German woman developed diffuse unilateral subacute neuroretinitis (DUSN). Ophthalmoscopy revealed a nematode, which was photographed and measured planimetrically. Further tests suggested that the parasite was not *Toxocara canis*; the patient, who had kept a pet raccoon, was most likely infected by raccoon roundworm, *Baylisascaris procyonis* (Kuchle et al. 1993).

By 1980, raccoons had crossed the borders to some of Germany's neighboring countries and were recorded in the northeast of France, in the town Laon (Léger 1999). The forests surrounding Lake Lebsko in Poland are home to the raccoon, as are areas of the Netherlands, White Russia, Caucasus, and Turkestan. Raccoons have also been recorded in Moravia, a region in the Czech Republic. In a 1994–97 Czech study of *Plesiomonas shigelloides* and its serovars in wild animals, one host was the raccoon (Bardon 1999). This presented evidence that Miko, who was born in the Czech Republic, could very well have been exposed to a number of pathogens, including *Baylisascaris procyonis*.

Treatment

Dragoumis described the eggs found in Miko's fecal sample to the North American team (that had formed to provide information and support for the raccoon's care) as being similar to those of canine roundworm (*Toxocara*), but somewhat larger. Samples were sent to the laboratory at the University of Thessalonica, but it would be days before results were known. The laboratory informed Dragoumis that, while a species of *Baylisascaris* had been found in a bear, *Baylisascaris procyonis* had never been found in Greece.

The North American team, aware of the serious problem *Baylisascaris procyonis* presented, forwarded photographs of both canine and raccoon roundworm, and recommended the raccoon immediately begin a course of medication. In North America, a drug commonly used to treat raccoon roundworm is Strongid-T® (pyrantel pamoate), at 25 mg/kg body weight. This can be administered orally: 0.5 cc/kg of a 50 mg/ml commercial solution (Smith 2000).

The initial procedure is repeated over a period of three days. Treatment can begin at 2–4 weeks of age. For juvenile raccoons, administration of a single dose of the drug should continue at biweekly or weekly intervals for at least 2.5 months. Older raccoons should be treated weekly or biweekly for 3–4 weeks, then again fecal tested for evidence of eggs. Older raccoons in long-term care, or housed as educational animals or in zoos, should undergo quarterly fecal tests and treatments for the parasite. Newly admitted raccoons should be quarantined until appropriate anti-helmintic treatment is completed and fecals are negative. Fecal examination has its limitations, however; if the worms present are not yet adults, they won't be shedding eggs yet, and feces will test negative. This is especially true for young raccoons that may be negative for many weeks and then suddenly become positive and begin shedding large numbers of worms (Kazacos and Boyce 1989).

Because Strongid-T® was not available in Greece, Panacur® (fenbendazole) was used as directed by the veterinarian.

The North American team was concerned about the possibility of roundworm eggs or larvae being ingested by other animals. A small bird or mammal could easily transport the parasite, thereby introducing a new pathogen to native wildlife and domestic animals, as well as to the human populations of Greece.

Sanitation and careful disposal of feces were crucial to limit the possibilities of infection to other animals and those who were caring for Miko. Feces and bedding were burned and the enclosure was cleaned with boiling water and disinfectant. Staff wore protective gloves and masks, and special clothing was worn when working in the enclosure. Plastic bags were used to cover footwear and were subsequently burned. Cleaning supplies and equipment were not used outside of the enclosure, and these items, too, were routinely burned.

Continuation of Preventative Measures

The laboratory at the University of Thessalonica subsequently informed HWH that both fecal samples examined for *Baylisascaris procyonis* were negative. Nonetheless, the raccoon is routinely wormed. Because he is not indigenous to Greece and there are no known raccoon populations there, the possibility that a parasite or disease could be introduced remains real. Conversely, there also is a risk that the animal could come into contact with parasites and/or diseases inherent to the native wildlife populations of Greece. Of particular concern is the possibility of tick-transmitted diseases like ehrlichiosis, which present problems for native wolves and jackals. As a result, the raccoon is preventatively treated with ivermectin and Merial's topical anti-flea and tick product FRONTLINE® (active ingredient: fipronil) during tick season. He also has been vaccinated with the Merial product Hexadog®, a combination preparation used in Europe for canines. It confers protection from rabies, distemper, adenovirosis, parvo virus, and leptospirosis.



MARY CATHERINE KURUZIAK

As Greece's first documented raccoon introduction, Miko will spend his life in captivity. All possible precautions will be taken to guard indigenous wildlife from any pathogens he may carry. In turn, the staff at HWH will make every effort to protect the animal from contact with indigenous wildlife. Unfortunately, there are no guarantees that Miko will be the last raccoon introduced to Greece via the pet trade, or that other European raccoons will not find their way into the country.

In the Next Issue

The next issue of the *Journal of Wildlife Rehabilitation* will include the final installment of this series.

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Recommended Reading

For information on raccoon populations in Germany: www.gwn.de/gwn/html/UFZ-Bericht.html.

For information on rabies in Ontario visit the MNR Rabies In Ontario website: www.mnr.gov.on.ca/MNR/rabies.

For information on *Baylisascaris procyonis*: www.biosci.ohio-state.edu/~parasite/baylisascaris.html.

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Evaluation of Reptiles and Amphibians for Release, Rehabilitation, or Adoption

by Patricia J. Latas

Introduction

With ever-increasing human populations and urbanization, interactions between people and herpetile species are becoming more and more frequent. Compounding the problems associated with the impact of humans on native reptile and amphibian populations are the accidental and intentional release of exotic species into native habitats.

Protocols to assign various herpetiles to rehabilitation and release programs need to be developed. Such protocols assume assessment of health, physical condition, and biological viability are accurate. The purpose of this article is to provide guidelines to evaluate the health of herpetiles relative to release or adoption. (Please note that consultation with local biologists should always determine release of these animals back into native populations.)

Table 1 presents a general plan for evaluating an animal for rescue.

Basic Physical Examination

A thorough physical examination should be performed on every animal. The general appearance, behavior, demeanor, and stance should be observed before the animal is handled (Figure 1).

The entire body should be checked for deformities, asymmetries, lameness, and general strength. The head and face should be examined closely, including the oral cavity, under the tongue, in the choanae, and in the nares. Skin should be evaluated as to turgor, color, sheen, scalation, echdysis, and parasites.

The cloaca should be examined externally for debris and gently everted to check for lesions. Manual eversion is potentially traumatic and should only be attempted by those with experience and hands-on training. The body cavity should be palpated carefully or, in the case of turtles and tortoises, with gentle ballotment.

All animals should be auscultated over the lung area and coelomic cavity. Any breathing sounds and characteristics, bowel sounds, or "gizzard grinding" can be evaluated.

TABLE 1. GENERAL PLAN FOR EVALUATING A HERPETILE

I. Weigh

II. Physical examination

- eyes, ears, nose, throat
- skin, integument, shell
- muscle tone
- auscultation
- palpation

III. Fecal examination

- color, consistency, odor
- float
- direct smear
- urine/urate evaluation

IV. Special tests bacteriology

- hematology
- virology
- imaging
- necropsy

V. Triage

- release
- treat and release
- rehabilitation
- long-term treatment
- adoption
- euthanasia

VI. Zoonotic considerations

ABSTRACT: With ever-increasing human populations and urbanization, interactions between people and amphibian and reptile species ("herpetiles" or "herps") are becoming more and more frequent. Compounding the problems associated with the impact of humans on native reptile and amphibian populations are the accidental and intentional release of exotic species into native habitats. This article provides guidelines to evaluate the health of herpetiles relative to release or adoption.

KEY WORDS: Reptile, Amphibian, Rehabilitation, Herpetile, Evaluation, Release

PATRICIA J. LATAS, DVM, is a semiretired veterinarian and past owner of a specialty clinic for birds and reptiles. She has worked with rehabilitation organizations to evaluate wild reptiles and amphibians for treatment and release. Her interest comes from a background in field biology and field observations of many herpetiles all over the world.

Dr. Latas has worked with and taught classes for field officers and animal law enforcement officers in the investigation and documentation of cruelty and neglect of nonmammalian species in the pet trade. She is currently working as a scientific illustrator and developing an online tutorial site for rehabilitators and law officers.

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Droppings or other excretions should be examined for their consistency and various components.

Turtles and Tortoises

Water turtles, box turtles, and tortoises should generally be active, alert, and responsive. There should be no noxious odors. The plastron together with the carapace should form a smooth dome free of active lesions. The skin should be supple.

Eyes should be open, bright, and clear with no discharge present. The oral cavity should have healthy pink mucus membranes (although some species will have oral pigmentation from black to yellow). The choanae should be smooth and free from mucus. The saliva should be moist and clear.

Breathing should be regular, even, and inaudible. It should be noted that turtle and tortoise lungs are located immediately below the carapace, not above the plastron, as many would expect.

Movements of the head and limbs should be coordinated and strong. Muscle tone should be good enough that the animal can support itself by the front limbs alone.

The cloaca should be free of mucus, feces, or other material. Examination for external parasites should include full visualization of the axillae. Feces will vary from species to species, but urine should be clear and urates white.

It should be noted that many water turtles shed scales, unlike most land turtles. This can be confused with several illnesses by those unfamiliar with this trait.

Snakes

Temperate species (native snakes) will be active, alert, and possibly defensive. Excessively cooled natives and escaped exotic species may initially be sluggish, but rapidly change demeanor when properly warmed. Eyes should be bright and free from lesions. The mouth and choanae should be pink and moist, smooth, and free from ulcerations and swellings. The trachea should open and close with regular breathing, and be free from mucus or other debris.

Auscultation of breathing should be unremarkable. Palpation of the body is easily accomplished and should not reveal any masses or gas bubbles.

Muscle tone and body condition should be strong and firm (similar to an equal-sized sausage). The vertebral column should be symmetrical and not overly prominent. Skin should be smooth, shiny, and lustrous. Areas around the eyes, gular fold, and ventral scutes should be carefully examined for parasites. Normal body condition among wild natives is variable, with most being quite thin after hibernation, and gradually filling out over the course of the year.

The cloaca should be clean and closed. An occasional snake will express a foul-smelling substance when handled, but there should be no other noxious odors.

Lizards

Most lizards will be active and alert. Care must be taken to prevent possible tail loss when handling nervous animals.

Eyes should be open, clear, and bright. Depending on the species, pupils may be slits, irregular, or round, but should be equal and reactive to light. Breathing should be regular and free of moist sounds on auscultation. The oral cavity should be moist and smooth, free of mucus, swellings, and ulcerations. Dentition varies between species, but the teeth should be symmetrical and even. The loss of teeth is a normal occurrence among wild natives and irregularities are normal. Nearly all herpetiles are polydontic, replacing teeth as they are lost. Unusual trauma would involve damage to the gum areas and mouth joints. This is equally applicable to all toothed herpetiles except the agamid lizards and some chameleons.

The skin should be supple and scales uninterrupted. Patches of shedding skin may be present on a normal animal. Scarring is perfectly normal and expected in wild natives. Much occurs as a result of either mating behaviors or as "escape" wounds caused by predators. This is particularly true of many lizard species.

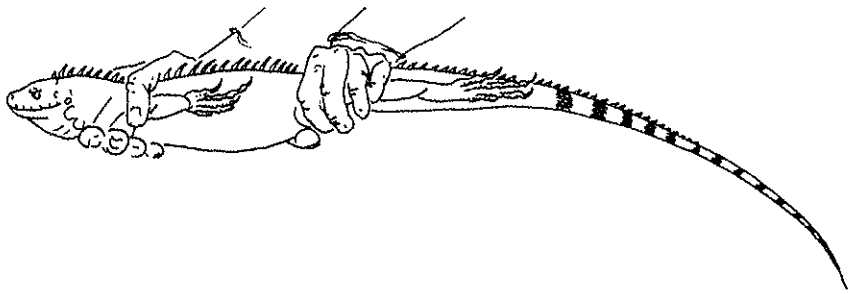
Limbs should move in a strong and coordinated fashion. If toes are missing, the stumps should be smoothly healed and not swollen. The occasional lizard will have a regenerated tail.

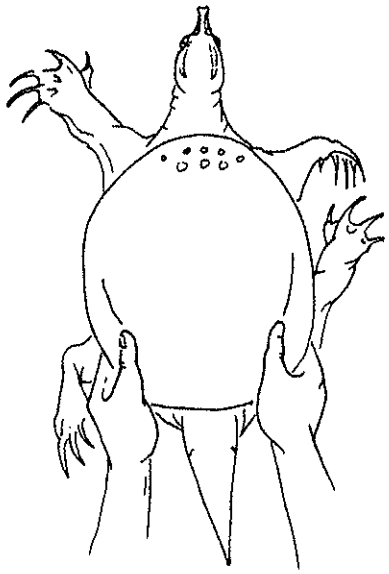
The coelom should be palpated for eggs and bladder stones. The cloaca should be clean and free from debris. (Remember, droppings have feces, urine, and urates.)

TERMS USED IN THIS ARTICLE

Anoxic:	severe oxygen deficiency
Auscultation:	diagnostic monitoring of the sounds made by internal organs, generally using a stethoscope
Avulsion:	a forcible separation; torn away
Axillae:	the armpits or an analogous part
Ballotment:	a technique for detecting or examining a floating object in the body, generally using digital pressure
Buccal:	pertaining to the cheeks or mouth cavity
Choanae:	an opening with a funnel shape, esp. one of the internal nares
Coelom:	the body cavity
Cyanotic:	inadequate oxygenation of the blood
Diasthesis:	"leaking" of serum from the capillaries
Ecdysis:	shedding of an outer integument or layer of skin
Lactic acidosis:	an abnormal accumulation of lactic acid
Septicemia:	systemic disease caused by pathogenic organisms or their toxins in the bloodstream
Sequelae:	pathological condition resulting from a disease
PCV:	packed cell volume
TP:	total protein
CBC:	complete blood count

FIGURE 1. RESTRAINT TECHNIQUES





Large Lizards

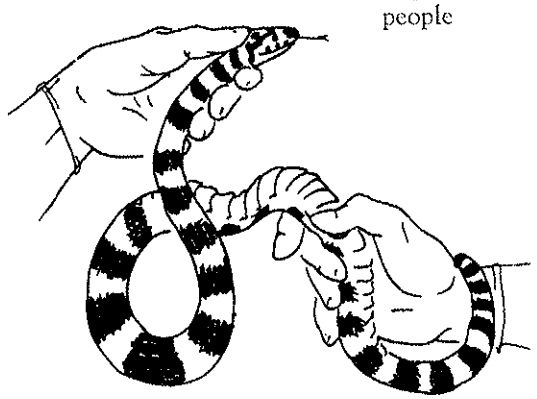
- hold at base of limbs
- do not impede chest
- watch for tail whipping
- claws are razor sharp
- beware of sawblade-like dorsal scales on tail

Water Turtles

- neck can often reach to the rear of the carapace
- animal will urinate and defecate
- very powerful and slippery

Snakes

- hold close to head
- do not squeeze
- support the body
- close cloaca with thumb
- large snakes may require several people



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External parasites may most often be found in the axillae or around the base of the neck. Carefully examine any folds under the chin or surrounding the cloaca.

Amphibians

Amphibians vary widely in physical appearance and attributes; however, in general they should be alert and responsive to gentle manipulation. Use latex exam gloves during handling, since many species have delicate skin and mucus, which are easily damaged during a routine physical.

The eyes should be bright, alert, and symmetrical in placement. The medial aspect of the eye can be examined via the open mouth. Breathing may or may not be via lungs, but respiratory breathing should be even and regular in rate. The oral cavity should be clean and free from debris.

The skin should be smooth and free from ulcerations. Some species may slough the entire skin during times of stress. Muscle tone and body condition may vary depending on the natural history of the species.

Diagnostic Protocols

Some attempt at diagnosis and acquisition of laboratory samples will assist triage and give long-term prognosis.

Table 2 lists basic diagnostic tests that may be useful to establish baseline data for individual animals.

Laboratory Testing

Some basic laboratory work is as necessary as a basic physical exam. A few tests are easily and economically done in the facility, with only a moderate amount of training required. Most tests are similar to those used in avian and mammalian species.

Fecal Analysis

A fecal exam is important for every reptile and amphibian admitted. Although certain levels of parasitism are normal in the free-ranging animal, these can amplify in captivity. Many parasites are identifiable via standard fecal floatation or by direct smears of fresh feces. It is imperative that both methods be used, since some parasites do not "float." Correct identification and treatment of parasites is important to the individual and to the proper cleanliness of the facility.

Hematology

Blood samples are very useful. Because "normal" values have not been established for many species, sampling the healthy individual may contribute to overall knowledge. Sampling for diagnostic reasons may also allow for DNA analysis and other useful biological data. Blood should be sent to a laboratory that routinely analyzes reptile and amphibian samples.

Blood chemistries are good for prognostic value and in triage. Differential blood counts give immediate information regarding the immune and stress status of the animal.

Table 3 lists the various sites at which to collect blood samples.

Bacteriology

Healthy animals may carry a complement of potential pathogens (including salmonella) that will manifest in disease with the stress of capture or release. Unhealthy animals can benefit from accurate diagnosis of bacterial infections. Appropriate culture and sensitivity of pathogen assure correct treatment protocols and triage.

Table 3 lists sites at which to collect bacterial samples.

Virology

Any information on herpetile viral infections is valuable. Many viruses are highly contagious and should be prevented from establishing in the facility or in the wild. Some viral infections can cross species boundaries with devastating results.

Imaging

Radiographs or ultrasound imaging can be useful and informative. Specialists may be willing to donate their time and equipment.

Necropsy

Postmortem examination and sampling of tissues should be performed on every animal that dies or is euthanized.

Common Problems in "Found" Herpetiles

Turtles and tortoises

Trauma: Box turtles, desert tortoises, and turtles sustain trauma from a variety of sources, and can withstand massive bodily injury. Hit By Car (HBC) is common in tortoises, in aquatic turtles during the nesting and breeding seasons, and in escaped exotic species. Injuries include fractures of the limbs and shell,

TABLE 2. SUGGESTED DIAGNOSTIC PROTOCOLS FOR COMMON SITUATIONS

Trauma
- radiography
- PCV/TP

Chemical or oil spills
- PCV/TP
- fecal exam (check for chemical odors, blood, mucus, etc.)
- radiography (check for pulmonary edema)

Burns/inhalation injuries
- PCV/TP
- bacteriology
- radiography

Drownings
- PCV/TP
- bacteriology

Infections
- Bacteriology
- culture of lesion exudates
- CBC
- parasite check (feces, trachea, etc.)

"Die-offs"
- complete blood profiles from moribund animals
- complete necropsies, including histology
- bacterial culture of organs and excretions
- frozen tissue for virology and toxicology
- collect stomach contents; save serum for miscellaneous testing

TABLE 3. SAMPLING SITES FOR DIAGNOSTIC TESTS

Blood samples

Turtles and tortoises:
- jugular
- toenail

Snakes:
- heart
- tail vein
- buccal veins

Lizards:
- toenail
- tail vein

Amphibians:
- heart

Bacterial samples
- choana
- cloaca
- feces
- lesions
- urine
- exudates

Virology samples
- blood
- feces
- tissues
- exudates
- saliva

abrasions, and amputations. Turtles should always be tested for neurological deficit if HBC or head trauma is present. Water turtles, in particular, need to be checked for their ability to swim properly; that is, they should be able to submerge, rise to the surface, capture appropriate live prey, and (in many species) climb upon partially submerged rocks or logs.

Fall injuries are common in box turtles (especially "escapees"). The carapace and plastron sustain multiple fractures; pleural contusions are always a component of this traumatic injury.

Aquatic species are especially prone to harassment from raccoons and other predators. Injuries may include amputations, avulsions, abrasions, eye injuries, and puncture wounds. Box turtles and tortoises exhibit similar injuries due to dog attacks.

Upper respiratory syndrome: Upper respiratory infections (URI) may be found in any turtle or tortoise species. The plethora of external signs include audible, labored breathing; stenotic nares; nasal discharge; mucoid material in the choana; or foamy material in the trachea. Viral, bacterial, and environmental etiologies have been suggested. It should be assumed that any animal that shows signs of URI is highly contagious, and should be isolated. Associated with this are lower respiratory infections, including pneumonia and lung abscesses.

Abscesses: Box turtles and water turtles are commonly affected by abscesses of the ears. These require extensive surgical debridement and systemic antibiotics. Other abscesses may be found adjacent to old traumatic or penetrating wounds of the plastron and carapace, on digits, and in the nail beds.

"Shell rot": This syndrome is properly termed *septicemic cutaneous ulcerative disease*—which indicates the extent of the infection throughout the entire animal. External signs include the obvious pitting or softening of focal areas of the shell, pink serum accumulation under the scutes of the plastron, and possible open ulcers on the skin. The syndrome is most common in aquatic species, but may occasionally occur in terrestrial species. The term "dry" or "fungal" shell rot is commonly misused to describe a dry exudative disease of the plastron and carapace. True fungal infection can be determined only by microscopic or microbiological diagnosis. Sometimes a scar formation or healed burn can be interpreted as "shell rot," so appropriate diagnosis is recommended. (See Resources for a more extensive discussion of cutaneous disease in turtles and tortoises).

Drownings: Box turtles and tortoises may drown in fresh water (swimming pools, irrigation canals); aquatic turtles may become immersed in salt water. Resuscitation should always be attempted, as most turtles and tortoises are adapted to temporary anoxic conditions and the associated lactic acidosis.

Parasites: External parasites can be so numerous as to pose an emergency situation. Aquatic species may be infested with leeches. Exotic tortoises can support large numbers of ticks. With heavy infestations, animals may show pale mucus membranes and be weakened by anemia.

Pollution: Aquatic turtles are frequently exposed to environmental pollutants, which include oil or diesel spills, sewage, and the myriad toxins of urbanization. Herbivorous box turtles and tortoises may fall victim to herbicide or pesticide ingestions.

Snakes

Trauma: Traumatic injuries in snakes may result from HBC, predators, or human interactions. Some exotic species may present with severe rat bites. Injuries include fractures, avulsions, penetrating coelomic wounds with herniation of organs, and prolapses.

A snake should be tested for the ability to right itself on a slightly rough surface. A normal animal can flip over from an up-side-down position with relative ease.

TABLE 4. FLOW CHART FOR SCORING TRIAGE OF INDIVIDUAL ANIMALS.

Note: This is a rough guide only. All scores are easily mitigated by species, biological conditions, environmental constraints, laws, and available release sites.

Overall condition					**SCORE**
Normal	thin	dehydrated			
0	1	2			
Skin					
Normal	discolored	ulcers	trauma	disechdysis	
0	1	2	3	4	
Mucus Membranes					
normal	pale	splotchy	yellow	blue/grey	
0	1	2	3	4	
Respiratory					
normal	moist	labored	mucus/blood		
0	1	2	3		
Droppings					
Normal	none	increased urates	increased urine	increased feces	blood
0	1	1	1	2	3

TOTAL: _____

Score	Action Plan
0–2	examine; release or adapt immediately
2–5	examine; treat; release or adopt
5–10	treat; hold; then release or adopt
10–15	treat; hospitalize; then release or adopt
>15	long-term hospitalization and/or rehabilitation
>20	consider euthanasia

TABLE 4A. EXAMPLE OF TRIAGE

A garter snake was found along the road, alive but not trying to escape. The mucus membranes were slightly cyanotic with some blood present at the glottis. There was a small laceration at mid-body. The animal excreted a foul substance from the cloaca when examined. The eyes were bright, the body responded to pinching, and the breathing was not audible or labored.

Overall condition						**SCORE**
Normal	thin	dehydrated				
(0)	1	2				0
Skin						
Normal	discolored	ulcers	trauma	disechdysis		
0	1	2	(3)	4		3
Mucus Membranes						
normal	pale	splotchy	yellow	blue/grey		
0	1	2	3	(4)		4
Respiratory						
normal	moist	labored	mucus/blood			
0	1	2	(3)			3
Droppings						
Normal	none	increased urates	increased urine	increased feces	blood	
(0)	1	1	1	2	3	0
					TOTAL:	10

Score	Action Plan
0–2	examine; release or adapt immediately
2–5	examine; treat; release or adopt
5–10	treat; hold; then release or adopt
10–15	treat; hospitalize; then release or adopt
>15	long-term hospitalization and/or rehabilitation
>20	consider euthanasia

Action Plan: This snake should be treated for respiratory trauma, held for observation of progress, possibly hospitalized, and eventually released.

Burns: Thermal burns may be the result of natural catastrophes or incorrect husbandry. Chemical burns and traumas may be associated with environmental or household pollution.

Respiratory problems: Native snakes may present with severe viral or bacterial respiratory infections complicated with lung parasites. Exotic tropical species are often compromised by poor husbandry practices or adverse environmental conditions. External signs include cyanosis, labored breathing, and foam or mucus in the trachea.

Reproductive: Some moribund or recently killed females, especially gopher and garter snakes, may be gravid. Every effort should be made to salvage and incubate the eggs.

Lizards

Trauma: Predator-inflicted injuries are the most common trauma in lizards. Few survive HBC. Puncture wounds, avulsions, abrasions, amputations, lacerations, and hemorrhage are features of a "survived" predation. Iguanas and other large exotic lizards may suffer from falls from trees, roofs, or power poles. An unfortunate percentage of lizards will present with wounds inflicted by humans.

Consequences of captivity: Lizards acquired as "pets" may have survived poor husbandry and may be starving. Stress-related illness and parasites exacerbate the poor condition of these animals. A complex of diseases (known commonly as "metabolic bone disease" to the layperson) may be of serious concern. Dysfunctions of all organ systems, not solely the skeletal structures, can be seen, including male and female reproductive disorders, muscle tremors, seizures, liver failure, renal failure, central nervous disorders, endocrine dysfunction, immune suppression, and disease of the heart and blood vessels. Contrary to common belief, these problems are a consequence of hyperphosphatemia and other malnourishments, and not just a lack of calcium in the diet. Consequently, many of these animals will have been "treated" inappropriately with excessive calcium in the diet, and hence show signs of overdose. This complex disorder is not of consequence in wild reptiles and amphibians. Rehabilitators who commonly see "pet" herpetiles should establish contact with a reptile/amphibian veterinarian to establish appropriate diagnostic and treatment protocols, and refer to the Resources section below.

Burns: Natural catastrophes may result in many animals suffering from burns and smoke inhalation.

Amphibians

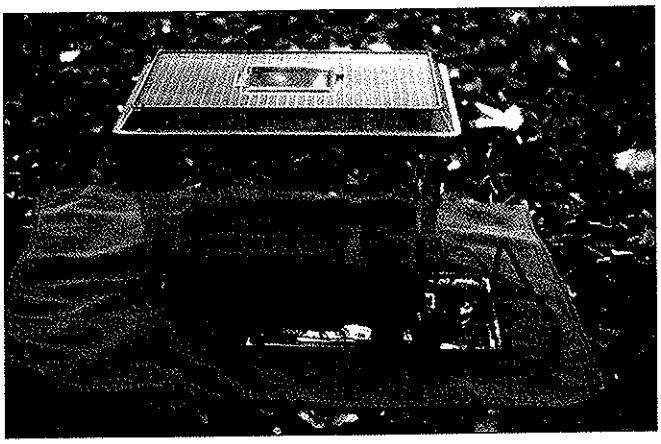
Trauma: Native amphibians are at risk for HBC during annual breeding migrations. Predator-related injuries include skin sloughs, amputations, abrasions and puncture wounds. Non-native species often show trauma from capture techniques, such as net burns and noose injuries.

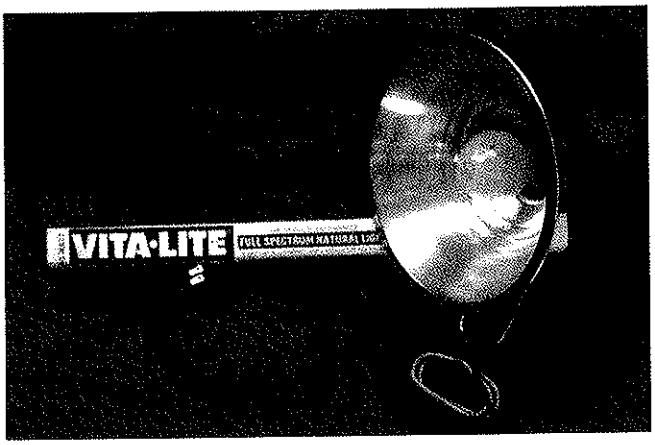
Pollution: Environmental pollution may damage the amphibian skin and immune system, and thereby induce multiple external signs. Deep ulcerations and discoloration are common sequelae to skin damage. Sewage and chemical pollutants alter osmotic control and may damage electrolyte balance.

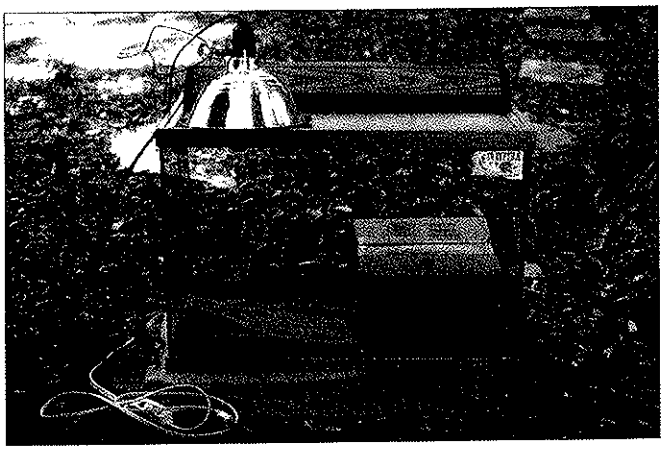
"Red leg": This syndrome is a complex of signs and disease processes. Red discoloration or distended blood vessels of the ventrum and legs results from diasthesis due to septicemia. The most common bacterial pathogens associated with this syndrome are aeromonas and pseudomonas.

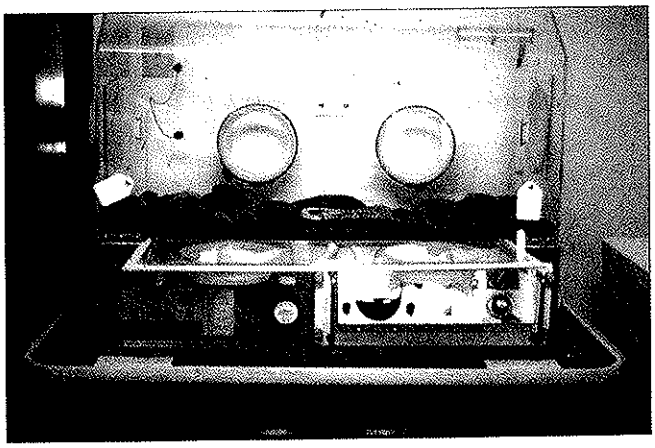
Triage for Individuals

Table 4 is a flow chart and arbitrary scoring system to assist in the triage of individual animals, starting with the initial physical exam.









PATRICIA J. LATAS

In general, injured or ill animals should be housed in a clean, warm environment with ambient temperature of 85°–90°F. An effort should be made to provide hiding places, normal photoperiod, and quiet surroundings. From left to right, top to bottom: a cheap and efficient hospital unit; components for a hospital unit; a controlled-environment pediatric unit; a pediatric incubator.

TABLE 5. ITEMS REQUIRED FOR THE BASIC CARE AND SUPPORT OF THE HOSPITALIZED HERPETILE

- incubator set at 85–90°F
- fluids (0.45% sodium chloride/2.5% dextrose) at 5–10% body weight
- antibiotics (enrofloxacin or ceftazidime)
- tube feeding for small active lizards or debilitated individuals
- basic first aid for traumatic injuries
- bath towels for bedding
- appropriate hiding places

Basic Supportive Care

Table 5 lists some basic means to support the hospitalized herpetile. In general, injured or ill animals should be housed in a clean, warm environment with ambient temperature of 85°–90°F. An effort should be made to provide hiding places, normal photoperiod, and quiet surroundings. Temperature ranges can vary radically, and many temperate-zone herpetiles require lower temperatures when they have recovered.

Treatments will vary according to the situation, but most herpetiles will benefit from parenteral fluids. The preferred solution is 0.45 percent sodium chloride/2.50 dextrose at 5–10 percent of body weight given intracoelomically or subcutaneously (in reptiles), or as a soak in amphibians. (This hypo-osmotic solution has not caused any problems with animals the author has treated.)

Antibiotics should be given parenterally to animals with trauma, infections, or unknown conditions. Preferred are enrofloxacin (10 mg/ml) and ceftazidime (20 mg/ml), but many other antibiotics may be given depending on circumstances and bacteriological sensitivity testing. Basic first aid should be given for trauma, fractures, prolapses, and bleeding.

Table 6 summarizes some common situations and suggests basic treatment plans. Because each situation is unique, and protocols should be viewed as basic plans for action and not as strict rules of care.

Triage for Release, Rehabilitation, or Adoption

It is essential to have triage protocols in place prior to need.

TABLE 6. TREATMENT PROTOCOLS

Trauma: shock, avulsions, fractures

- maintain airway
- O_2 if required
- control hemorrhage
- control seizures
- bandge wounds or stabilize fractures
- appropriate antibiotics
- warm in incubator

Osmotic insult: burns, chemical exposures, oil spills, hyperthermia

- clear airway of foam or discharge
- fluids at 5–10% body weight, IP, IV, SC, or as a soak
- clean offending material from external body or gently debride burns
- cover external lesions to prevent further fluid loss
- lactulose/toxaban PO (tubed) for oiled or chemical victims
- appropriate antibiotics
- warm in incubator

Infections: abscesses, pneumonia, URI, trauma

- debride wounds (no betadine in amphibians)
- clear choanae and nostrils of debris or mucus
- fluids
- appropriate antibiotics
- warm in incubator

Fresh water drownings

- O_2 if cyanotic or unconscious
- fluids (0.9% sodium chloride)
- diuretics (such as furosemide)
- maintain airway
- appropriate antibiotics
- warm in incubator
- check PCV and serum, as hemolysis is likely

Salt Water Drownings

- O_2
- fluids (0.45% sodium chloride preferred)
- appropriate antibiotics
- warm in incubator

Herpetiles intended for release should be held for as little time as possible. Potential pathogens and parasites can amplify during captivity and infect the general population after the animal is released. Due to stress-induced physiological changes initiated prior to capture, exam and treatment must be kept to a minimum during captivity. Before release, animals held in captivity for extended periods should be confirmed free of parasites and pathogenic bacteria by fecal analysis and culture. Always check with local biologists before planning a herpetile release program.

Euthanasia may have to be considered in cases of severe trauma, illness, or zoonoses. (Zoonotic potential of herpetile pathogens and parasites is a huge topic in its own right. Care must be taken and sound judgments made based on the possible introduction of disease to wild populations, to different species, and to humans.)

"Die-offs"—acute deaths of massive numbers of individuals—require special protocols and planning. Triage of living individuals may assist in such a disastrous situation.

Whenever possible, release should be to the area where the animal was recovered. If this is not possible, then careful review is indicated, leading in most cases to adoption rather than release. CITES provides a well-documented set of release criteria that should be followed by rehabilitators.

Table 7 (on page 21) outlines triage protocols for given situations.

Resources

There are a great many published sources of information regarding amphibians and reptiles. The following is a list of essential publications; however, any source that can help identify species is useful. Books on basic husbandry should be read with considerable criticism, since much information available from pet store sources is erroneous and even harmful. The same is true of information taken from the Internet. Maintaining contact with a veterinary member of ARAV can be invaluable, as can obtaining their list of "good" amateurs. Natural history experts and biologists are excellent primary sources of information.

Magazines and Journals:

Copeia. Published quarterly by the American Society of Ichthyologists and Herpetologists.

Journal of Herpetology. Published by the Society for the Study of Amphibians and Reptiles.

Reptile Magazine. Published monthly by Fancy Publications, Inc.

Books:

Conant, R., J. T. Collins, and I. H. Conant. 1998. *A field guide to reptiles and amthibians: Eastern and central North America*. (Peterson's field guides). Boston: Houghton Mifflin.

DeLisle, H. 1996. *A natural history of monitor lizards*. Melbourne, Fla.: Krieger.

Duellman, W., and Trueb, L. 1986. *Biology of amphibians*. New York: McGraw Hill.

Ernst, C. H., J. E. Lovich, and R. W. Barbour. 2000. *Turtles of the United States and Canada*. Washington, D.C.: Smithsonian Institution Press.

TABLE 7. TRIAGE PROTOCOLS FOR GIVEN SITUATIONS

Exam and release (native species)

- minor trauma, tail loss, noninjured animal

Treat and release (native species)

- toe amputations, minor lacerations, "road rash"

Treat, hold, and release (native species)

- ear abscesses
- external parasites
- easily repaired trauma
- severe internal parasites

Treat, hospitalize, and release (native species)

- minor burns
- chemical exposures
- oil spills
- severe trauma
- near drownings
- minor fractures

Treat, hospitalize, rehabilitate, and release (native species)

- drownings
- burns over more than 10% of body surface
- chemical or oil spills
- minor shell fractures (native aquatic turtles)
- major limb fractures
- crushing injuries to snakes

Treat and adopt

- all healthy, noninjured tortoises of unknown origin
- all healthy, noninjured amphibians of unknown origin
- minor fractures

Treat, hospitalize, and adopt

- URI in turtles and tortoises, snakes, and lizards
- "red leg" in amphibians
- severe trauma
- severe shell fractures
- minor amputations

Long-term hospitalization

- severe infections or pneumonia
- major burns
- severe trauma
- severe fractures
- limb amputations, deformities, or avulsions

Euthanasia

- irreversible cyanosis
- no cranial neurological response
- large avulsions exposing multiple organs
- irreversible seizures

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http://netvet.wustl.edu/e-zoo.htm

www.members.home.net/frank-gould (Reptile Rescue and Rehabilitation Home Page)

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This article has been expanded and updated from an earlier version that appeared in the 1994 IWRC Conference Proceedings.

Building Commitment for the Volunteer Program: A Replicable Model

by Terry Valeriote

ABSTRACT: In order for a volunteer program to be an integral component of an organization, it requires the strong endorsement of the administration. This article describes how one organization acquired that endorsement through a process of collaboration and compromise. A Statement of Commitment was produced and ratified. That statement identifies the organization's commitment to its volunteer community and the staff's role and responsibility toward volunteers. The process can be replicated in other organizations.

KEYWORDS: Volunteers, Management, Administration, Statement of Commitment

TERRY VALERIOTE is a volunteer coordinator at the Alberta Children's Hospital in Calgary, Alberta, Canada. A former teacher, he has worked with volunteer coaches and sports administrators at the national level in Canada to develop coaching programs for all sports, from entry to Olympic level. He has written on sports for children and was invited to Washington, D.C., by the American Youth Sport Coaches Association to help develop standards for youth sports in the United States.

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Introduction

There are many initiatives being taken throughout the United States and Canada to further excellence in volunteer management. The discipline is growing in importance, increased responsibility, and professionalism. At the Alberta Children's Hospital in Calgary, Alberta, Canada, a Statement of Commitment has been adopted that it is hoped will serve as one more contribution toward the development of excellence in volunteerism.

Background

Volunteers have been part of the Alberta Children's Hospital (ACH) since its founding in 1922, but it was not until the early 1980s that a full-time Volunteer Resources Department was formed. Its main focus was on the recruitment, training, placement, evaluation, and recognition of volunteers.

Experience revealed that a good volunteer program needed capable volunteers and efficient management support of them on a daily basis. Equally important, the volunteer program needed the support of the staff with whom the volunteers were regularly interacting.

A major initiative of the department focused on the staff/volunteer relationship, keeping staff up-to-date on the needs of volunteers, and showing them how they could more effectively relate to the volunteer community.

It was always understood that a truly successful volunteer program required a strong, unified organizational commitment and that this commitment needed to be made visible. Susan Ellis (1986), in her book, *From the Top Down: The Executive Role in Volunteer Program Success*, stated: "After years of training and consulting with so many leaders of volunteers, I have become convinced that many of their concerns stem directly from a lack of substantive support from their agencies' top administrators." In concrete terms, she explains how the CEO and the board of directors should be directly and actively involved in promoting and making the volunteer program visible.

At ACH, the administration had always been very supportive of the volunteer program, but more needed to be done. Why? Because there were inconsistencies. Not everyone had the same commitment to volunteers. While some staff felt that volunteers played an invaluable role in the hospital, others were quite indifferent. It was often said that volunteers were appreciated for what they did, but the lack of follow-up, such as a simple thank-you or even small tokens of appreciation, were sometimes lacking or given as afterthoughts. At times, volunteers were often taken for granted and asked to perform menial tasks with no effort taken to know their names or their backgrounds. The volunteer program was seen as an appendage to the mainstream activities at the hospital, not an integral component in assisting the hospital fulfill its mission. Volunteer Resources staff and volunteers were sometimes not given the opportunity to provide input into decision making in the hospital that could affect them. It was even a struggle to have the volunteer voice present at new staff orientation sessions.

A Turning Point

In 1997 the Volunteer Centre of Calgary hosted a workshop titled "Training Busy Staff to Succeed With Volunteers." The facilitator, Betty Stallings from the United States, said that a successful volunteer program needed formal commitment and support from the top of the organization. Without genuine support from the administration, the volunteer program lacked credibility. The premise of the workshop provided the impetus to pursue stronger organizational support

for the volunteer program at the Alberta Children's Hospital.

The Process

The process of gaining meaningful support for the volunteer program throughout the organization involved both collaboration and compromise. Many staff members were enthusiastic about the initiative. In fact, one said that given the valuable contribution volunteers had been making over the years, it was time the organization made this formal commitment to them. The process is outlined here.

Development of the Draft Statement

The concept was first discussed as part of the annual planning day of the Volunteer Resources Department. A draft of a Policy of Commitment was presented and discussed at the meeting. The manager and staff of the department were very supportive of the concept. Over the next few months, the initial draft was refined by the Volunteer Resources Department staff.

Sharing the Draft with Hospital Opinion Leaders

It was felt that the administration would not accept the concept unless there was support from all hospital staff. Consequently, it was decided to share the draft with several key people in the organization whose opinions were well respected. These individuals were selected from all areas of the hospital: inpatient, ambulatory, and human resources.

Revision of the Draft

The feedback received was thoughtfully presented and constructive. Two major changes were made. The term "supervision" was removed and replaced by the term "direct." Under the union contract, nurses who might be working with volunteers do not play a supervisory role.

Secondly, a clause specifying that staff directing volunteers would have this task formally included in their job descriptions was removed. With the many changes occurring in the regionalization of acute-care facilities in Calgary, and with staff cutbacks, it was felt that the organization was not ready to implement this procedure. Rather than stall the process, or have the entire draft rejected, the clause was removed.

Presentation of the Draft to Administration

The two administrators of the hospital were invited to a luncheon meeting in the hospital hosted by the Volunteer Resources Department. The purpose of the meeting was to update them about the volunteer program in general, the department's annual plan, and the draft Policy of Commitment. The agenda for the meeting was sent out beforehand, along with the draft. After some discussion and clarification, the administrators agreed to sign it. There was only one change: because of the administrative procedures that would have been necessary to have something accepted as policy, the document was renamed a Statement of Commitment (Figure 1). The draft was subsequently presented to the two regional senior operating officers responsible for the hospital and its volunteer program and they, too, agreed to sign the document.

The Purpose of the Statement of Commitment

The statement serves to promote:

- A formal institutional/community philosophy toward volunteers rather than the Volunteer Resources Department's or an individual's personal philosophy.
- A clear, consistent, comprehensive, and cohesive standard in the organization's approach to volunteers that should be nurtured and maintained.
- The acknowledgment that volunteers are integral to fulfilling the mission of the hospital.
- A strengthening of the staff/volunteer relationship.

From the perspective of the volunteer administrator, the Statement of Commitment assists in facilitating his job. If there is difficulty regarding the staff's approach or attitude toward volunteers, the statement gives the volunteer administrator a strong organizational position on which to stand. No longer is there a struggle to have the volunteer voice presented at new staff orientations. Volunteer Resources staff are now included in these orientations and each new staff person receives both an explanation and a personal copy of the statement.

FIGURE 1. STATEMENT OF COMMITMENT TO THE VOLUNTEER

The Alberta Children's Hospital recognizes the contribution of volunteers in assisting staff fulfill the mission of the hospital.

Towards the continued pursuit of excellence in volunteerism and in support of volunteers as valued members of the ACH team, the hospital's administration makes the following commitment to the volunteer community at ACH:

1. The hospital will support a Volunteer Resources Department, providing appropriate staffing to manage the volunteer program.
2. Hospital staff, both professional and support, who are directing volunteers will be oriented to the needs of volunteers. In specific terms, all new staff, as part of their orientation, will receive instruction from Volunteer Resources. All staff working with volunteers will receive ongoing education from Volunteer Resources, as required.
3. Hospital staff will play a role in the orientation, directing, evaluation, and recognition of volunteers working in their areas.
4. Staff will facilitate a positive environment for volunteers working in their areas. This will involve welcoming them, assisting them, mentoring them when necessary, and thanking them regularly for their contribution.
5. Staff working with volunteers will be recognized for this contribution.

Signed in March 1999 by the Administrative Leaders of the Alberta Children's Hospital and the Regional Senior Operating Officers responsible for the hospital and its volunteer program.



ELIZABETH P. ELLISTON

Volunteers play a critical role in the succes of wildlife rehabilitation organizations. Above, Eagle Scout Jeff Richards and helpers pose before a completed project.

Introduction of the Statement

The Statement of Commitment was presented by the administrators of the hospital to the volunteer community of the Alberta Children's Hospital at the annual volunteer recognition evening in 1998. The statement on a bronze plaque was placed in the main foyer of the hospital for all visitors, guests, and staff to see. It was also displayed in the volunteer lounge.

A memo, along with the Statement of Commitment, was sent by the administrators of the hospital to all paid staff clearly stating the hospital's commitment to its volunteers. In part, it said:

> It must be emphasized that the volunteers participating in over 28 areas of the hospital are not primarily volunteers of Volunteer Resources. They are the volunteers of the respective areas in which they are volunteering. As staff, we have a responsibility to our volunteers and we hope that this has been clearly identified in the Statement of Commitment.

Several departments have requested individual copies of the statement to frame and have placed them in their working areas.

Other Developments

The chief operating officer for all of the acute-care hospitals in Calgary received a copy of the statement and sent this memo to the administrators of the Alberta Children's Hospital:

> I wish to commend and congratulate you on the development of the Statement of Commitment to volunteers who work at the Alberta Children's Hospital. This fits in with the CRHA [Calgary Regional Health Authority] vision statement about working with communities for the development of excellence in health. The volunteers are members of our community and certainly give a very big commitment of hours to support us in the care of children and their families.
>
> I like this Statement of Commitment and would certainly encourage all other sites to develop a similar statement. The volunteers provide a tremendous support and service to all of us in providing quality acute care services in our facilities. Thank you for working with the volunteers at ACH and for getting staff to support the commitment to working with volunteers.

All acute-care sites in Calgary are now developing similar Statements of Commitment.

Conclusions

Everything takes time and it is never too late to try something new. When a concept is right, it pays to have a plan and be persistently patient. Being aggressive or simply dropping an idea that is not accepted are not productive choices. At the Alberta Children's Hospital, patience paid off in increased commitment to the volunteer program throughout the organization and throughout the region.

The Statement of Commitment is the culmination of much that had gone on before and is also a new beginning. Much remains to be done to implement its goals throughout the entire organization, but the statement now provides a strong foundation to strengthen a valued volunteer program, forge meaningful volunteer/staff relationships and enhance the partnership between the organization and its volunteer community toward advancing its mission.

It is hoped that other volunteer resource departments that wish to further excellence in volunteerism by "taking it to the top" will benefit from the experience at the Alberta Children's Hospital.

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Environmental Literacy

by John F. Disinger and Charles E. Roth

ABSTRACT: The creation of an environmentally literate citizenry is the bottom-line goal of environmental education. This goal does not mean, however, the same thing to everyone. Although the term *environmental literacy* has been used for more than two decades, it continues to lack precise definition. It has received a good deal of attention since 1968 and creates positive images, while conveying little in the way of substantive information or direction. Renewed interest in environmental education affords an opportunity to reconsider and highlight the interrelationships between environmental education and environmental literacy and to define the latter so it can be a useful term and concept.

KEY WORDS: Environmental Literacy, Environmental Education

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CHARLES E. ROTH, former director of education programs for the Massachusetts Audubon Society, is nationally known as "the father of environmental literacy." A former biology teacher and nature camp counselor, an author, an illustrator, and a lifelong advocate for environmental causes, Roth believes in teaching people to explore their environment with sensitivity and understanding.

J. Wildlife Rehab. 23(3): 25–26

Background

The 1990 National Environmental Education Act (Public Law 101–619) brought environmental education back to the attention of many educators and most environmentalists (Marcinkowski 1990–91). At present, as in the past, educational leaders show little direct interest in education about the environment, except as it may be subsumed by traditionally defined curricular areas. The 1970 Environmental Education Act, for example, received essentially no priority from the United States Department of Health, Education, and Welfare, where it was housed. Over the years, significantly greater interest has been demonstrated by conservationists and environmentalists. Environmental quality is their priority, and they see education as a mechanism for promoting it. For this reason, the 1990 Act has received significant attention from its host unit, the United States Environmental Protection Agency, and from conservationists and environmentalists in general.

Discussion

The promotion of citizenship education, often for adults as well as school children, is typically identified as the primary task of schooling. A continuing assumption is that the success of the formal education system is essentially defined by its ability to prepare individuals to be citizens—i.e., to function effectively in today's and tomorrow's society (*America 2000* 1991). To achieve this goal, the development of both general and specific literacies is essential.

How Is "Literacy" Defined?

In its earliest uses, the term *literacy* referred solely to the ability to read and write; one either could or could not. In point of fact, the term *illiterate* predated the positive term with respect to general literacy, as literacy, mathematical literacy, computer literacy, visual literacy, cultural literacy, and so on. As described by Michaels and O'Connor (1990):

> Literacy...is an inherently plural notion. We each have, and indeed fail to have, many different literacies. Each of these literacies is an integration of ways of thinking, talking, interacting, and valuing, in addition to reading and writing.... Literacy then is less about reading and writing per se, and is rather about ways of being in the world and ways of making meaning with and around text.

Although environmental literacy is not identified by direct reference in most discussions of educational goals, it may be inferred from considerations of specific literacies such as those identified in *America 2000*. This paper deals with environmental literacy as a specific literacy. Most of its content is derived from a 1992 monograph by Charles E. Roth, the 1968 originator of the concept. His monograph traces the roots, evolution, present status, and future prospects of environmental literacy.

Are Standards Possible?

Since 1989, an environmental education task force of the American Society for Testing and Materials (ASTM) has sought the establishment of consensus standards for environmental education. ASTM assumed organizational leadership at the request of the Federal Interagency Committee on Education's Subcommittee on Environmental Education (FICE/SEE). Professional leadership and participation comes from individuals who are experienced and active in environmental education. A first task, on which advancement of other tasks depends, is defining environmental literacy.

Most literacies are defined in cognitive terms. Knowledge is a necessary precondition of thoughtful behavior and action. Educational systems usually limit their operational objectives to the attainment of knowledge and skills related to their effective and efficient acquisition; they do not actively promote the proactive development of "responsible environmental behavior," as described by Hungerford (1987). Individual and societal environmental behavior, however, belies the assumption that

behavioral change follows directly from development of necessary knowledge and skills (Iozzi 1989).

Since the term was coined, a distinguishing characteristic of environmental literacy has been its "action" perspective:

> Environmental literacy is essentially the capacity to perceive and interpret the relative health of environmental systems and take appropriate action to maintain, restore, or improve the health of those systems.... Environmental literacy should be defined...in terms of observable behaviors. That is, people should be able to demonstrate in some observable form what they have learned—their knowledge of key concepts, skills acquired, disposition toward issues, and the like (Roth 1992).

Levels of literacy are generally assumed to exist but are not often defined. With respect to environmental literacy, Roth proposed the identification of three levels:

- *Nominal*, indicating "ability to recognize many of the basic terms used in communicating about the environment and to provide rough, if unsophisticated, working definitions of their meanings";
- *Functional*, indicating "a broader knowledge and understanding of the nature and interactions between human social systems and other natural systems"; and
- *Operational*, indicating "progress beyond functional literacy in both the breadth and depth of understandings and skills."

What Are the Attributes of the Environmentally Literate?

In expansion of the above, Roth specifies that:

> Persons at the operational level routinely evaluate the impacts and consequences of actions, gathering and synthesizing pertinent information, choosing among alternatives, advocating action positions, and taking actions that work to sustain or enhance a healthy environment. Such people demonstrate a strong, ongoing sense of investment in and responsibility for preventing or remediating environmental degradation both personally and collectively, and are likely to be acting at several levels from local to global in so doing. The characteristic habits of mind of the environmentally literate are well ingrained. They are routinely engaged in dealing with the world at large.

For educators, a complication is the interdisciplinary nature of environmental literacy. Many educators apparently assume that environmental literacy is equivalent to, or a subset of, scientific literacy. There is good reason for making this assumption: "...environmental education has not been infused equally within the curriculum, but tends to be treated mostly as an enrichment of the science program" (Simmons 1989). Beyond that, science educators have demonstrated more interest and involvement in environmental education than have others. The danger, Roth argues, is that scientific literacy appears to be built on a mechanistic paradigm, whereas environmental literacy builds on an ecological paradigm. More simply, environmental literacy derives its focus from four basic issues that take it well beyond the typical boundaries of science education, or any of the traditional disciplines:

- the interrelationships between natural and social systems;
- the unity of humankind with nature;
- technology and the making of choices; and
- developmental learning throughout the human life cycle.

Thus, environmental literacy draws upon six major areas: environmental sensitivity, knowledge, skills, attitudes and values, personal investment and responsibility, and active involvement. In Roth's descriptions of the specifics of literacy level, environmental sensitivity and attitudes and values are subsumed under the term "affects," while personal investment and responsibility and active involvement are subsumed under the term "behavior." This creates four strands—knowledge, skills, affect, and behavior—to be addressed in education for environmental literacy.

Conclusion

More work remains to be done to refine the components of environmental literacy. These refinements need to be keyed to general developmental levels in formal education and to the opportunities provided by nonformal education. Effort needs to be extended to encourage each component of the broad educational system, formal and nonformal, to accept as part of its mission the fostering of environmental literacy. If each does a more effective job of nurturing environmental literacy, more individuals will achieve higher degrees of competency on the environmental literacy continuum.

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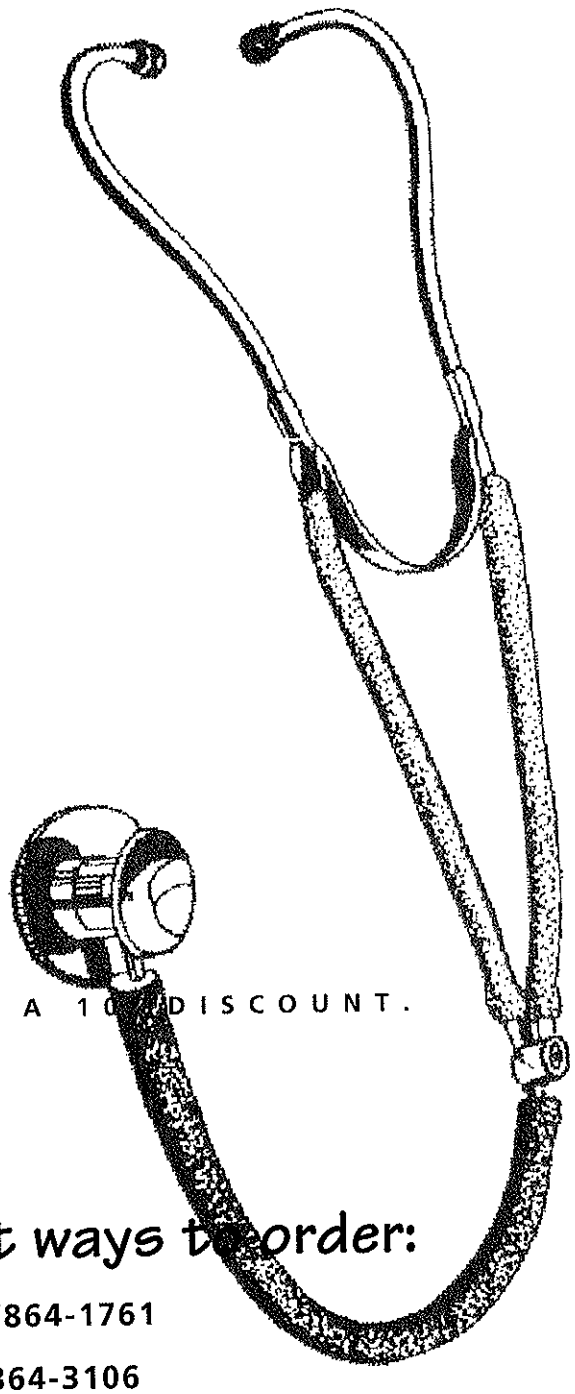
"*Environmental Literacy*," Educational Resources Information Center Digest, *November 1992. Used with permission.*

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SIMPLE SOLUTION

Keeping Formula Warm

by Carol Hoopingarner

Keeping formula the correct temperature while feeding young mammals or birds is critical. Formula that is too cold may cause the animal to refuse the food or may affect the animal's body temperature; formula that is too hot can cause fatal burns in the digestive system.

Once the sucking instinct has been stimulated, it is important to continue feeding until the animal is full. However, very young animals eat so slowly that the food frequently becomes cold in the syringe before the feeding is completed. Stopping to warm the formula may interfere with the sucking reflex and cause the animal to eat less than it otherwise would.

Microwaving the formula is unsafe, as it heats unevenly and may result in "hot spots" that can cause fatal burns all the way from the mouth to the crop and throat and into the digestive tract. The use of a plug-in, hotplate-type individual cup warmer provides a simple solution. Below are three suggestions for using one:

1. Place multiple syringes prefilled with warmed formula in a coffee mug containing hot tap water and place them on a coffee cup warmer. Tap water of 115°–120°F will keep formula warm in syringes at 98°–103°F for as long as needed. The syringes are ready to use when needed and the temperature of the water inside the cup is never hotter than is comfortable for a human to drink.

2. Alternatively, you can purchase Fire King custard cups at a second-hand store or garage sale. Fill a custard cup with formula and place it in a large coffee mug containing hot tap water. Set both on a coffee cup warmer. Draw formula up into the feeding instrument as needed.

3. You can also place syringes or custard cups filled with formula in an insulated Thermos® containing hot tap water if there is no power source readily available. Tap water of 120°F should keep formula at 98°–103°F for 5 minutes and syringes warm for at least 10 minutes.

While you can use an insulated container or mug by itself to keep formula warm, the custard cups may be boiled.

Carol Hoopingarner holds Minnesota and federal rehabilitator permits and has been a rehabilitator for more than 15 years. She works primarily with mammals.



CAROL HOOPINGARNER

A hotplate-like cup warmer makes it easy to keep formula warm.

NEWS BRIEFS

WildlifeHealth List Archived

According to moderator F. Joshau Dein, DVM, the WildlifeHealth List is being archived and all past messages are now easily accessible through eGroups. The archive is organized by month, and posts can be viewed by date or by thread. The URL is: http://www.egroups.com/group/wildlifehealth.

Yoplait® Containers Hazardous

Urban and suburban wildlife often make their living as garbage scavengers. Unfortunately, some of the refuse they encounter is potentially life threatening. Wild animals find the sweet remains inside discarded Yoplait® yogurt containers irresistible. But many animals—especially skunks—lack the dexterity to free themselves from the container's unique narrow, tapered rims once they've poked their faces inside. Trapped animals may die from dehydration, starvation, suffocation, or trauma. The Humane Society of the United State is trying to convince General Mills to change the design of its Yoplait® container. In the meantime, cutting the containers in half before discarding them will minimize the hazard.

Folding Net Seals Exit Routes

If you are involved in rescues, you may want to have the McLean folding net at your side. Fully extended, the net has a reach of 4 feet; collapsed and stored in its belt scabbard, it measures just 15 inches. That makes it compact enough to carry anywhere, but large and strong enough to handle birds and small- to medium-sized mammals. The flexible, triangular frame allows the net to be placed flush against a tree or curved wall, or squeezed into a tight corner to seal off exit routes that most circular nets leave open. The soft, 5/8-inch netting allows for gentle handling of animals, but is durable enough for regular use. Because the net is dark green rather than white, animals are a little slower to see it coming. The brass, stainless-steel, and aluminum components make this net a sturdy, reliable tool. Available from Animal Care Equipment & Services, 800/338-2237 (phone); 909/338-2799 (fax).

FROM THE LAST ISSUE... CASE XII

Eager to Help

How can rehabilitators build productive, mutually respectful relationships with non-wildlife veterinarians and caregivers?

Ann had just received a call from the new veterinarian at the local animal clinic. Dr. Carron was interested in donating her services to the local humane society and wildlife rehabilitators. While her background was with dogs and cats, she would help with any animal in need.

Over the last 10 days, five wild birds had been brought to Dr. Carron's clinic. Ann agreed to take the birds, and Dr. Carron arranged for a veterinary technician bring them over immediately; she would call later to discuss their treatment plans.

The veterinary technician arrived, and handed Ann two kennels and two small boxes. She brought no paperwork; clinic staff had not written down who brought the birds in or where they had come from.

The first box contained two fledgling starlings. Clinic staff had fed them moistened dog food, with seeds as a "treat." The second box held an adult blue jay with large, crusty pustules almost obscuring its eyes and sealing its vent. Believing the jay might have been exposed to some chemicals, Dr. Carron had washed it several times and started it on antibiotics. Ann recognized the pustules as an advanced case of avian pox, an outbreak of which had been sweeping the area.

The first kennel held a western grebe with a severely damaged wing joint. Dr. Carron believed the bird would most likely not fly again; however, she wanted to see if the wing might heal. Ann knew the grebe could not recover and would probably have to be euthanized.

The second kennel held a crow that had arrived at the clinic with a severe wing-tip injury. Dr. Carron had amputated two inches and the wing had healed beautifully. The crow did not seem stressed by captivity or proximity to people. The technician suggested that, if the bird remained unable to fly, it could be adopted as a pet or kept at the clinic.

The technician said Dr. Carron was relieved to have found Ann; another rehabilitator had said the crow and grebe had to be euthanized. Dr. Carron had replied that the birds could still have a good life.

QUESTIONS FOR DISCUSSION

1. **Problems can arise when inexperienced caregivers "help" wildlife. These situations can be more difficult when veterinarians and other domestic animal-care professionals are involved. How can rehabilitators build mutually respectful relationships with private practice veterinarians and others?**
2. **A caregiver's best efforts may result in a healthy but nonreleasable animal. What issues must be considered when deciding the future these animals?**
3. **Some rescuers "shop around" when one rehabilitator doesn't tell them what they want to hear. How can this situation be handled effectively?**
4. **Domestic-animal caregivers often expect heroic measures to be performed to keep wild animals alive even when it means the animal would have to spend its life in captivity. They may become angry with rehabilitators who euthanize nonreleasable wildlife. How would you respond to this?**

RESPONSES

1.

Sandi Leonard, DVM
Lakeside Nature Center
Kansas City, Missouri

In response to Question 1:

This case discussion addresses some important issues that all rehabilitators should consider. Most veterinarians, especially those involved with household pets, approach medicine from the standpoint of making the animal well and keeping it alive and free of pain. Few veterinarians receive any education in wildlife medicine, unless they actively pursue it as an elective activity during their training. Wildlife medicine is concerned with other animal needs that veterinarians are not taught to consider,

Wildlife rehabilitators' interests range far beyond the direct care and handling of wildlife. Standards, ethics, wildlife policy, and community involvement are among the many issues that have a direct impact on the work rehabilitators do every day.

Since these issues benefit from broad public discussion, this section of the *Journal* is designed to offer a forum for wildlife rehabilitators to exchange ideas about challenging issues, which are "up for discussion" by you, our readers. Some of the cases may also be discussed at upcoming IWRC conferences.

The following cases will present either hypothetical situations or real-life problems facing active rehabilitators. Each case is followed with several questions for readers, and responses from people involved in wildlife rehabilitation. To encourage a free exchange of ideas, both attributed and anonymous responses are welcome.

Each issue of the *Journal* will publish a synopsis of the original case from the last issue, several responses, and a new case for your consideration. Please see page 31 for this issue's new case and page 30 for details about how to participate.

Space may not be available for all responses submitted, and responses may be edited for space and clarity, but we will include as many responses as possible. We welcome your participation. Only with your help can this forum thrive.

NOTE: The International Wildlife Rehabilitation Council makes no claims as to the accuracy or truth of the following cases, not does it endorse any particular answer or viewpoint.

such as releasability and natural ability preservation. These are areas where rehabilitators can provide education for medical professionals. To put their best foot forward, rehabilitators need to remember that vets are approached almost daily by clients who have received medical advice or information from questionable or poorly informed sources, such as pet store employees, the Internet, or a neighbor. Many vets tend to become defensive when such advice is repeated.

When providing animal lifestyle information to a veterinarian, the more scientific your sources, the better response you will have. Most medical professionals do not take anecdotal information seriously. Published studies or case histories carry more weight, especially those from science-based sources. It may be helpful for rehabilitators to provide interested veterinarians with copies of articles or even their own copies of appropriate reference books, such as the NWRA handbook, a subscription to the IWRC journal, veterinary textbooks, or a good natural history reference. If your facility has written protocols, it may be helpful to provide those as well, including copies of intake forms.

Other ways to develop a good relationship with veterinarians include inviting them to participate in volunteer training classes, or spend an occasional day off at your facility to see how rehab works. Encourage them to join a rehab newslist on the Internet. Provide them with information on seminars and rehab conventions. Education in a mutually respectful manner is the best approach to a good relationship with your veterinarian. Understanding of the difference in philosophies of the goal of treatment is important.

In response to Question 2:

The first thing to consider about a nonreleasable animal is how it would handle captivity if placement in an education or display program were possible. Some animals simply cannot tolerate captivity and are better off being euthanized. If it is a species and personality type that would handle captivity, then you must consider if it is likely to be desirable in such a program. Some species are too common (e.g., robins or field mice), others too difficult to manage (e.g., skunks), others too dangerous (e.g., bears) for many facilities to be interested in obtaining them on their permits. If proper placement with a well-managed licensed facility is impossible, euthanasia becomes the only option.

In response to Question 3:

How caregivers are informed of the proper course of care is vital. Even if euthanasia is the only option, many people are willing to accept this if you can convince them why it is best for that animal. Explaining why a certain animal may die from stress or chronic pain if it must remain in captivity because it cannot fly or requires a limb amputation may help. Putting the situation in terms of how the animal is suffering now and will continue to suffer in the future will help them to accept the appropriate treatment. You may need to include information about how the animal behaves in the wild to make this more clear. A young hawk blind in one eye will not be able to learn to hunt properly to adjust for its handicap, and will starve. A rabbit with a crooked leg or damaged joint will not be able to escape from predators. These injuries are far from fatal in themselves, but indicate euthanasia to a trained rehabilitator. If you provide enough information, a reasonable person will see why this decision has to be made.

Try to avoid judging other people's opinions on this matter as many of them are looking at the animal from the standpoint of standards for a pet, and don't realize the differences until you educate them. Be gentle with their feelings, as this is an emotional issue for many. It is also often necessary to explain the laws protecting wildlife and why only those licensed to do so should care for them. Again, do so with understanding and from the standpoint of why this is the best thing for the animal. Encourage them to get involved with your organization as a volunteer if they are interested in helping wildlife, or to make a donation to help more animals in the future.

In response to Question 4:

Again, education is key. If you can show a veterinarian that you are a trained professional, and not an unwashed tree-hugger, they will be more willing to learn from you. Inform them of your credentials, the licensing process, and the training and experience you have received. Give them information from national and international sources on the topic. The NWRA handbook has an excellent article or two on euthanasia that you might copy for them. Statistics on releasability of animals with certain injuries will support your argument. Explaining the time involved in rehab and why spending time on nonreleasable animals detracts from the care releasable animals receive may also help if phrased carefully. Once they understand why you have to make the decisions you do, they will be more willing to support you, and will often look to you for advice when they are not sure about a case. Rehabilitators must recognize the difference in emphasis on education—veterinarians are trained to cure disease and repair injuries to provide a good quality of life. A dog or cat will have an excellent quality of life with three legs. A squirrel will not, and your information will help vets understand the difference.

As a veterinarian as well as a sub-licensed home rehabilitator I can relate to both sides of this issue. Some vets see time spent treating wildlife as time wasted and money lost, and rehabbers may be wasting their breath trying to convince them otherwise. Dr. Carron is on the other side of the pendulum and may well be a very useful resource to Ann

JOIN THE CONVERSATION

We invite you to read Case XIII, "Volunteer Needs," and consider the questions posed at the end. The cases are designed to raise complex issues, leaving plenty of room for varied or even contradictory perspectives. To join the conversation, send your response by 15 November 2000 to Attn: Up for Discussion, IWRC, 4437 Central Place, B-4, Suisun, CA, 94585-1633, USA, or via e-mail to iwrc@inreach.com.

The *Journal* also welcomes suggestions for topics to feature in future issues.

in the future, if handled carefully. When she calls, Ann should be very diplomatic and thank Dr. Carron effusively for her offer of help and the treatment so far provided. She can explain that she may need a few days to make final decisions on each animal's situation. She should then offer to come by the office, at Dr. Carron's convenience, to introduce herself and provide some information to assist in her further efforts. At that time, in a private, face-to-face conversation, Ann can discuss each case in great depth, explaining what decisions were made and why, and providing printed materials supporting those decisions. Ann should not berate Dr. Carron for her decisions. From a medical standpoint they may very well have been correct, and not acknowledging this may only put the vet on the defensive. Instead, supporting information can assist Ann in re-educating Dr. Carron on the difference in philosophies, and hopefully get her thinking about wildlife treatment in a more practical manner. Inviting Dr. Carron to visit Ann's house on a weekend or evening to witness feeding, care, and treatments—accompanied by a running dialogue on what is being done and why—might be very enlightening to her.

RESPONSES

II.

Susan Checchio
Volunteer
Wildlife Rescue Inc. of New Mexico
Alburquerque, New Mexico

Prior to my current position as a volunteer for Wildlife Rescue Inc. of New Mexico, I was the director of Avian Rehabilitation Center in New Jersey, and following that I was clinic supervisor at Tri-State Bird Rescue and Research, Inc. in Delaware. Both of these hospitals had very large caseloads: Tri-State averaged 2,000 or more wild patients per year when I worked there. In addition, they respond to oil spills that take place east of the Mississippi. Through these experiences over the years, I have had the opportunity to work with many different veterinarians.

I would like to address how rehabilitators can help to build mutually respectful relationships with private practice veterinarians. For me, this was achieved through three main approaches. The first approach I took was to be truly willing to work in a spirit of cooperation with veterinarians and others involved closely with wildlife. The second approach was to focus on what people were doing right, and the third was to connect a new veterinarian with a mentor veterinarian experienced in the needs of wild patients.

For me, the third approach seemed to be the easiest. It was straightforward and it never required me to change my mind or my ideas about what was best for a patient. The only thing it cost me or the hospital was the long-distance calls it might take to set up the initial contact between two vets. If you have access to the Internet, you can now do this for free. Another option for a mentor for your eager new helper is someone you trust who works for U.S. Fish and Wildlife or your local Game and Fish office. If your veterinarian wants to keep a permanently injured crow in the reception area of the clinic, the mentor from Fish and Wildlife can explain why laws were established and how they are designated to protect wildlife. I'm not saying I didn't jump right in myself on enough occasions to sound like a broken record, but advice coming from a professional peer is easier for some vets to take. And when I did call on people for assistance and advice, I was always met with a helping hand. Veterinarians, just like rehabilitators, love to share their medical knowledge.

I'd like to share my experience with the other approaches that worked for me. I have found that both being willing to work in a spirit of cooperation and education and the approach of focusing on what people were doing right are challenging, yet very fruitful.

In "Eager to Please," it's initially hard to see what Dr. Carron has done right. However, I would look at the fact that Dr. Carron wants to help. You also have a technician who is very willing and has a great potential as a volunteer. They were feeding the fledglings dog food, another positive thing to look at, and to recognize in opening comments to Dr. Carron. I'd next open a discussion about the western grebe and talk about the specific needs of such a bird out of the wild. The hope is to draw in Dr. Carron's interest and use the discussion to discover how much background this new veterinarian has with wildlife. I'd also ask about her previous successes with wild patients and use them to go from there.

Whenever working with private practice vets and other nonwildlife rehabbers, I was always honest about topics such as euthanasia, and felt it was my obligation to educate people in this area in order to protect wild patients from a marginal life in captivity. When placement of permanently injured wildlife was considered, it was carefully researched where they would end up. It would only be at facilities that were properly permitted and had above standard housing. Of course, the birds were only placed where they would have educational value. If, over time, this approach—combined with a discussion of most beneficial allocation of resources—was not successful in convincing Dr. Carron, I wouldn't see it as a personal failure. The field of wildlife rehabilitation doesn't need people who are unwilling to look at the deeper effects of their actions.

Discussion could go on and on with just the one scenario the article puts forth. Every experienced rehabilitator could add dozens more stories like this one. But rather than getting stuck in the individual cases, I have found that by following the three approaches I outlined above, I could follow a course of action for each individual veterinarian and come across with integrity and tact. I believe this, in turn, benefited the wildlife under my care, and also opened people's minds to broader issues. If I am successful in turning around one vet, think about all the other people he or she might influence over the course of their career.

NEXT TOPIC... CASE XIII:

Volunteer Needs

High Desert Wildlife Rescue (HDWR) board members Susan, Jane, and Sarah were meeting for a year-end analysis and review. It always tickled Jane to hear people refer to this annual meeting as a postmortem; indeed, most of the

association's loose-knit group of rehabilitators felt moribund, if not dead, by the end of each year. As usual, the three women talked about the year's caseload—and the now familiar and seemingly insurmountable challenges of operating a wildlife rehabilitation organization. The past 12 months had seen more than the usual roster of problems. HDWR had received just over 2,000 animals for care, an increase of more than 20 percent over the previous year. Unfortunately, operating funds had decreased, as the State Employees Charity Campaign, which had allowed participants to earmark HDWR for contributions, had narrowed its interpretation of appropriate organizations. Wildlife rehabilitation and education no longer met their criteria.

But as membership chair, Susan was primarily concerned about volunteers—or rather, the lack of volunteers. She observed that the group continued to expend a lot of time and energy providing training classes prior to the baby season, with less than satisfactory results.

Training classes were the HDWR's "standard operating procedure" and had been offered annually since the organization was formed 10 years ago. The class format had varied over time in an attempt to accommodate the schedules of potential volunteers. For several years HDWR had featured a series of eight weekly classes that addressed the basics of rehabilitation. While not as intense as the IWRC Basic 1AB, the classes did expose new volunteers to similar concepts: baby care, principles of hydration, anatomy and physiology, bird ID, nutrition, conversion mathematics, zoonosis and necropsy, wildlife regulations, and record keeping. But since many prospective volunteers found it hard to commit to such a long series of classes, the group had changed its strategy, inviting speakers from a variety of wildlife professions and cramming all of the information into a single weekend class.

One year they had even tried a single afternoon consisting solely of instruction for working with baby birds, followed by an apprenticeship with permitted rehabilitators. This approach hadn't been much of an improvement. Ironically, the mentors didn't have time to invest in the new volunteers who, with proper training, would have lightened the load for everyone.

Regardless of the format, every year 30 to 40 students attended. Every year 30 to 40 people passed the final exam. By year's end, however, only one or two people could be considered contributing members of the organization.

"Maybe that's because after the spring and summer baby season, we don't have as much for our volunteers to do, so they lose interest and get involved with some other organization," Susan mused. "Even so, you might think that two people a year for 10 years would produce a reasonable group of people dedicated to the job."

"But people move away," Jane noted. "The demands of a family grow to outweigh the demands of rehabilitation; people develop health problems, and some of our most dedicated and capable rehabilitators have died." She added with a wry grin, "Hey, some people just decide they want a life!"

Regardless of the reasons, HDWR's core of rehabilitators never actually seemed to grow. A small but dedicated group of individuals found themselves caring for an ever-increasing caseload and all the associated state and federally required records and paperwork. In addition, many of the rehabilitators had complained about being asked to also handle tasks not directly related to animal care, such as hotline calls, public education, report writing, and fundraising.

"I can't say that I blame them," Sarah sighed. "I got involved in rehabilitation so I could take care of animals, and early on it was rewarding and brought me a lot of joy. Now I'm juggling so many other responsibilities, my rehab animals often feel like a distraction. Problem is, I know all of these other 'chores' are important, too. I feel so frustrated and overwhelmed sometimes. I wish we could find volunteers to handle some of the nonrehabbing work...and more rehabilitators, of course."

Jane and Susan nodded knowingly. Demand for the organization's services continued to increase, as did public scrutiny of the operation. The time needed to generate operating funds had grown; the paperwork seemed neverending. All three women agreed that their current method for attracting and keeping volunteers wasn't working, but they were at a loss as to how to correct this problem.

QUESTIONS FOR DISCUSSION

1. **Modern lives are busier than ever before; work hours and commute times are longer, and "leisure" pursuits such as volunteering must be squeezed into the same 24-hour day as the demands of home and family. Who has time to volunteer, and how can rehabilitators find these individuals?**

2. **A wildlife rehabilitation operation's schedule of daily tasks includes animal care, fundraising, answering phones, handling paperwork, and presenting public education programs. How can rehabilitators attract people with diverse skills and experience to fill these roles?**

3. **The volunteer program of a large rehabilitation center can be quite different from that of a loose-knit coalition of home-based rehabilitators. Are there methods for finding and keeping volunteers that are appropriate only for certain kinds of organizations? Are there methods that will work for all?**

4. **How can a group or organization determine exactly what kind of help is needed?**

5. **Regardless of the task, training volunteers involves a significant investment of time and effort. Once volunteers have been found and trained, how can they be encouraged to stay? What is the best way to keep volunteers active and enthusiastic?**

Erratum: Mary Anna Cook-Babcock's affiliation as listed in the summer 2000 issue of the Journal of Wildlife Rehabilitation *is incorrect. She is with Nebraska Wildlife Rehab, Inc., in Omaha, Nebraska.*

COLUMN

Operating Instructions

Put It In Writing (or...How to Cover Your Butt)

by Nathalie Karvonen

That phone! It always seems to ring at the worst imaginable time. You're juggling 17 different things and just want to handle this caller as quickly as possible and move on. In these hectic moments the temptation to "misplace" your hotline log is hard to resist. Take a deep breath, reach for the log...and put it all in writing.

Carefully documenting every call can be a hassle, but it's one of the most crucial elements of your hotline's (and your organization's) success. Why? Here are just a few reasons:

To Protect Yourself from Lawsuits

It's a litigation-happy world, and, yes, even nonprofit organizations get sued. I know of a situation in which a caller used the wrong kind of light when following the recorded hotline instructions for how to get raccoons out of their attic. The house burned down; the callers filed a lawsuit against the wildlife group.

Make sure your hotline staff have been provided with simple, clearly stated instructions for a variety of situations. Tell them to always keep safety in mind, and *never* assume anything is "common sense." Ask them to repeat important points several times—and to always document their conversation. You can't stop anyone from filing a lawsuit, but a paper trail provides a much stronger legal position if someone decides to take legal action.

To Help More Animals

Piecing together clues from several seemingly unrelated sources will help you solve puzzles. One recent weekend the Toronto Wildlife Centre (TWC) was contacted about an oil-covered duck the caller had found at work. The next day another person called about an oil-covered duck found in a park. TWC fields up to 200 phone calls a day, so there were a lot of calls in between! But using the information from notes taken during these two calls, we were able to gather enough crumbs of information to track down a spill of 1,000-plus gallons of oil into a local creek. We then sent volunteers out to walk the length of the creek and rescued even more oil-soaked ducks.

To Help Change Policy/Laws

Wildlife rehabilitators often are called upon to give deputations at public hearings when issues affecting wildlife arise. Subjects may include pesticide use, free-roaming cats, off-leash areas for dogs, and wild or exotic "pets." It is important to provide a well-researched, well-thought-out testimony, supported with hard facts from your wildlife hotline statistics. Numbers and specific examples make your case much stronger.

To Secure Grants

TWC is currently trying to convince our city council to subcontract operation of their newly proposed Wildlife Information Line to us. They have set aside funding because raccoon rabies has become a problem in our area. TWC has used our hotline statistics to show council members the enormous volume of calls we already handle (more than 16,000 a year, with 69 percent coming from this city). We also have kept records on which government agencies already refer calls to us...including the city council offices! In the past, we have used our hotline statistics (and detailed information taken from the notes) to obtain foundation grants: some of our callers were even used as references in these grant applications.

To Increase Productivity

Anytime there is more than one person answering the phones, or even when one person is handling a high volume of calls, taking careful notes means whoever subsequently talks to the caller will not have to go through all the same questions again. If a caller has left a baby squirrel out to see if the mother squirrel will retrieve it, and then calls later to say that it is still there, the hotline staff member who takes the second call can check the notes and determine if something else should be tried or the baby should now be admitted.

To Improve Public Relations

Everyone likes to think their situation is special, and most callers don't have a clue about how many other people are using your hotline service. Mrs. Jones has called for the third time in a week to ask yet another question about the house finches nesting in her hanging flowerbasket. A quick check of the hotline records will help you personalize your response—"Have you seen that stray cat around that you were worried about, Mrs. Jones?"—and help her feel that you and your organization really care.

Staff Training/To Catch Mistakes

When working with less experienced staff, checking their notes may alert you to potential problems: an important question not asked, crucial information not provided. By catching the problem early, you will be able to fix it easily. Even experienced staff can benefit from "continuing education." And on those days when you're not quite as sharp as you should be, you can catch your own mistakes as well!

* * * * * *

So what kind of information should your hotline staff consistently collect? Always try to get some information about the caller—at least a name and phone number. Record as many details about the animal(s) as you can determine over the phone—age, sex, species—but *never* assume the caller knows this information (if I had a dollar for every baby eagle that arrived in a shoe box, having mysteriously morphed into a neonate rock dove on the ride over...). Ask specific questions about the situation: Why is the caller concerned about this? How long have they been aware of the situation? Are there other factors contributing to this situation? And, finally, always record what advice was offered.

Nathalie Karvonen is the executive director of Toronto Wildlife Centre. TWC operates a wildlife hotline service available to the public. Last year the hotline received more than 16,000 calls.

COLUMN

Open Minds

The Importance of Translators

by Kieran Lindsey

Where would the United Nations be without translators—those amazing people with ability to move effortlessly between the worlds of two (or more) languages? Without their skills, meetings and negotiations between countries would be deadlocked. Ambassadors and their advisors gather the data and design treaties, but it is up to the translators to make the information they've assembled understood.

What do U.N. translators have to do with wildlife rehabilitation and informal education? Plenty. Look into the heart of a successful educator and you'll discover a skilled translator, someone able to take technical data gathered by scientists and naturalists and convert it into language anyone can understand.

According to the *American Heritage Dictionary*, a translator is one who expresses ideas "in another language, retaining the original sense." I would expand on that definition and say that, for our purposes, a translator is a person with specialized training in science and technology who can restate the terms and concepts of his field into the language and experiences of everyday life.

Any number of topics lend themselves quite readily to translation. For example, a person who studies volcanoes might explain the process of an eruption to someone at a cocktail party by comparing it to a pot of percolating coffee. But as the subject becomes more complex, the job of interpretation becomes more difficult. Difficult, but not impossible. I would argue (and have, with my geophysicist husband on many occasions) that when a layperson of average intelligence is unable to understand a technical topic, it is due primarily to limitations in the understanding of the person delivering the explanation. And I've backed up my argument with the following example from Dale M. Gorczynski's book *Insider's Guide to Environmental Negotiations*:

Dr. Paul Chu, a materials science professor at the University of Houston and the world's leading figure in the field of superconductivity research, had lunch one day with Gorczynski and his eight-year-old son. The boy asked Dr. Chu to explain what superconductivity was and why it was so important. Dr. Chu responded:

> John, if you ran down the hallway of your school, and you bumped against the walls all of the way down, you would be very hot and very tired at the end of your run. You wouldn't have much energy left to do anything else for a while. But if you ran straight down the hallway of your school, without bumping against the walls anywhere along the way, you would be cool and you would not be tired at the end of your run. You would have plenty of energy left to do other things.

Dr. Chu continued:

> That's the way it is with electricity as it runs along a pathway. Usually the electricity bumps against the walls so much that it is tired and has little energy left at the end. In the case of superconductivity, the electricity travels down the pathway without bumping into the walls and without losing energy [so] it has all of its energy left to do useful work.

Now *that's* a translator! If a world-renowned scientist like Dr. Chu can explain superconductivity in terms that an eight year old can understand, there's no excuse for not converting the technical language of wildlife and conservation into language everyone can comprehend. (And no excuse for my husband's inability to explain what he does for a living to his mother!)

In making science understandable, translators make science real to the people listening. Those hearing the explanation experience the joy of understanding, and, equally important, they are impressed that you care enough to communicate with them in ways that they can understand.

People have a profound appreciation and respect for skilled translators, which springs from two basic human desires. First, everyone wants to understand what's going on in the world around us. In addition, we want to be respected by other people. Translators fulfill both of these basic human needs. If a knowledgeable person is willing to communicate with you in your language, she is telling you that you matter as a person, that you are worth educating and enlightening. If an "expert" believes you have worth as a human being, you're likely to agree with her on that point, and you are likely to agree with her on any other points she wishes to make. A skilled translator has the power to change minds.

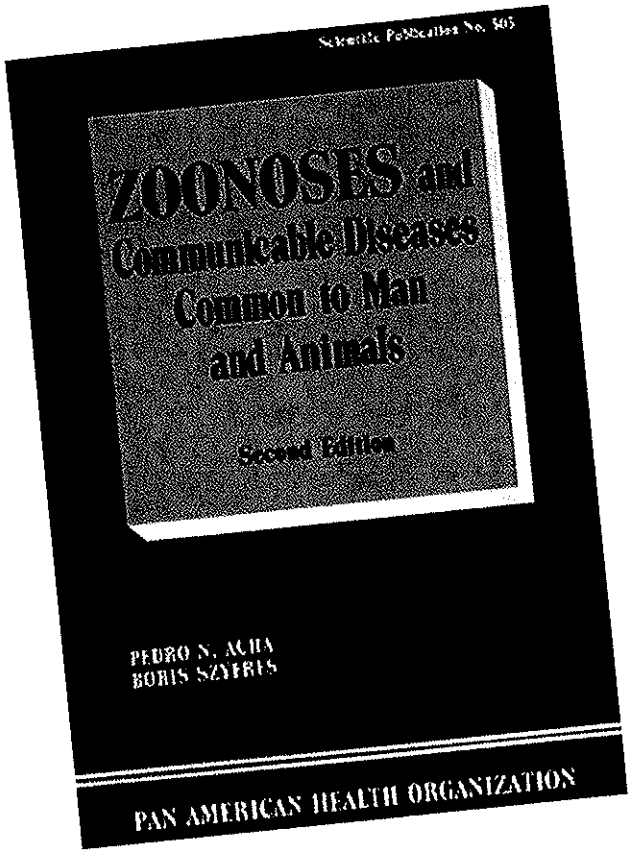
You may remember in the very first "Open Minds" column I suggested that by delivering an effective environmental message to one person, "we light a spark that will spread in ways we can't imagine—to neighbors, co-workers, parents and siblings. Imagine the impact if every person passed along your message to just two other people, who passed the message on to just two other people, and so on." This is accomplished by developing your skills as a translator.

When you imply, through your actions, that someone is worth educating and enlightening, you empower your audience. The joy of understanding a technical idea is an experience not soon forgotten, and your audience will be eager to share their newfound knowledge with others.

You've set the process in motion—now stand back and watch the sparks fly!

Kieran Lindsey is the former director of the TWRC Wildlife Shelter in Houston, Texas; a wildlife biologist; and president of Natural Assets Consulting. Send your comments and questions to IWRClindsey@aol.com, *or to P.O. Box 1443, Cedar Crest, NM 87008-1443, U.S.A.*

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Conservation Classics

Pilgrim at Tinker Creek
by Annie Dillard

New York: HarperCollins (Harper Perrenial Library), 1998
288 pp; $13 U.S. (softcover)

Reviewed by Kieran Lindsey

Over the years, I've discovered people react to Pulitzer Prize–winning author Annie Dillard in one of two ways: they either love her writing or they hate it. Rarely have I experienced a lukewarm response.

Dillard was born in 1945 in Pittsburgh. She attended Hollins College, where she studied English, theology, and creative writing. In 1968 she graduated with a master's in English, after completing a 40-page thesis on Thoreau's *Walden*. When you read *Pilgrim at Tinker Creek* it is obvious that Thoreau had an enormous influence on Dillard's style of writing.

Tinker Creek was also indirectly influenced by a near-fatal attack of pneumonia Dillard experienced in 1971. Once recovered, the author decided she needed to experience life more fully. She began spending a good deal of time outdoors, in the woods near her home, creating a journal of her experiences. In the eight months it took to craft this, her first book, Dillard was so absorbed in the process she lost 30 pounds and all her house plants died.

For those who find it difficult to glean inspiration from the dry descriptions of natural processes found in most textbooks, Dillard will prove to be a godsend. While academic writing oft-times seems to suck the very essence out of biological subjects, Dillard's writings pulse with life. Her essay on "Fecundity" is not for the squeamish, but those who have the stomach for it will come away with a visceral understanding of natural pressures to eat and breed.



In this chapter, Dillard facilely explains the pitiless process of evolution and the concept of carrying capacity in one fell swoop:

> "The faster death goes, the faster evolution goes. If an aphid lays a million eggs, several might survive. Wonderful things, wasted. It's a wretched system.... Say you are the manger of the Southern Railroad. You figure that you need three engines for a stretch of track between Lynchburg and Danville. It's a mighty steep grade. So at fantastic effort and expense you have your shops make nine thousand engines.... You send all nine thousand of them out on the runs. Although there are engineers at the throttles, no one is manning the switches. The engines crash, collide, derail, jump, jam, burn.... At the end of the massacre you have three engines, which is what the run could support in the first place. There are few enough of them that they can stay out of each others' paths. You go to your board of directors and show them what you've done. And what are they going to say?.... They're going to say: "It's a hell of a way to run a railroad."

"Is it a better way to run a universe?" Dillard asks. Maybe not, but it is the way the world works, and has worked, since the beginning of life on our planet. This author is not one to shy away from nature "red in tooth and claw."

In "Seeing," Dillard shows her readers a world made new when viewed through eyes that truly witness. She set out to cultivate her own ability to see, and since, for her, seeing clearly is very much a matter of verbalization, she wrote down what she saw. "Unless I call my attention to what passes before my eye, I simply won't see it.... It isn't that I'm observant," she insists, "it's just that I talk too much." *Pilgrim at Tinker Creek* allows us to listen in on the author's internal play-by-play commentator.

No doubt you predicted which group of Dillard-readers includes my name—it's not likely that a Dillard-hater would include her book as a Conservation Classic. I can't begin to predict which list will come to include *your* name. But I strongly suggest you find out for yourself.

Conservation Classics is intended to provide our readers with suggestions for building a collection of must-have wildlife and ecology reference books.

Practical Diagnostic Imaging for the Veterinary Technician (2nd Edition)

by Connie M. Han and Cheryl D. Hurd

London: Mosby, 1999
$29 U.S. (softcover)

Practical Diagnostic Imaging for the Veterinary Technician begins by providing basic information on physics theory and X-ray generation. This is the only section of the book that is a bit technical, but I find it necessary: a fundamental understanding of diagnostic radiology is a prerequisite to producing high-quality radiographs. The authors explain exposure variables such as milliamperage (mA) and kilovoltage (kVp) and demonstrate how changing them affects the quantity and quality of X-rays. Different types of radiographic equipment are also reviewed, along with the basics of fluoroscopy and how it differs from conventional radiography. The authors list helpful considerations when investing in equipment. Darkroom techniques and radiation safety are explained in a very concise manner with their utmost importance stressed.

Chapter 7, which explains how radiation can affect living tissue, may be the most important chapter in the book. It explains proper safety practices, including the importance of film badges. The last part of Section 1 covers step-by-step development of a small animal radiographic technique chart. Lastly, the creation of radiographic artifacts before and during processing is explained, as well as how to avoid them.

The second half of the book deals with radiographic positioning. Small animal, small animal dental, large animal, and exotic animal radiographs are all included as examples. Each section has excellent illustrations of animal positioning relative to the primary X-ray beam. Commonly used contrast agents are listed with their dosages and iodine content. The book concludes with an overview of diagnostic ultrasound. It also explains how to prepare an animal and what artifacts may appear with this particular modality.

This book is thorough and concise. It is easy to read and user friendly. The text provides pertinent information that is needed on a daily basis, and the illustrations and radiographs are of excellent quality. The authors have additionally included radiographs containing animal motion artifact or technical errors to make the reader aware of these issues. The authors' goal was to retain the practical aspects of the first edition of their book, while adding more illustrations and radiographs. Other topics, such as exotic radiography, dental radiography, and ultrasonography were introduced to the second edition as well. The authors have achieved their goal, making this book a welcome addition to any veterinary reference library.

Reviewer Susan Kaveggia is a wildlife technician at the Wetlands and Wildlife Care Center of Orange County in California.

Insider's Guide to Environmental Negotiations

by Dale M. Gorczynski

Boca Raton, Fla.: CRC Press, 1991
$104.95 U.S.

Let me begin by saying that I am not suggesting you buy this book. The hefty price tag will prevent all but the most serious wildlife advocates from adding this title to their personal library. I do, however, strongly suggest that you track it down at your local public library.

When Dale Gorczynski sat down to write the *Insider's Guide*, he had more than 10 years of environmental negotiation experience under his belt. When this fact was pointed out to the former Houston City Councilman, it came as a surprise. Until then, Gorczynski hadn't made a connection between environmental negotiation and his efforts to get raw sewage out of Lake Houston (a major source of drinking water for the city), control flooding and subsidence, and create a Master Water Plan for the city while protecting the Wallisville estuary. Upon further reflection, he realized that he had amassed much valuable knowledge.

Gorczynski believes the best way to succeed at environmental negotiations is to treat the process as a game, albeit a serious one. This approach, he argues, helps you to depersonalize, to detach. "You must learn to think of your opposition as the opposing team, not as the enemy, or worse yet, as the Devil.... If you view it as a war between the powers of the light and the forces of darkness, you will miss some of your opportunities for true greatness as an environmental negotiator."

The book begins with an introduction to the different kinds of environmental negotiations—formal versus informal, public versus private—and when each are likely to be used. He then provides an introduction to the various players one is likely to encounter in any negotiation—engineers/scientists, politicians, bureaucrats, industrialist/developers, environmentalists, lawyers/lobbyists, the media, and the public. Gorczynski also talks about translators, primary leaders, bridge-builders, "and other candidates for sainthood"—in other words, the people you should make every effort to have on your team.

I found the "environmentalist" description most intriguing, in part because the conservation community so often must go through extensive negotiations within the "choir" before it can begin to approach those outside the conservation fold. Gorczynski's observations are helpful for dealing with our opponents. They also are invaluable when, in the immortal words of Pogo, "the enemy is us."

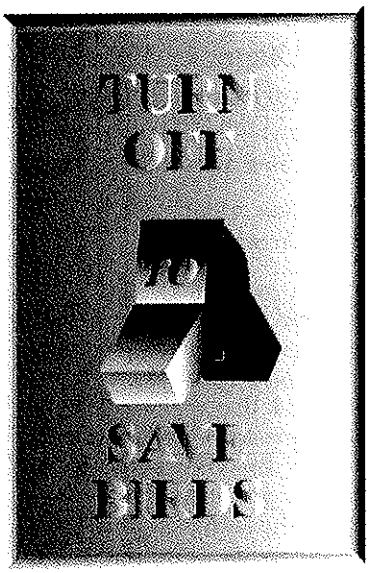
The *Insider's Guide* goes on to discuss strategy and tactics, using examples and unintimidating language. While the book doesn't specifically address wildlife-related negotiations, the basic tools for any environmental negotiation are there.

Gorczynski doesn't pretend to offer a fool-proof method for achieving all your environmental goals, so when it becomes time to discuss possible outcomes he addresses both winning and losing. He admits to having won and lost negotiations, and, not too surprising, prefers to win. But "it does matter how you play the game of environmental negotiation.... The ending of one environmental negotiation is usually the beginning of another. The way you win and the way you lose your current environmental negotiation will pay a big role in determining your success or your failure in future negotiations."

Dale Gorczynski has won big with *Insider's Guide to Environmental Negotiations*.

Reviewed by Kieran Lindsey.

Want to save migratory birds? It's as easy as flipping a switch!



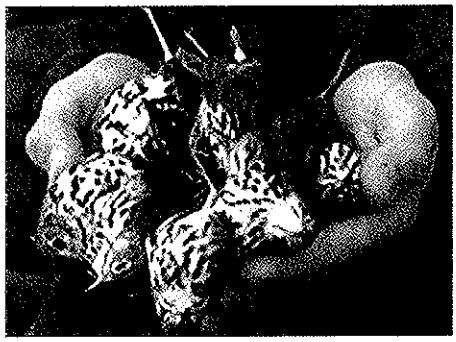
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AVIAN SPECIES

"Ultrasound Therapy for the Prevention and Correction of Contractures and Bone Mineral Loss Associated with Wing Bandaging in the Domestic Pigeon (*Columba livia*)"

Jeffrey Wimsatt, Priscilla Dressen, Clinton Dennison, and A. Simon Turner

J. Zoo and Wildlife Med. 2000. 31(2).

Figure-of-eight wing bandaging is widely used to treat wing injuries, to immobilize wings before and after fracture repair, and during transient wing paralysis. However, prolonged bandaging can lead to bone loss and to contractures and reduced range of joint motion. Studies evaluating the efficacy of therapeutic ultrasound to reverse and prevent bandaging-associated contractures in pigeons (*Columba livia*) showed a significant increase in elbow and carpal extension after 10 twice-weekly ultrasound treatments when started either 4 or 11 days after bandage placement. In addition, after 42 days of wing bandaging, three ultrasound treatments stimulated a faster reversal of carpal wing rotation loss than removal of the bandage over the 10-day treatment period. Finally, bone loss in response to 28 days of bandaging was significant, progressed at 2.8 percent per week, and was not affected by ultrasound treatment twice weekly during this period. Therefore, therapeutic ultrasound prevented and reversed loss of wing extension associated with figure-of-eight bandaging, but did not lessen the disuse osteoporosis created by bandaging in these birds.

"Nest Site Selection and Productivity of Suburban Red-Shouldered Hawks in Southern Ohio"

Cheryl R. Dykstra, Jeffrey L. Hays, F. Bernard Daniel, and Melinda M. Simon

The Condor. 2000. 102(2).

The authors measured nest site selection and productivity of suburban-nesting red-shouldered hawks (*Buteo lineatus*) in southwestern Ohio and rural-nesting red-shouldered hawks in south-central Ohio. At both the suburban and the rural locations, nest sites had greater canopy height and overall tree basal area and were located closer to water than were paired random plots. Nest trees also had greater diameter and height than random plot-center trees. Reproductive rates at suburban and rural sites were similar, averaging 2.6–3.1 nestlings per successful nest. Results indicated that suburban-nesting red-shouldered hawks were very similar to rural-nesting hawks in both nest site selection and productivity, suggesting that red-shouldered hawks were habituated to their suburban environs.

MAMMALIAN SPECIES

"Zinc-Responsive Dermatosis in a Red Wolf (*Canis rufus*)"

Karen Kearns, Jonathan Sleeman, Linda Frank, and Linda Munson

J. Zoo and Wildlife Med. 2000. 31(2).

An 18-month-old male red wolf (*Canis rufus*) presented with footpad hyperkeratosis, suppurative paronychia, distal limb pyoderma, and peripheral lymphadenopathy. Diet for the previous 11 months consisted of a mixture of two commercially prepared dog foods with a mineral supplement containing primarily calcium. Culture of the draining tracts on the distal limbs yielded a mixed population of opportunistic bacteria. Histopathologic findings were consistent with a diagnosis of zinc deficiency. Medical therapy consisted of 15 mg/kg amoxicillin P.O. B.I.D. and 10 mg/kg zinc sulfate P.O. S.I.D. Calcium supplementation was discontinued. Clinical signs resolved by 10 weeks after the initiation of treatment.

"Disseminated Blastomycosis in Two California Sea Lions (*Zalophus californianus*)"

Laura S. Zwick, Michael B. Briggs, Stefan S. Tuney, Carol A. Lichtensteiger, and Robert D. Murname

J. Zoo and Wildlife Med. 2000. 31(2).

Two captive California sea lions (*Zalophus californianus*) from different facilities were diagnosed with disseminated blastomycosis. The first, a 12-year-old male, died after a 3-week history of progressive anorexia and lethargy. Gross examination revealed acute jejunitis with focal perforation and associated peritonitis, along with severe purulent bronchopneumonia. The second, a 15-year-old female, was euthanized after a 2-week history of severe cutaneous ulceration and declining clinical condition. Gross examination revealed severe pyogranulomatous bronchopneumonia and ulcerative dermatitis. Histopathologic examination in both individuals revealed severe multifocal subacute to chronic pyogranulomatous pneumonia associated with massive numbers of fungal organisms morphologically compatible with *Blastomyces* sp. Fungal organisms were 8–20 um-diameter, broad-based budding yeasts with thick, refractile, double-contoured walls. The male sea lion had multifocal transmural *Blastomyces*-induced enteritis with subsequent rupture and peritonitis. The organism was also present in the liver, with minimal associated inflammation. The female had severe multifocal pyogranulomatous ulcerative dermatitis associated with large numbers of intralesional fungal organisms. Dissemination to the spleen had occurred in both animals. A serologic immunodiffusion test for *Blastomyces dermatitidis* was positive in the male. The presumptive primary pathogen in both cases was *Blastomyces dermatitidis*.

HERPETILE SPECIES

"Diarrhea Associated with Enterotoxigenic *Clostridium perfringens* in a Red-Footed Tortoise (*Geochelone carbonaria*)"

J. Scott Weese and Henri R. Staempfli

J. Zoo and Wildlife Med. 2000. 31(2).

Enterotoxigenic *Clostridium perfringens* was associated with diarrhea in a 4-year-old, female, captive-bred red-footed tortoise (*Geochelone carbonaria*). Diagnosis was based on bacterial culture, detection of C. *perfringens* enterotoxin in feces, and exclusion of commonly recognized pathogens. After treatment with metronidazole, normal feces were passed and C. *perfringens* enterotoxin was no longer detected in the feces. Although the role of C. *perfringens* cannot be determined definitively from this case, this pathogen should be considered in cases of diarrhea in tortoises and, perhaps, other reptiles.

TAIL END

by Astrid MacLeod

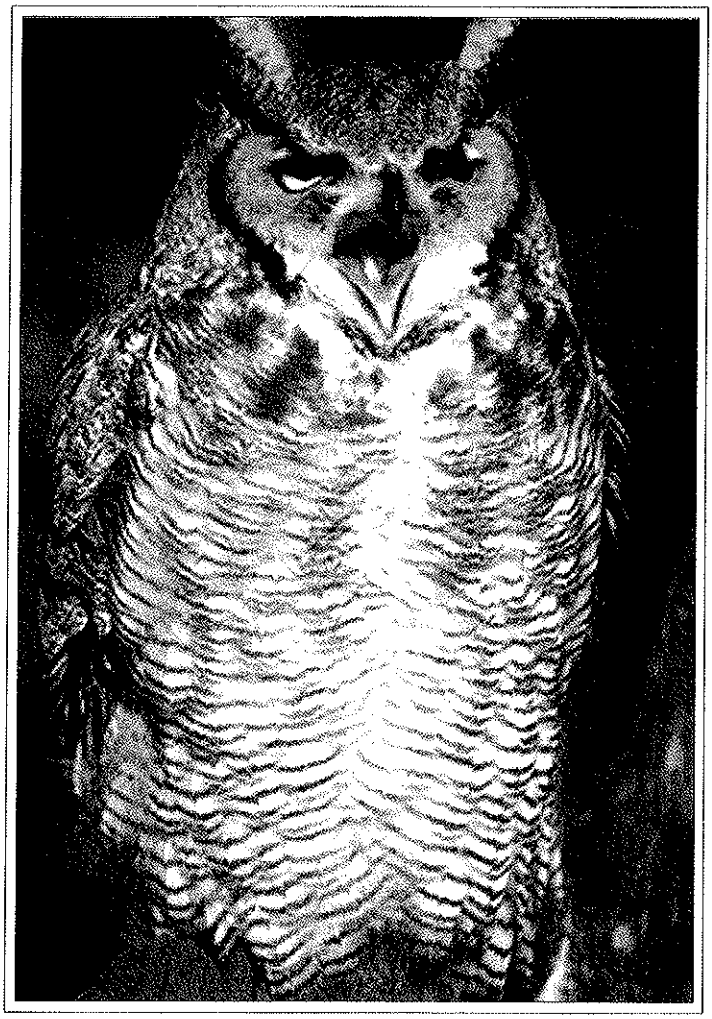


PHOTO: GREAT HORNED OWL (*Bubo virginianus*) ©1997 THE LEARNING COMPANY

"Some enCHANTed evening...."

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