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Inside this issue
- Chimpanzee rehab
- Eagle case studies
- Promoting safety

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 edition. 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: This young male chimpanzee was among a group of 30 captive chimpanzees rehabilitated and released on an island off the coast of Liberia, West Africa, in the mid-1980s. Researchers used radio collars to help track the animals' movements on the island. The techniques developed for the project could be useful in rehabilitating other group-living primate species in the future. Photo by Minna J. Hsu. See page 3 for the story. AT RIGHT: Providing safety for animals during rehabilitation involves proper diet, predator controls, and caging. The padded perching material used with this owl will help its feet remain healthy. Photo by Marge Gibson. See page 18 for the story.

JOURNAL OF

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CONTENTS SPRING 1999, VOL. 22, NO. 1

Editor
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FEATURES

3
Rehabilitation and Release of Chimpanzees on a Natural Island
Methods hold promise for other primates as well
By Govindasamy Agoramoorthy and Minna J. Hsu

8
Case Studies in Poisoning: Two Eagles
Lead and pesticide toxicity in two challenging cases
By Louise Shimmel and Kathleen Snell

18
Yours to Protect
Keeping wildlife safe in your care
By Marjorie J. Gibson

DEPARTMENTS

27
SUCCESS STORIES

29
SIMPLE SOLUTIONS

31
UP FOR DISCUSSION

35
BOOK REVIEWS

36
NEWS BRIEFS

37
CAREER CORNER

38
YEAR-END REPORT

39
CALL FOR PAPERS

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EDITORIAL

A Call to Advocacy

REHABILITATORS ARE IN NO way strangers to interceding and speaking on behalf of wildlife. Indeed, they do it every time they receive an injured animal and patiently explain why the animal will need specialized care. And in the case of those who educate, they do it each time they present to a classroom of children and describe the meaning of "wild," and how humankind can hinder it or help it. This is the foundation of advocacy.

But it doesn't end there. Rehabilitation and rehabilitators are being pulled more and more into the mainstream. The public expects us to care for injured and orphaned wildlife, the government regulates us, some medical and/or conservation professionals criticize us, and others praise us. Our skills have become increasingly refined and standardized; our networks and the organizations representing us flourish. While our first duty may remain the supportive care of individual animals, our responsibility to wildlife has changed. It has become more comprehensive. In response, we have the opportunity, and perhaps the responsibility, to become advocates.

What, then, does advocacy entail? It is not a battle cry, nor is it a line drawn in the sand. It is a self-issued challenge to learn critically through participation; cooperation with partners outside our field who share our goals; engagement with the larger issues that can affect how we practice; and the addition of strong, thoughtful voices. These are the key elements of the advocacy I envision for rehabilitators.

IWRC shares this responsibility with the member rehabilitators it represents. This organization's board, staff, and volunteers work to provide you with the resources, skills, and forums in which you can participate and enhance your own advocacy.

In this spirit, over the next few months, we'll be unveiling a renewed state representatives program. The program has been renamed the Area Representatives Council or ARC. Thanks to the stewardship of Marge Gibson, board president, ARC counts members from over 30 states, five Canadian provinces, and a handful of countries. As the new board representative overseeing the program, I have taken the role of coordinator. Louise Sagaert, co-representative from Michigan, will serve as ARC liaison, focusing on communication among members and strengthening area networks.

The ARC mission is to encourage rehabilitator participation through IWRC programs, cooperation with a variety of partners, and advocacy at the state, provincial, or regional level. Representatives will serve at the hub of an area network, identifying resources available to rehabilitators, facilitating communication, and keeping track of issues or concerns particular to their area.

They might work with compatible government, research, or conservation agencies to implement coordinated response to wildlife health issues or focus on creating flexible networks allowing for the transfer of resources among individual rehabilitators. While appointed to serve IWRC members, representatives will work with nonmembers for the benefit of wildlife in their area. And as particular areas develop particular strengths, area representatives will be encouraged to share strategies.

Information about ARC, program guidelines, and member responsibilities will soon be in the mail to current representatives. In the next few months a portion of the IWRC website will offer information on the program. In the meantime, if you are interested in participating in ARC, even if you currently have area representation, contact the IWRC office. It's time to add your voice.

Kelley R. Tucker, Director,
Pesticides and Birds Campaign,
American Bird Conservancy

Rehabilitation and Release of Chimpanzees on a Natural Island

Methods hold promise for other primates as well

By Govindasamy Agoramoorthy and Minna J. Hsu

ABSTRACT: This paper describes the rehabilitation of 30 captive chimpanzees and their eventual release on an offshore natural island in Liberia, West Africa. The authors share details involved in chimpanzee rehabilitation and island releases. The majority of the rehabilitated chimpanzees adjusted well on the island and fed on naturally occurring plants, insects, fruits, and nuts. This island release model could prove effective for other group-living primate species.

KEY WORDS: chimpanzee, *Pan troglodytes*, socialization, rehabilitation, island release, Liberia.

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Tropical forests in Asia, Africa, and South America are being destroyed at a rate of 17 million hectares (2.471 acres/hectare) per year. If the current rate of habitat loss continues, half of the 234 primate species existing today will face extinction in the near future (Brown et. al., 1997). The future survival of our closest relatives, the great apes, is also at risk due to ongoing destruction of tropical rainforests for timber, expansion of shifting cultivation activities, illegal hunting for the bushmeat trade, and pet trade.

The great apes comprise the families Pongidae (orangutan) and Hominidae (gorilla, chimpanzee, and human). They have larger bodies and bigger brains than other primates and are sexually dimorphic, meaning, in this case, the males are larger than the females. Taxonomists in the past placed all great apes in a single family, Pongidae, and humans in a separate family, Hominidae. However, recent molecular genetics data and new fossil evidence have led experts to conclude that the African apes (gorilla and chimpanzee) diverged from each other some five million years ago, are more similar to each other than to orangutans (Diamond, 1993), and rightly belong in Hominidae along with humans. The taxonomy of great apes mentioned in this paper is based on Rowe (1996).

Orangutans occur in two distinct species, the Sumatran orangutan (*Pongo abelii*) and Borneo orangutan (*Pongo pygmaeus*). Distributed on the islands of Sumatra and Borneo in Southeast Asia, orangutans are also called "the people of the forest" by natives in Indonesia, where roughly 80 percent of the species' rainforest habitat has been destroyed during the past two decades.

Gorillas are the most endangered of all the great apes. They occur in three forms: the mountain gorilla (*Gorilla gorilla beringei*), which is restricted to the borders of Uganda, Rwanda, and Zaire; the western lowland gorilla (*G. g. gorilla*), which is distributed from Nigeria to Zaire; and the Eastern lowland gorilla (*G. g. graueri*), which occurs in Zaire.

Chimpanzees occur in two forms, the bonobo (*Pan panicus*), which is restricted to Zaire, and chimpanzee (*Pan troglodytes*), which has a wide distribution in equatorial Africa.

The social structure of each genus of great ape is different. Orangutans are primarily solitary. Gorillas live in troops composed of one male and numerous females. Except for bonobos, which rarely display aggressive behavior, chimpanzees are the most aggressive of all great apes. The males of one chimpanzee community have stalked and killed members of another community in a war-like situation. Observers have seen captive chimpanzees using the appearance of friendly reconciliation to draw in and then retaliate against an aggressor that escaped an earlier conflict (de Waal, 1993). Several cases of cannibalistic infanticide have also been observed among wild chimpanzees. They form fission-fusion communities, in which large groups tend to split into smaller subgroups while ranging for food, then join again after several days.

Most conservationists agree on the necessity of establishing projects to rehabilitate wild-caught or captive-born endangered primates for eventual release into the wild. Over the last three decades, researchers have made numerous attempts to rehabilitate great apes in their natural habitats. This rehabilitation usually involves

training behaviorally inadequate individuals in skills that would enable them to survive independently. By socializing the primates in naturalistic enclosures, rehabilitators have worked to teach them to find and process food and water, find and avoid predators or other dangers, seek or make shelters, mate, and rear offspring.

The authors studied the process of chimpanzee rehabilitation and release in Liberia, West Africa, during 1987-88. This paper describes details of the rehabilitation and release procedures.

Govindasamy Agoramoorthy is on the right, next to an island holding cage where chimpanzees were housed until ready for release. (Photo by Minna J. Hsu.)

Great Ape Rehabilitation

Orangutans were first rehabilitated in Sarawak, Malaysia during 1961 (Harrison, 1963). Later, in 1964, the Sepilok orangutan rehabilitation center in Sabah, Malaysia, was established to return orphaned individuals back to the wild (Silva, 1971). During the 1970s, two more projects involving orangutan rehabilitation were established in Indonesia (Rijksen and Rijksen, 1975, in Sumatra; Galdikas, 1975, in Kalimanthan).

However, the orangutan rehabilitation project in Wanariset, Kalimantan, is the most recent project using a new approach designed to minimize the effects of the old-fashioned rehabilitation procedures characterized by inadequate preparation for release and insufficient medical tests to determine the health condition of individuals (Susilo, 1998). This project has rehabilitated 264 orangutans through July 1997. Of these, 109 were released in two protected rainforest areas, Sungai Wain and Meratus in Kalimantan, Indonesia.

In Taiwan, confiscated and abandoned orangutans have also been rescued and rehabilitated over the last five years and a total of 32 individuals have been repatriated to Wanariset, Indonesia (Agoramoorthy, 1996, 1997a, b, 1998a, b).

A confiscated infant mountain gorilla was cared for by the late Dian Fossey for three months and released into a wild group. The infant survived for a year, but later died of pneumonia due to prolonged heavy rains in the forest (Fossey, 1983).

The original idea of releasing primates on an island was initiated by Carpenter in 1938 when rhesus macaques (*Macaca mulatta*) from India were released on a 15.2-hectare island off the southeast coast of Puerto Rico (Carpenter, 1959). But it was not until 1966 that the earliest chimpanzee rehabilitation was attempted. Seventeen chimpanzees, all wild-caught and held in captivity for a few months to several years, were released on Rubondo Island, a 2,400-hectare island in Tanzania (Grzimek, 1970).

In contrast to island release of chimpanzees, another project for the first time attempted to release rehabilitated individuals in a natural forest at Niokolo-koba National Park, Senegal (Brewer, 1978). Although the rehabilitated chimpanzees adjusted well in the park, wild chimpanzee groups were very aggressive toward the newcomers. For their safety, the rehabilitated chimpanzees were removed from the forest and released on secured islands in the Gambia River.

Similar island release projects are still in progress in countries such as Gambia, Liberia, Sierra Leone, and Uganda.

Case Study: Chimpanzees in a Captive Setting

The New York Blood Center established a research laboratory in Liberia during 1974 to use chimpanzees in hepatitis B vaccine studies in collaboration with the Liberian Institute of Biomedical Research. Four years later, a rehabilitation project for healthy individuals free of communicable diseases began and groups of chimpanzees from the laboratory were prepared to be released onto offshore natural islands in Liberia.

Prior to the release, chimpanzees were maintained for about 2-3 months in large enclosures with high concrete walls with an area of 160 square meters. The enclosures were equipped with adequate shelter, climbing structures, and sand floors. All cages were outdoors and two cages could be connected by opening an adjoining door. These doors were used to mix subgroups.

Chimpanzees to be released in a group were introduced first into large enclosures and observations were carried out to monitor their com-

patibility to each other. The authors used focal animal sampling and scan sampling methods, standard techniques for collecting and recording behavioral data (Altmann, 1974). Weak and severely wounded individuals were removed and added later, when healthy, to other groups.

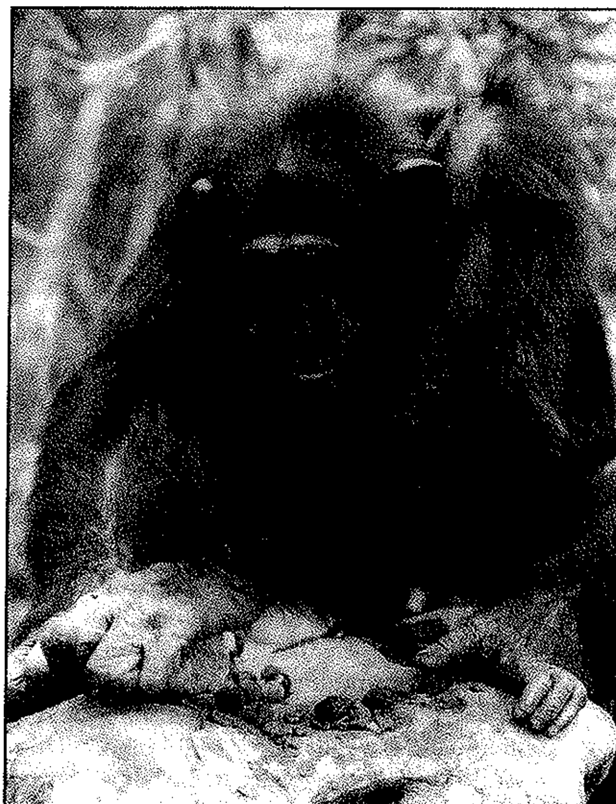
Individual profiles for each chimpanzee were developed prior to their release. Data were recorded for each individual on food intake, favorite food items, kinship, friendly relationship with other individuals, body weight, and morphometric measurements. Health tests for protozoan parasites, tuberculosis, and hepatitis A, B, and C were performed on all chimpanzees and only disease-free animals were selected for eventual island release.

Release of Chimpanzees on an Island

During July, 1987, a group of 30 chimpanzees were released onto an island with an area of 9.7 hectares surrounded by mangrove swamp. There were 11 males and 19 females and the age of the chimpanzees ranged from 3 to 20 years. Younger and low-ranking individuals were taken to the island first, in subgroups of mixed sex to get used to the new environment. Older individuals joined the younger groups later, which appeared to reduce stress among the young, weak, and low-ranking individuals.

Prior to the release of each subgroup, individuals were kept in a holding cage (3 x 3 x 1.5 meters) on the island for a few days. The holding cage was also used to keep tranquilized or wounded individuals isolated since rehabilitated chimpanzees usually are hostile towards immobilized and wounded members of their group. Although some of the chimpanzees slept inside or on top of the holding cage for a few days before finding their own sleeping areas, many selected sleeping sites on trees.

The authors and two field assistants routinely walked different trails on the island with the chimpanzees. Radio-collars were used for 24 out of 30 chimpanzees in order to follow them daily on the island. Without the radio-collars, it would have been difficult for us to locate the weak, wounded, and dehydrated individuals in the mangrove swamp.



A dominant male chimpanzee cracks open palm nuts with a stone hammer on a ledge. (Photo by Minna J. Hsu.)

Seven out of 30 individuals had difficulty adjusting to new social conditions and were brought back to captivity. These individuals all had long histories of being pet animals, which appeared to make adjusting to the new surroundings and social settings more difficult.

Feeding Behavior

Food supplements including fruits and specially prepared bread pieces were given to all individuals on the island on a daily basis to meet their nutritional needs. However, a majority of them started to feed on the island by themselves within a few days after release. The chimpanzees found several feeding trees on the island, including palm trees in which they preferred to eat the nuts. They also fed occasionally on the island's abundant insects. Younger chimpanzees watched and learned feeding strategies from older animals. Although newcomers did not eat wild plants and fruits during their first few days, they slowly increased their intake. A week after the release, the dominant male was observed pulling a nest of weaver ants (*Oecophylla longinoda*) and eating the ants and their larvae. Several other individuals also followed the same pattern of eating ants.

The rehabilitated chimpanzees on the island also collected palm nuts and cracked them open using naturally occurring hammerstones within the first few days. They used tree trunks as a platform to crack the nuts. When adults concentrated on opening nuts using stone tools, the younger individuals keenly observed nut-cracking techniques. This phenomenon of wild chimpanzees using tools to open hard-shelled nuts, considered culturally transmitted behavior, has been observed only in West African countries such as Guinea, Liberia, and Ivory Coast (Boesch and Boesch, 1983).

Nest-Building Behavior

In the wild, all great apes build fresh nests every evening to sleep. Several days prior to the release, chimpanzees were given fresh leaves and branches for practicing nest-building behavior. Most of the adults were able to make bigger nests in captivity while younger, lower-ranking individuals made smaller nests since they were easily discouraged from obtaining more leaves and branches by dominant individuals. After the rehabilitated chimpanzees were released onto the island, many of them imme-

diately began making their own nests every evening on tree tops, while a few individuals slept near the holding cage for several nights.

Chimpanzee socialization in a rehabilitation setting. (Photo by Minna J. Hsu.)

Reproductive Behavior

Soon after the release of chimpanzees on the island, adult females (Helen, Popeye, Samantha, and Carola) were seen copulating with adult males (Brutus and Sokomoto) and also younger males (Saffa, Mango, David, and Dr. Me). Two females gave birth after their release. Maria delivered a baby during the first week of November, 1987 while Goldilocks gave birth on November 27, 1987. But, both infants were seen dead after a few days. Samantha, the dominant female in the group was seen carrying Goldilock's dead infant, which had bite wounds. It appeared that Samantha had probably killed the infant.

Similar cases of infanticide by adult females have been recorded among wild chimpanzees (Goodall, 1996) and other primates (Agoramoorthy, 1994).

By mid-December 1997, females Houdina and DMW both delivered infants, both of which survived until the end of this study. The paternity of the infants was not confirmed due to lack of techniques available during that time in the field.

Stereotypic Behavior

When chimpanzees were kept in isolation from conspecifics, the authors observed certain conditions leading to the stereotypic behavior such as body-rocking, squat-walking, eye-poking, and palm-pinching. Some of the chimpanzees also ate their own feces, while others threw their feces towards human observers. However, after release on the island, the chimpanzees were preoccupied with roaming around the island, finding food and shelter, and interacting with group members, and ceased all of these stereotypic behaviors.

Aggressive Behavior

Several episodes of aggressive encounters among released chimpanzees were recorded during this study. Weaker individuals often received serious bite wounds when they were repeatedly attacked by dominant individuals. Two young males, Mango and David, were returned to the laboratory within a few days of release. Mango suffered head injuries, which led to dehydration while David had a severe bite injury on his left thigh. A female named Houdina dealt another female named Anita a 4-centimeter canine wound on the right shoulder, requiring treatment. After a month, all three injured chimpanzees were released again into the group without any apparent conflict.

The rehabilitated chimpanzees also showed aggressive behaviors toward observers on a few occasions. During the course of our study, one of our field assistants was attacked and both of his legs were bitten by a group of four chimpanzees on the island. The chimpanzees also attacked a 12-year-old boy who was fishing around the island. When his canoe reached the edge of the mangrove swamp, the chimpanzees apparently grabbed and bit him severely. He was rescued by a passing fishing boat. Although the boy had several broken bones and deep cuts, he survived the chimpanzee attack.

Conclusion

The majority of the rehabilitated chimpanzees adapted to life on the island. Some of them built nests and found food by themselves immediately after their release. Younger chimpanzees learned social and survival skills more quickly than older animals. Only two older males (more than ten years old) were included in the group since older apes are more difficult to rehabilitate. Considering the fact that rehabilitated chimpanzees can be aggressive toward local people and wild chimpanzees can be hostile toward the newly released chimpanzees, it is essential to select future release sites that are as far as possible from both human habitations and wild chimpanzee groups.

The rehabilitation procedures highlighted in this paper can also be used to rehabilitate other group-living primate species in other parts of the world (Hsu and Agoramoorthy, 1997). In a recent project (a study not yet published), the authors have been using this model to rehabilitate a

group of ten Formosan macaques on an uninhabited islet just ten hectares in area, in Penghu archipelago, Taiwan.

The authors were forced to end the study described in this paper when civil war broke out in Liberia in 1989. At present, an unknown number of the chimpanzees released in the 1987-88 study still survive on the release island. These chimpanzees could be used to help educate the local people and school students on various wildlife conservation issues facing the nation today. Indeed, education is essential to stimulate wildlife conservation awareness in a developing country like Liberia (Agoramoorthy, 1997b). However, the ongoing political instability and tribal warfare threaten the prospect of establishing wildlife conservation education programs there in the near future.

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Dominant male walks with palm nuts in both hands and mouth while a young male greets him. (Photo by Minna J. Hsu.)

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Case Studies in Poisoning: Two Eagles

Lead and pesticide toxicity in two challenging cases

By Louise Shimmel and Kathleen Snell

Raptors occupy a niche at the top of their particular food webs that makes them uniquely susceptible to toxins. Though raptors themselves are rarely direct targets, they may be affected by poisons — particularly insecticides and rodenticides intended for other species, and lead. Many environmental toxins such as pesticides accumulate in the tissues of prey animals. Raptors may scavenge animals that have died of poisons, thereby ingesting toxic substances on the surface or in the stomach of the scavenged item. These birds also may find easier prey in animals whose response time or awareness is impaired by a sub-lethal dose of a toxin - leading to bioaccumulation of crippling, even fatal, levels of poison in their own system.

Lead poisoning has been documented extensively in waterfowl and raptors. Though lead shot has now been banned for waterfowl hunting, there are literally tons of spent shot in waterways and marshes. Waterfowl picking up grit easily ingest shot and die of lead poisoning. Fishing birds such as cormorants or grebes ingest lead sinkers. Both lead shot and sinkers, in the grinding and acidic environment of a bird's digestive tract, can cause toxicity and death. Raptors scavenging carcasses or preying upon debilitated waterfowl can become poisoned upon eating the gizzard of affected birds (Kramer and Redig, 1997). They also can ingest lead through scavenging or preying on game birds or small mammals that have been killed or wounded with lead shot. Although raptors routinely regurgitate the non-digestible portions of their meals approximately every 24 hours, if no casting material is ingested with the lead pellet and no casting formed, the lead is retained longer. Further, lead ingested repeatedly over several days, even if the bird is casting regularly, may lead to a toxic level (Redig, 1993).

Cholinesterase-inhibitor (organophosphates and carbamates) and other pesticide poisonings are also common among raptors. Typically, they are poisoned when they feed on carcasses of farm animals treated with pesticides for external parasites or when feeding upon dead or dying prey that have been poisoned. There have been cases of illegal use of OP poisons to lace carcasses purposefully to kill predators and scavengers, but this leads to such an acute, overwhelming dose that death is fairly certain. Many cases of low-level toxicity may go undetected. One study of raptors submitted for traumatic injuries at the Wildlife Center of Virginia (Waynesboro, VA) indicated that these birds often had been exposed to a level of OPs that did not lead to overt toxicosis but that could have caused a level of debilitation which might have compromised reflexes, leading to other traumas, such as collisions with vehicles (Ed Clark, personal communication, July 1996).

This article chronicles two case studies — a golden eagle with lead poisoning and a bald eagle with OP poisoning. These cases were the first confirmed toxicity cases for Cascades Raptor Center (Eugene, Oregon) and both birds were released following treatment.

CASE I: Lead Poisoning in a Golden Eagle

Presentation

An adult golden eagle was presented for care in the late afternoon of Friday, December 5, 1997. The bird was discovered standing in a driveway in a rural area

ABSTRACT: Wild, free-ranging birds are susceptible to numerous environmental toxins. Raptors can be seriously affected by ingestion of poisoned prey. This article details the presentation, diagnosis, treatment and outcome of two toxicology cases at a raptor rehabilitation facility: a golden eagle with lead poisoning and a bald eagle with cholinesterase-inhibitor compound poisoning.

KEY WORDS: pesticides, organophosphate toxicity, cholinesterase-inhibitor, lead poisoning, chelation therapy, flaccid paralysis, rigid paralysis.

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in the Cascade Mountains of Western Oregon. When approached, she moved to a wood pile but seemed to have some difficulty perching and slipped off. U.S. Forest Service personnel capturing the eagle reported a "leg problem," saying the bird was able to ambulate, but awkwardly. She made no attempt to fly, but was holding both wings normally and spreading them symmetrically when threatened.

Initial physical examination revealed a moderately pronounced keel, a weight of only 3.4 kg, though with some muscle mass over the sternum, no food in the crop, moderately pale mucous membranes, and no palpable fractures. Although the handlers could manually open the bird's toes, the bird seemed unable to do so; pinching of the toes indicated the presence of deep pain; when extended, the legs slowly went back to a slightly flexed position; and cloacal tone was intact.

The bird was placed in a hospital cage, after treatment for a "shock-like syndrome" (bolus injection intravenously of 48 mL lactated ringers solution [LRS], dexamethasone sodium phosphate at 4 mg/kg intravenously, B-complex vitamins at 30 mg of thiamine/kg intramuscularly), and given supplemental heat. When first placed in the cage, the bird attempted to stand with her toes flexed, but later would not stand or perch at all. Initial blood values were a packed cell volume (PCV) of 33% and total solids of 1.2 g/dL. Normals are provided in Table 1, and drugs and dosages used are referenced in Table 2 [tables begin on page 14]. Fecal portion of mutes (droppings) were dark green, possibly indicating inanition, supported by the low total solids and prominent keel.

Diagnosis and Treatment

The diagnostic rule-outs were head or spinal trauma, and lead or cholinesterase-inhibitor poisoning. There was no evidence of head trauma and because the bird had been walking, though awkwardly, it was believed that the flaccid paralysis of the feet without palpable orthopedic problems was caused by a toxicity. The absence of the bright green, odorous droppings that have been reported anecdotally as being representative of lead poisoning led to the initiation of treatment for possible cholinesterase-inhibitor poisoning (atropine at 0.02 mg/kg intramuscularly, 1 g/kg activated charcoal orally, followed by 120 mL LRS with 5% dextrose [LRS/D5] orally; a follow-up dose of 0.03 mg/kg of atropine was given intramuscularly 4 hours later). Light inter-digitating bandages were placed on the eagle's feet to protect them from self-inflicted trauma.

Six hours after intake, the bird was administered 25 mL of Amino Acid Solution (Phoenix Pharmaceutical, St. Joseph, MO) with 95 mL Pedialyte® (Ross Labs, Columbus, OH) orally, and two skinned, chopped day-old chicks were force-fed.

Day 2: The bird remained in a prone position with legs extended or flexed, depending on how it was placed in the cage. The crop was empty, and mutes were a more normal color, indicating successful digestion of the food force-fed the night before.

As a prophylactic against aspergillosis (to which eagles in captivity are prone), a regimen of itraconazole was initiated at 10 mg/kg orally BID, suspended in Lactulose Solution, USP (Zenith Goldline, Ft. Lauderdale, FL) given at 1 ml/kg. Additional bolus IV fluids (48 mL LRS) were administered, along with 0.05 mg/kg atropine, half administered IV and half administered intramuscularly, twice during the day; oral fluids and nutrition were provided through a gavage of 20 mL of an amino acid solution and 80 mL LRS/D5 in the morning, 120 mL LRS/D5 in the afternoon and evening.

Three cut-up, skinned day-old chicks (supplemented with bone meal, calcium, vitamins) were given four times per day. Radiographs were taken; there was no evidence of fractures or sign of lead in the GI tract.

Day 3: The bird was more alert and passing normal mutes in the morning, although still making no attempt to stand. She was force-fed five cut-up day-old chicks, with head and skin intact to provide casting material, and gavaged 120 mL LRS/D5 orally and itraconazole at the above dose. However, by late afternoon, she seemed more depressed. Five cut-up chicks with head and skin intact were force-fed; 20 mL amino acids, 5 mL Pet-Tinic® (SmithKline Beecham, West Chester, PA) providing supportive care for anemia, and 80 mL lactated ringers with 5% dextrose (LRS/D5) were gavaged; itraconazole treatment was continued. No further atropine was administered.

Day 4: The bird was found on the floor, out of the hospital cage, but was still not using her legs. In a phone discussion, Dr. Patrick Redig, of The Raptor Center, University of Minnesota (St. Paul, MN), identified the bird's signs as more likely to be resulting from lead poisoning than exposure to organophosphorous pesticides. Based on that consultation, blood was drawn for lead testing as well as cholinesterase activity. See Table 1 for blood test results over the treatment period.

Based on Dr. Redig's advice, chelation therapy was initiated immediately utilizing CaEDTA at 20 mg/kg IM BID (Calcium Disodium Versenate, Edetate Calcium Disodium injection, 3M Pharmaceuticals, Northridge, PA) rather than waiting the several days before blood lead results would be available from the laboratory. In-house PCV showed a drop to 24% with rehydration and an increase in total solids to 2.2 g/dL; weight was up 120 g.

By the end of the day, the bird was voluntarily eating cut-up chicks from the forceps, sitting more upright back on her hocks rather than recumbent and actually moved one leg as if attempting to foot the handler. Itraconazole, maintenance fluids and Pet-Tinic were continued on a twice-per-day (BID) basis.

Day 5: The bird was feeding very eagerly, biting hard at the forceps. She moved her right toes for the first time

in the late afternoon. Preliminary laboratory results showed a normal cholinesterase level of 1,805 IU/L, and an elevated white blood cell (WBC) count of 23.8 thousand, with a normal distribution (see Table 1). Treatment was continued as on Day 4.

Day 6: The bird was alert and responsive in the morning, but not eating well by evening, possibly because she was accumulating casting material but had not yet regurgitated a pellet. She did, however, move toes on her left foot for the first time. The previously established treatment regimen was maintained.

Day 7: The bird produced her first casting and moved her right toes again. Her weight was up only 57 g in 3 days. Dr. Redig, in a follow-up phone discussion, suggested that the itraconazole might be suppressing the bird's appetite and indicated that after 5 days of itraconazole at 10 mg/kg twice per day, blood levels of the drug remain adequate for aspergillosis prophylaxis with once-per-day (SID) administration (Patrick T. Redig, personal communication, December 1997). He also suggested varying the bird's diet. Quail and rat were force-fed during the day in addition to day-old chicks (which had been fed exclusively up to this point because of their levels of moisture and ease of digestion).

Because of the elevated WBC, antibiotic therapy was initiated: enrofloxacin (Baytril®, Bayer, Shawnee Mission, KS) at 5 mg/kg BID orally. Suggested enrofloxacin dosages for raptors vary, in the lack of pharmacokinetic data. Itraconazole treatment was decreased to once per day; maintenance fluids and Pet-Tinic were continued twice per day. Chelation therapy was continued twice per day intramuscularly, but the bird clearly was finding the shots painful by this time. Although IV administration of the CaEDTA would have been preferred, staffing limitations made it difficult, as treatments frequently needed to be administered by a single handler.

Day 8: The bird was alert and responsive and though her crop in the morning still held some food (rat) from the previous evening's feeding, it did not have a fetid odor. By afternoon, she started to feed herself cut-up food from a plate despite still being in a prone position or occasionally up on her hocks. She was now definitely moving toes with some frequency. Blood lead levels for the sample drawn on Day 4 were received: 0.29 parts per million (ppm). The laboratory's reference range ranked this as "exposed," and indicated "less than 0.06 ppm" as the lower level of detection of their assay system. Twice per day maintenance fluids, Pet-Tinic, chelation and once-per-day itraconazole were continued. Mutes produced during the chelation treatment had taken on a grey-green and grainy appearance.

Raptors like this golden eagle are at the top of the food chain, making them especially vulnerable to the effects of accumulated toxins. (Photo by Michael Kevin Daly.)

Days 9-11: The bird was eating well on her own. Chelation therapy was discontinued temporarily on Day 10. Clinicians are concerned about renal toxicosis with continued CaEDTA therapy, however this has not been documented in avian patients. Once-per-day itraconazole and twice-per-day enrofloxacin were maintained, along with oral fluids and Pet-Tinic twice per day. On Day 11, blood was sent in for a follow-up lead panel which, when received 5 days later, indicated that her blood lead levels had been cut in half to 0.14 ppm. The bird was now over 400 g above her intake weight, her hematocrit had improved to 34% (with the assumption that her initial PCV had been artificially elevated from dehydration) and total solids were now a healthy 3.8 g/dL.

Day 12: The eagle was up on her hocks and flapping her wings, though her feet were still balled. A flat wrap was placed on her feet to open the toes, and she stood and walked for the first time. She was also eating cut-up food entirely on her own. The second round of chelation therapy was

started late on Day 12 (after a 60 hr respite). A regimen of penicillimine (Cuprimine®, Merck Sharp & Dohme, West Point, PA) at 45 mg/kg orally twice per day was initiated instead of calcium disodium versenate, on the advice of Vickie Joseph, DVM, Dip.ABVP, and director of California Foundation for Birds of Prey, with Dr. Redig's concurrence. The penicillimine was chosen for blood-brain barrier penetration and because it was felt that the increasing trend in the bird's WBC was possibly a result of inflammation from the calcium disodium versenate injections.

Enrofloxacin was continued twice per day, with itraconazole, oral fluids and Pet-Tinic once per day. Supplemental fluids were decreased to once a day to minimize the stress of handling, now that the bird was standing part of the time (previously, handlers had been able to gavage fluids without restraining the bird, and oral medications had been given with food). Food was moistened, however, to help keep the bird hydrated.

Day 14: After 36 hours on the penicillimine, the bird regurgitated part of what she had eaten and, later that day, was less eager to eat. Despite being fed whole food, with some venison, the bird did not cast again after Day 7 until the morning of the 15th day, when she also regurgitated again. She was increasingly reluctant to eat. She was force-fed a small amount in order to administer medications. On Day 16, the bird was standing most of the time, the foot wraps were removed and she was given a perch. Despite this progress on the neurological front, she continued to regurgitate food, along with casting material, and would not eat voluntarily. The eagle was removed from all medications for 24 hours.

Day 17: The bird was still not eating, but was getting very restless in the close confinement of the hospital cage. Although she could straighten her toes and was perching, the talons on the left foot, as well as the whole right hallux (rear toe) continued to curl under, so light wraps were placed on each foot to assist in maintaining the toes in a correct position. She was moved to an outside enclosure, where she moved back and forth between the ground and a low perch. However, she was lying down (very unusual behavior for an adult raptor) by afternoon, so she was moved back inside in the evening.

At the end of the day, the eagle was placed back on once-per-day itraconazole and twice-per-day enrofloxacin, which was increased to 10 mg/kg twice per day, but chelation therapy was not re-started. It was not until late on Day 18 that her appetite revived, 48 hours after being taken off the penicillimine. She ate two whole quail on her own, showing normal self-feeding behavior for the first time, i.e., her toes were now unwrapped, and her equilibrium was sufficient to hold down food for tearing. Her appetite was fully restored and she ate five quail on her own on Day 19; once-per-day itraconazole and twice-per-day enrofloxacin were continued. On both Days 20 and 21, she was able to tear up and eat a whole chicken. She continued to be housed in an outside enclosure during the day and brought in at night, as she persisted in lying down by late afternoon; once-per-day itraconazole and twice-per-day enrofloxacin were continued.

On Day 22, the itraconazole was discontinued permanently, since the bird was outside a large part of the time in a well-ventilated enclosure. Her weight was up to 4.5 kg, more than a kg above intake weight. The penicillimine was restarted at 30 mg/kg orally that evening. However, the bird's appetite started to decrease the next day (Day 23). She regurgitated what she had eaten, and then would not eat at all on Day 24, when the penicillimine was again discontinued. She continued to refuse food on Day 25. Blood was drawn for a blood lead level on Day 25 (and showed a decrease to 0.11 ppm, despite the sporadic chelation therapy during the previous two weeks); her PCV was up to 43% and her WBC down to 25,000 from 32,000. Enrofloxacin was discontinued.

The bird refused an adult chicken on Day 26 (and thereafter) but did eat quail. Her mutes were a bright grass green, not at all the normal bilious color of inanition. On Day 27, after discussing the case with Dr. Redig again, who confirmed that the penicillimine was probably causing the digestive upsets, the bird was started on oral CaEDTA (Meta-Dote®, Anpro Pharmaceutical, Arcadia, CA) at 35 mg/kg twice per day in food, which was maintained for four cycles of 4 days on and 2 days off. Oral CaEDTA therapy is often mentioned in the literature, but the efficacy of such therapy in birds has not been proven in controlled studies.

Progress and Outcome

By mid-January, almost 6 weeks from intake, the bird was able to kill a small rat and was much more agile in jumping to perches. Lingering neurological problems as the lead levels came down had definitely affected her balance, resulting in some of her earlier attempts to jump up onto even a low perch ending with her hanging upside down*. She stopped lying down and was kept consistently in an outside enclosure.

Chelation therapy was discontinued after the blood lead level reached 0.08 ppm and stayed there, despite a further two cycles of treatment. Dr. Redig indicated that some birds may carry residual blood lead for life.

The bird was in a small (8' x 12') outside aviary during the day from Day 17 through Day 40, then outside full-time. On Day 74, some three weeks after the final chelation dose, with weight at a healthy 5.4 kg (up 2 kg), the bird was transferred to a large aviary for flight conditioning and was released 6 weeks later. Total treatment time was 4 months.

[***Author's Note**: Lead poisoning does not always present with obvious neurological signs. Although the case reported here was the first confirmed case in Cascades Raptor Center's 10-year history, a second case was received in early May 1998. This second case, another female

golden eagle, presented in reasonable flesh at 4.7 kg; not anemic or obviously dehydrated; no discernible injuries; but unwilling to fly; and with an extremely full, pendulous, flaccid crop. The crop was so pendulous that it hung down over the breast like a pouch, with the majority of the food in the crop sitting below the top of the sternum, unable to continue its passage down the esophagus. Mutes were green, grainy and very odorous.

Blood lead and cholinesterase were tested along with a complete blood count (CBC) and blood chemistries; cholinesterase was normal at 2,020 IU/L but blood lead, at 0.16 ppm, was ranked as "exposed." Although two cycles of calcium disodium versenate twice per day intramuscularly and then CaEDTA orally, both at 35 mg/kg, removed all lead to below discernible levels, and the flaccid crop resolved with the use of a "crop bra," the bird remained reluctant to fly, especially to fly up, for over 4 months. Several work-ups and x-rays indicated no discernible problem. Ten months later, she remains in a large (100' x 40' x 20') aviary at California Foundation for Birds of Prey and is finally flying normally; she will be released after conditioning.]

Case II: Organophosphate Poisoning in a Bald Eagle

Presentation

A call was received on Saturday, February 7, 1998, that an adult bald eagle had been found lying in a grass seed field. On approach by the finder, the bird would raise its head, but was unable to stand. In collecting this bird from the very muddy field, it was apparent that the onset of its problem had been acute, as the tail and wing feathers were not frayed or muddy from being on the ground for any length of time. The eagle was able to move its wings, but had rigid paralysis of the feet and legs - the only movement was a spastic tightening of the already tightly clenched toes.

Muscle mass was good, weight was normal at 4.7 kg, mucous membranes somewhat pale; pupils would occasionally dilate and contract spastically. There was good cloacal tone, no palpable fractures, and normal deep pain response and reflexes. Initial blood values done in-house (PCV of 47% and total solids of 3.0 g/dL) were normal. Toes were clenched so tightly that it was very difficult to place padding between the talons and plantar surface of the foot to prevent self-inflicted injury.

Bald eagle. (Photo by Marge Gibson.)

Diagnosis

Diagnostic rule-outs included head or spinal trauma, lead poisoning, and pesticide toxicity. The rigid paralysis and presentation in an agricultural area led to a tentative diagnosis of acute cholinesterase-inhibiting pesticide poisoning (Dumonceaux and Harrison, 1994). However, treatment of both lead poisoning and organophosphate poisoning was initiated while waiting for laboratory confirmation (see Table 2). Although there was no way to be certain that the presumptive diagnosis of pesticide poisoning was indeed due to an organophosphorous compound, rather than a carbamate, the rapid response to treatment would indicate that it was OP toxicity.

Treatment

Along with treatment for a "shock-like syndrome" (dexamethasone sodium phosphate at 4 mg/kg intravenously, B-complex vitamins at 30 mg of thiamine/kg intramuscularly, bolus IV fluids of 48 mL LRS and 60 mL LRS orally), immediate treatment was initiated for OP toxicity: 0.02 mg/kg atropine intravenously and 220 mg/kg activated charcoal orally. (Activated charcoal doses in the referenced formularies show a wide disparity; the dose selected was within the range but essentially heuristic.)

Although there was no food in the crop in this case, removal of food would be important in such acute onset poisoning. Given the similarity with the lead poisoning case two months prior, chelation therapy (35 mg/kg calcium disodium versenate IM) also was initiated in case the bird's problems were arising instead from ingestion of lead.

Four hours after intake, a second dose of atropine at 0.5 mg/kg was given intramuscularly, along with 120 mL LRS and more activated charcoal at 440 mg/kg orally. The two primary formularies used by the authors provided widely varying doses for atropine; the choice was ultimately made to follow the higher dose — 0.5 mg/kg, as used by Porter, 1993, and annotated in Carpenter et al, 1996, specifically for raptors with suspected OP poisoning. A quiet environment, heat, fluids and antifungal medication were maintained throughout the course of treatment.

Day 2: The bird was more alert, and the toes seemed a little less tightly clenched, though the legs were still very rigidly extended. She had regurgitated some activated charcoal during the night. Droppings looked nor-

mal and by afternoon they were containing the activated charcoal administered the evening before. Oral fluids (60 mL LRS/D5) were administered early and, two hours later, atropine at 0.5 mg/kg was administered, half intramuscularly, half intravenously, along with bolus IV fluids of 48 mL LRS; calcium disodium versenate was administered intramuscularly, and itraconazole was initiated at 10 mg/kg as a prophylactic against aspergillosis. No further activated charcoal was administered. Oral fluids were continued throughout the day to assist with flushing whatever toxin might remain in the GI tract. Despite copious mutes passing the activated charcoal, the bird also continued to regurgitate small amounts of charcoal throughout the day. Atropine at 0.5 mg/kg was given intramuscularly in the evening.

Day 3: The eagle had turned herself around in the hospital cage, though was still recumbent with legs rigidly extended. Morning treatment included 60 mL LRS/D5 and itraconazole orally, atropine and chelation, intramuscularly. Blood was drawn for CBC as well as blood lead and cholinesterase levels (Table 2). At mid-day, the bird ate willingly parts of day-old chicks, without head, wings, unfeathered portions of legs, cut into small pieces and supplemented with bone meal, calcium and vitamins. Oral CaEDTA (also at 35 mg/kg) and itraconazole were given in the evening, along with food (four chicks, force-fed). Atropine was discontinued on the advice of Dr. Redig because of its slowing effect on intestinal motility.

Day 4: The bird was calm but not interested in eating. Morning treatments were oral CaEDTA, itraconazole, 50 mL LRS/D5 orally, and four chicks force-fed. Test results received during the day showed cholinesterase levels at 64 IU/L, severely depressed from the normal levels of 2,000 IU/L (see Table 2); CaEDTA was discontinued. Oral fluids and itraconazole were continued.

Day 5: The eagle was very feisty and uncooperative, up on her hocks and moving around well, although not standing. Some cut-up food was eaten voluntarily, some was force-fed. Oral fluids, 60 mL LRS, were administered twice per day, along with itraconazole. On Day 6, the bird regurgitated some fish that had been force-fed, but also ate some voluntarily; the crop was emptying and mutes were normal. LRS was gavaged once, and itraconazole administered twice per day. By Day 7, though still not standing, the bird was very strong and becoming difficult to handle and feed. Itraconazole was decreased to once per day. By Day 9, the bird was standing. Ball wraps placed on her feet to protect them from self-inflicted talon punctures were replaced on Day 10 with inter-digitating padded wraps. Although she did not eat, she managed to bathe her head in her water bowl. She was perching by Day 12, becoming quite defensive during handling, and was moved to an outside enclosure. Despite her lack of appetite, difficulty to force-feed and occasional regurgitation, her weight dropped only 50 g in the 12 days of treatment; blood values stayed normal, despite the extra fluids pushed through her system — PCV fell only 2% to 45%, while total solids increased to 3.8 g/dL.

Progress and Outcome

This case progressed very rapidly, unlike some pesticide poisoning cases, which can take months for recovery. Given the apparent response to therapy, it is assumed that the agent was an OP. On Day 17, blood cholinesterase levels showed a ten-fold increase, all neurological signs were resolved, and the bird was transferred to a large flight cage for conditioning. This bird needed no urging to self-exercise (some birds need gentle hazing), flying strongly from one end to the other. She was released on Day 27. She was in excellent condition and it was felt that she was in actual danger of injuring herself or breaking feathers if kept in captivity, being extremely restless in the flight cage, flying at full speed into the shadecloth walls.

Conclusions and Summary

Raptors can be susceptible to toxins ingested incidentally in the consumption of contaminated food items. They are, in fact, uniquely positioned to be affected by poisons that bioaccumulate, as well as the ingestion of lead from their whole food diet. The cases described in this paper were challenging because of the lack of previous experience with poisoning cases and the presentation of both cases on weekend evenings, exacerbating the normal delay between laboratory sample submission and receipt of results.

Although the flaccid paralysis in the first golden eagle and rigid paralysis of the bald eagle were indicative of poisoning, other definitive signs were lacking. The second golden eagle received with lead poisoning lacked both classic neurological signs and signs of debilitation but did have distinctive droppings. Presumptive diagnoses were necessary so that treatment could be initiated immediately. Certainly the size and strength of an eagle present their own unique challenges in terms of housing, handling, and conditioning. The authors are very grateful for the opportunity to assist these birds in returning to their natural habitat.

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Table 1. Blood Profile - Golden Eagle

	Day 4	Day 11	Day 25	Day 39	Day 54	Normals†
Cholinesterase (IU/L)	1805					20,001
WBC Count	23,800	32,000	25,100			11,700-14,700[2]
WBC Estimate			15,300 - 17,300	8,000 - 10,000		
Hematocrit (%)	25	34	43	54		35-47[2]
Heterophils (%)	95	92	90	78		75 (13)[3]
Lymphocytes (%)	5	6	3	14		18 (10)[3]
Monocytes (%)	-	2	6	6		3 (3)[3]
Basophils (%)	-	-	1	2		Rare [3]
Thrombocytes	adequate	adequate	adequate	adequate		
Remarks	a	a,b,c,h	b,d,e,h	b,f,g,h		
Plasma Protein (g/dL)	3.0		5.1			2.5-3.9 [2]
Reticulocyte Est.	1+	2+		1+		
Blood Lead ppm*	0.29	0.14	0.11	0.08	0.08	

NOTE. Remarks: (a) heterophils appear moderately toxic, (b) slight polychromasia, (c) slight anisocytosis, (d) moderate anisocytosis, (e) few reactive lymphs present, (f) cells do not appear toxic or reactive, (g) few immataure RBC's present, and (h) no blood parasites seen.

Abbreviation: WBC, white blood cell.

* Blood Lead reference range given by V.D.S.-IDEXX Veterinary Services: < 0.06 ppm considered normal; 0.06-0.35 ppm indicates exposure; > 0.35 ppm, toxic levels.

† In the Normals column, note the following:

1. Bennett.[8] A decrease in acetylcholinesterase of 50% from normal is considered diagnostic of organophosphate or carbamate pesticide poisoning.
2. Wildlife Rehabilitation Database,[9] which sites multiple sources.
3. Redig,[10] Tables of selected hematology reference values, Bald Eagles, p 38. Parentheses indicate standard deviation

Table 2. Therapeutics

DRUG	DOSE/ROUTE	REFERENCE
Activated Charcoal (Toxiban™, 104 mg activated charcoal/ml; Vet-A-Mix, Shenandoah, IA)	2-8 mg/kg PO, use 1 g in 5-10 ml water	Carpenter et al, [5] p 147
	2-8 g/kg PO as needed	Ritchie et al,[6] p 470
Atropine (Atropine Sulfate, 15 mg/ml or 0.54 mg/ml; Amvet, Yaphank, NY)	0.5 mg/kg, _ IV, _ IM	Carpenter et al, [5] p 146
	0.01-0.02 mg/kg IM, SC as needed	Ritchie et al,[6] p 470
Calcium disodium versenate (CaEDTA) (200 mg/ml; 3M Pharmaceuticals, Northridge, PA)	35 mg/kg IV, IM q 8 hr x 3-4 days, off 2 days, repeat til asymptomatic	Carpenter et al, [5] p 145
	20-40 mg/kg IM, BID-TID	Ritchie et al,[6] p 470
Calcium Disodium EDTA (Meta-Dote®, 50 mg/ml; Anpro Pharmaceutical, Arcadia CA)	35 mg/kg IV, IM q 8 hr x 3-4 days, off 2 days, repeat til asymptomatic	Carpenter et al, [5] p 145
	20-40 mg/kg IM, BID-TID	Ritchie et al,[6] p 470
Dexamethasone (Dexamethasone Sodium Phosphate, 4 mg/ml; Steris Laboratories, Phoenix, AZ)	2-4 mg/kg IM, IV 1q 12 hr	Carpenter et al, [5] p 131
	1 mg/kg IM or IV	Ritchie et al,[6] p 471
Enrofloxacin (Baytril®, 22.7 mg/ml for injection, or 68 mg tablets; Bayer, Shawnee Mission, KS)	5-15 mg/kg PO, IM q 12 hrs	Carpenter et al, [5] p 99
	5-15 mg/kg IM, PO SID to BID	Ritchie et al,[6] p 471
Itraconazole (Sporanox®, 100 mg capsules; Janssen Pharmaceuticals, Titusville, NJ)	5-10 mg/kg PO q 12-24 hrs	Carpenter et al, [5] p 109
	5-10 mg/kg PO BID	Ritchie et al,[6] p 472

Penicillimine (Cuprimine®, 125 mg capsules; Merck Sharp & Dohme, West Point, PA)	30-55 mg/kg PO q 12 hrs	Carpenter et al, [5], p 138
NUTRITIONAL SUPPORT:		
Vitamin B complex (B Complex 150 Injection; Butler, Columbus OH)	dosed by thiamine at 1-3 mg /100 g IM weekly	Clubb,[7] p 345
	dosed by thiamine at 1-3 mg/kg IM, weekly	Ritchie et al,[6] p 474
Pet-Tinic® (SmithKline Beecham, West Chester, PA)	as needed; used by authors at 1-1.5 ml/kg BID in tube-feeding formulations or injected into food items for anemic birds	
Amino Acid Oral Solution (Phoenix Pharmaceutical, St. Joseph, MO)	as needed; the authors typically use 5 ml/kg BID in tube-feeding formulations for anorexic birds	

Abbreviations: PO, orally; IV, intravenously; IM, intramuscularly; SC, subcutaneously; q, every; BID, twice per day; TID, three times per day; SID, once per day.

Table 3 : Cholinesterase and CBC: Bald Eagle

	Day 3	Day 17	Normals†
Cholinesterase (IU/L)	62	617	2000‡
WBC Count	18,000	11,000	12,849 (4,769)
Hematocrit (%)	38	37	44 (4)
Heterophils (%) Heterophil Bands (%)	90 1	84	75 (13%)
Lymphocytes (%)	4	11	18 (10)
Monocytes (%)	4	4	3 (3)
Eosinophils (%)	1	1	
Thrombocytes	adequate	adequate	
Remarks	a,b,c,d	a,b,c,	
Plasma Protein (g/dL)	4.1	3.7	
Reticulocyte Est.	1+	2+	
Blood Lead*	none detected		

NOTE. Remarks: (a) no blood parasites seen, (b) slight polychromasia, (c) few reactive lymphs present, and (d) RBC morphology appears normal.
Abbreviations: CBC, complete blood count; WBC, white blood cell; Alk. Phos., alkaline phosphatase; SGPT, serum glutamic-pyruvic transaminase; ALT, alanine aminotransferase; SGOT, serum glutamic-oxaloacetic transminase; AST, aspartate aminotransferase; CPK, creatinine phosphokinase; LDH, lactic acid dehydrogenase; A/G, albumin/globulin ratio; RBC, red blood cells.

Blood Chemistries: Bald Eagle

	Day 17	Normals†
Alk.Phos. (IU/L)	37	57 (12)
SGPT (ALT) (IU/L)	27	24 (13)
SGOT (AST) (IU/L)	449	218 (63)
CPK (IU/L)	1304	
LDH (IU/L)	787	
Albumin (g/dL)	0.8	1.09 (0.18)
Total Protein (g/dL)	2.9	4.0 (1)[a] 3.51 (0.75)[b]
Globulin (g/dL)	2.1	
Cholesterol (mg/dL)	130	
Glucose (mg/dL)	339	302 (25)
Calcium (mg/dL)	8.1	9.94 (0.45)
Phosphorus (mg/dL)	2.7	3.03 (0.51)
Potassium (mEq/dL)	2.1	3.0 (0)
Sodium (mEq/dL)	155	156 (4)
A/G Ratio	0.4	
Uric acid (mg/dL)	1.8	5.07 (3.33)[c]

* Blood Lead reference range provided by V.D.S./IDEXX Veterinary Services: < 0.06 ppm considered normal; 0.06-0.35 indicates exposure; > 0.35 toxic levels
† All normals provided, with the exception of cholinesterase, are from Redig,[10] tables of selected hematology reference values, Bald Eagles, p 38-41. Parentheses following values indicate standard deviation; a) p 38; b) p 40; c) post-prandial samples
‡ Bennett.[8] A decrease in acetylcholinesterase of 50% from normal is considered diagnostic of organophosphate or carbamate pesticide poisoning.

Yours to Protect

Keeping wildlife safe in your care

By Marjorie J. Gibson

ABSTRACT: When animals are in our care during the rehabilitation process, they must depend on us, the wildlife rehabilitator, to make choices for them. These involve not only the best treatments for injuries or illness, but protection from physical harm in captivity as well. Predator control methods are presented as well as solutions to other problems that occur when wild animals are in temporary care. This article is meant to help the wildlife rehabilitator anticipate most common problems before they happen.

KEY WORDS: Predator control, wildlife housing, aviaries, wildlife poisoning, captive wildlife care, household hazards to animals, bumblefoot, wildlife rehabilitation, raptor care.

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Few people realize the complexity of caring for wildlife that will be returned to the wild. Wildlife rehabilitators are uniquely qualified to address this most difficult of captive management situations.

When an animal comes into our care, the first thought is to treat its injuries. While that is certainly an appropriate concern, other factors including safe housing and appropriate food are also important. There are numerous possible problems that are difficult to anticipate, but rehabilitators must avoid difficulties before they occur.

Accidents that occur to wildlife in captive situations take their toll not only on the animals but the rehabilitator as well. It can be devastating to lose an animal from an unrelated incident following an otherwise successful rehabilitation. To have an animal ingest poison-laced donated meat, become permanently disabled, or die due to an accident that happens during captivity is something a rehabilitator does not expect. Unfortunately such events do occur.

Rehabilitators must share with each other our tragedies as well as our success stories. In this manner we can gain additional valuable experience and avoid mistakes before they become personal experiences.

Accidents will happen regardless of the care exercised. It is not fair for rehabilitators to shoulder all the responsibility of every situation. However, this paper is designed to help the rehabilitator think ahead and learn to evaluate and avoid potential problems. By eliminating weak spots in our program, we will be better able to prevent many tragedies before they happen. By investing a few extra minutes evaluating a problem, we can help prevent possible catastrophe.

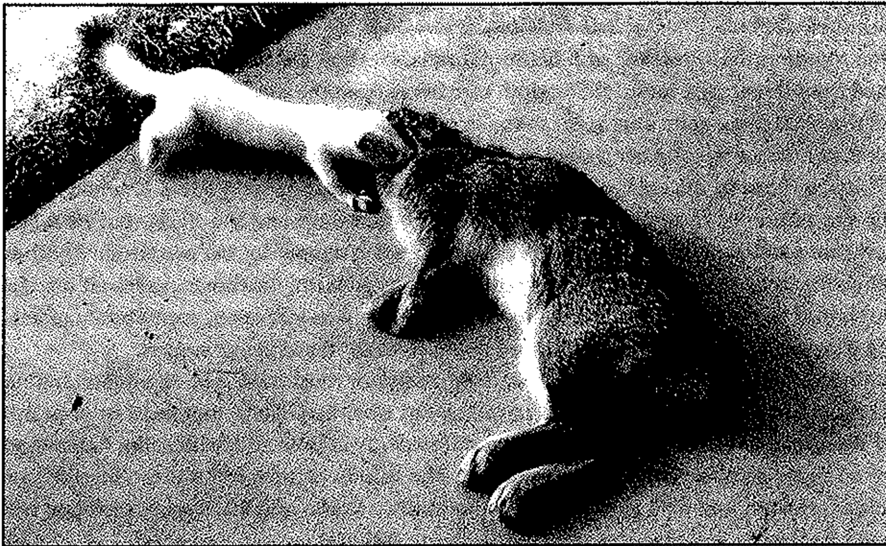
First Things First

It is natural human compassion to want to help the injured and the sick. With wildlife rehabilitators this role extends to wildlife of all descriptions. Emotions and adrenaline run high when an injured animal is presented. Every detail of care and treatment is carefully considered. Almost without exception, rehabilitators strive to provide optimal care for their wild patients. This can take the form of veterinary treatment, nutritional needs, and housing. However, problems frequently arise after the urgency of initial care subsides. Many of those same animals, given first class care initially are destined to die later in captivity due to accidents that might have been prevented.

Why does this happen? Well, some of it has to do with our own physiology. Adrenaline and other hormones call us to action in an emergency situation (Bennett, Plum, 1996). Our minds and bodies are functioning at peak efficiency in this supercharged chemical state. Once the crisis has abated, the hormones dissipate and allow for a more relaxed state. Other responsibilities and demands necessarily shift our full attention away from the stabilized animal. Now experience, open lines of communication, and networking become critical. For example, networking with other rehabilitators, talking, and demonstrating both successful methods and persistent problems can add to our caging expertise and understanding of animal behavior. Unfortunately this kind of exchange among rehabilitators does not always occur, probably due to grief or embarrassment.

Predators and Caging

Wildlife housing and predator-proofing is frequently misunderstood and its importance underestimated. The result may be the premature escape of the patient,



This weasel was photographed killing a cottontail rabbit and then dragging it away. Weasels can easily fit through wire that many would consider adequate to keep animals safely confined. Keeping predators out of housing is as important as keeping rehabbing animals in. (Photo by Donald R. Fliemer.)

further injury, or even death.

Some rehabilitators feel that predator guards are not necessary when housing predator species. The thought is that if a skunk or a weasel does get into a cage that houses a great-horned owl, red-tailed hawk, or an eagle, they will be dispatched and become dinner for the winged predator. Perhaps that would be true in a wild situation; however, it must be noted that this is frequently not the case when the bird or animal is captive and compromised in some manner. Even a predator's first line of defense in the face of a threat is to flee. Captivity removes this option.

Part of a raptor's method of killing is to dive on its prey from great heights, stunning the animal with the force of the blow. The unconscious animal is then quickly dispatched in a manner that is safe to the raptor.

It is true that raptors have great power in their talons. When recovering from an injury, however, they are not at peak efficiency. Certainly the bird may still be able to "foot" the approaching animal, and may be capable of killing smaller animals. However, to assume they can kill large prey without utilizing the speed-diving aspect of their hunting technique and rendering the animal unconscious before killing it, is both dangerous to the predator and inhumane to the prey animal.

Prey in the natural world occasionally kill raptors and other predators during capture. Weasels are notorious for being capable of killing animals much larger than they are [see photo above]. An animal that is compromised due to health or injury is frequently not capable of killing, nor should it be expected to defend itself against an interloper that ventures into its caging.

Animals furred, feathered, or scaled try to gain access to our facilities for the most basic of reasons. That reason is survival. They are there for food, either what is being fed to the captive animals or the captive animals themselves. Wild predators are not evil, and there is no "lesson" for them to learn about not invading captive animal or wildlife rehabilitation facilities. They are acting naturally and are within their own home range. Wildlife do not understand false boundaries, such as fences. If wild animals are hungry, they locate food and eat, so steps must be taken to make access to food impossible. The responsibility of protecting animals in captivity falls to us, the wildlife caretakers.

To protect your facilities it is important to research your particular region and fully understand what steps must be taken to protect animals in your care. If the need is to prevent access by a digging predator keep in mind that many mammals can dig holes up to two feet deep within a short time. If wire is buried underground, it must be attached securely to the base of the building, particularly around corners to prevent gaps and possible portals of entry to a predator. The wire must be galvanized to prevent rusting and decomposition over time. The openings should be a small enough gauge to prevent all predators from entering.

There have been many documented cases of mice or rats gaining entry to aviaries and killing or bringing disease to songbirds in the rehabilitation process. Rats that gain entry to a mew containing small raptors frequently kill the smaller avian predator. Reptiles can gain access through a very small opening and kill small mammals and birds. Raccoons and primates use their considerable dexterity to enter or reach through cages that are less than completely secure and either harm the captive wild creature or leave an opening that allows it to escape from the rehabilitation facility prematurely (Gibson, 1996).

Predator Guards

Predator guards at their most effective should be dug straight down from the building and at least two feet into the ground. Three feet is an even better choice. Galvanized wire with 1/2-inch openings, such as hardware cloth, exclude predators that may create a hazard for the wildlife patients inside the facility. Solid sheet metal guard barriers are also an option, but usually are higher in cost.

If your region has rocky terrain, a high water table, or a soil type incompatible with the installation of such a buried guard, consider attaching the galvanized wire to the building and extending 3 feet laterally from the exterior of the building. The wire should be covered with landscape type rock, pea gravel or soil. While not as secure as a buried guard, it will

protect against most predators.

Covering the entire bottom of the cage is also an option that works for many rehabilitators. This may also help keep patients inside that might otherwise dig out. Securely attach the wire to the framework. It is important to cover the wire and the attached site with several inches of substrate. The substrate will vary with what is available. Soil, coarse sand or pea gravel works well and prevents the wire from becoming a hazard to sensitive footpads, nails, or talons.

Include predator guards in your construction plans, and be sure to include guards around door entries as well (even double door entries, which prevent accidental premature releases or escapes, need guards). It is easier and less expensive to do it at the time of construction than to add them at a later time. Do not consider building facilities without them. Most assuredly, predator problems will occur, if not immediately, then in the future. This lesson is best learned through the experience of others, not at the cost of the lives of animals in your care.

Visual barriers are also important. Solid barriers extending up 4 ft. from the ground on the sides of cages are important for animals that stay low, and a solid plywood barrier covering the entire side of the enclosure does the same job for birds that perch up high. While this aspect of caging may be mostly of psychological importance, it does prevent wild predators or domestics from seeing captive wildlife and making attempts to chase or challenge them.

Predators can come from above as well. In the case of roofing, the slats or netting should be narrow enough to prevent the foot of an accipiter or raccoon from reaching through and seizing an unsuspecting animal. A solid roofed area should be provided as a secure place that will create a visual barrier between the possible predator and the animal held for rehabilitation, as well as providing shelter in inclement weather.

KNOW YOUR LOCAL WILDLILFE

One morning the caretaker of a California rehabilitation center went out to check and feed the animals. She found shade cloth torn away from the top of the bird of prey flight. All the birds were gone except for those so compromised they could not reach the eight-foot roof. Raccoons had been seen in the yard before, but she had underestimated their ability to climb to the roof, damage the shade cloth top, and gain entry. She had taken the precaution of having a buried wire predator guard around the flight. But now she saw that a tree limb had grown over the roof, creating a ramp for the predators. Another rehabilitator had enclosures secured with a hook-type latch. Raccoons used their dexterous hands to open the latch and gain entry. The door was left open, prematurely releasing a young fox as the raccoons helped themselves to the patient's supper.

Before accepting animals into a facility, a rehabilitator must have a good understanding not only of the wildlife that will be cared for, but also the wildlife that must be kept out of the caging. Frequently they are quite different. Take time to find out the habits and peculiarities of every species in the region. The results of such self-education will be a better rehabilitator, able to give answers to public wildlife queries. It most certainly will make us better caretakers for the animals in our facilities.

PREDATION CAN BE RISKY

Accidental deaths at my own facility taught me important lessons over the years. A small alligator lizard gained access to a kestrel mew through a 1/2-inch wire hardware cloth. The kestrel attempted to grab the lizard and was instead grabbed around its own leg by the reptile. I was alerted by the scream of the bird and arrived at the unusual scene of a kestrel being thrashed, one side then the other by the reptile. The bird was rescued, and I gained valuable experience and respect for the small but powerful lizard. Had I not heard the bird's alarm call, the end result could have been very different.

Fur, Feathers, Scales, and Skin

To protect themselves from the elements, animals rely on feathers, fur, or scales. In addition to maintaining body temperature, these also aid in camouflage, physical protection, and, in many cases, are important in mating displays. They must be in good condition to function as nature intended.

A bird's feathers provide not only insulation but also the means by which it flies. This seems a simple premise perhaps, but is regularly ignored by rehabilitators who rationalize birds will somehow survive by regrowing broken feathers rapidly and magically upon release to the wild. Broken flight or tail feathers will affect a bird's flight. Such a bird may exhibit a lack of control in flight, losing the turning ability necessary to hunt or avoid predators effectively. Landing accuracy might also be affected. An otherwise healthy bird with compromised feather condition should not be considered a candidate for release unless the feathers can be imped in or the bird held through a molt. The latter may mean captivity for the bird for a year or more. A bird's very existence relies on the condition of its feathers.

Inappropriate housing is the most common factor in feather breakage or damage. Birds must be housed in facilities that are made from safe materials and that are appropriate for their stage of recovery as well. Wire must not be used on any inside surface when housing birds for rehabilitation. Educational birds that are comfortable with their captive situation or lack the ability of flight are one of the few exceptions to this rule. If wire is part of your existing caging, cover it from the inside with shade cloth or a similar product that will prevent direct contact.

The fur of a mammal or marsupial is important to the animal's health and welfare as well. Caging or housing material is not as much an issue with fur-bearing animals, but instead injury or parasite infestation is often the cause of fur loss. A small section of a hip or abdomen that has been shaved for a surgical procedure

is not life threatening, but keep in mind that even in warm climates fur aids in waterproofing and prevents hypothermia particularly during wet weather conditions. Fur cushions and protects against environmental dangers such as plant spines, sharp branches, or rocks. Fur also provides camouflage.

Reptile and amphibian scales and skin protect the internal organs from injury and bacterial infection, serving a similar function as fur for mammals and feathers for birds. Adequate mobility and camouflage must be given consideration, as well as the ambient temperature in ectotherms. Certainly the same rules apply with respect to the individual's condition as well as the environment into which it is released.

Before the release of any wild animal, be sure their fur, skin, or scales are in a condition that will give them the best chance of success.

Feet

The health and protection of the bottoms of the feet are an important part of the whole animal. Footpad problems , including injury and stress, can lead to a serious and potentially fatal condition commonly called bumblefoot in avian patients. A conscious effort is required to maintain birds held in captivity with protection of the feet in mind (Redig, 1993).

In the wild, avian species choose many different surfaces throughout the day. This occurs naturally as they hunt, roost, and nest. Their feet come into contact with a new surface with each new landing. This natural variation allows for constant stimulation of the footpad, increasing circulation and preventing pressure sores.

Raptors in captivity are subject to several conditions leading to foot problems. Perches are not as varied as they would be in the wild, leading birds to develop pressure sores, much as bedridden humans develop bedsores. Movement is compromised, and hard impact landings due, at least in part, to injuries make it impossible to land naturally.

Variation in perches should be provided for the birds. A range of perch coverings should also be provided. Natural perches with a variation in width and rough bark make a good choice. Astroturf®, a commercial brand of plastic doormat, provides excellent perch coverings for preventing bumblefoot.

For larger bodied birds such as eagles, consider padding the perch first with "egg crate" mattress padding, then covering it completely with Astroturf®. All the foam padding must be covered with the Astroturf®, duct tape, or something equally effective so the birds do not pull at and ingest it. Plush pile carpet is an option for indoor perching, but must be kept dry. Wet carpet dries slowly and acts as a haven for bacteria and fungi. Looped carpet can catch talons, so must be avoided. Sisal or hemp rope perches have been used in the past and are still used in some centers with mixed success. It does maintain bacteria and fungus when used outdoors or in moist climates. The fine but stiff hemp fibers in hemp-wrapped perching can break off, however, penetrate the delicate footpad, and cause a deep abscess that can develop into bumblefoot (Gibson, 1996).

A wild bird landing is a vision of elegance and control. Even heavy birds such as eagles land lightly and with precision. When compromised with a wing or leg injury, control is taken away. Even jumping a short distance to the floor creates an impact that is rare in the natural world. Keep this in mind when selecting substrate for covering the floor of the mews or flight room.

Flighted birds will not encounter as much difficulty as non-flighted birds. Rounded pea gravel is a good choice, whereas gravel that is sharp may injure or cut the birds' feet upon

Enclosures should include a "safe area" for protection from sun as well as from disturbance by predators or humans. The natural plantings in this great-grey owl's enclosure enhance the bird's comfort and lower stress. A buried predator guard and varied perching surfaces all help ensure safety and health. (Photo by Marge Gibson.)

landing. Test it yourself with your hand or your own foot. That is a good indicator as to how it will affect the birds' feet as well.

Waterbirds and shorebirds have a different set of foot and hock problems. Sandpipers through geese and swans are affected. Many tend never to perch in the wild. Extra attention must be given to the flooring and substrate when housing these species. Some water birds spend much of their time in the water with no weight on the footpad at all. In fact, the movement of water many hours a day provides a constant massage to stimulate circulation. Think of the birds' natural situation in the wild when making flooring decisions. They should not be housed on cement floors for long. Towels as floor coverings contribute to rapidly developing foot problems as well. Supply them with a natural substrate they would encounter in their wild environment, such as sand or piled rocks.

Shorebirds should never be housed on cement. When birds cannot be housed on sand, newspaper over bubble wrap, changing the newspaper frequently, works well. Unhappy experience has shown that kitty litter as substrate, though it may at first appear to be a reasonable alternative to sand, takes only a few days to seriously damage the feet of waders. Shorebirds do best with damp sand, preferably a few inches deep, and lots of water to walk in (Grey, 1999).

The Food You Provide

Wildlife rehabilitation is, by the most generous description, underfunded. Caring for herons, bobcats, raptors, and other carnivores can be enormously expensive in terms of food bills alone. To alleviate some of the cost, many rehabilitators use donated food items. The food we feed patients in our care must come under scrutiny, especially when donated.

When accepting donated meat, or wild game secured by someone not known to you personally, it is important to take information on the individuals donating the food items. A simple form with the name, address, and phone number as well as the items donated is sufficient. The food itself is then marked and dated in some manner. This will deter those that would bring poisoned meats masquerading as wildlife food. This may seem like an extreme precaution, but my own experience just a year ago has encouraged me to make this step mandatory at my own center.

It is also important to understand that many species of animals are hunted using lead shot. Pheasants, grouse, and small mammals such as rabbits and squirrels are in this category. Before you feed these to animals in your care, x-ray them for evidence of lead shot. It you are unable to x-ray them, do not use them. It only takes one piece of lead to subject a bird to lead poisoning.

LAB RAT HAZARDS

The raptor rehabilitator made her routine weekly check with the university laboratory that supplied rats and mice from terminated experiments. Sure enough, there were some euthanized rats in the "disposed" freezer. As this lab routinely used CO_2 for euthanasia in animals to be used for food, no questions were asked. The rats were taken home and eventually fed to raptors. Several meat-eating birds died after consuming the animals donated that day. On investigation it seemed that the new "animals man" had not been told of a use for the rodents subsequent to the end of the experiment. He had used the recommended cocktail of barbiturates called Beuthanasia to kill them.

Before securing rodents from research facilities as food items, key persons should be questioned as to the method of euthanasia. If you notice any unusual smell or consistency of the animals, discard them. Do not chance feeding possibly tainted or spoiled food to animals in rehabilitation. Occasionally research animals may be euthanized with methods other than CO_2. This fact may not be noted by the facility unless the question is specifically asked.

A bird with broken primaries is not a candidate for release unless the feathers are imped in or the bird is held through a molt. This red-tailed hawk with damaged feathers would not survive in the wild. (Photo by Marge Gibson.)

Domestic and Companion Animals

It is hard to think of a domestic pet, family friend and protector, as being a hazard to the wild ones in our care. However, no matter how terrific the cat or dog is with the family, wildlife may well be seen by the pet as a prey item or even an interloper. Even in the case of an elderly pet or those that have shown themselves trustworthy with wildlife in your care, it is unnatural for wild animals to trust those that could be predators. Therefore domestic pets and wildlife in rehabilitation should be excluded from

visual and auditory contact with each other if at all possible. This practice is consistent with sound wildlife rehabilitation practices.

A rehabilitator is not doing any favor to fawns, for instance, by allowing the family dog to snooze or interact with them, even through a fence.

Young wild animals must be reared as their species would be naturally. A mother deer would never allow a predator near her youngster. Fear of predators, be it human, domestic pet or other native wildlife species, is healthy and necessary for wild animals to survive in their natural environment. Without that fear, wild animals are given a death sentence upon release. It is important to consider the reaction of the natural parents. Emulate those protective mechanisms as closely as you can.

Wild birds and small mammals naturally react with alarm to cats, dogs, or large reptiles. Their natural instinct is to flee. Many rehabilitators have at least one story to tell of a companion animal causing a wild patient death or compounding an injury that already existed.

Wild animals of all species need to have a place where they can feel protected and secure. This need is part of their survival instinct. Protected space can come in the form of opaque barriers, roost boxes, or mock dens, as long as it provides privacy and a feeling of security to the animal. This statement is true not only for wildlife during the rehabilitation process, but those on exhibit in educational facilities as well. It lessens the stress that can take a toll on their immune system.

Domestics, exotic companion animals, and livestock may share certain diseases with wildlife, so it is a good rule to avoid using pens, cages, or feeding dishes for wildlife that have previously been used with domestics. Diseases vary across regions and can be passed between species in many ways, including when deer or elk touch noses through fences or when wild and captive populations share food sources. House wildlife, livestock, or poultry in separate parts of your property.

Electrical Shock

Electrical plugs, extension cords, and wires are a poor mix with animals. There are times when a heat lamp or a heat source is needed. Be certain that the animals in your care are not capable of chewing through the cord and electrocuting themselves. Exposed wires are also capable of causing a fire.

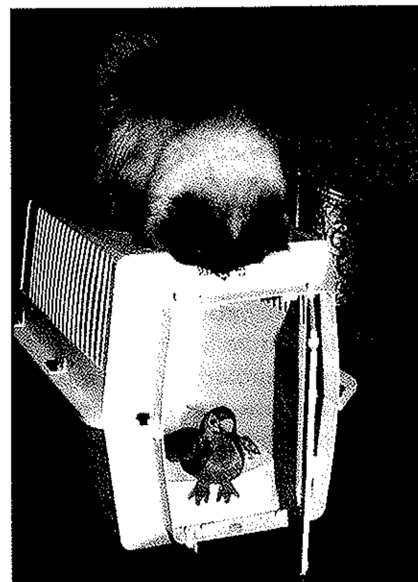
When used in conjunction with birds, keep all wires fixed tightly to the walls or ceilings. Birds of almost any variety will look for the highest perch available. A cord draped near the ceiling looks like a perch to them. They will try to land on it, frequently taking the cord, lamp, and its attachment to the floor. If a light bulb is involved, a fire can be the outcome. If a broken bulb results, animals can cut themselves. Some species may even ingest the glass from broken bulbs with unhappy results.

Before using any electrical equipment or appliance, consider the capability of the animals being housed. Take a minute to think like they do. Does this animal chew, or have sharp nails or talons that could penetrate the protective coating on the wire? Raptors can mistake cords for reptiles, in many cases their natural prey. Some mammals are playful and may manipulate the cords. Very compromised animals can sustain burns if they are unable to move away from the heat source as it gets too hot. If there is any chance of a problem, it is always better to err on the side of being too cautious.

Household Hazards

The same problems and products that create hazards to domestic pets create danger for wildlife in rehabilitation (Ritchie, Harrison, Harrison, 1994).

Open toilet bowls or standing deep water, even in a sink filled for dishwashing, are a drowning hazard that cannot be underestimated. While preparing this paper I interviewed many rehabilitators. Most had per-



This bird is fake but the cat's curiosity is real. Companion animals and wildlife shouldn't mix. (Photo by Alicia T. Bailey.)

sonal experiences with birds or small mammals drowning in toilets. Bathrooms are perfect first flight rooms for young birds just learning to fly. They are small rooms, frequently without the additional hazard of windows. However, the problem of standing water in a sink, tub, or toilet is a danger of major proportions.

Windows kill birds that are trying to get out the same way they kill birds hitting them accidentally from the outside. If you have windows in a room used to test-fly young or rehabilitated birds, cover them with curtains, a sheet, or newspaper before test flights to prevent accidents.

The list of chemical hazards in household products seems endless and grows with each new "miracle" discovery, particularly if it utilizes an aerosol. Home products that cut cleaning chores and make the home smell fresher can be particularly dangerous for sensitive animals.

Polytetrafluoroethylene (PTFE) gas, released when various nonstick surfaces such as Teflon overheat or burn, has long been noted as a respiratory toxin in birds (Klucinski, Targowski, Holt 1997). Nonstick pans have made cooking clean-up a joy, but use them with care around birds. Never let them overheat or burn and always use ventilation when

cooking. Even nonstick-coated breadmakers have been tracked to bird deaths. Nonstick-coated space heaters pose a definite danger and should not be used with any wildlife or domestic pets.

Scented candles and air fresheners make the smell of animal cages less noticeable to the human nose. Unfortunately, these products come with fumes that can be fatal to birds

Carbon monoxide is a hazard not only for humans, but for animals as well. For animals in a heated area with no ventilation, a carbon monoxide detector will sound an alert to possible problems. Animals need far lower levels than humans to become sick or die from exposure (Dumonceaux, Harrison, 1994).

Pesticides used to control both indoor and outdoor pests can also be an irritant, and can sicken or even kill animals in temporary care. Use them only with extreme caution. Consider some of the safer alternatives to chemical pesticides (Tucker, 1998).

A good rule of thumb is strong scents or fumes are to be avoided especially in young animals and avian species. Even if not noticeable to the rehabilitator, it may be a hazard to pets or wild animals in your care.

CAT ON A CAGE

A well-meaning rehabilitator would occasionally phone me with her tales of woe. She just could not seem to get injured adult birds to a releasable condition. During phone conversations we checked and rechecked the food, water sources, and caging. All seemed to be in order. She took a skills class, with no improvement in release statistics. She was frustrated. She was doing everything right. "What's wrong with me?" she asked in anguish. One day I was going to be in her area. She was very happy to have me stop. In fact she was worried about a goldfinch that had hit a window and had a droopy wing. She was keeping it quiet and supplied with good food and clean water. It took me about five seconds to diagnose the problem that she had overlooked for three years. The bird room off her kitchen was warm and pleasant, and filled with hanging plants designed to make the birds feel comfortable as they healed. And there lying on top of the goldfinch cage was a huge cat. "He's old," she said. "Wouldn't hurt a feather on any of the birds." But the birds didn't know that. They were bouncing around like popcorn, trying to flee the proximity of a known predator sleeping on their sanctuary. It never crossed her mind that stress caused by this harmless predator would be a factor in recovery. Over-stimulating the flight/fight response puts an enormous strain on the adrenal glands, leading to exhaustion.

Unique Problems

Wildlife rehabilitation problems are unique among all captive animal needs. Domestic animals have been bred to tolerate and embrace captive situations. Many persons dealing with livestock with wild strains limit themselves to a single species. When commercial profits are involved, research and topics of care, housing, and predator protection are addressed rapidly. Wildlife applications frequently have little if any financial backing, thus techniques lag.

Wildlife rehabilitators have a difficult task, the complexity of which few appreciate. The problem involves care for many species at the same time. No commercial monies assist the learning curve in such aspects as care and housing. Perhaps the most difficult aspect of all is that the animals with which we work must remain wild. This issue in not faced even by zoos or wildlife parks that also deal with genetically wild species. The animals in the zoo or wildlife park situations are encouraged to become comfortable with human caregivers and handlers. They gradually become more tame and easier to care for over time. That is not an option with wildlife that will be returned to the wild.

Clearly each region or climate zone will have its own unique set of problems. The wildlife rehabilitator must remain adaptable. Be prepared for changes that occur not only with individual species but regions and weather conditions as well.

What is the most valuable source of information on wildlife care and captive housing? Discussion with others and self-educating on wildlife in your region are mandatory. Organizations such as IWRC and NWRA strive to bring the newest and best information to their members in order to create a better understanding of wildlife in rehabilitation situations.

The best advice that can be given is simple. There is no magic wand that will teach rehabilitators everything they need to know. There is no magic book that can illustrate all the problems that are possible to encounter during a rehabilitation experience for any one species. The situation must be thought through. Put yourself in the animal's place. See the facility from the perspective of the animal living in your housing. Learn everything possible from as many sources as possible about the animal in your care. Go beyond that point. Watch the animal in your care. Let it be the teacher. Those who spend the most time observing animals become the most successful wildlife rehabilitators.

As wildlife rehabilitators, we are in a unique, difficult yet amazing situation. We have the ability to study at close range animals that most people see only in fleeting glances. Sharing information is an invaluable source of information. Document observations and make them known to the wildlife rehabilitation community so others may benefit from your findings. The result will be a community better able to care for the wildlife with which we are charged. Wildlife will benefit, but so will rehabilitators, who will feel the satisfaction of a job well done.

Responsibility

Many years ago we did not fully understand the value and need of seatbelts in automobiles. Parents routinely carried infants and children on their laps or children frolicked unrestrained as the car moved along the

highways. My own daughter wears a small scar on her forehead due to a quick stop in a car I was driving. The stop resulted in an impact of her head on the dashboard. No seatbelts or airbags were available at that time. Deaths occurred routinely due to passengers being ejected from motor vehicles during accidents. Now baby carseats, seatbelts, and airbags all offer mandatory protection for children and adults alike.

We cannot be held accountable for what we do not know. We cannot take blame for lack of knowledge that is yet to emerge. However, just as we are responsible for learning new regulations for highway safety, as responsible caretakers for wildlife we are charged to research and have knowledge of everything that allows us to better care for our animals.

When you commit to the care of an injured or orphaned wild animal you agree by permit and implied consent to give that animal the best you can provide. With that implied consent you agree to prevent injuries and nutritional problems and to release them in as perfect condition, and as expediently as possible. You agree to release them into appropriate habitat at an appropriate time, taking into consideration migration, weather trends, and solid food base or prey availability.

These things are the responsibility of the rehabilitator. If you cannot assure that these conditions will be met by you or your facility, your responsibility becomes to find someone that can provide the conditions needed for a successful release.

Ethics

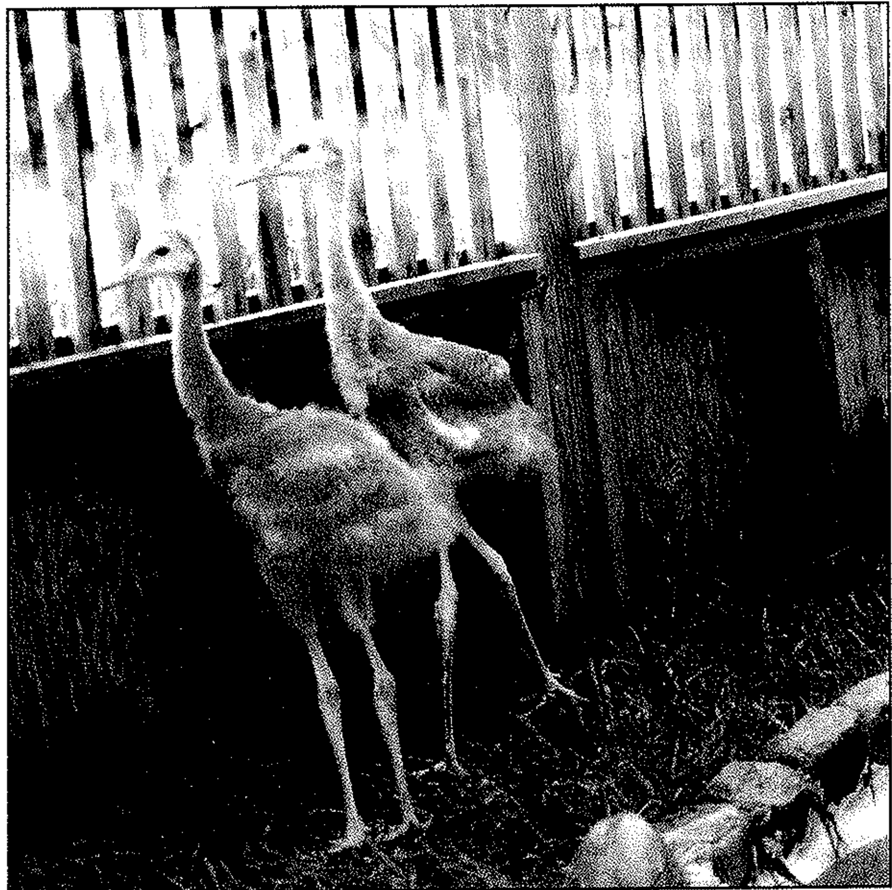
For some individual rehabilitators or center managers it seems to be a point of pride that every animal that comes into care remains at the center for its complete course of treatment. When that individual or center has the best resources for the care of such an animal, this can certainly be a valid emotion. Unfortunately, it has been alleged that such pride merely masks a less ethical motive — the desire for larger numbers at the end of the year,

KNOW YOUR FOOD DONORS

Prior to hunting season, hunters typically empty their freezer of game from the previous season. The game is professionally cut and wrapped for human consumption and should make good animal food. I accepted donations for several years, and the raptors in my center fared well with the extra variety of wild game in their diets. Most of the hunters were acquaintances and I would personally accept their donations. One busy day a nice-looking couple pulled up to the porch and began unloading a box of wrapped meat and two hind quarters of a young deer. I was in the mews with the birds and could not extricate myself before they drove off down the driveway. I called out but they seemed to be in a hurry and did not respond to my call. The timing was perfect. I had not taken food from the freezer that day to thaw. As soon as the meat thawed I fed it to the birds.

Within hours I noticed a bird perched on the floor. As she was recovering from an injury, I was concerned that she was relapsing and brought her to a smaller indoor mews for observation. When I checked on her early the next morning, her mutes were an unusual grass green color. Within hours that first bird died. She was a broadwing hawk, a rehab bird that was doing well and had eaten heartily. I raced to observe the other birds — the flight mews were deadly quiet. All of the birds had the same symptoms of poisoning, and a total of four birds were lost. Several, including my educational red-tail hawk, had liver symptoms for months following the incident. The toxin was never identified, as the meat was all ingested and the crops were empty of contents by the time the symptoms began.

We will never be sure if it was a naturally occurring toxin or if the meat was purposely contaminated. Either way, it killed birds for which I was responsible. I fed it to them. I no longer take any donations of food items unless I know the individuals.



These young sandhill crane colts move about on varied natural substrates to facilitate foot/joint health and development. The solid panel along the enclosure's side allows visibility but protects against predators. (Photo by Marge Gibson.)

or numbers of particular species, in order to bring in higher donations.

Each rehabilitator and rehabilitation center must sort out for themselves the rationale behind their decisions on this score. But the focus of these decisions should be the welfare of the animal involved. If that focus comes into question, then self-evaluation should be taken. If a young animal would be better off placed with conspecifics or a foster parent elsewhere, transfer it. If another center has more appropriate conditioning cages or access to more specialized veterinary care for a specific case, transfer it.

Conclusion

It would be impossible to identify every possible source of accidental injury or kind of accident that may occur with wildlife while in captive care. The nature of an accident is that it is not foreseen. By raising awareness to potential problems and encouraging communication with others in the field, perhaps we will be better prepared to meet the challenges of this complex field of wildlife rehabilitation.

Just as humans have learned how to use high-speed transport more safely, wildlife rehabilitation, too, has evolved. Levels of care that were acceptable even a few years ago may no longer be considered quality care. We are expected to be experts in many fields, including natural history, handling, housing, and nutrition. To meet this challenge, we must read, network, attend classes, and share information with each other. By working together, we can continue to provide the best care possible for the animals entrusted to our care.

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TOILET MENACE

Many rehabilitators have found that bathrooms make an easy-to-clean, easy-to-heat, quiet, and private place to house wildlife in care. There is one major hazard, however — the toilet. The rehabilitator may train him or herself to "always" leave the seat cover down, but a casual guest or anyone in an unthinking moment can fail to do so. Tragedy can strike with even the most experienced rehabilitators. For example, an education screech owl given the run of the house for some weeks until outside quarters were available was drawn to the toilet bowl, left open only once, for bathing or drinking. He was found drowned. He simply could not get back up the steep, slippery sides. The same story is told with passerines and small mammals. If using bathrooms for housing, be sure the animal is contained. If using the bathroom for exercise, be sure someone is present or the seat is taped shut.

A Laysan Albatross Nine-Year Reunion

By Jay Holcomb, International Bird Rescue Research Center, IBRRC, Berkeley, California

Species & natural history

Although Laysan albatrosses are commonly seen feeding offshore from California to Alaska, they are rarely found on the mainland. They nest on islands in the remote areas of the Pacific Ocean and can fly hundreds of miles a day in search of food. Laysans have a ten to twelve foot wingspan designed for soaring and traveling long distances. Studies have shown that an individual bird can spend a year or more at sea, never touching land.

Albatrosses are just one of the seabird species that have an unusual habit of landing on ships, most likely thinking they are land. It is not unusual for International Bird Rescue Research Center (IBRRC) to get a few calls a year from local shipyards, with reports that while unloading cargo they discovered an albatross hidden between boxes or cargo containers. They usually come to us in their breeding season when they would normally sit on an island for weeks at a time, mating, courting, and establishing territories. We believe this is why they land on boats and don't leave. They think the boat is land. These birds are usually in good condition and just can't get airborne. Most birds spend under a week at the center and are then taken by boat and released about 25 miles offshore.

How the bird was obtained

On March 26, 1979, a Laysan albatross was found wandering around the streets of San Francisco. The bird was captured and brought to IBRRC in Berkeley, California.

Problems, concerns

An examination revealed that all of the primary and secondary feathers on both of the bird's wings and all of the tail feathers had been clipped about halfway down the shaft. We could only assume that someone thought this bird would be a good pet and clipped its wings. The bird was otherwise in good condition.

The question then was, what do we do with a flightless albatross? Holding this bird until it completed its annual molt in October was not a good option for various reasons. These birds are difficult to keep in captivity as they rarely self-feed and are always aggressive and difficult to handle. They prefer to just sit around and in order to prevent secondary husbandry problems such as feather damage and foot and keel sores we keep them floating in pools at all times. They do not like this and it means that they usually have to have a pool to themselves as they are very intolerant of other birds in such close quarters and annoyed that they can't get out of the water. These factors can all add up to a lot of stress for a bird, making them susceptible to aspergillosis and other diseases. The bottom line in albatross rehabilitation is to keep them floating in clean water while in captivity and get them released as soon as possible.

Comments on Rehabilitation

After reviewing all the facts, the idea of imping the bird's feathers was brought up. Imping was originally developed by falconers. It is a feather splicing technique where a whole feather that matches the broken one is cut to fit, with the other feather making a whole feather. The feather shaft is then plugged or splinted internally with something light but strong like thin wire and then glued to the broken feather creating the whole feather. This partially "fake" feather should replace the broken one until the bird molts and grows a new whole feather. That may be fine for a

NEW SECTION DEBUTS...

Statistics show that every year tens of thousands of wild animals are admitted to rehabilitation centers in the United States alone. Many are released back into the wild, but what happens to them next? Most of the animals that we release are never encountered again. However, many rehabilitators have stories to tell of animals they meet again, after release. Each case is significant and interesting. They not only give us hope that the rehabilitation of wildlife can succeed, they offer us another way to evaluate our work. Up until now there has not been a place where wildlife rehabilitators could share individual stories with the rehabilitation community at large. This column was created to help fill that gap.

You may encounter critics who say that there is absolutely no way that you can rehabilitate a raptor chick, an oiled bird, an orphaned mammal, or any wild animal for that matter. This column is as much for our critics as it is for us. We invite you to participate by contributing your own rehabilitation "success stories." You do not have to be a writer or editor. Just follow the basic story format below and give us the information in your own words — no writing expertise is necessary. We will then contact you to get the full story. Send your stories to IWRC, 4437 Central Place, Suite B-4, Suisun, CA 94585-1633, or e-mail iwrc@inreach.com.

Story Format:

1. Species & pertinent natural history information appropriate to the story.

2. How the animal was obtained, found, or captured.

3. Problems or concerns: circumstances, injuries, or illnesses.

4. How the animal was rehabilitated: specific techniques.

5. The release: where, why the site was chosen, and how the animal was released.

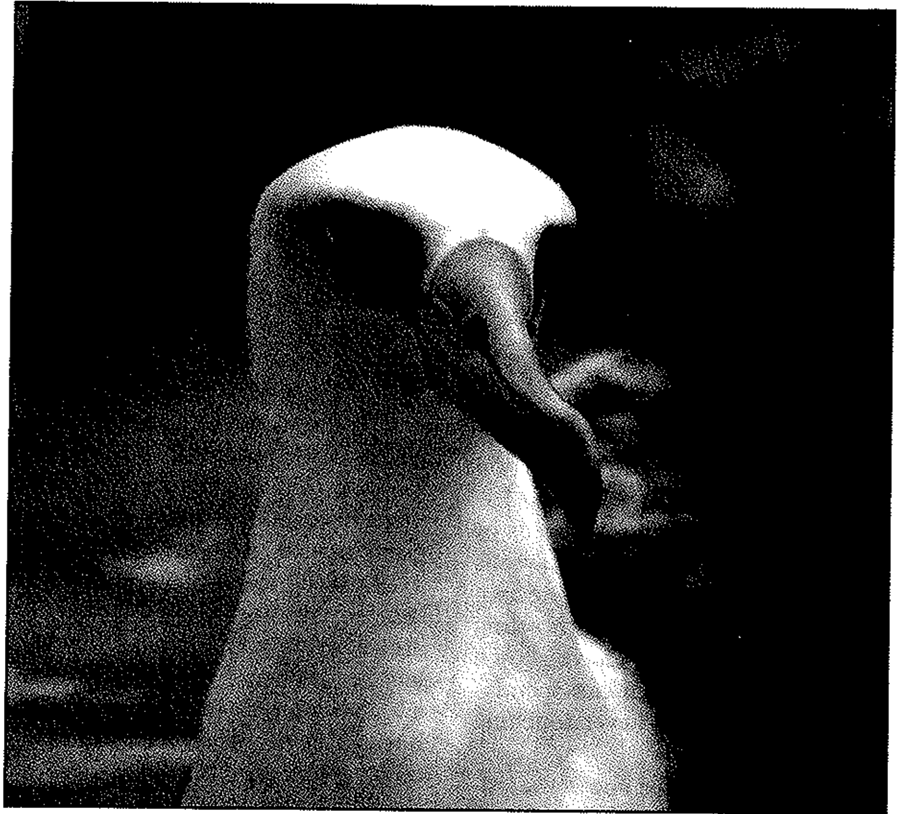
6. The encounter: how it was encountered after release.

7. Comments: significance of this animal's rehabilitation and this encounter.

raptor as there are usually plenty of feathers around. But where do you get an entire Laysan albatross body necessary for whole feathers, and what kind of glue will hold up on a bird that relies so heavily on the perfection of its feathers in a pelagic environment?

The U.S. Fish & Wildlife Service was very helpful and sent us a dead Laysan albatross from Hawaii that had a complete set of healthy feathers. A salt water epoxy was located and tiny drill bits were found that were thin, light, and strong enough to act as the internal support for each feather. The actual imping procedure took only 30 minutes per wing. It was most stressful on the people doing the procedure as it required four people: two to hold the bird still and two to do the imping. The tail feathers proved too thin to imp but albatross tails are fairly short anyway so we figured that it would probably not affect the bird's flight.

After the procedure the bird was placed back in its private pool and seemed to be oblivious to its new feathers. The rehabilitation of this bird was otherwise simple and basic albatross rehab. It was force-fed daily and left alone in the pool.



Nine years after being released on Midway Island in the Pacific Ocean, this Laysan albatross was found near Baja California, several thousand miles away, successfully breeding.

The Release

At that time it was thought that to give the bird the best chance for survival it should be released at least 200 miles offshore so that it could resume its natural flight patterns. We now know that these birds regularly feed within sight of the California coastline and we release albatrosses within 25 miles of the mainland. At that time releasing the bird just offshore was not an option.

Plan B was to send the bird to a breeding colony on one of the main Hawaiian Islands but the Hawaii Department of Agriculture did not agree with our plans, fearing that the bird could introduce Newcastle's Disease to the islands. However, after weeks of various tests for disease, acquiring health certificates, and doing a lot of pleading and dealing with government bureaucracy, IBRRC was given the OK to release the bird on Midway Island. On May 21, with a $93.98 one-way ticket to Honolulu and an agreement by the U.S. Coast Guard to fly the bird to Midway Island, the bird left California.

It is important to point out that this bird received a lot of attention from the press while it was at IBRRC. Several feature articles about this animal's unusual story were featured in the *San Francisco Chronicle* and other local papers. Although we do not usually name birds, the bird received the name "Munch" by the press and those who need to name birds. Munch was an accurate name as the bird was extremely aggressive and grew even nastier after a few months of being handled daily. All the staff that had to handle Munch were happy to see him go and everyone, including the press, was anxious to know how the release went.

Munch was released on May 22, 1979, into the Laysan albatross colony on Midway Island. The head game warden on the island reported to IBRRC that as soon as Munch was released he started a courting dance with another bird but then acted disoriented for the first 24 hours. He also mentioned that out of the hundreds of albatrosses they had handled while doing their banding and monitoring projects, Munch was by far the meanest bird they had ever come across. We attributed his particularly nasty behavior to the almost two months of being force-fed by humans. In short, we created a monster.

On July 23, 1979, we received a letter that gave a brief explanation of the six days of observation that followed.

The game warden's letter ended with: "Finally, on the seventh day, Munch disappeared into the sunset, or so we would like to believe, as he can no longer be located on the island. We sincerely hope he has joined the more than 365,000 Laysan albatrosses who yearly make Midway Island their home. We will certainly notify you if he is one of our recoveries next season."

The Encounter

Nine years later, on February 20, 1988, I received a call from Steve Howell, a seabird biologist. He asked if I remembered an albatross that IBRRC had banded in 1979. He explained that he was visiting Isla Guadalupe, a group of small islands off of Baja California, and had heard that Laysan albatrosses had begun nesting there two years earlier. On January 25, 1988, he located 35 to 40 Laysan albatrosses in their new colony. Twelve were incubating single eggs. On closer inspection he noticed that one had been banded. He gave me the band number that was on the bird, 977-35061 and I looked it up. It was Munch.

Comments

Munch made rehabilitation history by being the first known "imped" albatross, and now she or he was making albatross history. The Guadalupe colony is the first ever east of Hawaii. That is about 2,500 miles from Hawaii.

Munch's discovery was a significant finding for us. We, of course, had no way of knowing if the glue or the feathers held up or if there were any other captivity-related problems that showed up once Munch was released. This showed us that this species of bird can be rehabilitated, imping is a worthwhile tool for rehabilitators, and that our efforts had paid off. The fact that Munch was reproducing was significant, as critics of rehabilitation often question whether rehabilitated animals reproduce. And the fact that Munch lived for nine more years was just great.

Of all the birds that IBRRC had cared for up until that point, Munch was hands-down the one that we all were the most curious about. The discovery of Munch, nine years later and as a parent was a dream come true for us.

For more information on the rehabilitation of aquatic birds contact International Bird Rescue Research Center (IBRRC) at 510/841-9087 or by e-mail at IBRRCDIR@aol.com.

SIMPLE SOLUTIONS

Portable heat

By Christine Brocklebank
80 Gabriel Drive
Lockport, NY 14094
Bless The Beast Foundation, Inc.

As REHABILITATORS WE ALL have the challenge of keeping infant mammals and birds warm or starting the warming process of cold, weak, and "shocky" animals. I have found a simple solution to this problem: Reusable cow corn microwaveable heating pads. They are both cheap and easy to make.

They are made with cow or cattle corn, sold in 50-lb bags for about $6.00. And after you make the number of bags that you need, (I made enough for all my volunteers) you can use the remaining corn for the animals.

To make the bags, you also need a 100 percent cotton fabric (synthetic fabric will melt in the microwave). I use flannel as it is soft and warm, but you can use any cotton fabric.

The size I make is 11" x 9" inches with a 1/2" seam allowance. Sew three sides and leave one open for filling. Fill with corn about 1/2 to 3/4 full, fold in the fabric and sew shut. I don't recommend hand-sewing, simply because of the weight of the corn. Microwave for 2-4 minutes, shaking every 2 minutes to avoid hot spots. The heat is also slightly moist, which is great for opossums, etc.

You may also make a washable cover if you would like. I use a chux or blue pad over mine to keep it clean. You now have portable heating for the cold wildlife in the car, remote areas, or even when you are getting caging ready at home.

Editor's note: Other dry, clean grains may be used as well as corn for a filler for the "heating pad." Rice, buckwheat and other grains have been used with success. Avoid moldy corn, however, as a precaution against aflotoxin. Use the bags with care, as you would any source of heat so as not to burn the young animal.

Nesting box

By Allan M. Casey
and Shirley J. Casey
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Evergreen, CO 80439

THIS SMALL "HINGELESS" nesting box has been used often with older juvenile, pre-weaned squirrels in indoor cages. It has a snugly fitting top that can be removed easily without the use of hinges. The removable top is important since there are times when the nest box must be opened to retrieve animals, plus it allows for easier cleaning and sanitation. It is also a size that commonly fits in pre-weaning wire cages (see example in *Journal of Wildlife Rehabilitation*, Summer 1998). The wood nesting box is also "quieter" and more durable than cardboard. The nest box is made of wood, minimizes the use of small nails, and uses nontoxic wood glue. The cost for materials is generally less than $10 (or lower if untreated, unstained, or unpainted scrap wood is used).

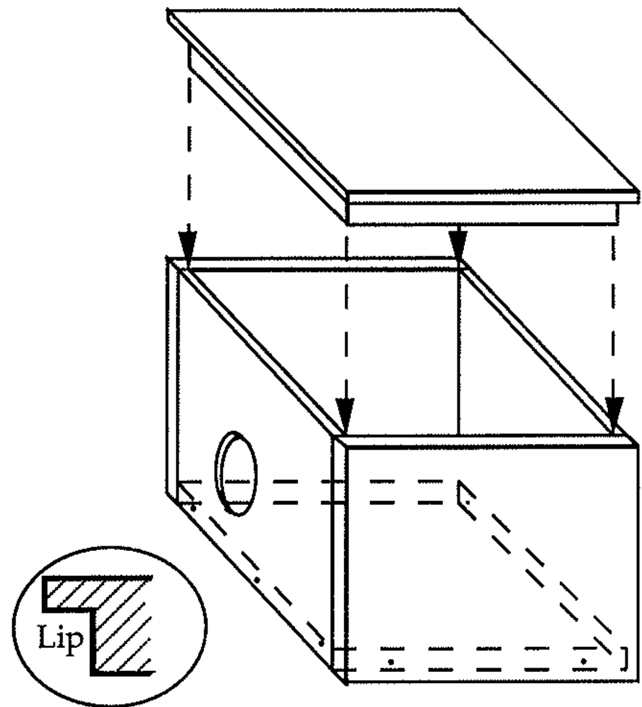
Start with some 3/8" plywood that is 6 1/2" wide and about 35" long. Cut four pieces from this, two cut at 9" long that will form the two sides of the box, and two cut at 7 3/4" long that serve as the two end pieces. In one of the 9" side pieces, cut a 2 1/2-3" hole, as shown in the diagram. Then take some 3/4"-thick, 10"-wide particle board (used for indoor shelving) and cut two pieces. One piece (the bottom or base of the box) should be cut at 7" x 9", and the other (the top) cut at 7 3/4" x 9 3/4".

Start the assembly by attaching the two side pieces to the base. Both the sides and the base are 9" long, so the ends should be flush when attached. Place some white wood glue on the bottom parts of the sides that will be touching the base. Also place glue on the base. Place a side piece next to the base and attach with three small 1" brads or nails. Repeat with the

other side piece. Next, place glue on one of the end pieces on the area that will come into contact with the base and side assembly. Repeat with the other end. Nails or brads are optional on the end pieces. Then use clamps or rubber bands to hold all of the sides and ends together until the glue dries, generally overnight. Wipe any excess glue that oozes out of the joints just after the clamps or rubber bands are put in place.

Cut the remaining top piece so that a lip will hold the piece snugly on top of the box. With a router, power radial arm or table saw, cut around the edge of the piece in 3/8" to create a lip that is 3/8" thick (see inset). (Or, if such a saw is not available, simply cut a piece of 3/8" plywood at 7 3/4" x 9 3/4" and attach it to a piece of the particle board cut at 7" x 9" with glue. This will serve the same purpose.)

The wood can be purchased at any lumber store, or may be found for free in the scrap pile of a construction site. It is preferable to use older wood or allow it to age for six months or so (this allows some of the residual glues used in the manufacturing process to breathe and evaporate out of plywood and particle board.)



Horned Grebe Splint Revisited

By Wendy Perrone and Dr. William Streit
Three Rivers Avian Center
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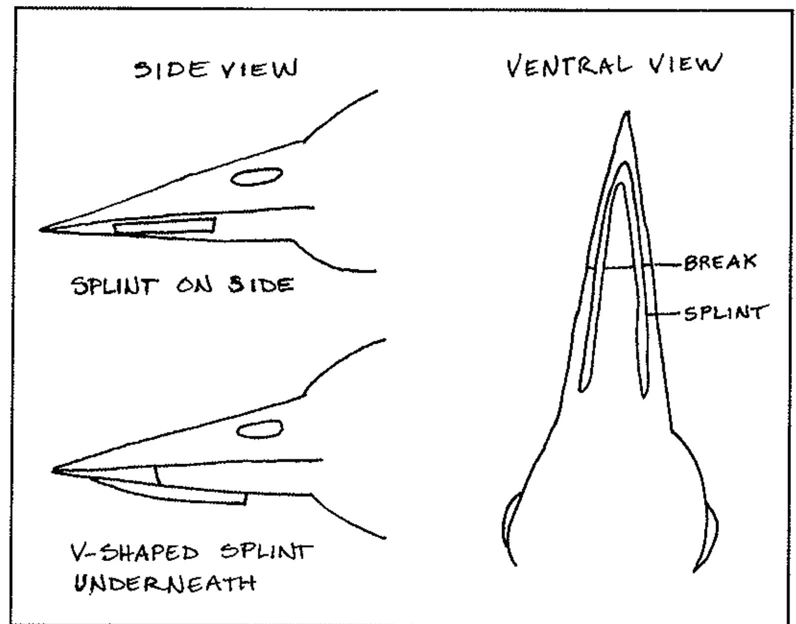
Editor's note: The last edition of the Journal featured a grebe whose broken beak was successfully repaired with a splinting technique. We hope the diagrams at right will help readers visualize the technique.



AFTER INITIAL TREATMENT FOR shock, pain, and swelling, we decided that the best way to repair a horned grebe's broken beak was to use a paper clip splint attached with 2-minute epoxy. We used 2 separate pieces of a jumbo metal paper clip cut to length, shaped to fit the beak line and epoxied to the outside of the beak, extending from the bend of the mandible out beyond the break.

But within a week, it became apparent that a new splint was called for. The epoxy holding the paper clip splints peeled itself free from the beak. Also, the 2 pieces of paper clip were not keeping the ends of the beak from moving apart when the grebe ate a minnow, despite an extra layer of epoxy at the tip of the beak. We suspected this was causing pain every time the bird ate.

We made a new splint with the bend of a jumbo metal paper clip pinched to mimic the point of the beak and the ends going back along the jaw to the feather line of the head. We also decided to glue the splint onto the bottom of the jaw to give a little better support and to bend the point of the splint up a bit to hold the edges of the point of the beak.

The splint had to be re-epoxied twice more during his stay, but we did not modify it further. We kept the splint off after about 5 weeks. As the the beak grew, he was able to catch and kill minnows without the splint perfectly. The lower mandible was still about 1/4 inch shorter than the top of the beak upon release, but he had definitely learned to manage, and was very eager to leave. He was released at a pond on February 28, 1997, in Greenbottom Wildlife Management Area in Cabell County, West Virginia.

FROM LAST EDITION . . . CASE VI:

Tough Choices

The last issue of the *Journal* featured a case in which a phone call from an individual created an ethical conflict for a wildlife rehabilitator.

The caller, who refused to identify herself, wanted to know the proper formula to feed two baby raccoons. Kate, the rehabilitator, urged the caller to bring the raccoons to her or another licensed wildlife rehabilitator, explaining that they need special handling and may carry diseases and parasites. She also informed the caller that state regulations prohibit private possession of raccoons without a license.

The response was hostile. The caller felt qualified to provide care and just wanted the formula. Kate explained the risk of rabies, especially the danger to the woman's family and pets. The caller's children were playing with the baby raccoons and some puppies during the conversation.

Kate did not share with the caller the fact that the Fish and Game Department had placed an immediate one-year moratorium on rehabilitation of all Rabies Vector Species one month earlier. If the caller brought the raccoons to Kate, there would be no other choice but euthanasia. If the caller kept the raccoons, her family and pets would be at risk for rabies.

Kate wouldn't divulge the raccoon formula, so the caller angrily hung up on her. Before calling the woman back with a new automatic phone feature, Kate wondered what she could do differently.

RESPONSES

I.

Dr. Patrice N. Klein, MS, VMD, DACPV, The Humane Society of the United States, Washington D.C. Veterinary Director, Wildlife Rehabilitation Training Center, West Barnstable, MA

THE DYNAMICS OF THIS INcident were worrisome and disconcerting. Kate made several errors in her interaction with the anonymous caller. Kate did not initiate or maintain control of the situation, she allowed her own frustrations to undermine her abilities to stay focused on the objective, and, most importantly, she demonstrated a certain reluctance in her responsibilities vis a vis the Rabies Vector Species (RVS) euthanasia mandate.

At the outset, Kate did not maintain control of the telephone conversation with the caller. Kate should have initially identified herself and her facility (e.g. "Wildlife Rescue Center, Kate Jones speaking") and requested the caller's name, address, and telephone number. If the caller refrained or asked why, then Kate should have stated simply that it was her policy to maintain a telephone log of all calls received. If the caller still refused to identify her/himself, then Kate must politely, but firmly, reiterate that the caller would be helping Kate to better understand the caller's problems and the animal's circumstances, and that she would gladly assist the caller if she knew the caller's location and identity.

Kate must establish and maintain a professional demeanor throughout the conversation. Her voice and presentation should reflect an appropriate authority and identify Kate as the knowledgeable, professional wildlife rehabilitator from whom the general public seeks advice and guidance on wildlife issues. There is no guarantee, of course, that an individual may heed her advice, but Kate's mistake was in being conciliatory or indecisive. This suggests to the caller that Kate is hesitant and unsure of herself.

Kate was correct in explaining the current regulations regarding wildlife rehabilitation. However, it may have been beneficial to first console the caller by noting that it appeared the caller was trying her best to care for this animal, but that it was in the animal's best interest to bring it to a wildlife rehabilitator where it would be raised and socialized with its own

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 the original case from last issue, several responses, and a new case for your consideration. Please see page 34 for this issue's new case, and see the box on page 33 for details about how to participate.

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

NOTE: ***The International Wildlife Rehabilitation Council (IWRC) makes no claims as to the accuracy or truth of the information contained in the following cases, nor does it endorse any particular answer or viewpoint.***

kind. This would give the animal its best chance for survival in the wild.

That being said, Kate faced the most difficult of circumstances which had been imposed by the state agency... no rehabilitation of RVS and mandatory euthanasia of RVS received at wildlife rehabilitation centers. There is no easy approach to confronting this situation. This regulation was imposed by current state policies, and not within Kate's ability to circumvent. Until the regulation was revised, Kate had no alternative but to comply or risk jeopardizing her state rehabilitation permit.

This underscores the critical need for a cohesive, coordinated state association of wildlife rehabilitators which can become integrally involved in state agency regulatory processes pertinent to wildlife rehabilitation. It is unfortunate that, in this instance, the state had already mandated the RVS prohibition. It is incumbent upon wildlife rehabilitators in their respective states to become empowered to address such issues *before* such restrictive regulations are instituted.

Kate would have had to explain the RVS restrictions to this caller. Should the caller have refused to relinquish the animal, Kate would have already had the caller's identity and telephone number. She would have had to make the decision to contact the appropriate local animal control or state wildlife department and to inform them of the circumstances. As disheartening as this situation would have been, Kate must consider the potential disease risks to the people and other animals that may have been in contact with the juvenile raccoon. She would have been liable and negligent in her responsibilities as a professional wildlife rehabilitator had she not intervened.

The emotional impact notwithstanding, one has to reinforce and reaffirm in one's own mind the valuable professional service that wildlife rehabilitators provide to the public, the state wildlife agencies, and the animals for whom they care. Hopefully as wildlife rehabilitators develop better working relationships with state agencies, confounding situations such as prohibition of rehabilitation of RVS will be prevented, and the wildlife care services provided by rehabilitators will be better recognized and supported.

RESPONSES

II.

Allan M. Casey
WildAgain Wildlife Rehabilitation
Evergreen, Colorado

CLEARLY THE FIRST IS THE task of "hostage negotiation" that we as rehabilitators often encounter with well-meaning rescuers who are more concerned with their own amusement than with the safety and well being of the animal. Others think "caring for sweet little wild things" is an easy job and, besides, if it dies, it would die sometime anyhow.

When we train new rehabilitators, we spend a fair amount of time on this subject. We use real cases in a role play setting so that the new rehabilitator can practice the hostage negotiation techniques as well as become aware of the types of frustrations and helplessness that Kate has felt. It is not easy to learn or do. Frustration abounds, both in the training and the reality.

Although there is no single correct way to handle every situation, an initial soft approach works well for many people, building on the belief that they care about the animal(s) since they rescued it. Then we try to educate the caller that there are many things required to raise a wild animal (e.g., recognition of injuries that could be serious; frequent feedings of special diets; the expense of supplies and veterinary service; space and financial requirements for proper caging, etc.). We explain that rehabilitators are trained to help the animal and have the supplies on hand. This generally gets the animal to us or another rehabilitator of the species.

At this point, if we have not been successful, we then get more assertive with the scare tactic of creepy, crawly parasites (internal and external) and possible zoonotic disease transmission. These descriptions and the associated risks often get the rest of them. When people, especially those with medical or veterinary training, still want to keep the animal, explaining the need to raise it with its own species sometimes convinces them to give it to a rehabilitator.

We also mention state and federal laws, rules and regulations, and the possible penalties for violations. However, this does not seem to matter to some rescuers who seem to care more about the animal and less about possible violations of the laws.

Even with all that, we are not always successful, as some people merely hang up. (Though at this point, if the telephone Caller-ID machine has picked up their number, sometimes a return phone call later in the day sometimes scares them into releasing the animal to us or to another rehabilitator). So, all in all, Kate probably used the correct approach initially and is probably doing the right thing in trying to reconnect with the caller.

The second thing that comes to mind in this case is the moratorium placed on rabies vector species (RVS) rehabilitation by the state Fish and Game Department. If the Fish and Game folks were really concerned about this issue, they would allow such activity by rehabilitators trained in the risks of RVS rehab and require them to follow very strict handling and reporting protocols, as have successfully been implemented in the state of Connecticut.

A study done in New York of 500 rescuers discovered compelling evidence that when rescuers are not provided a place to take injured and orphaned animals, many will attempt the rehab on their own (Siemer, et al, 1994, *Wildlife Rehabilitation*, NWRA). And in the case of certain RVS animals in certain locales, this can put the untrained public at severe risk, as well as risk to the animals' health and safety. Another outcome could be the development of "underground rehabilitation," with restricted species being cared for and never reported. Obviously this type of approach should be strongly discouraged.

So it seems to me that if an agency truly wants to stay on top of and manage the situation, they would allow rehabilitation of RVS to occur in an open and controlled fashion. Sadly, many agencies merely institute an edict for the activity to stop, hoping the problem will go away. In reality, such action seems irresponsible and may exacerbate the problem.

RESPONSES

III.

Kelly Martin
Board of Directors of the New York State Wildlife Rehabilitation Council
Founding member of the Southern Tier Wildlife Center, Binghamton, New York

KATE HANDLED THE CALL appropriately. She gave responsible answers in trying to talk the woman out of caring for the orphaned raccoons. Her only alternative was to give the woman the information on the proper formula since no matter what Kate said the woman was going to keep the animals. Not giving her the formula was not going to change her mind. The best she could do was give the woman accurate information on risks, diseases, and handling concerns and apprise her of the potential problems of improperly raising the raccoons.

If her new telephone service displays a phone number when it is redialed, Kate should consider giving the information to her local game warden. Even though it would mean euthanasia for those two raccoons, the woman was placing herself, domestic animals and children at risk. Also, if left with the woman, the orphans would most likely not be successfully returned to the wild.

Kate should be honest in giving the public accurate information. Her credibility will be damaged if she is not up front with people calling for assistance. However, she can enlist the help of the public to try to change the new regulation by directing them to call the appropriate agency to voice their concerns. It is difficult to convince the agency that there is a problem if the animals remain "underground." The agency needs to be made aware of the risks incurred by the public when rehabilitators are removed as a humane option for caring for rabies vector species.

Certain kinds of phone calls and some people, such as the one described, will always result in stress and frustration for rehabilitators. We must try to reconcile public safety, the welfare of wildlife, adhere to our license conditions and represent the profession of wildlife rehabilitation to the best of our ability. This is not always easy, but, if at the end of a frustrating call you can feel confident that the information given was accurate, honest, professional and forthright then that is the best you can do under difficult circumstances.

Regulations such as a requirement to automatically euthanize certain species is probably one of the most difficult situations for a rehabilitator to accept, and also for the person seeking help for an animal. Since most of us get involved in wildlife rehabilitation as a humane effort to help wildlife in need, the impact can be emotionally trying. The frustration and helplessness gets compounded when the public seeks help and is refused. These people often attempt to circumvent the regulations which adds another layer of frustration.

Wildlife rehabilitators facing such dilemmas must put public safety first. However, we also know people will often not give up the animals knowing they will be killed. These kind of regulations also do not give due credit to responsible, trained, educated, and licensed wildlife rehabilitators and do not show respect to the profession of wildlife rehabilitation. Zoonotic diseases are an ever present risk no matter what the species and good wildlife rehabilitation practices minimize those dangers.

It is imperative that wildlife rehabilitators, collectively and individually, try to work with the agency to change such restrictive regulations.

JOIN THE CONVERSATION

On the following page, the *Journal* presents a new case for readers to consider. We invite you to read the new case and consider the questions 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, please send your response by June 1, 1999, to IWRC, 4437 Central Place, B-4, Suisun, CA 94585-1633 (marked "ATTN: Up for Discussion"). You may also send responses via e-mail to iwrc@inreach.com.

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

CASE VII:
Baby Season Blues

GAIL MORGAN SAT IN THE parking lot at the coffee shop halfway between her house and her friend Terry's. This was the first time Gail had been away from the house in five days. Baby bird season wasn't even half over and she had already exceeded her numbers of songbird admits for the whole previous year. Sitting still for a few minutes, she realized how terribly exhausted and overwhelmed she felt.

When Terry arrived, the two friends decided to take a few minutes to visit over a cup of tea before they split up the recently delivered mealworms and headed home to begin the next round of feedings and cage cleaning.

As these two experienced home-based bird rehabilitators sat down to chat, they agreed that baby bird season was off to a roaring start. The biggest reason for the increase in their numbers seemed to be the attrition in bird rehabilitators.

In the last year, three bird rehabilitators had moved away from the area. Family situations changed for two others: for one a new baby arrived and for the other an ailing father needed constant care. Another rehabilitator found that she had a serious respiratory condition and could no longer rehabilitate birds. A few others quit because they couldn't afford the cost of feeding, caging, and veterinary care. Others were just plain burned out and couldn't take the stress of never-ending work and roller coaster emotions.

Plus, the local rehabilitation center, Flying High Songbird Rescue (FHSR), had closed in April. Since its formation six years earlier, FHSR had admitted large numbers of birds. But a new tightening of federal regulations required that the usual summer staff of high school City Summer Training Corps employees and volunteers could not have any hands-on contact with birds. All feeding and treatment of baby birds must be conducted by fully permitted or sub-permitted adults. At the same time, the center's funding levels had decreased significantly and could no longer cover basic building costs, and certainly couldn't support a staff of adult workers for 14 hours per day.

The FHSR Board had announced that they just didn't have adequate funding or the level of adult, permitted volunteers needed to continue operating, so they closed down.

Gail and Terry were desperate for help with the huge numbers of baby birds arriving daily and were trying several approaches. To recruit new volunteers and train new rehabilitators Gail had arranged some training and was supervising three volunteers who wanted to enter the field. As they seemed capable, she had tried sending some stable baby birds home with them. Her state only allowed her to send sparrows, starlings, and pigeons to her permitted apprentices, since those species did not require a federal permit, but it did help.

Unfortunately, one of the new trainees had already called, said rehabilitating birds at her house was a lot more work than she expected and interfered with her family life; she returned the birds. Another trainee had higher fatalities than normal, prompting Gail to take the birds back. Now only one new trainee still had some baby sparrows in her care. It helped, but wasn't nearly enough.

Gail worried that if she took many more birds, the quality of care would deteriorate. Each day, as calls were coming in constantly, she struggled to think of new strategies.

Terry didn't like the idea of having volunteers in her home or supervising others. So she had tried another approach. On her answering machine, she announced that her rehabilitation facility was full and she could not take any more birds. The machine referred callers to the state wildlife agency, even though Terry knew that she and Gail were the agency's most reliable referrals. Several callers left angry messages, venting their frustration that they couldn't find any help.

Terry felt terribly guilty that baby birds were dying because of the lack of rehabilitators. At the same time she knew she couldn't provide quality care to any more than she already had on hand.

Someone had suggested that Terry admit the baby birds and then just euthanize them, since at least that would be a "quick" death. As Terry told Gail, she just couldn't face the idea of accepting and then euthanizing healthy orphans just because they happened to be above her limit. The situation was ripping her up.

Gail and Terry agreed that it was tempting to enlist the help of several individuals who had called to volunteer their help, yet clearly did not possess adequate knowledge, time, commitment, or skill. Some who had not been particularly reliable volunteers were clamoring to come help, and other calls came from individuals who wanted to join in because it "sounded like fun."

The two of them finished their tea and walked outside. They transferred the box of mealworms to Gail's car without any escapes, and agreed that talking helped make the situation seem less overwhelming. As they drove off they each mulled over possible plans they could enact together to resolve the problem of having too many birds and not enough rehabilitators.

POSSIBLE QUESTIONS FOR DISCUSSION

1. The problems of overload affect all rehabilitators. What can we do to reduce this problem?

2. In theory, the idea of setting limits on the number of admitted wildlife sounds very reasonable. But the reality is very difficult. How can rehabilitators cope with this?

3. Sponsoring and supervising new rehabilitators is challenging. How can we help make it easier?

4. How can rehabilitators reduce and manage the stress related to overload?

A Guide to Nests, Eggs and Nestlings of North American Birds

By Paul J. Baicich and Colin J. O. Harrison

IF YOUR WILDLIFE REHABILITATION work includes birds, from the Arctic circle to the Southern border of the United States, this book is a must for your library. It is a much improved edition over the original 1978 version, which was in itself a very useful book. While classified as a field guide, this book is much more than that.

One of the very thoughtful features of this book is the section titled "Please Start Here." The authors give a gentle yet serious admonishment for those that might fancy themselves egg collectors. Cautions are included here as well on the etiquette of responsible birding. I found myself smiling broadly with the references. For too long authors have avoided that moral lecture, but perhaps the time has come to be clear about the human responsibility factor and the delicate nature of our birds.

The introduction is more like a book in itself. A detailed yet user-friendly description is given of every process such as egg laying, incubation, the hatching process, hatchling development (including excellent drawings of both an altricial and a precocial nestling, showing feather development and posture changes). Nestling narratives include mouth color and the small yet significant identifying marks that make such a difference when you have a bird in hand. This is all accomplished before the main text begins.

The main text presents a very complete description of the breeding cycle of each of the 669 species identified. This information includes nest; habitat, site location, and materials and methods of construction. The description of the breeding season, eggs, incubation periods, nesting and nestling period is given in detail, and for many species lists the period of parent dependence.

The color plates of the young and eggs alone are worth the price of the book to a wildlife rehabilitator. While not every species is represented in color plates, many of the most difficult to identify ones are here, including raptors. If you have ever misidentified a nestling, this section will soothe your frazzled nerves as you realize it need never happen again.

The authors' objective for this book was to be useful to the professional ornithologist as well as the amateur birder. While I am not certain they included wildlife rehabilitators as a target audience, it hits this profession right on the money. It is written in a comprehensive yet amazingly comfortable manner that lends itself to be used as an easy reference by even beginner rehabilitators.

This book will not only help you identify birds that are brought to your center, but those with wildlife helplines will use it until the pages fall out, advising callers on specifics such as incubation times or how long young will stay in the nest. By sharing even a tiny part of the natural history information given, you may be successful in preventing young birds from being removed from their natural site, while educating the public and yourself in the process.

— Reviewed by Marge Gibson

Second Edition, Natural World, Academic Press, San Diego, 1997, U.S. $22.95, Canada $31.95, U.K. £24.95.

Radiography in Veterinary Technology (2nd Edition)

By Lisa M. Lavin, CVY, BA

THIS IS AN EXCELLENT BOOK that is both practical and clinically oriented. Each chapter is written in a concise manner with basic step-by-step descriptions of very detailed procedures. It is obvious that the author is an instructor. The introductions at each chapter allow one to review basic concepts so that one may jump right into the text without having to re-read the preceding chapters.

The book is divided into two parts. In Part 1, the initial chapters (1-6) deal with X-ray production, generating and receiving equipment, safety, exposure factors (KVP & MAS) and quality analysis of the film produced. The subsequent chapters (7-11) deal with film processing, technique evaluation, and Quality Assurance and Control with case studies and explanations of both common and unusual errors/artifacts encountered.

In Part 2, the chapters (12-21) explain and demonstrate proper radiographic positioning for common and specific views. Special procedures (contrast studies) are discussed as well as large animal positioning techniques. A chapter on exotic positioning is provided and special or alternate imaging, such as ultrasound and CT scans, is addressed.

The best aspect of this book is the ease at which one can read the text and understand every aspect of what was written. The book is organized logically and can be used both as an instructional text as well as a quick reference for positioning and troubleshooting in any practice. This book should be in every veterinary hospital as a review and guide for veterinarians and technicians.

— reviewed by Scott H. Weldy, DVM

W.B. Saunders Company, 1999, 344 pages, 445 illustrations, $44.00 U.S.

Alejandro's Gift

By Richard E. Albert
Illustrated by Sylvia Long

THIS CHILDREN'S STORY IS set in the Southwestern United States, and addresses issues of respect for wild animals, their habitat, and the natural balance of all of the lives involved. The needs held in common by humans and the world around them are revealed as the story progresses.

It is a richly illustrated book, something we have come to expect from the efforts of Sylvia Long. The pages are filled with colorful and inviting images suggesting the balance between wildlife and habitat. The desert comes to life before our eyes with a gentle beauty, refuting the misconception of the desert as an empty wasteland.

Because the plot is simple but poignant, grammatical lapses within the text might be forgiven.

Alejandro is an elderly man who longs for companionship. He plants a garden and begins to feel the joy of watching things grow. Wild animals appear, enhancing days spent in the garden. The steps Alejandro takes to help the animals share life are environmentally sound, as well as beautifully told. This excellent book instills a respect for wildlife and mankind's responsibility to the world around him.

"And in these moments when Alejandro sat quietly listening to the sounds of his desert neighbors, he knew that the gift was not so much a gift he had given, but a gift he had received," writes Albert. This is a wonderful book that even adults will not soon forget. It is destined to become an environmental education classic.

— *reviewed by Marge Gibson*

Chronicle Books, San Francisco, 1994, Paperback edition, 1996, $6.95 U.S., ages 3-8.

Be Heard Now: Tap into Your Inner Speaker and Communicate with Ease

By Lee Glickstein

COMEDIAN JERRY SEINFELD says in one of his routines that recent surveys reveal public speaking to be the number one fear among Americans. Seinfeld's joke continues by pointing out if that's true then when attending a funeral most people would be more comfortable being the deceased than delivering the eulogy!

Even without fear as deep as the comedian describes, this book hits the target for many wildlife rehabilitators, particularly those that may relate better to animals than to people. Glickstein quickly puts the reader at ease with the subject, and sets to work immediately describing how to develop confidence in one's own ability to address groups.

The book uses the "transformational speaking" concept developed by the author some years ago. This practical and easy to use method is directed at speakers who find it difficult to grace a stage without serious or undue stress. The concept is different than what many public speaking books tout. There is no focus on artificial super-charging of the confidence and enthusiasm level of the speaker, but instead on the individual's natural style and intuition to achieve sensitive presentations that work for both the audience and the presenter.

Some of the chapters have titles that reveal the methodology: "Being Yourself," "Listening With the Heart," "The Laughing Spirit: Healthy Humor," "Vibrant Vulnerability," and "The Perfect Opening." The techniques are user friendly. Better than that, they are almost *every* user friendly.

We are accustomed to self-help books proclaiming to be cures to all maladies. This book is unusual in that it doesn't make unrealistic claims. It simply works. I've used these techniques myself.

I recommend this book to those who are uncomfortable with public presentations. It might also help the seasoned speaker by pointing out facts about audience and public speaking that are not widely appreciated. Nothing artificial offered, just 100 percent natural self-awareness brought to the forefront. It works.

— *reviewed by Marge Gibson*

Broadway Books, N.Y., 1998, 242 pages, U.S.: $20.00, Canada: $28.95.

Coming to your state soon: Help with rehabilitation regulations. Over the last half decade, a group of wildlife rehabilitation professionals from around the country have been meeting as the Wildlife Rehabilitation Cooperative Task Force (WRCTF). Leadership from IWRC and the National Wildlife Rehabilitation Association (NWRA) were included in the working group and one of the tasks to which particular attention was given was the subject of wildlife rehabilitation regulations.

The WRCTF developed a package of materials about rehabilitation regulations. Very shortly, copies of the complete package will be sent to state rehabilitation associations and to state and federal agencies responsible for these regulations.

The package includes a Statement of Need and Justification of Wildlife Rehabilitation Regulations; a comparison of rehabilitation regulations from several state wildlife agencies; copies of those rehabilitation regulations; a list of criteria for wildlife rehabilitation training programs; and a bibliography of articles on rehabilitation regulations. Funding for the effort was generously provided by the Humane Society of the United States.

The 48th Annual **Conference of the Wildlife Disease Association** will be held August 8-12, 1999, at the Georgia Center for Continuing Education on the University of Georgia Campus in Athens, Georgia, USA. The meeting will be sponsored by the Southeastern Cooperative Wildlife Disease Study and the College of Veterinary Medicine. General sessions will begin on Monday, August 9, highlighted by a Symposium on International Issues in Rabies Re-Emergence hosted in conjunction with the Centers for Disease Control in Atlanta, Georgia.

Requests to contribute a paper should be received no later than May 17, 1999. Abstracts can be submitted at the program email address: abstract@calc.vet.uga.edu. For other questions, please contact Charlotte

Quist or Susan Little (e-mail: WDAmail@calc.vet.uga.edu), Local Arrangements Co-Chairs, College of Veterinary Medicine, University of Georgia, Athens, Georgia, 30602, USA, 706/542-5349; fax: 706/542-5977.

Conference registration forms, a meeting outline, area accommodations, and other details can be found on the WDA webpage at www.vpp.vet.uga.edu/wda and the linked meeting website that includes all the meeting information.

The **Alliance of Veterinarians for the Environment** (AVE) announces the start-up of its new web site, www.aveweb.org, designed and uploaded by Dr. Katie Brown of Naperville, Illinois. AVE is dedicated to promoting environmental health and conservation through environmental education, advancing environmental research within the veterinary profession, translating scientific environmental facts into information the public can understand and use, and conducting workshops at the international, national, and community levels. Visit the web site for more information.

Veterinary toxicologists at the ASPCA National Animal Poison Center are conducting an on-going investigation into claims that use of **Febreze™ fabric deodorizer** in the home caused the death of several pets. All information reviewed to date suggests that there is no evidence that Febreze represents any risk to pets when used according to label instructions. Presently, the center considers the product safe to use in households with pets. As with any cleaning product, the center recommends that birds be removed form the room until the product application has dried and the area has been ventilated. For details, visit www.napcc.aspca.org/febreze.htm or call 800/345-4735.

The mysterious brain disease responsible for the deaths of bald eagles and American coots in Arkansas has now been found in two species of ducks discovered dead at Woodlake, North Carolina, and in bald eagles and coots from three other southeastern states. According to a USGS wildlife disease specialist, this is the first time the new disease, called **avian vacuolar myelinopathy**, has been documented in species other than American coots and bald eagles. (The disease is also known as coot and eagle brain lesion syndrome, or CEBLS, and is described by the Army Corps of Engineers at www.mvk.usace.army.mil/od/odm/cebls.htm.)

Pathologists at USGS's National Wildlife Health Center in Madison, Wisconsin, and the Southeastern Cooperative Wildlife Disease Study (SCWDS) at the University of Georgia have confirmed that bald eagles collected from four new locations (near Woodlake, North Carolina; Aiken, South Carolina; and Strom Thurmond Lake and Lake Juliette, Georgia) and coots from Aiken, South Carolina, died from the same brain disease that has killed at least 58 bald eagles in Arkansas and an unknown number of coots in Arkansas, North Carolina, and Georgia.

USGS wildlife disease specialist Dr. Kimberli Miller said "afflicted birds typically fly erratically or are unable to fly; they may crash land, swim tipped to one side with one or both legs or wings extended, or be in the water on their backs with their feet in the air. On land," she said, "birds stagger and have difficulty walking and may fall over and be unable to right themselves." Affected birds, however, are usually alert and still may bite when handled.

Despite extensive testing by USGS, SCWDS, and others, the cause of the disease and the route of exposure is still unknown. "All of the diagnostic, field and laboratory efforts indicate the cause is most likely a toxin, either one that is naturally occurring or manmade," Miller said. USGS pathologists have tested the tissues of dead birds for bacteria, viruses, parasites and none have been found. In humans and other mammals, similar lesions have been associated with genetic disorders, certain types of chemicals or toxic plants. Tests for these chemicals in the affected birds have been negative or inconclusive.

Wildlife biologists and public land managers may report birds exhibiting wobbly, uncoordinated flight or impaired swimming ability to Wildlife Disease Specialists at NWHC or SCWDS. Additional information can be found at www.emtc.usgs.gov/http_data/nwhc/news/news.html.

The **4th International Wildlife Ranching Symposium** will be held November 8-12, 1999, in Toronto, Ontario, Canada, hosted by the North American Elk Breeders' Association. The conference theme is "Biodiversity, Conservation & Sustainability, Ecotourism, Traditional Medicines & Health." The previous symposium, held in Pretoria, South Africa, was attended by more than 700 persons from 32 countries.

Proposed titles for papers and/or posters should be sent by September 1 to: Dr. Lyle A. Renecker, Chairman, 4th International Wildlife Ranching Symposium R.R.# 5, Stratford, Ontario, Canada N5A 6S6, Tel: (519) 393-6425, Fax: (519) 393-6404, e-mail: ltrenecker@golden.net.

CAREER CORNER

Opening for **assistant zoo nutritionist** with the Wildlife Conservation Society. Requires MS in Animal Science (nutrition emphasis), Nutrition, or Wildlife Ecology; Ph.D. and /or demonstrated interest in comparative nutrition preferred. Must have experience in diet formulation or research with wildlife feeding management, and /or commissary supervision in a zoological institution. Will assist with diet review, foodstuff quality assessment, and economic evaluation of nutrition programs for all facilities served by the Zoo Nutrition Center of the Wildlife Conservation Society, and conduct, advise, publish, and present scientific papers on research topics involving comparative animal

nutrition. Salary commensurate with experience. Housing subsidy possible. Position closes June 1st to begin July 15th. Send résumé and letter of intent to Wildlife Conservation Society, 2300 Southern Boulevard, Bronx, New York, 10460, Attn: Ellen Dierenfeld.

Wildlife Rescue Association of British Columbia, near Vancouver, offers a challenging position in an established rehabilitation center available from June 15, 1999. We are looking for a person for **education programs, volunteer coordination, and community relations.** Applicants require an excellent background in rehabilitation as well as experience with education presentations in the community, working with volunteers, and conducting training programs. We rehabilitate all wildlife species native to the area, with an annual caseload is 3,500+ patients and a staff of five, supported by over 100 volunteers. Please forward résumé with a cover letter to Wildlife Rescue Association of BC, Attention: Albert Steer, 5216 Glencarin Drive, Burnaby, British Columbia V5B 3C1, Canada.

Several positions are open at the **Wisconsin Humane Society Wildlife Department**, in Milwaukee, Wisconsin, a large (5,000 animals per year) urban wildlife rehabilitation center. The center has openings for volunteer coordinator and nursery manager, as well as wildlife internships. For more information about any of these positions, contact Cheryl Diehl, Wisconsin Humane Society Wildlife Dept. Manager, 4151 N. Humboldt Ave., Milwaukee, WI, 53212, e-mail: cdiehl@humane.mil.wi.us, phone: 414/961-0310, ext. 116, fax: 414/961-1070.

Seeking **director for PAWS Wildlife Center**: Direct operations at large wildlife center in Seattle area. Must have two years experience directing a wildlife center. Salary DOE. For details, contact J. Wasserman, PAWS Wildlife Center, PO Box 1037, Lynwood, WA 98046, Fax/425-742-5711.

International Wildlife Rehabilitation Council 1998 Year-End Financial Statement

Revenues	**$ Amount**
Conference	33,816.00
Contributions (restricted)	1,223.00
Contributions (unrestricted)	800.02
Literature Sales	28,553.00
Membership Dues	63,409.00
Skills Seminars	54,495.76
Interest Income	1,108.13
Miscellaneous Income	365.98
Total Revenue	183,770.89
Expenses	
Accounting Fees	1,861.49
Bank Service Charges	3,273.95
Conference Costs	13,753.66
Independent Contractor Fees (includes instructors and editing)	13,500.00
Insurance	5,316.50
Tax Expenses	1,505.10
Postage/Delivery	17,022.99
Printing & Reproduction	27,264.96
Program Costs (includes travel, per diem, equipment, & supplies)	23,635.22
Publications (includes book purchases and mailing services)	9,395.64
Rent & Utilities	9,624.00
Equipment Repairs & Upgrades	561.00
Service Contracts	1,202.15
Wages & Salaries (includes 1 full-time & 2 part-time staff)	38,070.30
Employee Benefits	1,296.35
Equipment Leases	3,844.58
Outside Training/Staff	109.95
Administrative Costs (includes office supplies, equipment, phone)	6,478.06
Grants Awarded	2,930.00
Professional Fees	1,337.90
Other Expenses	150.00
Total Expenses	**182,133.80**
1998 Net Income	**$1,637.09**

CALL FOR PAPERS

IWRC's 22nd Annual Conference

"Your Piece of the Puzzle"

Exploring Complementary Fields of Endeavor
October 13-17, 1999
DoubleTree Hotel at Reid Park
Tucson, Arizona

Each year at our annual conference, the International Wildlife Rehabilitation Council (IWRC) invites wildlife rehabilitators and other associated professionals to make presentations which will assist those working in the field of wildlife rehabilitation. We encourage papers that describe new and current methods as well as innovative concepts and ideas. Your audience will range from volunteers to veterinarians. The focus of your presentation should be chosen based upon personal and field experience.
At this conference we will be focusing on the following broad areas:

- Urban Wildlife
- Research
- Regulations
- Management
- Husbandry

If you feel that you can contribute "your piece of the puzzle" to this important meeting, please submit a proposal by the deadline. All submissions are subject to review by the conference committee. You will be notified in writing once your proposal has been accepted.

Categories of Presentations:

PAPER: A factual presentation of methods, report of research findings, and new or improved techniques. Topics can include animal care, natural history, administration and management, regulations, etc.

Note: All paper presentations require the submission of a complete manuscript for publication in the conference proceedings.

WORKSHOP: Demonstration of technique or skills. May be interactive.

DISCUSSION GROUP: Discussion between peers on a specified topic or area of concern.

CASE STUDY: A short report (usually 10-15 minutes) on one case, describing treatment and outcome.

POSTER SESSION: A presentation on paper for display.

What is the IWRC?

The International Wildlife Rehabilitation Council promotes education and networking as one of the most important methods of maintaining professional care and standards within the wildlife rehabilitation profession. We do this through a series of Skills Seminar training programs, which offer basic through advanced skills; our quarterly professional publication, the *Journal of Wildlife Rehabilitation;* a full catalog of wildlife care publications; standards and accreditation for wildlife care facilities and caregivers; referral services for assistance with specific animal care problems and non-releasable placements; member newsletter; an annual conference with its associated proceedings; and online access.

The IWRC is a non-profit, international membership-sponsored organization with a commitment to preserving our wildlife and its habitat.

Deadline: Proposals for the 1999 Conference should reach the IWRC office postmarked no later than June 30, 1999.