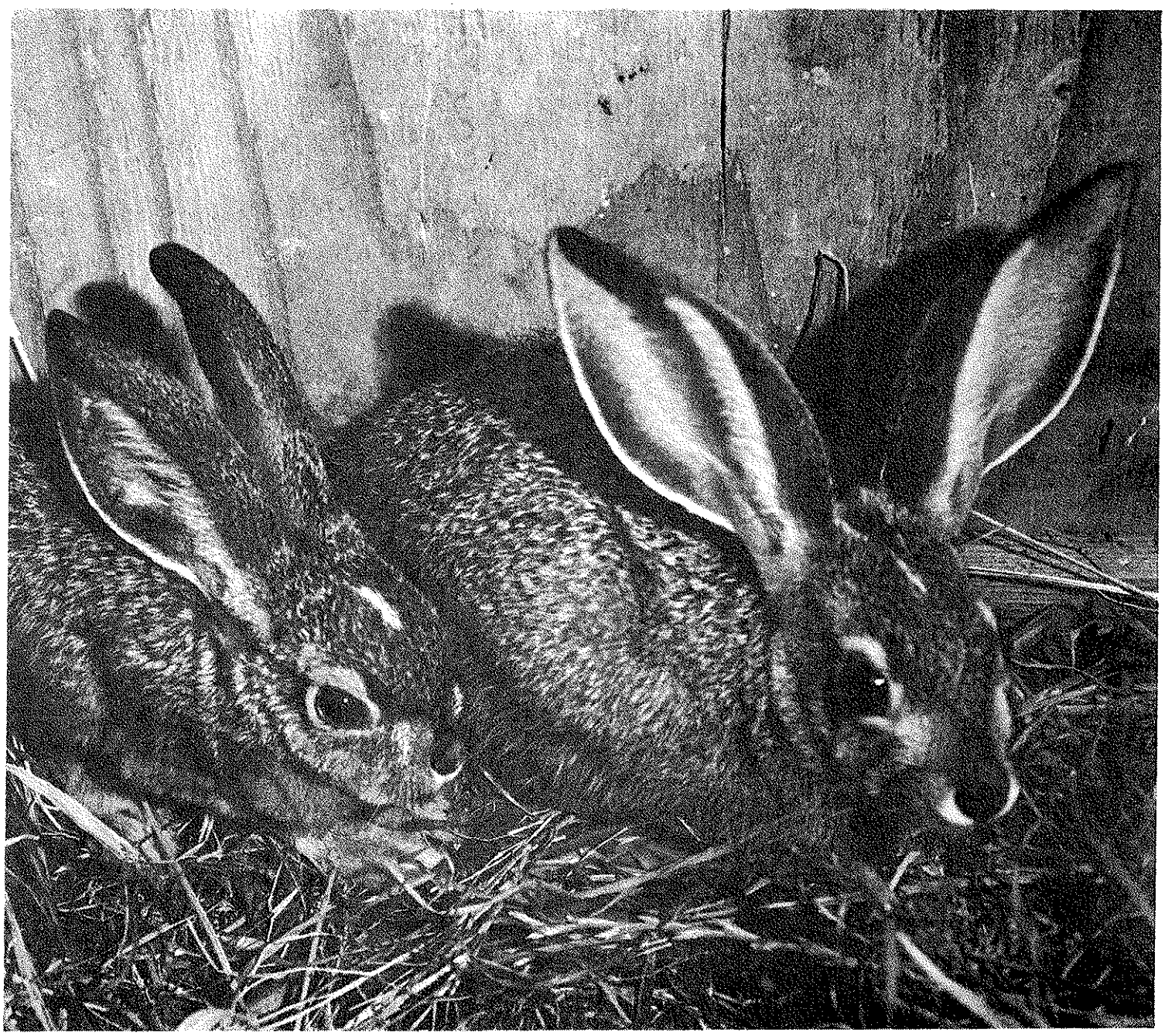
REHABILITATION
WILDLIFE COUNCIL

WILDLIFE JOURNAL

Journal of the Wildlife Rehabilitation Council Spring 1984



Raising Jackrabbits . . . page 7

Conference Announcement

9th ANNUAL Wildlife Conference

Sponsored by

Wildlife Rehabilitation Council

The conference will be held on February 1, 2, and 3, 1985 at the Dunfey Hotel in San Mateo, California. Topics to be covered will include the many different facets of wildlife rehabilitation, administration, fundraising and more. Workshops on necropsy procedures, hummingbird care, reptiles, and more will also be offered at the conference.

Watch for registration information later this summer and plan now to attend this three day wildlife conference.

Those interested in presenting papers should send a 200 word abstract to Susan Kelly, 1915 Kentucky St., Redwood City, CA 94061 no later than June 30, 1984.

GUIDELINES FOR AUTHORS

The following is a guideline for articles to be submitted to the WRC Journal. All manuscripts submitted to the Journal are subject to review and revision by our editors.

1. Submissions should be typed and double-spaced, with 1 inch margins.
2. Full length articles run between 1500 and 2500 words.
3. Fillers and short articles run between 500 and 1500 words.
4. The writer's name and address and organization should be typed on the first page, and name and page number should appear on all consecutive pages.
5. It is the writer's obligation to obtain permission or reprint rights if submitted copy has been published elsewhere.
6. Provide a stamped, self-addressed envelope if you wish manuscript and/or photos returned.
7. We accept black and white glossy photos only, preferably 8 × 10.
8. We pay $25 for any feature article accepted; $5 for any fillers and "Handy Hints" under 500 words.

Articles should be mailed to: Editor, WRC Journal, P.O. Box 3007, Walnut Creek, California 94598.

REHABILITATION WILDLIFE COUNCIL

WILDLIFE JOURNAL

Vol. 7, No. 1 Spring 1984

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Rt. 1 Box 110
Fairfield, California 94533

The WRC Journal is designed so you can use a 3-hole punch and store back issues in a binder for easy reference.

Printed by Fairfield Speedy Press
Fairfield, California

Features

FLUID THERAPY IN BIRDS* *(Part I)*
Dick Evans, D.V.M.
Tree House Wildlife Center
Brighton, Illinois 3

BOGUE TO THE RESCUE AND FAILURE
Gary L. Bogue
Defenders Correspondent
Defenders of Wildlife, Washington D. C. 5

REHABILITION NOTES: BLACK-TAILED HARE
*(Lepus californicus)**
Sandy Fender and Bill Stone
Alexander Lindsay Junior Museum, Walnut Creek, California 7

Departments

Editorial 2
Letters to the Editor 10
Regional News 11
Clinician's Corner 14
NWRA News 16

Cover photo: Two juvenile Jackrabbits. Photo by Gerrie Reichard.

* This article is available as a reprint.

This issue of the *Wildlife Journal* has been published with the assistance of the ANIMAL PROTECTION INSTITUTE OF AMERICA.

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EDITORIAL . . .

Standards and Accreditation for Wildlife Rehabilitation

A major effort is currently underway by the Wildlife Rehabilitation Council (WRC) and the National Wildlife Rehabilitators Association (NWRA) to develop an accreditation process inclusive of a complete program to achieve that aim. The program is being designed to foster professionalism in this new and emerging field. It will allow for recognition of good wildlife care by organizations and individuals while providing technical assistance for new and developing wildlife rehabilitation programs. Through a program of rigorous self-examination, this program will help to insure that animals are systematically cared for in appropriate facilities by trained people. It is felt that that self-examination and industry self-regulation rather than mandatory government regulation will net the best results to benefit both rehabilitators and the animals in their care.

This combined effort of both organizations will enable wildlife rehabilitators to apply for an accreditation status that is recognized by both WRC and NWRA. The Standards and Accreditation Committee is chaired by myself and has nine other members from across the country. It is charged with the task of putting together a complete program acceptable to the Boards of Directors of the two organizations. The program will be designed for both in-shelter and out-shelter wildlife care programs. The program is expected to be ready for implementation by early 1985.

SCOPE OF THE PROGRAM

The program will consist of a complete review and assessment of the applicant's operation. This is accomplished by the submission of information and accreditation application as well as an on-site visitation. The accreditating organizations are developing a Code of Ethics that will be a prerequisite for applicants. The approach to the accreditation process will be to quantify as much as possible the procedure to minimize the influence of individuals in the system.

Major areas to be considered are:

1. Housing: Guidelines have been established for raptors and terrestrial mammals by WRC. In 1984 the joint committee will be establishing guidelines for marine mammals, waterfowl, passerines, and reptiles.
2. Nutrition
3. Veterinary Care: A sub-section of the joint committee comprised of four veterinarians are developing national policy guidelines governing the roles of rehabilitators and veterinarians in wildlife care.
4. Record Keeping
5. Environmental Health and Safety
6. Facilities Review
7. Organizational Standards

MEMBERSHIP INPUT

Members who are interested in giving input in the areas mentioned can do so by writing me at the WRC address. Comments will be passed on to the appropriate sub-sectional committee members.

A PILOT PROGRAM FOR CALIFORNIA

A funding request is pending to provide some state funds in a statewide program of accreditation. If approved, work on this program will begin this summer. Providing on-site technical assistance would be a major component of this program. A two-person team comprised of the California project manager-rehabilitator and a specialty rehabilitator (i.e., waterfowl, raptor, marine mammals) would be responsible for on-site visitation. This is again a voluntary program designed to encourage rigorous self-examination, foster professional growth and development.

Bringing wildlife rehabilitation into the mainstream of the professional community is for some a dream, for others a goal, and in reality, only a matter of time and effort.

Jan White, President

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Fluid Therapy in Birds (Part I)

Dick Evans, D.V.M.

Tree House Wildlife Center, Brighton, Illinois

INTRODUCTION

The purpose of this multi-part paper is to acquaint the wildlife rehaber with, 1) the concept of fluid and electrolyte dynamics in birds, 2) conditions predisposing to or causing imbalances in these dynamics, and 3) methods to correct these imbalances utilizing appropriately balanced fluid and electrolyte therapy. Further, as a medical therapy it required certain specific medicants that frequently cannot be replaced by cheap, homemade versions.

The reader may find the text complicated and feel it is not germain to the actual practice of replacement fluid therapy. On the contrary, the text is an attempt to describe a very complex, not entirely understood process in an effort to make the reader fully aware of the fact that fluid therapy is a medical treatment as sophisticated as any other. Its practice cannot be undertaken with success unless the practitioner is at least familiar with the theory of water balance.

The mechanisms of avian fluid and electrolyte dynamics are very similar to mammals with the exception that birds possess different kidney function, a cloacal water reabsorption system and, in many species, salt glands which allow them to drink salt water and thus live in marine environments without developing salt poisoning.[1,5]

An adult bird's total body water approaches 50-70% of its live weight.[1,7,18] About 4-8% of this water is found in the blood as plasma, 15-20% in the intercellular spaces that bathe the cells, and 35-50% within the cells,[1,7,19] This total body water is divided into an extracellular (blood, interstitial fluid, hollow organ fluid) and an intracellular (within cells) portion or compartment.[1,7] The young bird has higher values of total body water which decrease signigicantly (by 15-20%) until the bird reaches full sexual maturity after which the decrease slows to a steady trickle until death.[1] The decrease from birth to sexual maturity results from a signigicant reduction (up to 50%) in the extracellular pool and a concurrent marked increase (up to 300%) inthe intracellular pool.[1]

Body water is a universal solvent diffusing between the above compartments, maintaining the various body chemicals and their reactions in solution. Also in water is the solvent through which body wastes are eliminated chiefly by the kidneys.

Body water is regulated by precise processes which actually have no beginning or ending phase, but in a normal, healthy bird are in a state of perpetual activation and are, therefore, highly dynamic. These processes work to conserve water or retain it in the body while removing excess electrolytes and other chemicals during times of dehydration and removing water, etc. during times of excess.

The daily water requirements of birds studied to date appear to be 5-30% of their body weight (25-130 ml/lb of body weight) when the bird is in a thermoneutral state in which it is not under heat or cold stress.[1,6,9] This water requirement is inversely related to body size and is satisfied by either intake of free water (drinking or moisture in foodstuffs) or by the metabolism of foodstuffs (oxidative metabolism) which releases water in the body as a by-product.[1,6,9] Metabolically produced water obviously doesn't have to go through an intestinal absorption process but directly enters the extracellular or intracellular water compartment while free water must be absorbed from the intestines before it can gain entrance to these pools. Absorption of free water from the intestines of birds and ammmals occurs as a passive affair secondary to the active absorption of sodium (Na+).[1,7] Recent research in mammals, especially ruminants, has shown that maximal active glucose or glycine absorption is dependent on concurrent high sodium absorption.[8,14] Acetate, bicarbonate and certain amino acids also promote sodium absorption by an as het not completely understood mechanism.[8,14] Since Na absorption is increased in the mid to upper small bowel by these mechanisms, water is also passively absorbed in greater amonts. In fact, the addition of acetate, glucose, glycine, Na, etc. to commercial calf oral replacement fluids is a practical approach to promoting more water absorption.[8,14] In studies on ducks,[20] it has also been shown that in birds maintained on 60% sea water (high in Na+) had higher Na and water absorption in the mid small bowel than those maintained on fresh water. thus, we can probably assume that glucose, glycine, certain amino acids, etc. promote active Na and passive water absorption in both mammals and birds.

Water is actually absorbed either into the space between the intestinal lining cells or through the cell and then out into this space. From here it enters the small blood vessels or capillaries as well as the lymph vessels (again passive to active sodium transport) in the tissue below the lining of the small bowel and then enters the general circulation where it is transported to other tissues and organs of the body. [7]

The respiratory, urinary and GI systems as well as the salt glands are responsible for regulation of electrolytes retained by the body through a number of complicated mechanisms.[1-5,17] Before discussing these mechanisms, let's digress a little and describe how electrolytes are absorbed into the body.

As stated previously, sodium is absorbed actively (utilizing energy) by the intestines in a system with water. Since Na has a certain electrical charge, either another oppositely charged electrolyte such as Cl- (chloride) or HCO- (bicarbonate) must be absorbed, or a similarly charge electrolyte such as K+ must be excreted to maintain electrical neutrality in this system.[7] By these mechanisms the intestines help regulate the absorption of electrolytes.

Now let us return to a discussion of the regulation of body water and electrolytes by the salt glands, intestines (including the cloaca), respiratory system and, finally, the kidneys.

Salt glands have been found in cormorants, herons, gulls, pelicans, flamingoes, wild and domestic ducks and geese, penguins, terns, skimmers, albatrosses, roadrunners, ostriches and other ratites, most falconiform birds of prey, budgerigans, and desert partridges.[1,2,5,6,9,11-13,16,19-20] The paired glands are found on the head either directly over the eyes (superorbital glands) or between the nose and eyes. Secretions leave the glands and travel to the nostril via a duct. From the nostril they trickle off the beak.[13] In the above species, the salt gland and not the kidney is the chief regulator of NaCl in the body, removing 60-85% of the NaCl eliminated by the body.[4,5,13] Thus, marine or shore birds are able to drink salt water and remove the large amounts of salt it contains (which is too much for the kidney to remove) while utilizing a very small amount of water to do it.[20] Additionally, desert birds utilize these glands as a mechanism to remove normal body salt wastes with only one-third the amount of water the kidney would use, thus assuring water conservation and survival in an arid environment.[17]

The salt gland operates as a blood tonicity regulator in that it responds indirectly to increased blood tonicity or sodium chloride levels (the chief constituent of tonicity in the blood).[3,4,11,13] When the tonicity of blood increases to 2-10% above normal,[13] this change is sensed by receptors in the wall of large blood vessels close to the heart. Impulses are sent from these receptors to the brain via the vagus nerve. From the brain, another impulse goes out over the secretory nerve (in the facial nerve) to the gland where a chemical is released from the nerve endings that activates the salt gland.[4]

Tonicity receptors are also located in or around the pituitary gland of the brain. Apparently they stimulate the pituitary which then hormonally stimulates the adrenal gland which in turn releases the hormone cortisol. This hormone stimulates the salt gland to secrete salt.[12] It also elevates blood glucose levels which appear to enhance salt excretion much as they enhance salt absorption in the intestines of ruminants and ducks as described earlier.[12] Any factor such as physical stress (temperature, light, sound) or psychological stress (excitement, etc.) which stimulate the adrenal gland to secrete cortisone may thus also influence positively the salt gland function.[12]

The salt gland responds to elevated blood tonicity or NaCl values within about 15 minutes to one hour is these values were the result of oral salt loading and immediately if salt loading was accomplished intravenously.[13] Initially during salt loading, there is a diuresis or loss of water and sodium through kidneys which is followed by increased secretion of sodium through kidneys which is followed by increased secretion of sodium from the salt gland and decreased excretion of sodium from the kidneys. Eventually the salt gland decreases the tonicity of the blood until it reaches values below which the gland is stimulated at which time the gland stops reacting. While the actual volume of secretion from the gland is small compared to the kidney, the gland has a capacity to secrete tremendous amounts of salt as a clear, colorless, supersaturated salty water (up to 5% salt water which is twice as salty as sea water).[13] In fact, in experiments in herring gulls in which birds were given sea water in an amount equivalent to 2 gallons for a human being, the birds were able to remove 90% of the salt in three hours via their salt glands with less than one-third the amount of water the kidney would have used to secrete this amount of salt had it been able to do so.[13]

Fecal excretion is often overlooked as a source of water and electrolyte loss, when in fact it represents a significant form of water and electrolyte regulation. As can be appreciated by anyone who has investigated the consistency of birds' feces, they may contain up to 50-75% water and an array of electrolytes including Na, Cl, HCO-, K depending on the amount of water and electrolytes ingested and the body's requirements for these.

The respiratory system is also an avenue through which the body loses water.[9] In the resting state, water or moisture on the oral membrane evaporate and is lost. The amount lost, though is small compared to other avenues of loss.[17] When a bird is subjected to physical or physiological stresses, rapid breathing or panting may occur which results in a greater but still small water loss compared to the kidney.[9]

Without a doubt, the kidneys are the major regulators of water and electrolyte levels in birds (excepting those with well functioning salt glands) as they are in mammals. The avian kidney is a mixture of reptilian and mammal type subunits (or urinary tubules) and many filtering units or glomeruli which are smaller and less than their equivalents in mammals.[1]

The kidney functions in three manners: filtration, absorption and secretion. The glomerulus is a device made up of small blood vessels surrounded by a dilation of a single urinary tubule. When blood passes through the glomerulus, water, Na, K, Cl, phosphate, glucose, erea, uric acid and other chemicals (excepting blood protein) are filtered out to form an initial urine.[1] The degree of filtration is actually controlled by blood pressure, i.e. the higher the blood pressure, the greater the rate of filtration and vice versa. The rate of filtration through the glomeruli in birds is 1-2 ml/min/square meter of body surface while in mammals this rate is 50-70 ml/min/square meter.[1,17]

As this pre-urine travels down through the urinary tubules, chemicals and electrolytes are either absorbed back into the blood stream from the urine or are secreted into the urine by special cells lining the

(continued on page 13)

Bogue to the Rescue—and Sometimes Failure

Gary L. Bogue

Defenders Correspondent, Washington, D.C.

It strikes me that in my discourses on the rescue, care and rehabilitation of distressed wild animals I may have been somewhat misleading my readers. Looking back over the last few years, it seems that I usually write about the positive aspects of my work, about successful rescues, about animals we have saved and returned to the wild. Sometimes it is well to report the negative side. It keeps things in perspective.

Actually, if you must know the truth, I had a lousy couple of days recently and feel like talking about it. The wildlife rescue business can do this to you. Lots of trauma cases, gunshot wounds, starving animals. You lose many, and it gets to you.

One of the most frustrating things about this work is the lack of proper rescue equipment—of means for helping animals without causing further injury to man or beast. Somethings we need simply haven't been invented. It's still a young field. Besides, you never have the funds you need. All wildlife rescue centers are non-profit—and I mean *really* non-profit. You're forever scraping and promoting and wheedling just to stay in existence. It was that way when I started with the Alexander Lindsay Junior Museum in Walnut Creek, California, years ago. It's still that way down at the Monterey SPCA's rescue center where I work now.

People who survive in this work do so by becoming professional con-artists. Oops! I don't want to offend anybody, so I'd better reword that. Let's just say they're good at persuading people to lend a hand. Anyway, that's what started my problems last week.

It had been a long day. Animals had died during the night , so the morning body count was up. One of the brown pelicans we released in the afternoon had suddenly developed a new problem (Murphy's Law of Animal Rescue). It couldn't extend its right wing all the way and thus couldn't take off. But it could still paddle out into the middle of Monterey Bay, where it bobbed and thumbed its big beak at us. Pat Quinn, director of our center, looked over at me in disgust. We both knew that feathered freeloader would probably beat us back to the clinic for the evening feeding.

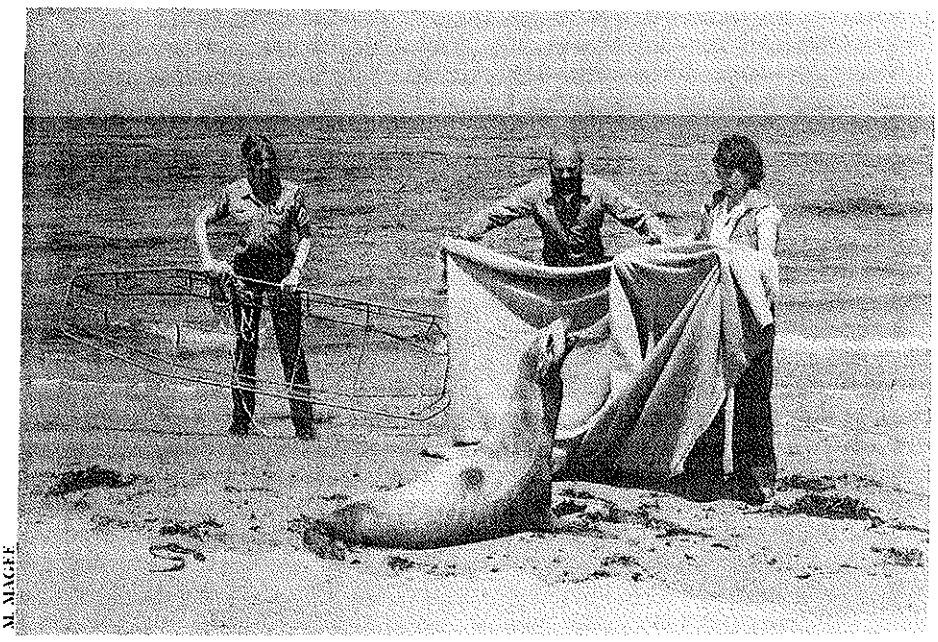
At 4 p.m. the calls started coming in. I'd been half-expecting it. Something always happens just before closing time. A gull was entangled in fishing line and floating about 100 feet offshore at Otter Point in Monterey. Tourists were lining the rocky beach wringing their hands. Every time the gull tried to swim, it would bob underwater. The sheriff's dispatcher called, pleading. Their switchboard was buckling under the load of calls about the gull.

We had our own problem—no boat. We'd been pulling our hair out for weeks trying to figure a way to get a rubber Zodiac with a motor, old or new and small and maneuverable, for close-in rescues like this.

Old tarnished silver-tongue here stared at the wall for a minute, then phoned the local U.S. Coast Guard Search and Rescue Unit and somehow got them to agree to order out a patrol and crew, on the condition that we accompany them to handle the killer gull. I figured it was sheer coincidence that it was also time for their boat to go out on patrol.

I was feeling pretty smug as Pat and I drove to the Coast Guard base. I had visions of a 40-foot white charger racing to the rescue of a damsel sea gull in distress, and of busloads of tourists clicking away with their cameras as the heroic wildlife rescue team feverishly gnawed the tangle of fishing line off the bird with our bare teeth.

We arrived at the Coast Guard pier and rushed to meet the crew of our



M. MAGEE

rescue craft, appreciative smiles on our faces. Three women glared coldly at us. One carried a shotgun, another had a .45 automatic strapped to her waist. These guardians of the coast always go out armed in case of smugglers. "You the people who want us to waste taxpayers' money going out after some blankety-blank sea gull?" asked the one with the .45. Hoo-boy!

Pat and I pulled on our life preservers and stood as far apart from the crew as we could without falling overboard. They must have been hot under the collar, but they were going about the jobs and doing them with the usual speed and efficiency of Coast Guard crews everywhere. I grabbed hold of the railing and hung on for dear life. When we reached the last reported location of the gull, the boat pulled in tight to the shore. We all lined up on the shore side of the boat, scanning the glassy, kelp-clogged waters. The gal with the .45 on her belt was beside me. My eyes searched the water frantically. I had the feeling that if we didn't come up with the gull, they were really going to be angry.

I felt a sharp tapping on my back. "They just radioed that your gull was rescued by somebody else," she gritted, turning back to stand in front of the cabin door with the rest of the crew.

Taking a deep breath and setting my shoulders, I strode across the burning deck to do what I could to salvage something from this fiasco. Gathering every trick I had left in my sea bag of golden oratory, I opened my mouth to thank the nice ladies for helping us. "Uh, gee, *guys.*"

Believe it or not, by the time we got back to shore we were all the best of friends. My verbal gaff had luckily broken the ice. By the time they all stopped laughing at my red face, and Pat and I had explained what we were all about (meaning that we helped things besides blankety-blank sea gulls), everyone was happy. Our crew promised to keep an eye out for injured wildlife on future patrols.

It was 6:30 p.m. when we got back. So ended a day beset by frustration, maybe a little fear (okay, so I really thought they were going to throw us overboard) and plain nervous exhaustion.

It didn't improve things when the SPCA's night animal control officer phoned me at 1a.m. to ask for a hand with a deer that had been hit by a truck. Especially when the animal died before we got there.

At 2:30 a.m. I got back wondering what I was doing in this business. At 5 a.m. I finally grew tired of tossing and turning and got up to make coffee and try to figure out why I'm so tired in the morning.

Just before lunchtime the Fish and Game Department's warden called to say one of his biologists had spotted two sea lions out on the end of the rocky jetty by the Coast Guard pier. He said they were both cut and bleeding, with fish net wound tightly around their heads. They were in very bad trouble, meaning they would die unless they got help.

I began to tremble. Please don't make me call the Coast Guard again! It developed that the fish and game biologist had a boat and was on hand to help. I phoned Tom Williams, our vet, a specialist in marine mammal care, and asked him what drug we should use with the tranquilizer gun. He named one. I asked how the sea lion would react to it. He didn't know. Big help you are, I said. Not much is known about tranquilizing sea lions in the wild, he replied. Yeah, I said, but we could kill one of those animals. That's right, but they are going to die a particularly horrible death if you don't try something, he responded. Nobody asked you to get into this work, he added. Tom always likes to get in the last word.

Pat and I loaded our nets, blankets and dart guns into the boat and sat down in the bow, Dan Qualls, the SPCA's patrol captain, sat behind us fiddling with the tranquilizer rifle. The biologist spun the wheel and sent us putt-putting along the jetty, heading for the congregation of sea lions, a jumble of brown bodies on the rocks out on the point.

As we chugged past the Coast Guard dock, I looked up and saw our crew of the day before cleaning their boat. We exchanged friendly waves. "Going out after another blankety-blank sea gull?" called one of the gals with a grin. Don't I wish, I thought, clenching my teeth and starting to worry.

Until recently, injured sea lions were caught by waiting for them to crawl up on the beach. We had to dream up a way to get them more quickly, while they were still strong enough for us to treat them and pull through. Pat and I talked it over. All we had to do was to take this drug, shoot the lions with the tranquilizer rifle from the deck of the tiny, tossing boat, then somehow keep the amimals from plunging into the ocean and sinking unconscious to the bottom, where they would drown. Then we had to load the 200-pound plus deadweights back into the boat without capsizing it and drowning us all, clip off the nets and treat the injuries on the spot, or at the vet's if they were serious, and finally get the sea lions back to their rocks and freedom.

How come Marlin Perkins never has such problems?

Dan's shot hit the first sea lion smack in the large muscles of the shoulder. This is the kind of shot you want. If you hit where the animal is thinly muscled, the shot can break bones. The animal and all 15 or so others lounging around her immediately dove off the rocks and began swimming around the boat. She wasn't hard to spot, with her monofilament-net halo, so we grabbed the dip net and started watching for the effects of the drug. We were still watching when we suddenly noticed that she hadn't come up from her last dive.

Fifteen minutes later we realized the worst. She was gone. Nowhere to be seen on the rocks, nowhere in the water. Maybe she had swum to another beach. There were lots around. Yes, that was it. She went somewhere else. Pat and I looked at each other. We both glanced down into the murky green depths. Maybe she'd turn up. Maybe she wouldn't. We'd have to live with that.

The other injured animal was in even worse shape. Her head was a thick ball of fuzzy nylon netting, and she was bony from lack of food. We could see where the sharp cords had cut deep into her neck, causing blood to flow down the sides. But she was alone and far back on the rocks along the middle of the jetty. This time we had a better chance.

Again Dan's shot was on target. The animal stopped on a shallow ledge and sat watching us. We drifted back to wait. Five minutes, ten, 20. You never see this on Wild Kingdom because it gets cut out of the film. At 25 minutes we were figuring the drug wasn't going to work when, suddenly, the sea lion plunged for the depths. A second later, she screamed up into the air, breaching gracefully like a whale

(continued on page 15)

Rehabilitation Notes: Black-tailed Hare/Jackrabbit *(Lepus californicus)*

Sandy Fender and Bill Stone

Alexander Lindsay Junior Museum, Walnut Creek, California

INTRODUCTION

Commonly called the Jackrabbit, the Black-tailed Hare is not a rabbit at all, rather it is a member of the hare family. Hares differ from rabbits in numerous ways, with one of the most important being that they have young that are born with their eyes open and are fully furred. There is also a difference in their skull structures.

Black-tailed hares are found from sea level to 12,000 feet. Their distribution includes California, eastern Oregon, southwest Oregon, southern Idaho, Nevada, Utah, Arizona, New Mexico, Texas, Oklahoma, Kansas, Nebraska, eastern Colorado, and southern South Dakota. Favored habitat includes open prairies and sparsely vegetated deserts but they also favor areas near human habitation. They do not dig burrows rather spending their inactive times hidden among vegetation in shallow depressions called "forms".

DESCRIPTION

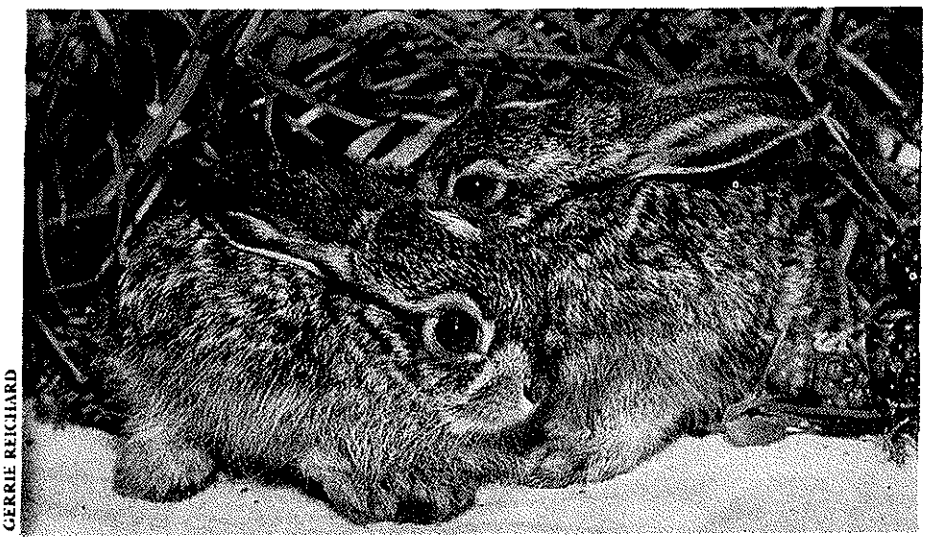
- ADULT: Head & Body 465-630 mm (average 22"); tail 50-110 mm; ears 150-177 mm (6-7"); weight 1.3-3 Kg (3-7 lbs.). Adult fur is grayish-brown with large black-tipped ears. The top of the tail is black with a brown underside. Possessing 26-27 teeth, they have cheek teeth that are rootless and ever growing. In the family Lagamorpha, they have 4 upper incisors. Their testes and scrota are in front of their penis. They have 6 mammae.
- The distal portion of fibula is fused to the tibia. They are able to deliver vicious kicks with their hind feet. Hares are subject to panic jumps and may break legs, neck, or back etc.
- They do not hibernate.
- Normal Body Temperature: 12.5 to 103.5° F. Large ears are used to thermoregulate via blood flow.

NATURAL DIET

- Herbivorous (i.e., grasses, herbs, and shrubs). They are coprophagous producing hard fecal pellet from the intestine and a soft fecal pellet from the caecum (which is taken directly from the anus and reingested. This provides an important source of protein and certain vitamins. In the wild, they have been observed eating dirt, possibly for mineral supplementation.
- Activity Patterns: Dusk to dawn, resting during the day in "forms" (depressions in the ground) under shrubs or other cover.
- Average Lifespan in the wild: unknown.
- Age weaned in the wild: possibly two to three weeks.
- Solitary in nature.
- Enemies: Man, eagles, owls, hawks, coyotes, bobcats, gophersnakes, and rattlesnakes.

BIRTH AND YOUNG

- GESTATION: 42-43 days. They give birth year round with a peak period between January and June.
- Litter Size: 1-8, usually 2-5. Possibly two litters per year.
- BIRTH WEIGHT: 2-6 oz., depends on the number in litter and food conditions.



GERRIE REICHARD

- BIRTH LENGTH: 3-4".
- Appearance of newborns: Fully furred, eyes round, short ears. they nurse five minutes after birth and are able to run after their mother soon after. Young hares can and have been known to survive with three days of maternal care.
- Eats plant materials while nursing.
- Age weaned in the Wild: possibly 2-3 weeks.
- Female has young in one or two "forms". Leaves young alone, visiting only to nurse. Female and young call to locate each other.

FORMULA-FEEDING

- Based on available milk analysis for White-tailed Hares (this specific species is not available) and experience, KMR is used. Although higher in carbohydrate and lower in solids, KMR has worked the best. The fat content appears to be the most important factor.
- Use a pet nurser if the hare will suckle, if not use a 3cc syringe and graduate to larger sizes as necessity dictates. Syringes allow for easy measurement of intake.
- FEEDING INTERVALS AND AMOUNTS: Generally, they are allowed to take as much as they want per feeding, but are ONLY fed two times daily (twelve hours apart). The stomach should be round but not tight. Some infants prefer formula at room temperature, while others like it warmer. As a rule of thumb, maximum feeding should be 50cc/Kg. Even the smallest of hares will usually take at least 6 cc's of formula. Place hand or towel over back to restrain and feed. Provide fresh food at all times (unsprayed grasses, apples, rabbit feed etc.)
- STIMULATION AND ELIMINATION: The infant usually does not require stimulation to cause urination or defecation. Monitoring of intake and outgo should be done as a part of charting the animals progress.
- WEANING: Wean as early as possible. Cut down to one feeding a day as soon as it is eating solid food regularly. Gradually eliminate the KMR completely. Rule of thumb for length of formula feeding is three weeks or less.

HOUSING

JUVENILE CAGING:

- A cardboard pet carrier or equivalent sized box will do nicely. Line with a non-stringy towel or receiving blanket. A larger enclosure should be provided for daily exercise periods which are especially important to stimulate digestion and elimination.
- A heating pad set on low in one part of the box can be used to insure the warmth depending on the ambient air temperature.
- Shallow water dishes should be provided to encourage self-feeding. If formula is like-wise offered, it should be changed 2-3 times daily depending on the ambient air temperature. Natural grasses, greens should be offered from day 1. Use of iceburg lettuce is discouraged as problems have been reported with diarrhea. Introduce new foods slowly.
- Reduce visual stress and noise levels wherever possible. These animals are particularly sensitive to stress in captivity. Provide nest boxes or hiding areas.
- After weaning, the enclosure used should also have solid sides and top (cloth over wire will work). Provide a front opening rather than top to discourage jumping upon entry. Hares are very nervous animals and will go into uncontrollable wild jumping fits which sometimes result in serious injuries. WRC recommended minimum housing guideline for juvenile jackrabbits (per litter) is 4'x6'x4'.

ADULT HOUSING:

- Adults can be housed in various ways including rabbit-type housing. Solid walls are recommended on three sides. Low ceilings leave less height for jumping and subsequent injuries. Urine scald will result if allowed to stand in urine; provide drainage or absorbent bedding. If wire is used on the floor, it should be small enough to preclude a rabbits foot from getting caught in it.

TABLE I Hematological Values in Clinically Normal Black-tailed Jackrabbits

ERYTHROCYTIC SERIES	*Range*	*Mean*
Erythrocytes (10^6/mm^3) (error corrected)	6.45-9.02	7.75
Hemoglobin (gm/dl)	13.5-18.4	15.80
PCV (volume %)	42-55	48
MCV (N^3)	58.2-68.9	62.1
MCHC (volume %)	31.1-34.7	33
Reticulocytes (%)	0-6.7	0.8
ESR (mm/60 min)	0-10.0	0.6
LEUKOCYTIC SERIES		
Leukocytes (10^3/mm^3)	2.2-16.1	6.59
Neutrophil (band) (%)	rare in ?	
Neutrophil mature (%)	13.0-81.5	42
Neutrophil mature (#)		2774.4
Lymphocyte (%)	16-80	49.2
Lymphocyte (#)	682-11,431	3229.9
Monocyte (%)	1.0-16.0	5.3
Monocyte (#)		332.7
Eosinophil (%)	0-11.0	3.0
Eosinophil (#)	0-864	204.9
Basophil (%)	0-1.5	0.5
Basophil (#)	0-162.0	28.6
OTHER DATA		
Icterus index	2-5	3.3
Plasma protein (gm/dl)	4.7-7.1	5.6
Fibrinogen (mg/dl)	100-500	270.9

- Provide hiding areas and minimize noise and visual stressers.
- They can become overheated in hot weather. Provide adequate shelter from the elements and always have water available.
- WRC recommended **minimum** housing guidelines for adult jackrabbits is 4'x4'x4' per animal. Cage rest conditions may dictate temporary use of smaller caging.

RELEASE

- No special training is required prior to release. Tameness is not a problem when appropriate rehabilitation techniques are employed and handling is minimal. Make sure the hare is acclimated, recognizes and eats natural foods, and has had ample opportunity to exercise.

SPECIAL PROBLEMS

- Overfeeding is a common error. Do not feed more than 2x daily. Better to underfeed per feeding than to overfeed. Diarrhea can and will often result.
- Jackrabbits are prone to gas and diarrhea. Proper exercise usually relieves the gas, while proper feeding regimes usually prevent nutritional diarrheas. For nonspecific diarrhea, 1cc pectaline/1b (3x daily) has been used successfully. If diarrhea persists beyond 24 hours, consult veterinarian. There are many causes of this disorder.
- Transmissible Diseases: Dogs may get tapeworms from eating infected animals. Humans may get tularemia while handling tick infested jackrabbits or skinning or eating affected animals that are not properly cooked. Plague may be spread by fleas associated with animals.

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Letters To The Editor . . .

Dear Editor:

In the Editor's note following Scott Sim's article, *"Use of IV Fluids in Small Wild Birds,"* reference is made to solutions of Lactated and Acetated Ringers with 2½ to 5% Dextrose. Wouldn't such solutions contain much too much dextrose to be safe and therapeutic for wild birds?

I have been instructed by an experienced and knowledgeable bird veterinarian to administer subcutaneous fluids in the following proportions: 5cc Lactated Ringers, 1cc Dextroxe 5% in water.

It is my understanding that there is no one IV solution available in the proper proportions for birds, so for subcutaneous administration I have been withdrawing 2cc from a bottle of D5W and 10cc from a bottle of Lactated Ringers (with good results). I would expect solutions of dextrose 5% and 2½% combined with Lactated Ringers to contain dangerously high amounts of dextrose.

Also, to maintain sterility in solutions for IV administration, wouldn't fresh bottles of solution be required for each administration? Wouldn't that be prohibitively expensive? I refrigerate my solutions and withdraw quantities as I need them for subcutaneous administration.

I look forward to your reply.

Joyce B. Eubanks
Phoenix, Arizona

Dear Joyce,

In the severely dehydrated and shocky patients I refer to, there is a relative, as well as an absolute lack of water in the body. This means that not only is the bird's body fluid content reduced, but that the fluids still in the body are more concentrated (with electrolytes, proteins, etc.) than they should be. In order to correct this, it is necessary to give fluids which are more dilute than normal body fluids (such fluids are referred to a hypotonic). The problem with very dilute fluids is that rapid administration is hard on the red blood cells. Lactated ringers (L/R) is isotonic (this means approximately the same concentration as normal body fluids). Half strength L/R is an acceptable fluid but I think that half strength with 2.5% dextrose in it is better. This fluid is isotonic when administered but because the dextrose is rapidly removed by cellular metabolism it has the effect of giving extra water to the body without risking red cell damage upon administration. It has the added benefit of supplying a small energy boost to the animal, something most of these down and out patients can use. The amount of dextrose will raise blood sugar levels very transiently but is not sufficient to cause kidney diuresis (excess water loss by urination which can be a problem with very concentrated dextrose solutions. Half strength L/R with 2.5% dextrose is an easy fluid to make up, just mix equal parts of normal L/R and D5W (5% dextrose in water).

Secondly, you asked about the best route of administration. There are basically four choices. I have listed them in order from most effective to least effective: 1) intravenous (I.V.), 2) intraperitoneal (I.P.), 3) oral (P.O.), 4) subcutaneous (S.Q.). There is little room to argue that I.V. is best at least as far as effectiveness goes. This method delivers fluids rapidly to the very spot they are needed most to support the cardiovascular system and vital organs. It is more technically difficult.

Intraperitoneal fluids are also technically difficult and the absorption is probably not much better than oral fluids (assuming the gut is not diseased), therefore although I.P. is second in effectiveness, I think P.O. is better. Oral fluids have two more advantages over all other routes, they need not be sterile, and they are very easy to administer.

Notice that S.Q. is the least effective route of administration. This is because it is dependent upon peripheral blood circulation to pick up and deliver the fluids where they are needed and in the severely dehydrated/shocky patient peripheral circulation is very poor. S.Q. is the route of last resort in my opinion.

Your third question dealt with sterility. **Only** *oral fluids can be administered in a non-sterile manner! It is the opinion of the doctors at the University of California, Davis, Veterinary School that once the seal on a bottle is broken the bottle should not be used for more than 24 hours. Refrigeration probably helps but I still would not use opened fluids for more than 2-3 days. Unfortunately, this is very expensive. I get away from some of the cost as follows: I buy several empty, sealed, sterile drug bottles, the one with the rubber top to allow removal of the drug by hypodermic needle. I then fill these bottles with my mixture of L/R and D5W in a 1:1 ratio by injecting the fluids into the bottles through the rubber top. Then I insert a needle in the bottle (to relieve the pressure and prevent explosion) and re-autoclave the fluids. The needle must be removed* **immediately** *after autoclaving. These small bottles can then be used one at a time, thus saving considerable amounts of money and wasted fluids.*

One last thing, the opened fluids can be used orally without any time restrictions, although the dextrose may be used up by bacterial growth.

Sincerely,
Scott Sims
Class of '84
School of Veterinary Medicine
University of California
Davis, California

VETERINARY MEETING

"Association of Avian Veterinarians 4th Annual Meeting June 20-23, 1984, Toronto, Canada. For more information contact Association of Avian Veterinarians, P.O. Box 299, East Northport, New York 11731.

WILDLIFE REHABILITATION COUNCIL
MINIMUM HOUSING GUIDELINES FOR REHABILITATION OF MAMMALS

These guidelines are meant to give guidance on minimum housing requirements for the rehabilitation of various species of western mammals. All cage sizes are indicated in feet and are in order of length x width x height. Abbreviations are as follows: PP - cardboard portable pet carrier, L - one litter, Gal. - size of an aquarium tank, (3) - number of animals per enclosure.

SMALL MAMMALS

Species	Initial Care	Nursing	Juvenile	Adult
Woodrat	(1) 15 gal.	(1) 15 gal.	(1) 4x6x2	(1) 4x6x2
Kangaroo Rat	"	"	"	"
Brush Rabbit	(1) PP	(1) PP	(L) 4x6x2	(1) 4x6x2
Jack Rabbit	"	"	(L) 4x6x4	(1) 4x4x4
Mice	10 gal. aquarium or lab caging 1 adult or 1 litter			
Pocket Gopher	(1) 15 gal.	(L) 15 gal.	(L) 15 gal.	(1) 15 gal.
Tree Squirrel	(1) PP	(L) PP	(L) 4x6x4	(1) 4x6x6
Ground Squirrel	"	" (L) 4x6x2	(1) 4x6x2	
Mojave Grd. Squ.	(1) 15 gal.	(L) 15 gal.	(L) 2x2x2	(1) 2x2x2
Chipmunk	(1) PP	(L) PP	"	"
Muskrat	"	"	(2) 4x6x2	(1) 4x6x2*
Weasels	"	(1) PP	(1) 3x3x3	(1) 3x3x3

Species Species	Nursing Eyes Closed	Weaning	Juvenile	Initial Inj. Adult	Outside Adult
Raccoons	(L) PP	(3) 3x3x3	(4) 4x6x5	(1) 2x3x3	(1) 6x8x6 * 4x10x6
Opossum	"	(L) 3x3x3	(1) 4x4x8	(1) 2x2x2	(1) 4x4x8
Fox					
Climber	(L) PP	(L) 3x3x3	(2-3) 4x8x6	(1) 2x2x2	(2-3) 4x8x6
Non-Climber	"	(1) 3x3x3	"	"	"
Badger	(L) 3x3x3	(1) 3x3x3	(1) 8x8x6	(1) 3x3x3	(1) 8x8x6*
Bobcat	(L) PP	(2) 3x3x3	(2) 8x8x6	"	(2) 8x8x6*
River Otter	(L) 6x8x6	(L) 6x12x6	(1) 3x3x3	(1) 6x12x6*	
Sea Otter	"	"	(L) 6x10x6	(1) 6x8x6	(1) 6x10x6*
Marmot	(L) PP	(L) 4x2x3	(1) 6x8x6	(1) 3x3x3	(2) 6x8x6
Ringtail Cat	"	(L) 3x3x3	(L) 4x6x5	(1) 2x3x3	(1) 6x8x6* 4x10x6
Fisher	"	(1) 3x3x3	(1) 6x8x6	(1) 4x3x3	(1) 6x8x6
Marten	"	"	(1) 4x8x6	(1) 2x2x2	(1) 4x8x6
Wolverine	(1) PP	"	(1) 8x12x6	(1) 4x3x3	(1) 8x12x6
Beaver	(L) PP	(L) 3x3x3	(L) 8x12x6	"	"
Aplodontia	"	(1) 3x3x3	(1) 8x8x6	(2) 2x2x2	(1) 8x8x6
Porcupine	"	"	(1) 4x8x6	(1) 3x3x3	(1) 6x8x6
Coyote	"	(L) 3x6x3 (eyes open)	(L) 10x12x6	(2) 4x3x2.5	(2) 10x12x6
Bear	"	"	(L) 8x12x8	91) 8x12x8	(1) 20x36x16*
Mt. Lion	"	"	(L) 6x24x8	(1) 4x3x3	(1) 6x24x8*
Wild Pig	(L) 2x2x2	(L) 10x15x8	(L) 10x15x8	(1) 6x8x8	(2-3) 10x15x8
Blacktailed Deer	(1-2) 4x4x2	(4) 10x15x6	(6) 30x50x6 or a barn	(1) 8x8x8	*
B. H. Sheep	"	"	"	"	*
Elk	(1-2) 6x6x2	(4) 12x20x6	(6) 30x50x6 or a barn	(1) 8x8x8	*
Pronghorn	(1-2) 4x4x2	(4) 10x15x6	*	"	*

* See Specific Species Requirements

SPECIFIC SPECIES REQUIREMENTS

Rodents:	Logs for gnawing to curb tooth growth, make sure bark is edible. Kangaroo Rats require sand for burrowing, but do not require water.
Raccoons:	Hammocks made of one inch square wire mest attached to wall or roof, tree limbs and logs to allow for climbing. Wading pool or container for water other than drinking.
Badger:	Be sure bottom of cage is secured so animal cannot dig out. Metal garbage can (on its side) can be used as a den. Line with tree trimmings or shavings. A large wooden box with at least three feet of soil for digging.
Bobcat/Mt. Lion:	Large branches and logs should be provided to allow for climbing and some high platforms for resting above cage floor.
Muskrats, Otters, Beaver:	Must have water containers large enough to swim in at least two feet in depth. Container of soil at least one foot deep for digging.
Hooved Animals:	If chain link is used in deep pen, drapes must be hung over the inside of the chain link to avoid injury and deer climbing out, (i.e. blankets tied securely or tarps). General practice is to take deer and Pronghorn from injured adult caging to release in an effort to prevent cage trauma. Big Horn Sheep will jump high, Pronghorn will jump long distances but not as high.
Bear:	Den should be made of concrete blocks or bricks (8x8x6) and attached to the wall of the cage. This will house one adult or two juveniles. Heavy logs and a large tub for bathing are also necessary.

OUTSIDE HOUSING MATERIALS FOR MAMMALS

The following are suggested building materials for outdoor caging.

WALLS: Chain link fencing, wood, or welded wire
welded wire sizes: ½" x ½" - rodents and oppossums (100g or less)
½" x 1" - squirrels
1" x 1½ - raccoon and larger mammals

ROOF: Chain link fencing or welded wire, solid section of wood, fiberglass, etc. to provide protection from the elements.

FLOOR: Floors should be concrete or if natural flooring is used, chain link fencing should be placed under cage and be covered with pea gravel or tree trimmings to prevent escape. Slope floor for proper drainage.

DOOR: All cages should be equipped with a double door system for the protection of the handler and animal.

DEN: Wooden box, fiberglas or plastic animal carrier is adequate.

WOODEN CAGES: If wooden cages are used, they should be properly water sealed.

DISINFECTION OF CAGES

Daily removal of feces and urine from cages is necessary to prevent odor, parasite reinfestation and insect over population. There are various disinfecting agents used after daily cleaning to properly sanitize the cage. The agents and methods briefly discussed here are suitable for disinfecting cages and are non-corrosive and non-irritating when used correctly unless otherwise stated.

Detergents

Detergents are cleaning compounds and include both soaps (anionic) and synthetic detergents (cationic). While soaps are not antibacterial, the scrubbing action removes microorganisms.. Disinfectants can be added to increase antibacterial activity. Synthetic detergents are not affected by the hardness of the water. While they have minor disinfectant action against vegetative bacteria, they are not effective against fungi or viruses. Additionally, they lose their effectiveness in the presence of blood and tissue debris.

Chlorine

Chlorine based products are often used in cleaning. They are effective against a wide range of microorganisms including vegetative bacteria, algae, fungi, and viruses, although they do not readily destroy spores. Chlorine is not affected by the hardness of water but does decompose in the presence of light. It is inactivated by organic matter, ammonis, and amino compounds. Metal surfaces can corrode with the use of this powerful oxidizing agent. Clorox bleach is a chlorine based product, though it can be expensive, if used in the correct dosage, should prove to be inexpensive. The recommended dilution rate is 1:30.

(continued on page 15)

(continued from page 4)

tubules. In the case of Na, this reabsorption is influenced positively by the adrenal gland hormone Aldosterone. The concentration of these chemicals or electrolytes in the urine may be higher or lower than the blood depending on whether there is a need to raise or lower their blood levels.

The water which was filtered through the glomerulus to serve as the solvent for electrolytes in the urine is likewise regulated by reabsorption. As in the intestines, water is passively reabsorbed following active Na, other electrolytes and glucose reabsorption. As much as 99% of the urine water may be reabsorbed during periods of dehydration or as little as 6% during periods of excess body water.[1] In mammals, this water reabsorption is regulated in the distal ends of the urinary tubules by antidiuretic hormones (prevents water loss or diuresis by absorbing Na+ and water).[7] The avian antidiuretic hormone, Arginine vasotocin, does not influence water absorption in the reptilian type urinary tubules in the avian kidney, only in the mammalian tubules.[1,17]

Because of the rather primitive, reptilian-like kidney anatomy and function, birds have commonly been said to have a less efficient urinary system compared to mammals. However, if one examines and compares the mammalian and avian kidneys, water and concentrating abilities, it becomes obvious that mammals' kidneys are actually less efficient in this regard.[17] Table I shows some equations in terms of body mass in exponential from as related to various parameters of water balance.[17] The total summation of these parameters of the total turnover of water in cc's per day is obviously less in birds, making them better suited to conserving body water than mammals.[17]

Table I

Intake cc/day	Mammals	Birds
Drinking	$99\ M^{.90}$	$59\ M^{.67}$
Metabolic	$12.6\ M^{.75}$	$14.1\ M^{.72}$
Preferred	?	?
Loss cc/day		
Evaporation	$38.8\ M^{.88}$	$24.2\ M^{.61}$
Feces	$39.6\ M^{.63}$	---
Urine	$60.9\ M^{.75}$	$27\ M^{.86}$
TOTAL TURNOVER	$123\ M^{.80}$	$115\ M^{.71}$

Lastly, we should discuss the cloacal water reabsorption system which is not found in mammals. Studies on this system have yielded conflicting results, in part because urine collection methods in birds commonly alter urine flow.[1,15,19]

What we can probably say is that the dilated sac or cloaca into which the digestive and urinary tracts empty can collect and hold urine as well as push it retrograde into the rectum and colon.[15] Further, it appears that water and electrolytes are reabsorbed from the cloaca, rectum and colon in birds to at least some extent.[15] In some species, this may be a rather significant method of water and electrolyte regulation.[15]

In summary, it can be seen that the intestines, including the cloaca, the respiratory system, the salt glands and, most importantly, the kidneys all work in concert to alter the body's levels of water and electrolytes by a very complex, highly inter-related and dynamic process involving the absorption and excretion of Na, Cl, K, HCO —, glucose, glycerin, some amino acids, acetate, etc. In cases of dehydration resulting from water loss or deprivation, the kidneys conserve water by decreasing urine production, the intestines try and absorb as much water as possible, evaporation or loss of water through the respiratory system is reduced and the salt glands function to remove body salt without losing vital water. Opposite events occur when body water is in excess.

Part II will appear in the Summer 1984 *Wildlife Journal.*

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Clinician's Corner . . .

Use of the PCV in Status Evaluation for Raptors

by
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St. Paul, Minnsota

The need for methods of quantitative measurement of a reaptor's health prior to release is of the utmost importance. Flight performance over a fixed course is a good method that yields information about how well the bird is using its wings, whether there are any compensatory shifts of body weight being made to offset a weaker wing, and a means of determining its endurance. Yet, outside of those birds that are actually trained by standard falconry methods and flown either to the lure or at game, seldom do such procedures even come close to placing the demands on a raptor that flying for survival in the wild does. Thus, it is helpful to measure other parameters that reflect the overall physiological status of the bird in assessing their preparedness for release.

We have found that most raptors after a period of inactivity for convalescence from injuries as well as many that begin the exercise phase of rehabilitation but never progress to the point of flying well enough for release, are living with a low-grade anemia, that is they simply have insufficient numbers of red blood cells to meet their body's demands for oxygen when subjected to heavy physical activity. The causes of such anemia are not well understood, but seem most likely to be associated with the presence of chronic infections or essential nutrient deficiences, especially iron. The method for detecting an anemia is a packed cell volume determination (PCV) or hematocrit.

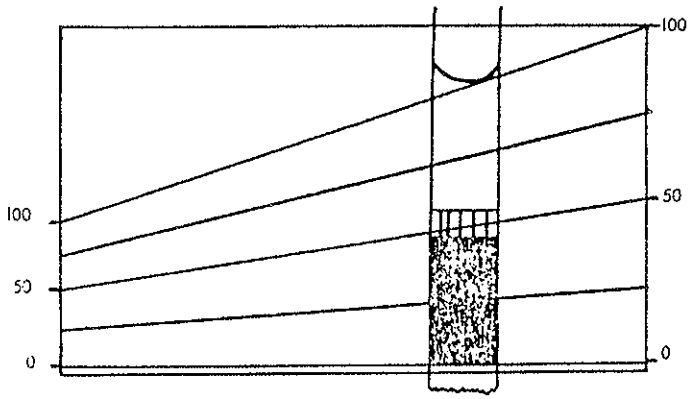
Materials Needed:

1. Microcapillary tubes, heparinized, available from Scientific Products or other biological supply house.
2. Modeling clay to seal the end of the tube — available on a clay card from same source as the capillary tubes.
3. Microhematocrit reading card — obtain from supplier.
4. Microhematocrit centrifuge — this is a special piece of equipment that is expensive, however, access to one may frequently be had through a human or veterinary hospital laboratory.

Procedure:

1. Draw 0.1-0.2cc of blood through a 25 guage needle inserted into the brachial vein. Do not heparinize the syringe.
2. Fill 2-3 capillary tubes about 2/3 full.

Figure 1



3. Centrifuge for 5 minutes in the hematocrit centrifuge.
4. Read the value on the card as illustrated in Figure 1.

Results — Interpretation:

1. The value of the PCV for all healthy raptors should be above 40%
2. Falcons tend to have higher normal values when they are in really good shape, usually above 45% and frequently close to 50%.
3. Values in the mid 30's are usually associated with chronic low grade anemias and respond to the injection of iron dextran 0.1 cc/kg given IM. Higher readings will usually be seen one week later.
4. Values below 30 are associated with severe starvation. These will recover to the mid-30's range with good feeding and nutrition, however, iron dextran injections are usually needed to bring the PCV's back to a normal level around 40%.

This method is inexpensive, can be performed very quickly, is very reproducible and provides one of the few means for quantitatively determining one health related parameter of rehabilitated raptors.

(continued from page 12)

Quaternary Ammonium Compounds (QAC)

While there are many trade names for these compounds, one of the commonly known products of this type is Roccal-D. They are used as general disinfectants but are not compatible with soap. While they are very effective against both gram negative and positive organisms, they are not virucidal, sporacidal, or fungicidal. Furthermore they too are inactivated in the presence of organic matter. When used as recommended, QAC's are not toxic.

Sodium-O-phenylphenol

Sodium-O-phenylphenos is an organic compound with disinfectant properties. It is usually compounded with other ingredients in commercial preparations. An example of this kind of product is Lysol. Sodium-O- phenylphenol is effective against staphlococcus, pseudomonas, mycobacteria, fungi, and lipophilic viruses. However, they may be corrosive to tissues. Therefore, animals should be removed from quarters during cleaning. The use of goggles and gloves are recommended. It should be noted that cats are extremely susceptible to phenolic toxicity.

Gluteraldehyde

Urcarsan™ Sanitizer 4128 combines the action of gluteraldehyde with a synthetic detergent. Its many advantages include:

1. Cleaning while sanitizing.
2. Effective against a broad spectrum of microorganisms.
3. Properly diluted solutions pose no detrimental effects on waste treatment systems.
4. Non-corrosive to metals.
5. Bio-degradable and fast-acting.

For further information, write: CHUTE Chemical Co. Blds. 97, Bangor, Maine 04401.

SPECIAL CLEANING PROCEDURES IN THE AFTERMATH OF INFECTIOUS DISEASES

Cages in which an infectious disease has occured require special procedures. If it is a reportable disease, follow the directions from the regulatory office.

CONCRETE OR WOODEN STRUCTURES: Remove all feces and bury or burn bedding. Scrub the floors and walls with a hot detergent solution. If no painted surfaces are present, complete the cleaning with hot lye solution. If painted surfaces are present, use an O-phenylphenol disinfectant. Allow to stand for two days, rinse all surfaces and then reintroduce the animals. If the cage has dirt flooring with a concrete base it is suggested to heat treat or soak the soil in an O-phenylphenol solution. Soil should be discarded after treatment and replaced with new soil.

When there is no concrete base under the soil all organic debris should be removed. Four inches of topsoil should be treated as described above. The remaining soil should be soaked with a solution of O-phenylphenol or formalin. Allow agent to dry, replace the four inches of soil with new. Always remember to clean all extra articles in the cage especially in a contagious disease outbreak, (i.e. fences, feeders, playthings, and all cracks and crevices).

VIRUS INFECTIONS: Following virus infections, chlorine and quaternary ammonium compounds are good disinfectants. Sunlight is also an excellent virucide and cages or accessories may be left in direct sunlight for several days. Ultraviolet fluorescent lamps help reduce viral infections in enclosed spaces.

REFERENCE:
FOWLER, M.E. 1978. Zoo & Wild Animal Medicine. Philadelphia: W.B. Saunders Company. pp 23-29

(continued from page 6)

and falling back into the water on her side with a great splash. She repeated this again and again. One second she would dive. Thirty seconds later she would be 100 yards away and broaching, then suddenly 100 yards off in another direction. The drug, rather than putting her to sleep, had totally agitated her, freaked her out. Wonderful! Even tried and true tranquilizer drugs used in animal rescue sometimes cause totally unexpected reactions. It doesn't make it easy.

Once we almost caught her when he was cartwheeling across the surface. Pat's lunge missed by inches and nearly sent her headfirst into the water with the animal.

Five minutes later the frenzy quieted as quickly as it had started. The sea lion was back up on the rocks, looking a bit dazed and perhaps wondering what the commotion was all about.

So it went. Tomorrow we'd have to try again with something else. And tomorrow we'd probably have to go scrounging for a new boat, since it would be the biologist's day off. Maybe that first sea lion would also be back on her rock so we could have another try at helping her. I hoped so.

The next morning both sea lions still enmeshed in strands of netting, were indeed back at the end of the jetty. That was at least one fear removed—we hadn't killed them in our attempts to help.

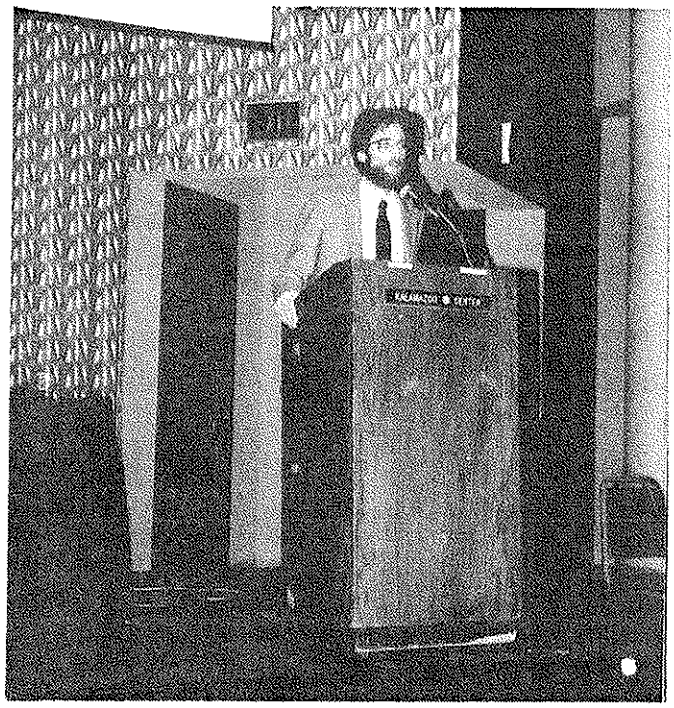
Unfortunately, we were never able to get close to them again. After several weeks both disappeared, and they were never reported thereafter. They left us with a feeling of guilt because we hadn't been able to help.

Nextime.

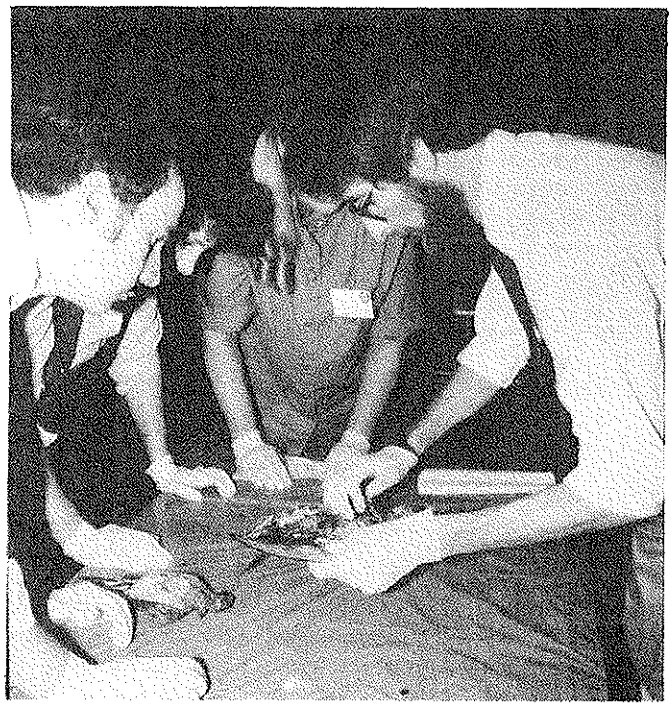
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NWRA News . . .

Highlights from the NWRA 3rd Annual Symposium in Kalamazoo, Michigan



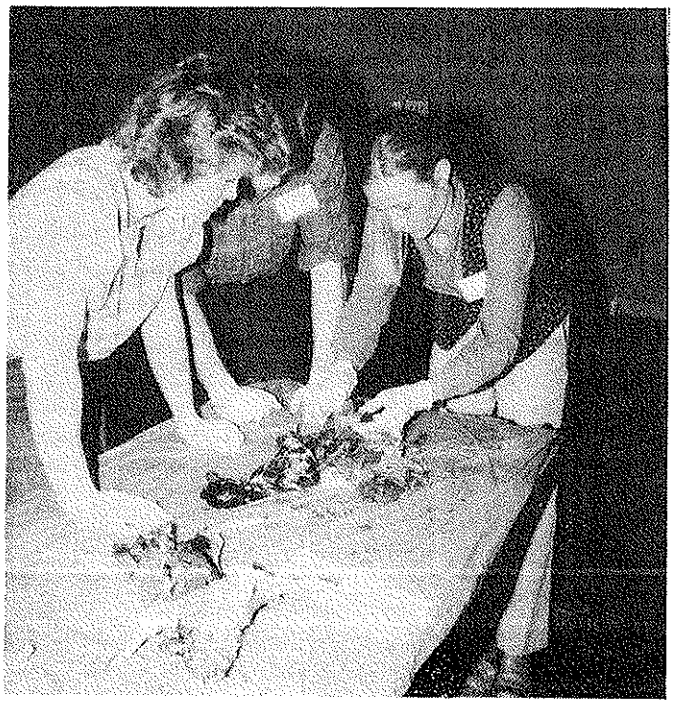
Dr. Richard Evans, President of the NWRA, gave the traditional welcoming address to the 225 participants who came from across the United States for the symposium held on February 22-26, 1984.



A hands-on Gross Pathology workshop was offered for the first time this year. Taught by Dr. Evans, it gave participants an opportunity to "wet lab" their way through a bird and mammal specimen.



Pictured (right to left) are David Manski, National Park Service, Washington D.C., Dan Ludwig, Willowbrook Wildlife Haven, Glen Ellyn, Illinois, and Carol Odell, Wildlife Rescue Team, Lincoln, Nebraska. They led a panel discussion on the importance of post-release studies and how to conduct them.

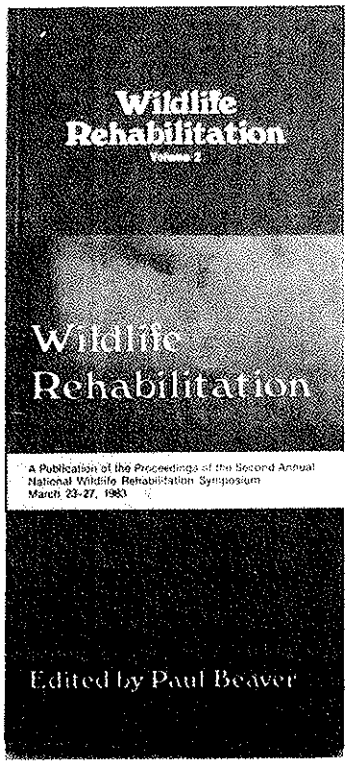


Examining a wild mallard corpse for signs of trauma and injury are three interested wildlife rehabilitators.

NATIONAL WILDLIFE REHABILITATORS' ASSOCIATION'S

Wildlife Rehabilitation, Volume 2

Edited by Paul Beaver



Partial List of Contents: The Organization of a Wildlife Rehabilitation Program, *Nancy Frank* • How to Establish and Maintain a Relationship with Your Veterinarian, *Mark Lerman, D.V.M.* • Nutrition and Feeding of Orphaned and Injured Wild Animals, *Murray Fowler, D.V.M.* • Rearing Orphan Opossum, *Debbie Marcum* • Housing and Maintenance of Accipiters and Harriers in Captivity, *Walter C. Crawford, Jr.* • Reptiles and Amphibians: Their Needs are Different, *Ray Pawley* • Some Behavioral Aspects in the Rehabilitation of Owls, *Katherine McKeever* • Notes on Fluid Therapy, *R.H. Evans, D.V.M.* • Pre-Operative Care: Assessing the Avian Patient for Surgery, *Mitchell Taylor, D.V.M.* • Uses and Limitations of Internal and External Fixation, *Douglas M. MacCoy, D.V.M.*

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