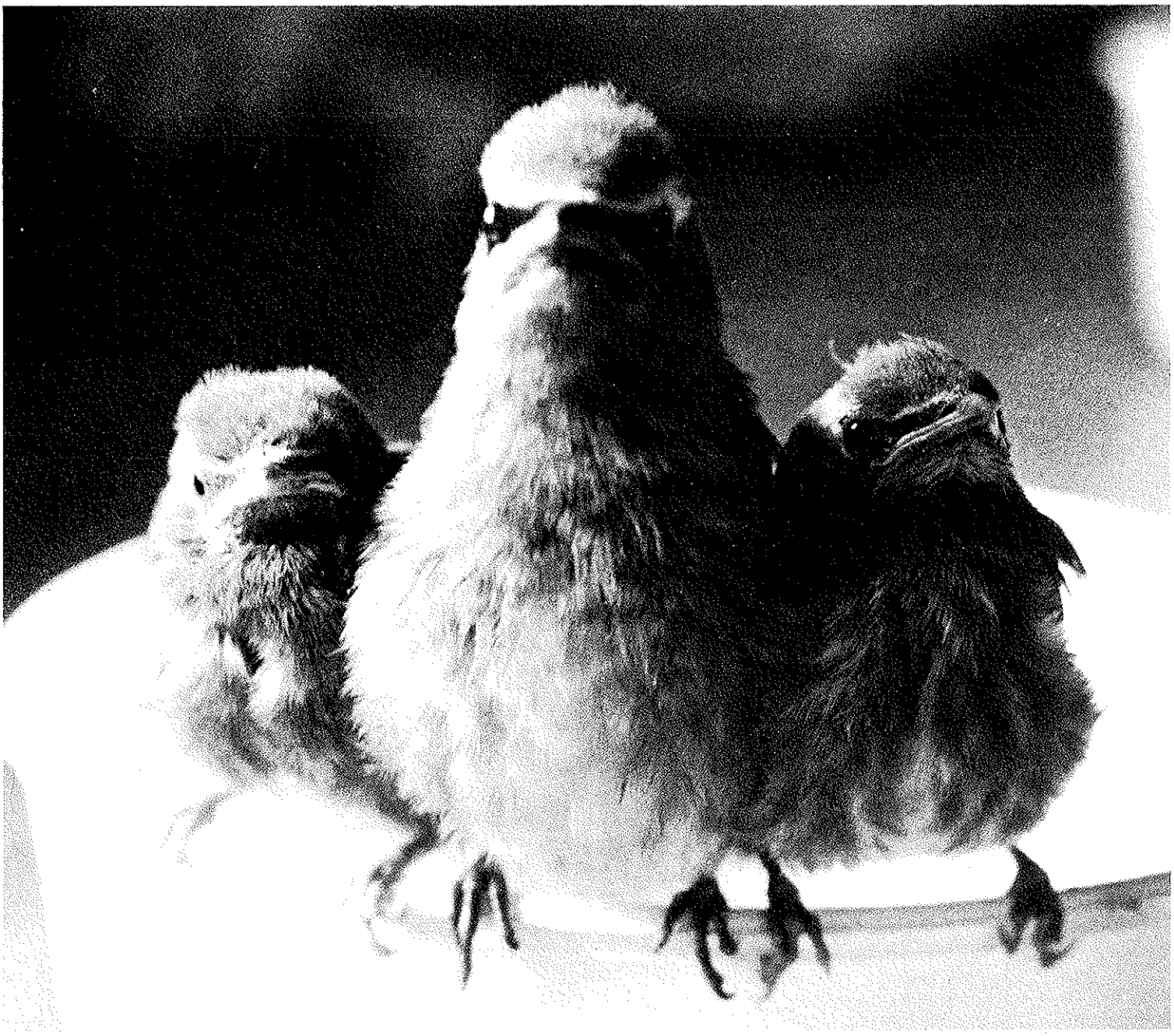
REHABILITATION WILDLIFE COUNCIL

WILDLIFE JOURNAL

Journal of the Wildlife Rehabilitation Council Summer 1984



Imprinting in Songbirds...Page 5

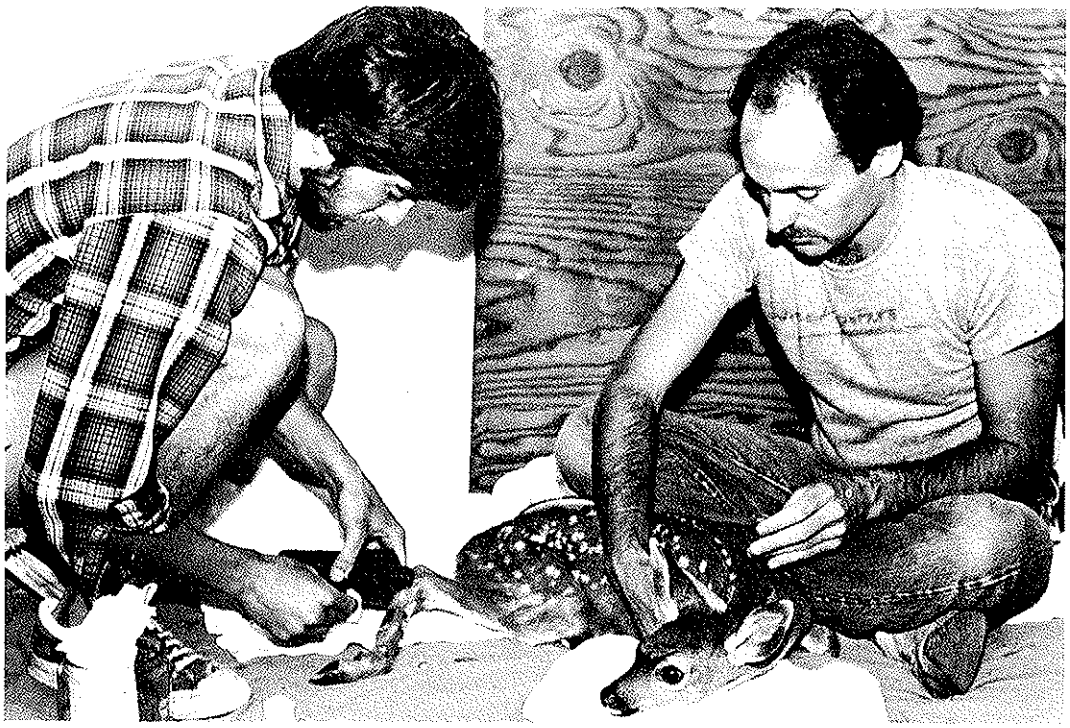
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The following is a guideline for articles to be submitted to the WRC Journal. All manuscripts submitted to the Journal are subject to review and revision by our editors.

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.

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WILDLIFE JOURNAL

Vol. 7, No. 2 Summer 1984

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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 Platypus Press
Oakland, California

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* 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 . . .

Directions for Training Opportunities in Wildlife Rehabilitation

A major function of the Wildlife Rehabilitation Council is and has been to provide opportunities for interested people to develop proficient skills in wildlife care. We do this by publishing up-to-date information on wildlife care in the *Wildlife Journal,* species papers, and by offering other good publications (i.e., *Wildlife Rehabilitation,* Vol. 2) as we can acquire them. We have, since our inception, offered quarterly meetings with continuing education speakers or general sharing sessions on selected topics for members who lived close enough to attend. For the last eight years we have co-sponsored, with the San Francisco Zoological Society and recently the California Academy of Sciences, a two or three day weekend conference which gave people an opportunity to come from farther distances for a longer meeting. With this year's conference, we will begin utilizing a hotel conference site to encourage more participation from people who must travel to the event. In an attempt to provide more classroom and supervised hands-on training with emphasis on technical skills, WRC began its skills seminars two years ago. These were offered during the week and consisted of two hour lectures followed by three hour laboratories. We feel good about the progress we have made and yet see the need for more such training.

When the original plans were developed for the skills seminars, we wished someday that internships would be available in conjunction with such sessions. As time has gone on, we have seen an increase in the number of such opportunities, not just in California, but across the country. We would like to encourage internships and help people find out when and where they are available. To do so, we are now developing a newsletter that would go out to the membership with internship announcements and job opportunities. We, of course, will need the cooperation of centers and wildlife care organizations across the country. Please send WRC a copy of all such announcements and we will help increase your pool of applicants. There is no cost to the center, and the newsletter will be another benefit of membership in WRC. We get numerous inquiries each spring and summer about employment and training opportunities and feel a real commitment to connect people where possible, with centers or organizations who have training programs or jobs available. We will put the publication out on a periodical basis as announcements arrive.

During the 1984-85 WRC Skill Seminars, we have planned some changes. We have noted that the level of experience and training among participants was not uniform for some of the participants. To rectify this, we are trying a new approach for this year's sessions. We will begin with two days of basic training with the usual 5-6 hours of accompanying hands-on lab time. Topics covered will include: Basic anatomy and physiology, handling and restraint, basic initial care, drug dosage calculation, maintenance in captivity, criteria for release and release methodology. Skills emphasized will be: capture and physical restraint, gavage, injections (IM, SQ), weighing procedures, and initial examination of wild animals. We will call these two sessions Wildlife Rehabilitation 1A and 1B.

We will then continue the series with a day devoted to Clinical Pathology in Wildlife Care (December), Examination and Assessment (January), Fluid Therapy in Wildlife Care (February), Wound Management (March), Physical Therapy (April) and Gross Pathology (May). All sessions have reading materials and homework.

We find ourselves in the position of having to figure out what the training needs are for a diverse group of rehabilitators in an ever changing new field. It is a difficult task. To meet the challenge, we will vary the topics covered from year to year based on input from participants and registration levels. We need your input on what your needs are and how we can meet them. Enclosed in this issue is a questionnaire regarding WRC training opportunities and we hope that you will take the time to fill it out and return it to us for our deliberations. If you live out of state, please pay special attention to the section on the conference. We do not currently have the capability to offer the entire Skills Seminar Series in other areas, however, the two sessions on Basic Wildlife Rehabilitation 1A & 1B could be offered with proper facilities and some local support. Contact us for further information.

Jan White

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API Awards Support Grant to WRC For Journal

The Animal Protection Institute of Sacramento, California has recently announced a grant of $5,000 to assist WRC with the increased costs of the *Wildlife Journal.* This is the second grant that WRC has received from them. Last year, they awarded $3,000 to assist us in our efforts to provide people in this country and elsewhere with the most up-to-date information on wildlife care. The increased costs of typesetting, better paper, and a part-time salary for the editor are not covered by the membership dues at this time. As WRC grows, it is hoped that the entire cost of the *Journal* will be defrayed by membership dues. To reach that goal, we need 1,000 members. We currently have approximately 600 members.

The Animal Protection Institute is a national non-profit organization dedicated to improving animal welfare in this country. They publish a bi-monthly magazine, *Mainstream* which highlights current issues and concerns in the field of animal welfare. Several organizations which conern themselves with animal welfare include wildlife as a focus, only API has shown as interest in helping to fund WRC in its efforts to provide information on the care of *individual* animals. Belton Mouras, API founder and President, is a strong supporter of individual animal rights. Realizing that the constant upgrading of information on animal care will directly benefit wildlife in this country, he has consistently shown an interest in helping WRC financially to publish the information.

We are indebted to him and the API Board of Directors for their continued support and wish to publicly thank them and the many API members who provided the financial support for these kinds of projects. When we needed them, they were there and willing to assist.

Raptors Collisions with Utility Lines: A Call for Information

The U.S. Bureau of Land Management, Sacramento, in cooperation with the Pacific Gas and Electric Company, is assembling all available published and unpublished information concerning collisions of raptors with power lines and other utility lines. Actual case histories — no matter how circumstantial or fragmentary — are need. Please acknowledge that you have such information by writing to Richard R. (Butch) Olendorff, U.S. Bureau of Land Management, 2800 Cottage Way, Sacramento, California 95825 U.S.A. (Phone: (916) 484-4541). A form on which to record your information will then be sent by return mail.



GREAT HORNED OWL
COURTESY OF HAWK ENTERPRISES

REQUEST FOR INFORMATION

Information is being gathered on the post-release behavior and survival of captive-reared and rehabilitated birds and mammals.

The objectives of this study are to assess the amount and type of work that has already been done, to summarize the available data and evaluate techniques,and define the reasons for the survival or mortality of released animals.

Published and unpublished reports and raw data would be appreciated. For additional information, individuals willing to cooperate please contact Daniel R. Ludwig, Ph.D., Willowbrook Wildlife Haven, Forest Preserve District of DuPage County, P.O. Box 2339, Glen Ellyn, Il 60138.

ERRATA

You may have wondered about the preponderance of typographical errors in the Spring 1984 issue of the *Wildlife Journal.* The editor and layout staff wondered also. The authors wondered about it, knowing that we are normally very careful to check the final copy. All we can do is apologize. We know they were corrected in the computer, yet the final corrected copy was uncorrected and went unnoticed. We are determined to learn from the mistake and hope our readers understand that the authors did not make the errors.

Clarifications on Rabbit Milk Formula

The Winter 1984 issue of the *Wildlife Journal* contained an article by Richard Evans, D.V.M. titled "Management of Diarrhea Related Problems in Cottontails." In that article on page 15, he gave the directions for making the whipping cream formula. He said to use 1 part *liquid* Esbilac, 3 parts water, and 1 part whipping cream. We have received several inquiries regarding those directions when using powdered Esbilac. One should make the powdered Esbilac as per the directions on the can (3:1). Once it is in a liquid form it should be mixed with an equal part whipping cream. Liquid Esbilac (pre-mixed in the can) is also mixed with an equal part whipping cream.

Note

Fluid Therapy Part II by Richard Evans, D.V.M. has been delayed to the Fall 1984 *Wildlife Journal.*

WREN SYMPOSIUM SET FOR FALL

A symposium for Wildlife Rehabilitators of Eastern North America, presented by Tri-State Bird Rescue & Research, Inc., has been set for October 12, 13, & 14th at the Nichols Village Inn in Clarks Summit, Pennsylvania. Registration is $42.00 w/out lodgings. For information on speakers, topics, and lodging fees, contact Tri-State Bird Rescue & Research at P.O. Box 1713, Wilmington, Delaware 19899.

A Preliminary Survey of Avian Haematozoa at the Wildlife Rehabilitation Service in Fairfield, California

Mary L. Rock
University of California, Davis, California

ABSTRACT

This report summarizes a preliminary survey of haematozoa found in wild birds at the Wildlife Rehabilitation Service. One hundred and three blood films representing 30 species of birds were collected. After obtaining the films, they were stained with buffered Giemsa stain and scanned over a ten minute period for parasites. Of the host species surveyed 35.9% had some form of blood parasite, while 22.3% of the individual birds surveyed had blood parasites. Because of the inadequate sample size, definite conclusions as to the prevalence of haematozoa in the avian species seen in this center cannot now be stated. However, there seems to be a trend toward a high incidence of haematozoa in these birds as compared to incidences reported in previous surveys of wild birds of California.[1] Infection with haematozoa may have an impact on the ability of birds to overcome illness, and this impact should not be neglected by the rehabilitator.

INTRODUCTION

While working at the Wildlife Rehabilitation Service, I took the opportunity to survey the incidence of haematozoa in a variety of species of wild birds. The purpose of this paper is to provide a summary of this preliminary survey of the haematozoa found in sick and injured birds undergoing rehabilitation. From June 1983 through April 1984, a total of 103 slides representing 39 avian host species were collected.

Life Cycles of Parasites Surveyed

The avian parasites surveyed include: *Plasmodium, Haemoproteus* and *Leucocytozoon*. Two hosts are required in the life cycle of all these parasites. The parasite achieves sexual maturity in the invertebrate host (insect) and multiplies asexually in the vertebrate host (bird). When the insect bites an infected bird, blood containing sexual forms of the parasite (micro- and macrogametocytes) eventually enter the insect's stomach. Here, the gametocytes leave the erythrocytes and develop into mature gametes. Exflagellation occurs in the male (microgametocyte) and it fertilizes the female (macrogametocyte). The zygote formed (ookinite) imbeds itself in the gut wall where it develops into an oocyst. Asexual reproduction (sporogony) occurs in the oocyst and produces sporozoites which, when mature, migrate to the salivary glands. The sporozoites position themselves in the lumen of the salivary glands from where they are released when the insect bites a vertebrate host. The inoculated sporozoites then move into the host tissues where they begin asexual reproduction (exoerythrocytic schizogony). Merozoites are formed, and eventually enter the erythrocytes where they mature into gametocytes, and also in *Plasmodium*, schizonts. The merozoites may also reinvade tissues and undergo more asexual reproduction. The time intervals for the different stages of reproduction vary according to parasite species.[2,3]

Non-haemosporidan parasites surveyed were *Trypanasoma* and microfilariae, both extracellular parasites.

Transmission of the blood parasites is dependent on a variety of vectors. Haemoproteus is carried by ectoparasitic hippoboscid flies and Culicoides, while *Plasmodium* is transmitted by a variety of mosquitoes (e.g., Culex).[2] *Leucocytozoon* is carried by blackflies *(Simulidae)* and some species of mosquitoes.[2] *Trypanosome* and microfilaria are carried by both flies and mosquitoes.[2]

Numerous studies on the prevalence of parasites in various wild birds have been published and are listed with other publications on avian haematozoa in a bibliography by Herman, Greiner, Bennett and Laird (1976).[4] Relevant North American surveys include: Herns (1939),[1] Clark (1960, 1966)[5,6] and Greiner (1975).[7]

Survey Area

The areas from which the center acquires birds includes many different types of habitat. Solano County is comprised of 70.6% cultivated, urban, and industrial land; 15.8% grass and woodland grass; 9.8% brackish marsh; 2.8% chapparral; and .76% hardwoods woodland.[8] The center receives many different bird species for rehabilitation.

Ten of the slides were from the Marin Wildlife Center, San Rafael, Ca. They include: six *Pelecanus occidentalis* (Brown Pelicans), one *Gavia Stellata* (Red-throated Loon) and one *Butorides striatus* (Green-backed Heron). One slide was from a *Pica nuttalli* (Yellow-billed Magpie) taken from the Davis Wildlife Care Association in Davis, Ca.

(continued on page 13)

Stress Management For Wildlife Rehabilitation Staff and Volunteers

by Sally Lewis
San Francisco S.P.C.A.
San Francisco, California

A lot of us during the course of the infamous "baby bird season" will frequently experience tight neck muscles that turn into headaches. Some of us will get so confused under the pressure that we may barely get anything done. There are times, although we often will not admit it, that we just want to sit down and cry or run away from it all.

What we all have in common are stress reactions to pressure. Pressure is the combination of the demands we make on ourselves by our work, people around us, and from pressures within each of us. Stress, however, is different. Stress is the activation of our neurological, physiological, and sensory systems to meet challenge or pressure. It is a form of energy that we need to function well. In fact, we need stress everyday. Selye (1974) clearly states that not all stress is distress and that complete freedom from stress occurs in death. It is true, however, that stress is like a double-edged sword that can either work for you or against you.

As one studies stress, it is apparent that its origins are from within. Pressure can come from external sources or from your own demands, but how you handle that pressure determines the magnitude of stress created and whether it will have a positive or negative effect on your ability to function. Thus, how you handle pressure measures the adequacy of your coping skills. Some individuals in adverse situations survive and grow while others succumb to the cumulative effects of their stress. What makes the difference is the process that goes on in each of their minds.

Researchers have come to believe that there are actually three kinds of stress: normal stress, bad stress (which is normal stress that has become chronic), and good stress.[2]

Good stress comes from successfully rising to a challenge, feeling confident and having a sense of control over one's destiny. Rosch (1983) claims the real secret to a long and healthy life is to enjoy what you are doing and be good at it. It is not to avoid stress. Feeling a sense of purpose, viewing change as a challenge rather than a threat, and believing that you are in control of your life, will likely reduce the negative impacts of stress. The proper handling of stress can help to make you a healthier individual than those who seek avoidance of conflict and competition altogether. How stress affects you is in your power. Attitudes about yourself and environment are factors that are very influential in whether stress will have a negative effect.

Bad stress is often triggered by the feeling that your decisions are useless and that life is overwhelming and well beyond your personal control. Whether this condition is real or perceived, the effects can be negative.

Bad stress can inflict real bodily harm. First, it can lower resistance to disease.[2] Interferon, a non-specific polypeptide which is one of the basic defenses against virus infections, is suppressed under some conditions of emotional stress.[2] If bad stress is occasional, the body's immune system can adjust. If it is prolonged, the immune system is thrown off balance. Second, repeated and unremitting episodes of bad stress mean repeated release of adrenaline. If the problem prompts no physical exertion to utilize all the adrenaline, then excess will remain in your system.[2] This extra adrenaline plays a part in the build up of cholesterol in your arteries that can lead to heart disease.

In order to convert bad stress to good stress, one must become cognizant of their inner voice. This voice, if left unrecognized, can lead to chronic stress syndrome, otherwise known in wildlife rehabilitation as "burn-out". The symptoms of burn-out fall into three categories: 1) physical symptoms, 2) emotional symptoms and 3) cognitive or intellectual symptoms.

Physical Symptoms

1. Feeling chronically fatigued, no matter how much rest you get, is a common physical symptom. Feeling emotionally drained to the point that it is difficult to be really enthused about anything is another symptom.
2. Wildlife rehabilitation is always with you. Exclusive focus on your work in this field, even in your dreams and sleep will often keep from the much needed relaxation that is necessary to avoid fatigue.
3. Physically you do not feel well. If you are not feeling as well as you used to and you are not old enough to blame it on your age, look into the problem.

Emotional Symptoms

1. Feeling irritable, not up to par, touchy or sensitive can be a symptom. Having strong, negative, emotional over-reactions is another sign of burn-out. The inability to stop or control emotional over-relations, even when you recognize them, is a symptom of the problem.
2. If you find yourself progressively withdrawing it may be a sign. It can manifest itself in a feeling of not wanting to hear about the problems any more or feeling too tired to care. Basically wanting to be left alone, not hassled by

the public or staff and their associated problems can be an indication of burn-out. This is often accompanied by a feeling of resentment when demands are made as they are on a continuing basis in this field.

Cognitive Symptoms

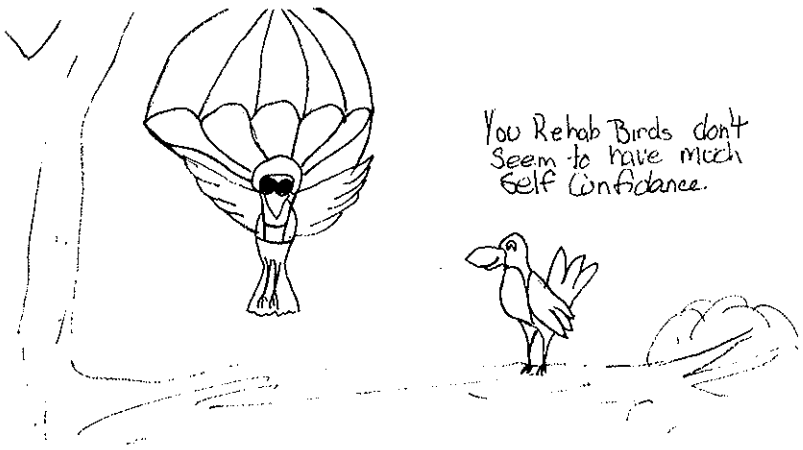
1. Finding that your thought processes are dulled leaving you not feeling as sharp or creative as you once were is a sign of this problem. Another common sign is to forget things more often than is normal and make more mistakes than ever before.
2. Although successful, you may begin to wonder why you ever got involved in wildlife rehabilitation. Having feelings of wanting to give up and/or run away can accompany contemplations of "why am I in this field?".

Stress does indeed have incredible effects on our personal and professional well being. So, what can be done about it? The following suggestions are a composite of strategies proposed by the authorities in stress management.

1. Clarify your goals. It is essential to develop a keen self awareness regarding your own goals, needs, and expectations (instead of responding only to the "oughts and shoulds" of others).
2. Keep breathing normally and get some exercise. Often, when people are tense, they engage in shallow breathing. Breathe deeply and exhale slowly. More and more experts are also seriously suggesting a program of aerobic exercise. Running, walking, and dancing will help develop greater cardiovascular efficiency to help counteract the negative effects of stress on your heart.
3. Good nutrition is sound preventative medicine. We are so careful about the food we offer our rehabilitating wildlife, it seems absurd not to also be careful about our own diet.
4. Create and utilize a personal support system. Many people have a tendency to pull inward or withdraw from others when experiencing stressful situations. This is exactly the opposite of what is most essential. Friends, spouses, or lovers are needed to offer empathy, understanding, and support if you are to be successful at combating stress.
5. It is important to learn to let go. One reason our personal loads seem so heavy is that sometimes we carry a lot of extra hurts, frustration, and sadness along. Leave your past grudges, dead relationships, unhealthy attitudes, and bad health habits buried in the ground. As the old saying goes, "Never stumble on anything behind you."
6. Seek variety in your life. This is one of the antidotes to prevent becoming a lopsided wildlife workaholic. Do not eat, sleep, and live with the wildlife center. Enjoy hobbies, get out and be with different people and do things that you enjoy. Variety in your personal life adds spice and shifts the focus which may help prevent burn-out in your professional life.
7. Seek to make the wildlife center environment less stressful. Organization is the key word here. Be prepared both physically and mentally for the coming of the hectic spring and summer seasons. Organize the many work tasks (by shift, day, week, etc.) and delegate them out to staff and volunteers so that no one person, including yourself, has more than they can possibly do. Introduce stress management concepts to your co-workers, board of directors, and volunteers.
8. Do not be hassled by small things. It is a waste of time and precious energy to worry and fret about things that are either unimportant or over which you really have no control. Traffic jams, burnt light bulbs, misplaced supplies, rainy weather, and busy signals on the phone are all examples that fit this criteria. One absolute prerequisite to stress management is a sense of humor. An invaluable tool to relieving burn-out is to see the funny side of things and people, especially yourself.
10. Take responsibility for yourself. It would be comforting to be able to believe that stress, time, and conflict are somehow the enemy and that we are all victims. Stress originates from within and acknowledging that is the first step to dealing with the problem. Reducing stress is challenging and exciting because the events are now in your control. Work in wildlife rehabilitation has a definite purpose and individual decisions are very important. The people involved need clear heads for decision making so good decisions get made and acted upon.

REFERENCES

1. BALDWIN, B. 1983. "Ways to Free Yourself from Depression, Fatigue, Restlessness and Anger". *New Woman* Vol. XIII No. 9 pp. 44-48.
2. SELIGER, S. 1982. "Stress: A Sure Prescription for an Early Grave? Nonsense! *New Woman* Vol. 12 XII No. 11 pp. 46-51.
3. SELYE, H. 1974. *Stress Without Distress.* New York: New American Library pp. 20.
4. WILSON, M. 1982 *Survival Skills for Managers.* Boulder, Colorado. Johnson Publishing Co. pp. 189-227



Rehabilitation Notes: Northern Mockingbird *(Mimus polygottus)*

Herta Richter and Bill Stone
Alexander Lindsay Junior Museum, Walnut Creek, California

INTRODUCTION

The "many-tongued mimic" is well named because of its ability to mimic a variety of sounds including other bird songs, squeaky gates, and frogs. Mockingbirds combine both imitative and original phrases, making them one of the most widely known songsters.

They are found from southern Oregon through northern Utah to Newfoundland and south to southern Mexico and the West Indies. This species has been introduced to Hawaii. It is continually expanding its range northward.

Territorial defense is an important part of mockingbird life. In the spring, the male will sing (day and night) from a tall vantage point and aggressively defend his breeding territory. He will display against people, cats, dogs, large birds, and other potential nest predators. They will attack their reflection in a window, hub cap, or mirror to the point where they may injure or kill themselves. In the fall, both males and females will sing to defend a winter food supply. The size of breeding and non-breeding territories ranges from 1-2 acres (2.4-4.9 ha). Mockingbirds are one of just a few common birds to hold a non-breeding territory through the winter.

Characteristic behavior for this species includes "wing-flashing". The bird halting raises its wings, holds them open for a few seconds, and then lowers them. The behavior is often repeated. While this behavior is most commonly observed during feeding on the ground, it is not known whether it has a communicative function. It is thought that this behavior may be used by the bird to flush insect prey.

Favored habitat includes open grassy areas for feeding, thick shrubbery for nesting and a high perch for the male to use for singing. Home gardens have proved to be an ideal habitat.

DESCRIPTION:

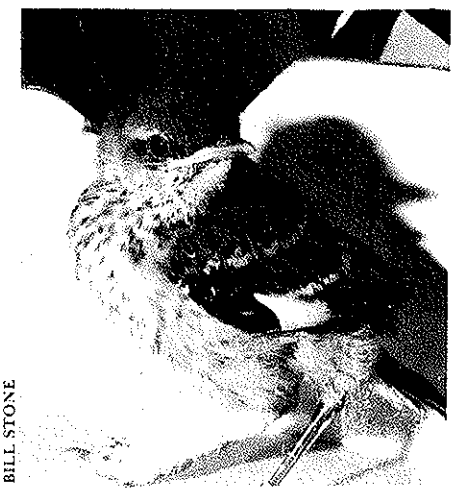
- *Adult:* Total Length 9-11" (23-28 cm) with a wing span of 13-15" (33 - 38 cm). These birds are medium gray above, gray-white below with a long tail. They have white outer tail feathers (rectrices) as well as two white wing bars and a large white patch on each upperwing at the base of their black primaries. The plumage of both sexes is the same. The female is smaller. Weights: (New Jersey) (5) 45.1--60.0 gm (1½--2 oz.); (California) (5) 39.7--57.0 gm (1½--2 oz.)
- *Juvenile:* An altricial bird, Mockingbirds hatch in a pale gray down. Their gape flanges are yellow. As pre-fledglings, their upper parts are mottled with brown, their under parts have a dusky spotting. As fledglings, their gape flanges turn grey to black, while their upper parts are gray and lower parts are plain grayish white. The eye color is gray to gray green while young although not all will attain the adults green-yellow, dark, or clear yellow to orange eye.
- Moulting once yearly in adult birds (August to September). Nuptial plumage is attained by feather wear. Young birds have a partial post-juvenile moult which includes their body feathers, wing coverts, and occasionally one or more flight feathers. This also occurs in August or September.
- The potential life span in the wild ranges from 4-12 years, based on banding returns. One hand raised nestling lived over 15 years in captivity.

NATURAL DIET

- During the spring and summer, Mockingbirds eat a variety of insects including: ants, flies, wasps, grasshoppers, bugs, caterpillars, and spiders. They are also know to eat crayfish, snails, lizards, and small snakes. In the summer and fall, they eat a variety of fruits from trees and shrubs.

BIRTH AND YOUNG

- Mockingbirds start breeding from mid-February (in their southern



BILL STONE

range) or late April (northern parts of range), to mid-September with a peak from May to July. They may have 2-3 broods per season. The clutch size is 3--6 with 4--5 being most common. Eggs are laid at daily intervals and incubated generally by the female only. Range of incubation is 10-14 days with 12-13 being more normal. Their eyes open at 3--5 days and they fledge from the nest at 10--14 days.

CAPTIVE CARE AND FEEDING

Infant: (Up through 2 weeks)

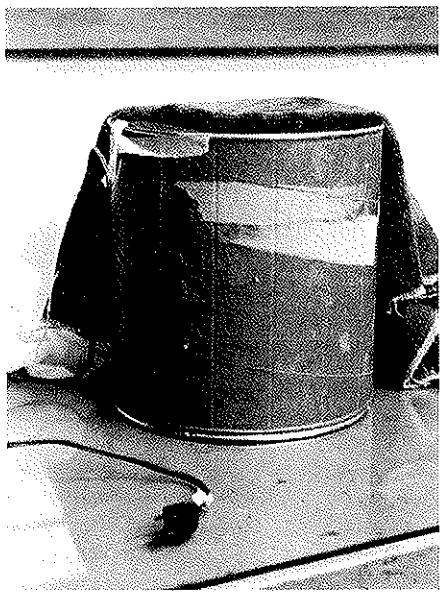
- Housing: The main emphasis is to provide a safe, warm, clean environment. There is a variety of systems in use today. Use common sense. Overall caging can be a small bird or animal cage, plastic lab animal tubs, or cardboard boxes. Supplemental heat must be given to nestlings in these systems. Another system in use provides its own heat using 7 watt red Christmas tree bulbs inside a 3 gallon ice cream bucket lined with absorbent material (i.e., disposable diapers). With the supplemental heat, humidity is supplied by placing a small piece of wet sponge in the container. Heating pads set on low may also be used. Ambient (air) temperature should be maintained at 80° F. Nestling birds are placed in margarine bowls with facial or toilet tissue.
- Diet: Any of the many adequate baby bird diets can be used. Several are listed in Table I. This species is susceptible to leg problems (i.e., folding fractures) possibly caused by metabolic bone disease. The calcium/phosphorous ratio and vitamin D^3 levels should be reviewed in the diet being used. Baby meats and fruits have a particularly poor calcium/phosphorous ratio and are often components of these diets. Supplementing with calcium lactate at a rate of 75 mg per day will generally re-balance the ratio. The best way to check it is to calculate the amount of each in the diet, check the ratio, and then add calcium to obtain a 2:1 ratio (Ca/P). These birds should be fed during a 12 hour period (i.e., first thing in the morning onward for 12 hours). Depending on their age, the interval of feeding times and amounts will vary. Fledglings can generally be fed at ½ hour intervals, depending on the content of the diet used. The rule of thumb is, if the birds are "peeping" they are hungry again. Full crops may be observed by blowing the feathers aside along their necks. Weights of growing birds should be monitored by routine weighing on the gram scale. Birds that do not show a regular net gain (1-3 gm/day) up to a fledgling weight of 35 gm should have their diet and feeding regime re-examined.
- Troublesome eaters will require special attention in order to maintain their strength until such time as they begin to eat normally. Gently tap the beak, or in older nestlings, the nest in order to stimulate the gaping reflex. If this fails, gently pry open their mouths and insert the food. This reluctance to accept food from human foster parents is very common in newly acquired birds and is more pronounced in the older nestlings and fledglings. It may take one or two full days of force feeding before the bird willingly accepts food.

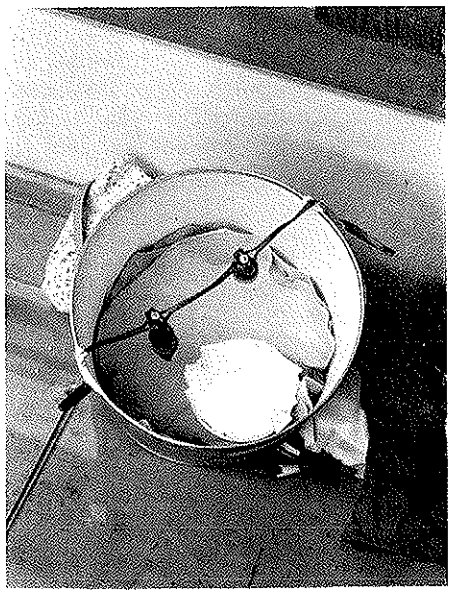
Adolescent: (3 - 6 weeks)

- Housing: At the age in which the birds show signs of leaving the nest bowls, caging with perches should be offered. With hand-raised juvenile birds, caging designed for pet birds may be used. The wire should be small enough so that birds cannot get their heads through the mesh. Size will vary depending on the number birds per cage. Placing one clutch of four birds in a parakeet size cage (12" x 14" x 12") usually works well while the bird's feathers are growing. Provide perches and dishes for food and water. When possible, birds can be placed in natural light to help them produce Vitamin D. This should be supervised to prevent hyperthermia on hot days as well as any problems potential predators may cause. Most bird cages are *not* cat proof. These periods of outside exposure will begin the process of acclimation.
- Diet: The basic diet is used along with live mealworms to stimulate self-feeding. If mealworms constitute a significant portion of the diet, they should be balanced with calcium lactate powder or grown in a calcium/vitamin enriched environment. Avianized vitamins should be supplemented if not in the basic diet. Mockingbirds do love a variety of fruits but they are all calcium deficient and care should be taken to either offer them as treats or supplement appropriately. By the time they are 5-6 weeks old, they should be self-feeding and ready to go outside into a flight cage.

Adults and Pre-Release Adolescents: (6 weeks and older)

- Housing: Injured adults may be placed in solid-sided caging (i.e., portable pet carriers) or adolescent housing (cover with towels). Light levels in the cage must be high enough to stimulate the bird to waking activities (i.e., eating). Open-sided caging may or may not work with adults who may or may not recognize the boundaries.





- Birds that are ready for flight prior to release should be placed in a large outside cage to enable them to exercise and get acclimated. A minimum size cage for this species of bird is 4' W x 8' L x 6' H.
- Diet is a combination of the soaked puppy kibble, vitamins, fruits, mealworms, or other insects. They also like to eat chopped, hard-boiled eggs.

RELEASE

- Habitat considerations should be made allowing for release in areas with ample supplies of insects, fruit, and water. These are urban birds and they must be wild enough not to approach people when they are released as they will almost certainly be in contact with humans.
  Diurnal; release during the day.
- Birds should be waterproof.
- Weights should be above 42 grams at the time of release. Range of release weights from 25 birds was 42-56 gms.
- Birds should have basic flight skills and the ability to sustain short to medium ranged flights at average ambient temperatures without panting.

DISEASES

- Mockingbirds are susceptible to ectoparasites (i.e., mites, feather lice) and should be treated immediately with a bird spray or powder (use a pyrethrins base). Follow the direction and do not spray directly onto the bird unless so indicated.
- While this species can acquire a range of diseases known to occur in avian species, it is particularly susceptible to avian pox and trichomoniasis. The viral avian pox is characterized by lesions around

Table I

SONGBIRD RECIPES & INSTRUCTIONS

- ALJM BABY BIRD DIET
  1 cup Purina Hi-Protein Dog Food
  4½ oz. of Gerber Banana Baby Food
  4½ oz. of Gerber Hi-Protein Cereal
  4½ oz. of Mockingbird Mix
  1 Teaspoon Superpreen Vitamins
  1 Hard-boiled egg (57 grams)
  1 cup water
  Directions: Soak Kibble. Blend egg, then add Kibble and other ingredients. Storage: Can be frozen in ice cube trays. Good in refrigerator 2 days.
- ALJM INSECTIVORE DIET
  1 cup Purina Hi-Protein Dog Food
  4½ oz. of Mockingbird Mix
  1 Teaspoon Superpreen Vitamins
  1 Hard-boiled egg (57 gms)
  1 cup water
- INSECTIVORE AND SONGBIRD DIET
  ½ cup Mealworms
  2 jars (3.5 oz.) Gerber's Strained Chicken
  1 jar (3.5 oz.) Gerber's Strained Beef
  1 jar (3.5 oz.) Gerber's Egg Yolks
  2½ Teas. Avia Vitamin & Mineral Supplement
  ½ Teas. Super Hygliceron B-Oil
  20 grains of Calcium Gluconate
  Directions: Place 2 jars of infant food in blender with mealworms, Avia, Hygliceron B-Oil, & calcium tablets. Blend until smooth, add ingredients and blend. If too thick, add ½ tablespoon of water at a time, blend.
  Diet should be a smooth and creamy consistency like pudding or catsup. If too runny at time of feeding, add finely pulverized and sifted Science Diet or any other balanced dry food. Use ⅛ tsp. to every 30cc of bird diet. Dry food is very absorbent so use caution not to add too much dry food. Do not add any extra ingredients which may imbalance the nutritional balance of this diet.
- SCIENCE DIET PREPARATIONS
  Mixing Instructions: Make fresh daily and refrigerate when not in use. Add water until very moist. Let soak.

Science Diet	(Canine)	(Feline)	ALJM Baby Bird Diet	ALJM Modified Insectivore Diet	Insectivore & Songbird Diet
% Protein	26.0	32.0	12.7	19.6	13.1
Ca/P ratio	1.4:1	1.8:1	1.47:1	1.52:1	1.6:1
Kcal/gram	4.27	4.29	2.37	3.38	1.4

the beak, eye, and sometimes on the feet. Trichomoniasis (often called frounce) is a protozoa that causes a cheezy white substance to build up in the mouth, throat, and crop. Birds displaying abnormal signs should be presented for veterinary care as differential diagnosis must be made between these and other similar diseases prior to treatment.

- Another endoparasite that affects mockingbirds is gapeworm (syngamus trachea). Veterinary diagnosis may be difficult on live birds. Treatment with Telmintic has proved of some value.
- Be sure to isolate all birds that appear ill until the veterinarian evaluates the situation and further directs the case at hand.

REFERENCES

1. BENT, Arthur C. 1948. *Life Histories of North American Nuthatches, Wrens, Thrashers and their Allies.* NY: Dover Publications, Inc.
2. BULL, John and John Farrand, Jr. 1977. *The Audubon Society Field Guide to North American Birds* (Eastern Region). NY: Alfred A Knopf, Inc.
3. COLLETT, Rosemary. 1974. *Rescue and Home Care of Native Wildlife.* NY: Hawthorn Books, Inc.
4. FARRAND Jr., John. 1983. *The Audubon Society Master Guide to Birding.* Vol 3 Warblers to Sparrows. NY: Alfred A Knopf, Inc.
5. FOWLER DVM, Murray. 1983. What's Wrong with Bug Butter?. *Wildlife Journal* Vol. 6, #2
6. HARRISON, Colin. 1978. *A Field Guide to the Nests, Eggs and Nestling of North American Birds.* Glascow, UK. William Collins Sons and Co., Ltd.
7. HARRISON, Hal. 1979. *A Field Guide to Western Birds' Nests.* Boston: Houghton Mifflin Co.
8. MARTIN, A.C., H.S. Zim and A.L. Nelson. 1951. *American Wildlife and Plants: A Guide to Wildlife Food Habits.* NY: Dover Publication Inc.
9. National Geographic Society. 1983. *Field Guide to the Birds of North America.* Washing DC: National Geographic Society.
10. PALMER, Laurence. 1975 *Fieldbook of Natural History.* NY. McGraw Hill Book Co.
11. PETERSON, Roger Tory. 1961. *A Field Guide to Western Birds.* Boston: Houghton Mifflin Co.
12. RICHTER, Herta. 1984. *Species Care Sheet: Mockingbirds.* Walnut Creek: Alexander Lindsay Junior Museum.
13. STOKES, Donald W. 1979. *A Guide to Bird Behavior* Vol 1. Boston: Little, Brown and Co.
14. TERRES, John K. 1980. *The Audubon Encyclopedia of North American Birds.* NY: Alfred A Knopf, Inc.
15. UDVARDY, Miklos. 1977. *The Audubon Society Field Guide to North American Birds.*
16. US Fish and Wildlife Service. 1976. *North American Bird Banding Manual.*
17. VARED, Jared and Allan Bass. 1980. *California Wildlife and their Habitats: Western Sierra Nevada.* US Forest Service: Gen Tech Rep PSW-37. Pac Southwest For and Range Experiment Station. Berkeley, Ca.
18. WHITE, Jan L. 1984. Unpublished data from case files at the Wildlife Rehabilitation Service, Fairfield, Ca.

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Imprinting and Wildlife Rehabilitation

Paul Beaver, Ph. D.

Bird Rehabilitation Research Institute, Ware, MA 01082

In the area of behavioral ontogeny and its implications for the successful reintroduction of captive-reared animals, problems as well as solutions remain to be clarified. Shortcomings in this regard are evident in this journal as well as the two volumes on wildlife rehabilitation that I have edited (Beaver, 1982; in press). The effects of early experience on behaviors such as migratory orientation, predator avoidance, bird song, nest building and habitat preference have yet to be considered as problems by rehabilitators. The only behaviors thus far benefitting from much attention have been foraging, and then only in predators, and imprinting. With regard to imprinting, conceptual confusion has impeded progress in the prevention or treatment of social-behavioral disorders.

The basic mistake made by rehabilitators is to equate imprinting with taming. Imprinting and taming are two different processes of socialization (see Hess, 1973). Both can lead to animals which socialize with humans. But imprinting and taming differ in ontogeny as well as in prognosis for successful rehabilitation.

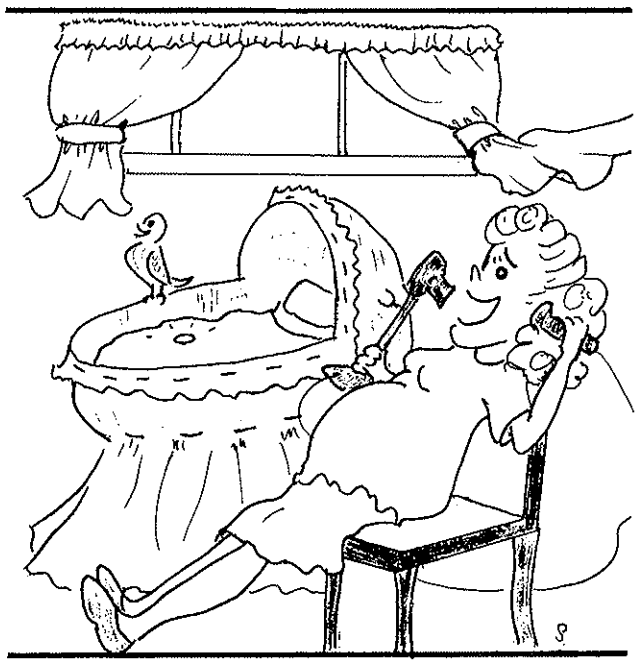
Imprinting is a special learning process through which an animal develops a sense of species indentification. Imprinting is a normal process which occurs early in life, during a restricted period of time called a critical period. Thereafter, all species-directed behavior, including courtship and mating, is directed toward the class of subjects that the animal was imprinted on. Imprinting is believed to be irreversible. Research on this phenomenon has been largely confined to galliformes and anseriformes. Of over 250 research papers published, over 90% deal with species belonging to these groups. With the exception of one paper on guinea pigs, scientific accounts of imprinting in mammals have been limited to the process by which mothers recognize their young by olfactory cues (documented primarily in ungulates).

Taming is the process by which an animal becomes socialized to humans through prolonged exposure of association with food or other comforts. Many species are easily tamed during infancy. Tame animals do not usually direct species-specific behavior, such as courtship, toward humans if conspecifics are available. Taming is reversible, although this may sometimes require prodigious dedication on the part of the rehabilitator. Taming is known to occur in a wide range of species, with variation in the ease and degree to which it can occur.

The problem such conceptual confusion over imprinting and taming can lead to is in the criterion adopted by the rehabilitator to make judgements for reintroducing animals to the wild. If an animal acts tame, it may be judged as human-inspired and thus permanently unfit for release. Since tameness is reversible, a potentially releasable animal may be euthanized or kept captive.

If an animal does not appear tame, it may be considered "non-imprinted", and thus releasable. but human-imprinted animals, especially juvenile and adult males, may act fearful or aggressive toward humans. Remember, a human-imprinted animal acts toward humans as it would act toward conspecifics, which, depending on age, sex, and contextual factors, may be characterized by aggression or fear. Truly human-imprinted animals may end up being released if the rehabilitator equates tameness with imprinting.

In any case, the mere absence of tameness is no basis upon which to judge the behavioral fitness of an animal for release. A better criterion includes the presence of behaviors necessary for survival. With imprinting, the issue is not just for the rehabilitator to avoid human contact with animals. To survive, an animal must have a normal imprinting experience. As long as the animal in question is exposed to conspecifics during the critical period, some himan contact will probably not be deleterious (Hess and Hess, 1969; Beaver, Shrout and Hess, 1976), but should be avoided if at all possible.



Hello.....Gary.....remember that cowbird you raised last summer.....

Imprinting has been extensively researched as noted above, only in some galliformes and anseriformes. Among these nidifuguous birds, the critical period for imprinting takes place before the age of nest exodus. For example, Mallard Ducks cannot be imprinted after an age of 30 hours post-hatch, though they can be tames. Among nidicolous birds, not enough is yet known to speak authoritatively about the subject. McKeever (in press) suggests that a critical period for imprinting in owls occurs between the second to sixth week. The Bird Rahabilitation Research Institute at Quabaug Bird Sanctuary is currently collecting data on some parameters of imprinting is songbirds. Present information, must of it anecdotal, suggests that nidifuguous bird type imprinting does not exist in such mammals as raccoon, squirrel, rabbit or oppossum. While early taming of these animals may delay or even exclude the normal development of necessary survival skills, the existence of the "imprinted raccoon" is thus far only a conceptual fallacy.

REFERENCES

BEAVER, P. 1982. *Wildlife Rehabilitation*, Volume 1. Exposition Press, NY.

BEAVER, P. In Press. *Wildlife Rehabilition*, Volume 2. Exposition Press, NY.

BEAVER, P., Shrout, P. & Hess, E. H. 1976. *Animal Learning & Behavior*, Volume 4, 193-196.

HESS, E. H. 1973. *Imprinting*. Van Nostrand Reinholt, NY.

HESS, E. H. & Hess, D. B. 1969. *Psychonomic Science*, Vol. 14, 129-130.

MCKEEVER, K. In press. *Wildlife Rehabilitation*, Volume 2, ed by P. Beaver, Exposition Press, NY.

Letters To The Editor . . .

Dear Gary Bogue:

I called you on the hotline for advice on my Harris Hawk on October 12, 1983. As you may recall, I found her in a catatonic state that morning. You asked that I let you know what happened. Here is the story.

I found the bird at 8:30 a.m. in a semi-coma, she became more alert when picked up, but very weak and uncoordinated. I administered Azium and Chloro until our vet got in. I suspected food poisoning, but the other raptors were fine, then suspected a concussion, but found no evidence of that. The veterinarian administered fluids subcutaneously. We placed the animal in isolation under a heat lamp, administered a Universal Poison Antidote and waited. The bird became catatonic when not stimulated. By noon, she began to stand up, but slept, very ruffled, and when awake seemed obsessed with preening. I called the lab that donates rodents to see if they could give any clues.

The rodents weren't decapitated but had puncture marks around the throat which wasn't normal. The lab said that if the rodents weren't decapitated, they were probably killed with ether, but this didn't seem to be enough reason for the hawk to be so sick. Later the lab called back to say that those particular rodents had been used in adrenal gland studies and were subdued with phenobarbital. Of course, occasionally a rodent is given too much and dies under anesthesia. Apparently, my hawk ate one who was overdosed. Actually, I fed her only the head, neck, and forelegs of the rat. (The overdosed rat was given to us by mistake.) By 6:00 p.m., after another dose of fluids, the bird was much more alert and hungry. She was still a bit wobbly and her aim was off when she pecked at food, but otherwise okay.

For the next few days, I kept her inside and warm, offering plenty of food and water. Five days later, I put her on a weathering perch and soon noticed that she had closed one eye. I took her inside and she seemed fine. The next day I had the same thing happen with both eyes remaining closed. She was ruffled and appeared not to feel well. An hour after bringing her in, she seemed fine again. We found out the phenobaritol and other related "downers" cause human eyes to be light sensitive. We wondered about the effects on the bird. The hawk is just now getting to the point where her eyes are back to normal (three weeks after the incident).

We certainly were lucky that we didn't lose the bird and have talked with the lab emphasizing that this kind of mistake not happen again.

If you have any information to add to this, we'd appreciate hearing from you. Thank you for your help. It's reassuring to know we can call your "Hotline" in emergencies. Also, your handbook *Raptor Care and Rehabilitation* was the only material I had to go on when I first started in raptor rehabilitation. It was my "bible" then and still is. I recommend it highly to all rehabers. Just wanted to let you know how much I've used and enjoyed it.

Krista Morgan, Coordinator
Wild Bird Rehabilitation Center
Audubon Park & Zoological Garden
New Orleans, La. 70178

Dear Council,

Our organization is a member of your group and we would like to pose a question to the membership. In Maryland only one rehabilitation permit was issued by the state for deer rehabilitation. The individual who possesses that permit has now made a public statement that she will euthanize all orphaned deer since she feels that they are inable to be raised and successfully released back into the wild. We are aware that other rehabilitation centers around the country have had successful programs with orphaned deer and we would like to hear from them about the details of their program. Our state wildlife officials have advised us that we may submit a proposal regarding orphaned deer and if it shows the documented success of other programs, we will be allowed to proceed.

We are interested in receiving detailed information regarding raising Virginia White-tailed deer and other species from the early stages as an orphan to release. We would appreciate any information you may send.

Dianne Pearce, Director
Chesapeake Bird and
Wildlife Santuary
10305 King Richard Place
Upper Marlboro, MD 20772

The New Wildlife Hotline Phone Number

The phone number for the wildlife hotline has been changed to (415) 687-7974, ask for pager #1856. Please make a note for future reference. You never know when it will be needed in a hurry!

(continued from page 4)

MATERIALS AND METHODS

To obtain the blood films, toe clippings were made on all small passerines. Films of larger species were made from blood obtained from a metatarsal or brachial venipuncture. Some samples were made from blood first placed in heparinized PCV tubes. For thin smears, a drop of blood was placed on a clean slide, the edge of a second slide was brought up to the drop at a 45° angle, and then pushed across the slide. Smears were immediately air-dried and fixed for 30 seconds in 95% methanol. The slides were stored in a slide box until staining.

Small batches of slides were stained using 49 ml of buffered (pH 6.8) distilled water and 1 ml of undiluted Azure B Type Giemsa's stain (Harleco©). The stain was mixed and used within eight hours. A drop of diluted stain was placed on each slide, left for 30-35 minutes, rinsed with distilled water and air-dried.

All stained smears were examined for at least 10 minutes with an oil immersion lens at 1000 power. Slides were scanned from top right to left, then down and left to right. The average number of fields read per minute was 23 and the X (mean) number of cells/field was 175.5. Therefore, an average of 40,261.05 red blood cells were scanned per slide. (See Table I).

TABLE I Number of Cells per Field

Number of Cells/Field	200	265	145	100
Number of Slides Read	36	52	13	2

To determine the species of parasites, the following criteria were considered:

1. Gametocytes
   --round or irregular
   --elongate
2. Host cell nucleus
   --displaced
   --surrounded
3. Morphology of pigment granules
   --small dot-like granules
   --large elongate granules
   --number of granules
   --refractibility of granules
4. Number of merozoites per schizont.

Indentification of species of parasites were made with the use of the dichotomous key in *Bird Malaria* by Hewitt (1940) pp. 56-58.[9]

The level of infection was determined by the following method:[10]

Condition	Level
No parasites observed	0
1-5 infected cells/10 minutes	1
6 or more infected cells/10 minutes (up to Level 3)	2
1 or more infected cells/field	3

Abbreviations used herein include: *Haem. (Haemoprotues, Plasm. (Plasmodium), Leuc. (Leucocytozoon), Tryp. (Trypanosome),* and micro (microfilaria).

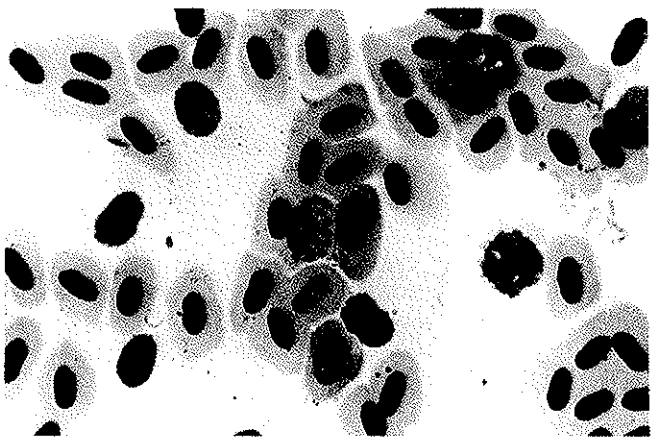
There is a possibility that very low-level infections were overlooked. Since tissue smears were not done on the majority of birds, exoerythrocytic stages were not observed. A few birds died during the rehabilitation attempts and in these cases impression smears by standard methods (Benjamin, 1978) [11] were done in an effort to help identify the species of parasite present.

RESULTS

TABLE II Incidence of Haematozoa Infection in Various Avian Species

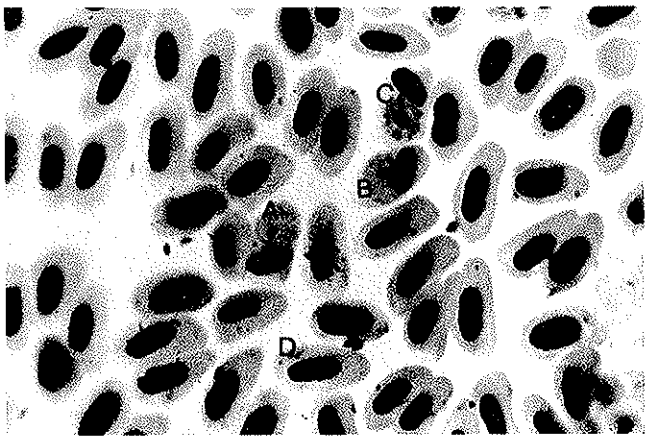
Of the thirty-nine species examined, 35.9% were found to be infected with haematozoa. Table II, Appendix I). Four of these species had double infections.

Parasite	Number of Species Infected	% Species Infected
Haemoproteus spp.	6	15.4
Plasmodium spp.	7	18.0
Leucocytozoon spp.	3	7.7
Microfilaria spp.	3	7.0
Trypanosome spp.	2	5.1



MARY ROCK

Plasmodium in a canary. Mature schizont with 11 merozoites desplacing the cell nucleus.



Mature gametocytes displacing cell nuclei (A--C) and trophozoite (D).

TABLE III Number of Individual Birds Examined and Prevalence of Infection

Of the 103 individual birds examined, 22.3% were found to be infected. (Table III, Appendix 1). Five individual birds had double infections.

Parasite	Number of Birds Infected	% Birds Infected
Haemoproteus spp.	9	8.7
Plasmodium spp.	8	7.8
Leucocytozoon spp.	6	5,8
Microfilaria spp.	3	2.9
Trypanosome spp.	2	2.0

Table IV annotates the incidence of infection by family. Of the twenty-one families represented in the survey, 47.6% were found to have one or more infected species. Passeriformes, Columibiformes, and Strigiformes had the highest rate of infection of those families tested.

TABLE IV Families of Birds Represented in the Survey

Order/Family	No. Examined	No. Infected	% Infected
Gaviiformes			
Gaviidae	4	1	25
Podicipediformes			
Podicipedidae	2	0	0
Pelicaniformes			
Pelicanidae	14	0	0
Ciconiiformes			
Ardeidae	7	0	0
Anseriformes			
Anatidae	11	0	0
Falconiformes			
Cathartidae	3	0	0
Accipitridae	4	0	0
Falconidae	3	1	33.3
Galliformes			
Phasianidae	1	0	0
Charadriiformes			
Charadriidae	1	0	0
Scolopacidae	1	0	0
Laridae	9	0	0
Columibiformes			
Columbidae	7	3	42.8
Strigiformes			
Tytonidae	9	3	33.3
Strigidae	1	1	100.
Passeriformes			
Corvidae	10	6	60.
Muscicapidae	2	0	0
Mimidae	2	1	50.
Emberizidae	8	5	62.5
Fringillidae	3	2	66.6
Passeridae	1	1	100.

DISCUSSION

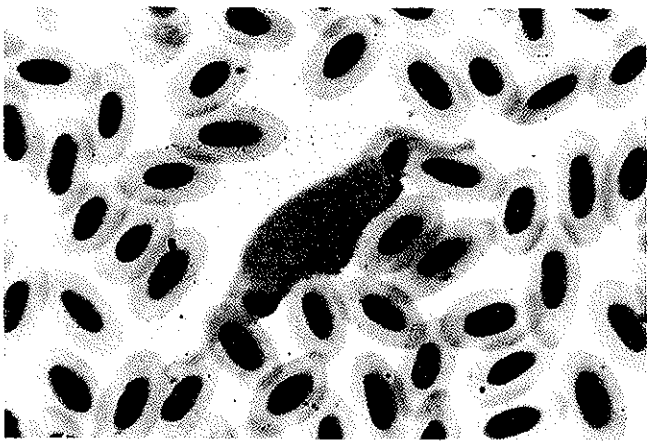
The small sample size from this preliminary survey precludes a determination of the prevalence of parasites in Solano County, California. There does seem to be a trend toward a high incidence of haematozoa in the birds at the center.

Many of these birds come from the Suisun Marsh or surrounding areas, and this is excellent breeding habitat for vectors. The high vector levels in this area may result in a greater incidence of malaria in these birds. Perhaps the parasites debilitate the bird and suppress the immune system leaving the birds more susceptible to injury and sickness or perhaps injured birds are more susceptible to haematozoa infection. In either case, one would expect a higher incidence of parasites in the wild birds brought into the center versus field surveys of healthy birds. Certainly, most of the birds with *Plasmodium* seem to have multiple problems associated with their illness in that they were emaciated and weak.

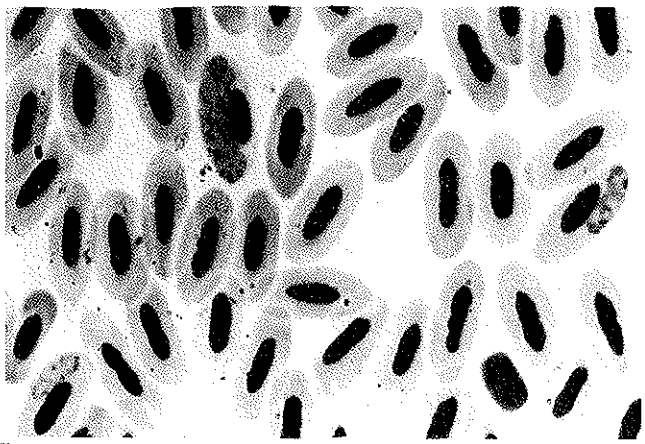
Recommendations

Birds found to be infected with malaria should be placed in isolation to reduce the risk of catching another malady which would interfere with their recovery.

Rehabilitators should consider the impact of malarial parasites on avian health. It is the author's opinion that malaria may play an important role in inhibiting the bird's return to health. This was only a preliminary survey. Many more slide samples from various species and more individual birds need to be obtained in order to properly assess the incidence of haematozoa and their possible impact on wildlife rehabilitation programs.



Leucocytozoon simondi in a Screech Owl.



MARY ROCK

Haemoproteus columbidae in a Rock Dove.

No drug yet has been found to be efficacious in the treatment of haematozoan infections. The author has successfully maintained canaries at UC Davis that were heavily infected with malaria without the use of drugs by providing symptomatic support. Follow-up smears indicated that infection dropped to level 1, birds gained weight, and were otherwise asymptomatic. Relapses can occur.

Supportive care includes providing warmth, feeding plenty of fresh food and water, providing vitamins with iron, and avoiding stress. In the case of canaries, the food provided included seed, fruits (i.e., pears, apples, greens), and vegetables. In a weakened, anemic state, stress can prove fatal, so all unnecessary stresses should be avoided.

APPENDIX I Individual Bird Species Represented in the Survey**

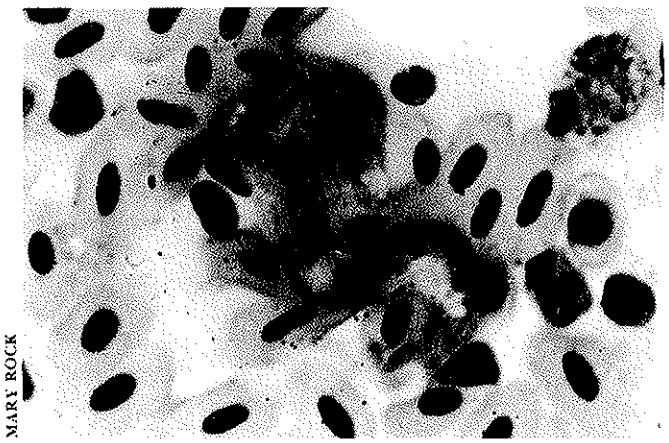
Common Name	No. Ex.	No. Neg.	No. Pos.	Parasite	Levels
Red-throated Loon	2	1	1	*Tryp.*	2
Artic Loon	2	2	0		
Pied-billed Grebe	2	2	0		
Brown Pelican	14	14	0		
American Bittern	2	2	0		
Green-backed Heron	2	2	0		
Black-crowned Night Heron	3	3	0		
Mallard	8	8	0		
Northern Pintail	2	2	0		
Cinnamon Teal	1	1	0		
Turkey Vulture	3	3	0		
Black-shouldered Kite	1	1	0		
Red-tailed Hawk	3	3	0		
American Kestrel	3	2	1*	*Haem.*	3
				micro.	1
Northern Bobwhite	1	1	0		
Killdeer	1	1	0		
Long-billed Curlew	1	1	0		
Ring-billed Gull	2	2	0		
California Gull	1	1	0		
Herring Gull	2	2	0		
Western Gull	3	3	0		
Glaucous-winged Gull	1	1	0		
Rock Dove	6	3	3	*Haem.*	2,3
				micro.	3
Ringed-turtle Dove	1	1	0		
Common Barn Owl	9	6	3	*Leuc.*	1,2,2
Western Screech Owl	1	0	1*	*Haem.*	1
				Leuc.	3
Scrub Jay	4	1	3*	*Plasm.*	2,2
				Leuc.	2,3
				Tryp.	2
Yellow-billed Magpie	1	0	1*	*Plasm.*	3
				Haem.	3
American Crow	5	3	2	*Plasm.*	2
				Haem.	1
American Robin	2	2	0		
Northern Mockingbird	2	1	1	*Plasm.*	3
White-crowned Sparrow	3	0	3	*Haem.*	1,2,2
Dark-eyed Junco	1	1	0		
Red-winged Blackbird	1	0	1	*Plasm.*	3
Western Meadowlark	1	1	0		
Brewers Blackbird	2	1	1	*Plasm.*	1
House Finch	1	0	1	*Plasm.*	3
American Goldfinch	2	1	1	micro.	3
House Sparrow	1	1	0		

* Double Infection

** Birds are listed in phylogenetic order following the 1983 American Ornithologists' Union Checklist of North American Birds.

REFERENCES

1. HERNS, W.B., C.G. Kadner, P.V. Galindo and D.F. Armstrong. 1939. Blood Parasites of California Birds. *J. Parasitol.* 25: 511-512.
2. GARNHAM, G.W. and B. Swinehart. 1966. *Malaria Parasites and other Haemosporida.* Blackwell Scientific Publ., Oxford. 1114 pp.
3. McCLURE, H.E., P. Poonswad, E.C. Greiner and M. Laird. 1978. *Haematozoa in the Birds of Eastern and Southern Asia.* Memorial Univ. of Newfoundland, St. John's, Newfoundland, Canada. 296 pp.
4. HERMAN, C.M., E.C. Greiner, G.F. Bennett and M. Laird. *Bibliography of the Avian Blood-Inhabiting Protozoa.* Memorial Univ. of Newfoundland. St. John's. 123 pp.
5. CLARD, G.W. 1960. The Prevalence of Parasites in the Blood of the Yellow-billed magpie (*Pica nuttali)* in California. *J. Protozool.* 7 (suppl.):18.
6. CLARK, G.W. and B. Swinehart. 1966. Blood Protozoa of Passerine Birds of the Sacramento (Ca.) Region. *Bull. Wildl. Dis. Assoc.* 2:53-54.
7. GREINER, E.C., G.F. Bennett, E.M. White and R.F. Coombs. 1975. Distribution of the Avian Haematozoa of North America. *Can. J. Zool.* 53:1762-1787.
8. NEITZEL, W.J. Editor. 1965. *The Flora and Fauna of Solano County.* Copy #96. Solano County Office of Education, Fairfield, Ca. 156 pp.
9. HEWITT, R. 1940. *Bird Malaria.* John Hopkins Press. Baltimore. XVII & 228 pp.
10. VAN RIPER, C., Van Riper, S., Goff, M., and M. Laird. 1982. *The Impact of Malaria on Birds in the Hawaii Volcanoes National Park.* Cooperative National Park Resources Studies Unit, University of Hawaii at Manoa. 74 pp.
11. BENJAMIN, M. 1978. *Outline of Veterinary Clinical Pathology.* Ames, Iowa: The Iowa State University Press. 351 pp.



MARY ROCK

Avian *Trypanosome* in a Red-throated Loon.

W.C.M.M.C.

The Scientific Committee of the California Marine Mammal Center is pleased to announce the First Annual West Coast Marine Mammal Conference (WCMMC). These two day meetings will focus on marine mammal strandings, medicine, husbandry, handling techniques and current research topics. Members of the C.M.M.C. staff, the Scientific Committee, and the Scientific Advisory Board will discuss topics from first-aid to nutrition and from natural history to current topics. Speakers will cover pinnipeds (seals and sea lions), cetaceans (whales and dolphins) and sea otters. These meetings will be useful for veterinarians, students, humane and wildlife care professionals and anyone who works around or regularly visits the coast.



Northern Fur Seal

The Conference is scheduled for September 14-16, 1984. It will be held at Morrison Auditorium, California Academy of Sciences, Golden Gate Park, San Francisco, California.

Preregistration (before September 6)

Cost: $50.00 Regular
$30.00 student or C.M.M.C. volunteer

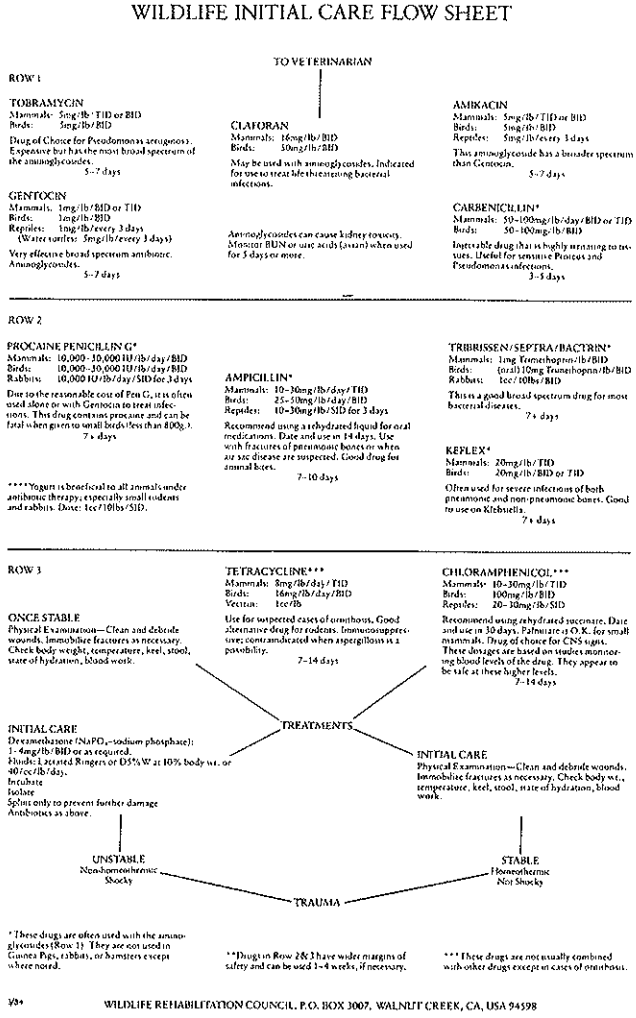
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Cost includes proceedings, ice-breaker on September 14 and barbeque on September 15. Preregistration closes September 6, 1984. For visitor information in San Francisco, call the Visitor's Bureau (415) 974-6900 or Accommodation Referrals (415) 346-5454.

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Or
Janet Prochazka
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NOW AVAILABLE!



WILDLIFE INITIAL CARE FLOW SHEET

TO VETERINARIAN

ROW 1

TOBRAMYCIN
Mammals: 5mg/lb/TID or BID
Birds: 5mg/lb/BID
Drug of Choice for Pseudomonas aeruginosa. Expensive but has the most broad spectrum of the aminoglycosides.
5–7 days

GENTOCIN
Mammals: 1mg/lb/BID or TID
Birds: 1mg/lb/BID
Reptiles: 1mg/lb/every 3 days
(Water turtles: 5mg/lb/every 3 days)
Very effective broad spectrum antibiotic. Aminoglycosides.
5–7 days

CLAFORAN
Mammals: 16mg/lb/BID
Birds: 50mg/lb/BID
May be used with aminoglycosides. Indicated for use to treat life threatening bacterial infections.

Aminoglycosides can cause kidney toxicity. Monitor BUN or uric acids (avian) when used for 5 days or more.

AMIKACIN
Mammals: 5mg/lb/TID or BID
Birds: 5mg/lb/BID
Reptiles: 5mg/lb/every 3 days
This aminoglycoside has a broader spectrum than Gentocin.
5–7 days

CARBENICILLIN*
Mammals: 50–100mg/lb/day/BID or TID
Birds: 50–100mg/lb/BID
Injectable drug that is highly retaining to tissues. Useful for sensitive Proteus and Pseudomonas infections.
3–5 days

ROW 2

PROCAINE PENICILLIN G*
Mammals: 10,000–30,000 IU/lb/day/BID
Birds: 10,000–30,000 IU/lb/day/BID
Rabbits: 10,000 IU/lb/day/SID for 3 days
Due to the reasonable cost of Pen G, it is often used alone or with Gentocin to treat infections. This drug contains procaine and can be fatal when given to small birds (less than 400g.).
7+ days

AMPICILLIN*
Mammals: 10–30mg/lb/day/TID
Birds: 25–50mg/lb/day/BID
Reptiles: 10–30mg/lb/SID for 3 days
Recommend using a rehydrated liquid for oral medications. Date and use in 14 days. Use with fractures of pneumonic bones or when air sac disease are suspected. Good drug for animal bites.
7–10 days

TRIBRISSEN/SEPTRA/BACTRIM*
Mammals: 1mg Trimethoprim/lb/BID
Birds: (oral) 10mg Trimethoprim/lb/BID
Rabbits: 1cc/10lbs/BID
This is a good broad spectrum drug for most bacterial diseases.
7+ days

KEFLEX*
Mammals: 20mg/lb/TID
Birds: 20mg/lb/BID or TID
Often used for severe infections of both pneumonic and non-pneumonic bones. Good to use on Klebsiella.
7+ days

**** Yogurt is beneficial to all animals under antibiotic therapy, especially small rodents and rabbits. Dose: 1cc/10lbs/SID.

ROW 3

ONCE STABLE
Physical Examination—Clean and debride wounds. Immobilize fractures as necessary. Check body weight, temperature, keel, stool, state of hydration, blood work.

TETRACYCLINE***
Mammals: 8mg/lb/day/TID
Birds: 16mg/lb/day/BID
Vectran: 1cc/lb
Use for suspected cases of ornithosis. Good alternative drug for rodents. Immunosuppressive; contraindicated when aspergillosis is a possibility.
7–14 days

CHLORAMPHENICOL***
Mammals: 10–30mg/lb/TID
Birds: 100mg/lb/BID
Reptiles: 20–30mg/lb/SID
Recommend using rehydrated succinate. Date and use in 30 days. Palmitate is O.K. for small mammals. Drug of choice for CNS signs. These dosages are based on studies monitoring blood levels of the drug. They appear to be safe at these higher levels.
7–14 days

TREATMENTS

INITIAL CARE
Dexamethasone ($NaPO_4$—sodium phosphate): 1–4mg/lb/BID or as required.
Fluids: Lactated Ringers or D5%W at 10% body wt. or 40 cc/lb/day.
Incubate
Isolate
Splint only to prevent further damage
Antibiotics as above.

INITIAL CARE
Physical Examination—Clean and debride wounds. Immobilize fractures as necessary. Check body wt., temperature, keel, stool, state of hydration, blood work.

UNSTABLE
Non-homeothermic
Shocky

STABLE
Homeothermic
Not Shocky

TRAUMA

* These drugs are often used with the aminoglycosides (Row 1). They are not used in Guinea Pigs, rabbits, or hamsters except where noted.

** Drugs in Row 2&3 have wider margins of safety and can be used 1–4 weeks, if necessary.

*** These drugs are not usually combined with other drugs except in cases of ornithosis.

V3+ WILDLIFE REHABILITATION COUNCIL, P.O. BOX 3007, WALNUT CREEK, CA, USA 94598

WRC Drug Dosage Wall Chart

by

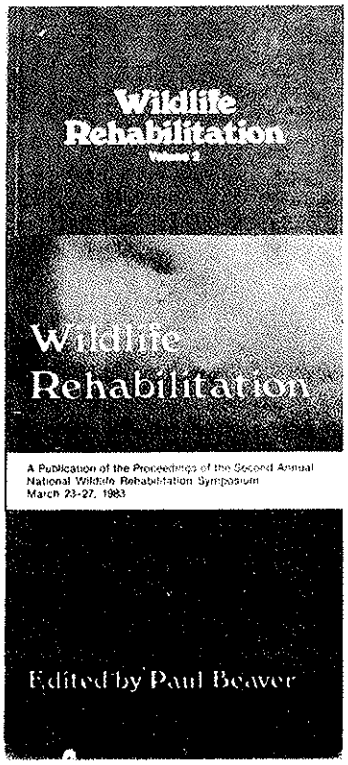
Sandra Emanuelson, D.V.M.

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