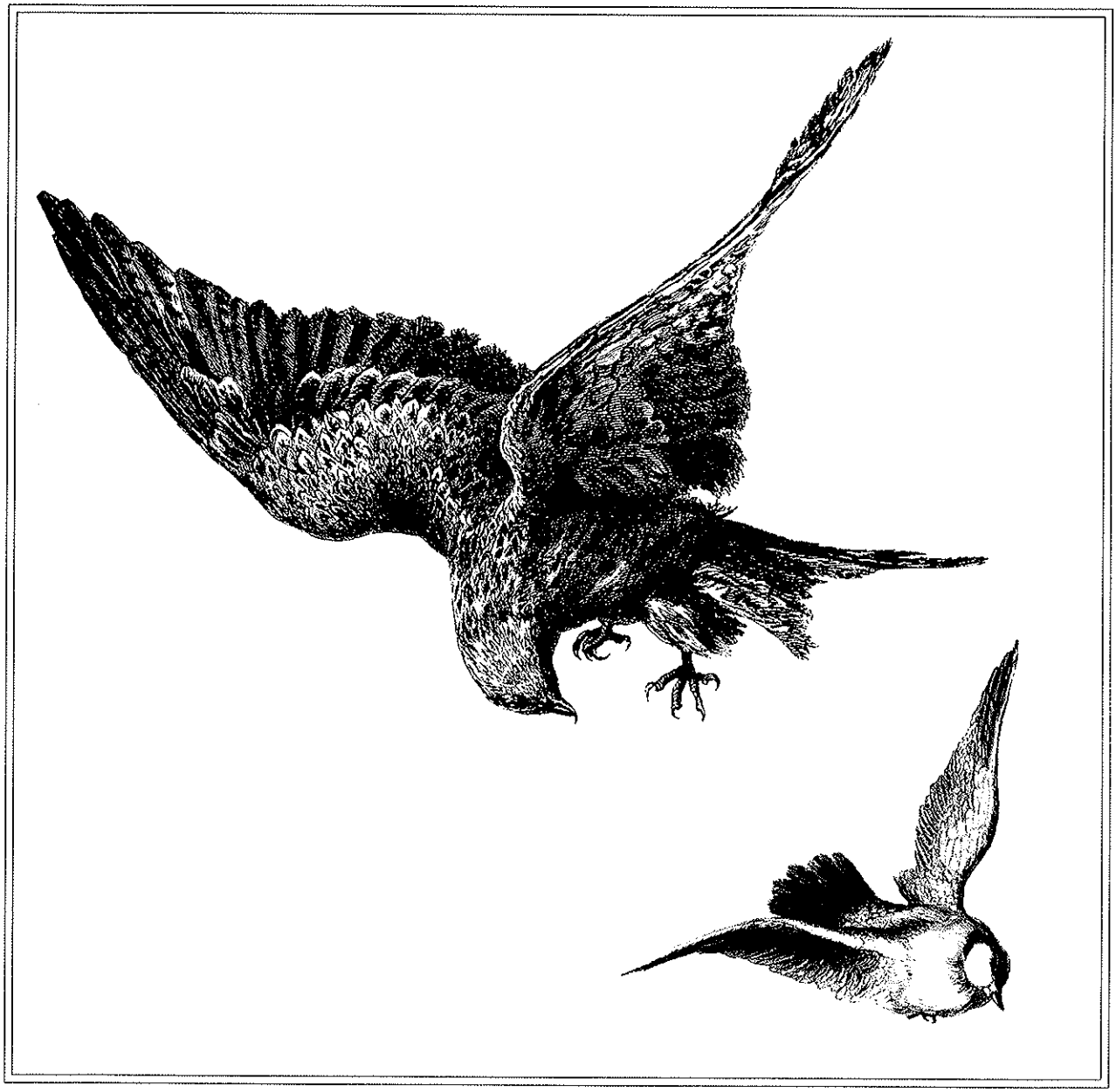
Vol. 19, No.1

JOURNAL of Wildlife Rehabilitation

A Publication of the International Wildlife Rehabilitation Council



Trichomoniasis in Raptors, Pigeons & Doves . . p. 8

Guidelines for Authors

The *Journal of Wildlife Rehabilitation* is designed to provide useful information to wildlife rehabilitators and others involved in the care and treatment of native wild species with the purpose of returning them to the wild. All feature articles are subject to a review process, and our staff and reviewers work with authors to produce the most accurate information possible in our ever-changing field.

The *Journal of Wildlife Rehabilitation* has various feature categories. We solicit submissions in the form of feature articles, rehabilitation notes, book reviews, news articles related to major events in the field, and selected case studies. Articles on veterinary medicine as it relates to wildlife rehabilitation are also welcome. We would like to expand the *Journal of Wildlife Rehabilitation* to include wildlife rehabilitation articles from countries outside the United States and welcome inquiries regarding such articles. We also have two short features we use for basic information: "For The New Rehabber" and "Simple Things That Make a Difference." They are intended for basic information or new ideas that are easily demonstrated with a short text and photos. All authors receive a $25 honorarium for each article accepted for publication or provide a one year membership or renewal.

Submission Instructions

1. An original and two copies of the manuscript should be submitted to the Editor, IWRC, 944 Anderson Dr., Suisun, California 94585, USA. The manuscript should include references, photo legends, and footnotes, and should be typewritten, double-spaced, if possible. The author's name, address, and phone number should be placed on at least the first page of the article so it can be readily identified and the author contacted. Please note that each article should be accompanied by an abstract and a set of key words. If tradenames are used for products mentioned the author must indicate whether the product is ™ or ®. A product table at the end of the article should give readers the name and address of the companies involved and generic name or category of product.

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4. A separate page should be submitted with a short synopsis of information on the background of the author. Included should be the name, address, rehabilitation organization, phone number of the author and a biographical paragraph. Where appropriate, please list any academic degrees, special training, or experience that is relevant to the article (i.e., physical therapy—RPT, etc.) Articles pertaining to areas of veterinary medicine that involve tasks or decisions requiring a licensed veterinarian (e.g., soft tissue or orthopedic surgery) require a veterinarian as either the author or a co-author.

5. Black and white photographs are preferred for use in the *Journal of Wildlife Rehabilitation*. When no other option is available, color prints can be converted but this is costly and to be avoided when possible. Photo credits should be listed with the photographs.

6. Acknowledgments are limited to people who have contributed to the article in a major way.

7. References should be noted in the text with the last name of the author and the year published (i.e., Leighton, 1983) and listed at the end of the manuscript in alphabetical order in the following style:

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Editorial . . .

International Wildlife Rehabilitation Efforts Continue To Grow

Over the years, I have become aware of the ever increasing efforts abroad to return wildlife to its habitat. While we have not been as successful as we would like in getting international wildlife rehabilitation articles for the journal, we are always looking for willing authors. During the Volume 19 series, the reader will see more international articles starting in this issue with an overview on wildlife rehabilitation in East Africa.

The way in which I learn of these efforts is through lay articles, national geographic specials and general information pieces designed to elicit awareness and support for these underfunded fledgling care operations. Recently I was reading the December 1995 (Vol. 188 #6) *National Geographic* which had a detailed profile on Jane Goodall's efforts to save 'orphan' chimpanzees that cannot be returned immediately to their family troops. There is a halfway house for up to 10 chimps (i.e., home rehabilitation) in Bujumbura, Burundi and a center in Tchimpounga, Congo, that has 50 orphans confiscated by the government from traders. Interestingly, the latter is financed by a major oil company (Conoco, Inc.). They are building on a 65 acre site near Point Noire, Congo. In Entebbe, Uganda there is a wildlife education center that houses 26 orphans. The last stop for orphans who enter the halfway house and graduate from the center is the Sweetwaters Game Reserve in Kenya. What does all of this cost? Well, in American dollars, it is $500,000/yr. So Jane Goodall tours the world encouraging people to join her in supporting conservation efforts that include rehabilitation. In an effort to raise the awareness of African children about animals and thus plant the seeds for future conservation she founded the "Roots and Shoots" organization. To her pleasure, the idea has spread and there are now 250 such groups in the United States, Canada, Germany and Japan.

Faced with the same criticisms as are all wildlife rehabilitators, Goodall answers the way many of us do. "Many conservationists feel it's a waste of money to build sanctuaries for orphaned chimpanzees, but there are not many people who, after meeting an orphaned infant and looking into those desperate eyes, can turn away." Additionally, she has had to come to grips with the use of her favorite animal in scientific research. In recent years she has taken a strong stand regarding the care of captive primates and their ultimate disposition when no longer useful. The article stated that many primates spend 2-3 years in testing programs and then are shipped off to holding facilities where they may live to be as much as 50 years old. She asks, "Having done their duty for science, don't they deserve better?" Thank God for people like Jane who fight so long and hard for the principles they hold so dear! The world is a better place because of people like her. (By the way, if you want to know more about Jane's efforts, you can write the Jane Goodall Institute at P.O. Box 599, Ridgefield, CT 06877.)

There are stories like this going on all over the world and we hope to bring some of them to our members. If you know someone willing to write about international wildlife rehabilitation efforts, please encourage them and help us make the connection. We would like to see both overview and technical care articles for future issues. The editor can be reached via the internet, (janwhite@ucdavis.edu) making international communication both less expensive and faster than before.

-Jan White-

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Wildlife Rescue Turned Violent

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ABSTRACT

Wildlife rehabilitators encounter strangers every day. Often rehabilitators find themselves in remote areas attempting rescues or meeting unfamiliar individuals bringing wildlife to them. The following article is one rehabilitator's personal account of an assault that occurred during a wildlife rescue call. Discussion is provided by a veteran police officer and counselor in the area of violent crime. The actual account is examined and tips provided that allow a rehabilitator both to avoid risk situations and to be empowered to handle a situation confidently should one occur.

Key words: Criminal assault, wildlife rehabilitation, wildlife rescue, personal security

Introduction

This is an article about a crime: an assault against a wildlife rehabilitator responding to a routine rescue call. The authors' purpose in sharing this with you is not to cause fear, but to provide information and to stress the importance of being aware and having a plan ahead of time.

Almost two years have passed since I was assaulted on a wildlife rescue call. During those months I frequently wanted to share my experience with other rehabilitators. As a seasoned rehabilitator, my premise is that if one of "us" doing wildlife rehabilitation has experienced a problem, odds are others have found themselves in similar situations. However, assault on one's person is one of those things for which we tend to blame ourselves; often rejecting the thought that others may have found themselves in similar threatening situations. My sincere hope is that such fears for others in the rehabilitation family are unfounded. My purpose in writing this non-wildlife article is to expose a potential problem, alerting others to dangers that can occur when dealing with the public. My goal is to encourage other rehabilitators to make provisions for their safety before they face any dangerous situations.

First Signs Of Trouble

The day started out normally enough. Normal, given that this was two days before Christmas, my grown family was all home, I was still shopping for those last minute gifts and planning a Christmas dinner for thirty-two, and operating my out-of-home rehabilitation center. A call came from my local Department of Natural Resources office that a citizen had picked up an owl that had been sitting in the road, and had brought it to the local DNR office. So far nothing was unusual. I mentally rearranged the next few hours and started for the car to go get the bird. The phone rang again, I answered, and heard the now tense voice of our DNR secretary suggesting the gentleman with the owl wanted to speak to me. The next few minutes on the phone were more like an inquisition than a conversation. What were my credentials, who was my veterinarian and on and on. I answered all questions and tried to reassure the finder that I was a licensed rehabilitator.

Red Flags

Okay, so far unusual perhaps, but I understand, even applaud a person wanting to be sure a licensed individual will care for the animal they have rescued and taken responsibility for thus far. Still there was that abusive tone to his voice...my survival instincts were on alert.

Suddenly he was back on the phone." How long will it take you to get here?"

" Fifteen minutes", was my response.

"That's too long I'll bring it to you," he insisted.

"Leave it at the DNR station," I countered. "The office is closer to my veterinarian's office."

"I'm bringing it to your house," he demanded. "I have your card."

Quickly I interjected with, "Meet me halfway. It'll save time." I gave him a location that was near my home, but the public parking lot of a restaurant. That action may well have saved my life. Then I did something that I rarely do when injured wildlife is waiting for my attention: I paused long enough to make a plan, and to leave a message for my family about where I had gone and when I expected to be back.

Have A Plan

As I started to leave, my son-in-law, Greg returned from a shopping trip. I told him of my strange feeling about this call. His first suggestion was don't go. This is great common sense in retrospect, but not an easy option to a lifelong wildlife rehabilitator. His second suggestion was that he would come with me.

We sat in the parking lot for what seemed like an hour, particularly in the cold Wisconsin winter. In reality it was about 30 minutes. No one drove up fitting the description of the vehicle the man had given. Finally, I thought I should call the DNR office back to get more facts. Perhaps they had a license number of the car. Regardless, it was time to update the warden in the event these folks had decided to keep the bird. Greg left the car and went into a nearby office to use the phone. Just as he was out of sight, up pulled a rattletrap of a minitruck and stopped next to my van. A huge, burly man was fairly overflowing from the small space of the truck's cab. His appearance was alarming enough, but it was his eyes that caught my gaze and held it. They were wild. Every part of me was screaming to leave. No plates were on the front of the truck. Ok, I'll check the back, I thought. I got out of my vehicle and walked around the truck. No back license plates either. Not good! My mind was racing, instincts now on full alert. I felt exposed, having left the safety of my vehicle. I knew I had made a mistake. Where was Greg when I needed him?

A woman cracked the window on the passenger side of the truck and said, "I have the owl in my arms under my jacket but we aren't going to give it to you because you will hurt it."

Staying Calm

I walked toward the women in an attempt to calm her. I asked what kind of owl it was and what type of injury it had sustained. Anything to defuse the situation. She didn't know what kind or what was wrong. It was lying on the road when they passed by and they stopped to help it. I gently explained that they had done the right thing up until then but I needed to examine it and see that it received the best veterinary care and rehabilitation so it could be released once again. She opened her jacket and out peered the dark eyes of a Barred Owl.

"Oh, look, you have a Barred Owl," I exclaimed "They are so beautiful, aren't they? It is such a shame when wildlife is injured."

The woman opened her door and leaned toward me indicating I should take the bird. I obliged, moving closer to her. It was then I noticed the bruises on her face and eyes, which added to her disheveled appearance. Before the transfer was complete the man became enraged. He let go with a string of obscenities and ended with "I'll see you dead before I give up that owl!" In a flash he was out of his truck and beside me (all 6'5" and about 350 lbs). His arm was raised. My options were limited.

The woman started to argue with him in my defense...

"She wants to help the owl...don't you see that?"

During this event she had pushed the bird into my arms and stood up to come between me and the man. Unfortunately she was only 5' tall. I towered over her with plenty of area exposed to catch his fist. I moved backwards to my van, cradling the owl and thinking as fast as I could. My van was running, keys in place. I raced for the door! The man came from the front, the woman

dangling from his arm like a lifeless doll. She was screaming at him to stop. He had a heavy chain in one hand and grabbed my shoulder with the other, lifting me from the ground. I felt my shoulder move and pain surged through my arm. I knew it was dislocated.

As calmly as I could I barked," You are going to hurt the bird! Is that what you want?" He dropped me to the ground. I got up without even glancing his way and growled, "Now let me see what is wrong with this owl."

" You better not hurt it" he boomed. "If you hurt it, I'll kill you right here!"

I believed him! I laid the bird on my front seat trying to buy time. The man at my side continued to spew rage from his eyes and mouth. I opened the bird's mouth and felt the wings for obvious breaks, then the legs. The man calmed as he watched the gentle examination. Okay, he needed calm reassurance. If I bolt I'm dead! I kept thinking about a predator's reaction to flight: he was the predator, I was now a rabbit.

He kept saying," Don't hurt it anymore."

I was thinking fast! Diversion. Keep him off balance. I exposed the ear. The large ear of an owl can be shocking to someone that has never seen one before. So it was with this man.

"My God, it has a hole in its head!" He shrieked " It's been shot!"

"Oh yes," I agreed "This is a bad skull fracture. I've got to get the vet right away."

I picked up the bird and wrapped a towel around it.

Suddenly Greg appeared at our rear. "What is going on?" he demanded.

" These are the folks that found the owl, Greg," I said, with such control that I didn't recognize myself. "I've just finished a quick exam and found a terrible fracture in the skull. We have to get to the vet right away! Can you drive please? I'll hold the bird. I don't even want to take time to transfer it to a carrier."

Greg jumped in the drivers seat I eased into the passengers side and left the couple, mumbling that they could contact the DNR to see how the bird did. We sped away. Once inside the car I poured out my story. They started to follow us.

"Lose them, Greg, and go anywhere but home," I pleaded.

Report To Authorities

Away we went back and forth, doing switchbacks, as I told more of my story along the way. We arrived at home about a half hour later, carefully looking to be certain they were not behind us any longer. The garage door was open and we pulled in, shutting the door and locking it from the inside. I called the sheriff's office, the DNR office and the veterinarian's office in the event they were to show up there. It was a good guess, as they were already at the vet's office searching every room for me, terrorizing the vet assistant. It was there the Sheriff apprehended the couple and took them in for questioning.

Resolution

You will be happy to know the owl did well, safely cradled the entire time in my jacket. She did have a head injury. It was a minor concussion and didn't need the emergency help I had indicated. She was released in ten days to her original territory. My injuries took longer to heal.

I was bruised and bleeding from the back of my head and neck where apparently the chain or fist made contact, but I honestly don't remember when it happened. My shoulder was dislocated, but during the struggle it must have corrected itself. I did have huge hand-shaped bruises on my arms and neck that lasted for weeks, which gave me cause to ponder my near disaster.

I couldn't help but think what must have happened to the woman in the car. The terror on her face haunts me still. Her actions may have saved my life but I've always worried that she took the brunt of his anger. She called me about 6 months later to apologize for the problem and tell me what a good person he is when he isn't drinking or doing drugs. Yes, he beats her, but he doesn't mean to, she says he just gets angry so easily. I talked to her about an abuse center in my county for battered woman and gave her the phone number, but I doubted she would use it. What I don't doubt is that she will be a fatality some day during one of his rages. I have witnessed them and they are powerful.

The man had a record for violence. He was armed with a gun and two knives, none of which I saw during my altercation with him. He was a Vietnam Veteran with war related post-traumatic stress syndrome. The sight of the injured owl apparently triggered war memories that brought him back to that place in his life where he felt powerless to help his injured buddies. While none of those things were my problem, they became

mine when I was interacting with him during one of his unstable times. He was sent back to the Veterans Hospital for therapy. While I have sympathy for the man and his unfortunate situation I could easily have become a statistic.

Commentary *by Hope Douglas*

As an overview, Marge handled this situation impressively. Even the owl survived. But there are additional steps she might have taken, and different decisions she might have made. To her credit, she was alert, aware and quick-thinking. This possibly saved her life. Wildlife rehabilitators encounter strangers every day. Often you find yourself in remote areas attempting rescues or meeting unfamiliar individuals who are bringing wildlife to you. According to the FBI's report, one violent crime occurs every twenty-two seconds. The chances of being a victim of violent crime are greater than those of being hurt in a traffic accident. What measures can be taken to safeguard yourself against physical crime?

1. BE AWARE. During the initial phone call Marge already suspected a problem: "The next few minutes on the phone were more like an inquisition than a conversation. " She described the tone of his voice as "abusive" and her survival instincts were alerted. She was AWARE.

2. HAVE A PLAN. Marge offered alternative meeting places. She selected a public parking lot. This is certainly better than a secluded path somewhere, however, it does not guarantee safety. It was an excellent plan to leave a message with her family as to where she was going and when she was expected to return. A note with a run down of the situation using names and as many specifics as you know is even better. Having Greg join her was, of course, fortuitous, but not always possible. Being alone puts you at greater risk of assault.

3. BE OBSERVANT AND ALERT. Marge observed that the truck had no license plates. Warning signals must have been very strong. At this point she could have probably escaped unharmed. Staying in her car and driving to the back of the suspects truck to check for back plates would have been a better idea than getting out of the safety of her automobile. While it is illegal not to have license plates on your automobile, you must remember that a person that may assault you isn't necessarily going to be following laws. The woman passenger's odd comment, "I have the owl in my arms...but we aren't going to give it to you because you will hurt it." Observing the bruises on the woman's face made Marge realize she was in a possibly abusive situation. She was instinctively aware the situation could escalate if she panicked.

4. DON'T GO TO CRIME SCENE #2 (secondary crime scene). She was suddenly overpowered by her assailant. He could have easily killed her with the chain or his enormous hands. Marge explained to me that she hadn't been prepared for the look of extreme rage in his eyes. That look can be terrifying and can immobilize the victim. That's what he wants. POWER. Never let an assailant take you away in a car. He is going to what is termed the secondary crime scene and murders often happen there.

5. GET AWAY, BE SAFE. Marge's quick thinking in pointing out the owl's skull fracture was brilliant and switched his focus. In addition, Greg's arrival probably saved her from further harm. She might have yelled "FIRE" to alert other people had she been unable to break away. The public is more apt to respond to a yell of "fire" than of "help" or "rape."

6. REPORT THE CRIME AND WRITE THE DETAILS OF WHAT HAPPENED. In telling the story to Greg as they drove away, she was able to give fresh information to someone else. Important— if no one had been with her, after she was safely home, she should have written down every detail she could remember. Marge called the sheriff's office and other appropriate places to alert them, which resulted in his apprehension. Instead of going home, she might have done better to drive to the police station first and eliminate the chance of being followed to her home and another possibly vulnerable area.

7. INSTINCTS. Trust your instincts. If a situation feels or looks unsafe or strange, it probably is. Hundreds of people have indicated after being victimized that they had a "bad feeling" about the situation before it happened. In preparing this article, Marge said , "I learned from my birds to trust my instincts. It works for them."

8. HAVE REASONABLE PRIORITIES. Had Marge left the situation early on she would have been safe, but would not have rescued the owl. Her life, however, is even more important than the owl's, and so is yours.

Facts

Most rehabilitators are women. A woman must constantly be aware of her status as prey. A rapist chooses his victim, primarily looking for a woman who is vulnerable to attack. After finding a vulnerable target, he proceeds, in essence, to ask the victim, "Can you be intimidated?" If so, he threatens her life. Add drugs and alcohol to this equation and the situation becomes rapidly deadly. No one, regardless of age, race, sex, or economic status, is safe from the threat of physical attack.

We need to believe the world is predictable and safe in order to function. The sun will come up, water in the drinking fountain is harmless, oncoming traffic will stop at the red light, the stranger who rescues wildlife will not hurt a wildlife rehabilitator. It is not possible to live constantly in fear, under a continual state of siege. We like to believe that we are in control of our lives. And so, when an attack comes, it is unexpected.

But the shock of being attacked goes deeper. In spite of watching years of cop shows on television, devouring crime novels, and reading murder and mayhem on the front pages of the newspapers, victims are taken by surprise. " I didn't think it could happen to me." Even if the assailant is unsuccessful in his crime against you, it does not insulate you from the feeling of isolation victims inevitably feel.

Conclusion *by Marge Gibson*

My area of the county is notorious for being safe. Stable midwesterners, friendly down-home folk. The fact is, a town only 30 miles from mine was listed in 1995 as the safest city in the United States! Yet I was assaulted by an unstable individual. I am a mature woman, not a fresh faced girl, yet I was assaulted. I consider myself a good judge of character, yet I was assaulted. I'm not used to playing the victim, nor is it a hat I wear easily. I have always felt I could control a bad situation with common sense and quick reactions yet I was assaulted. Without a set of very lucky circumstances I could have been killed for doing what I do best, helping wildlife in trouble.

Crime is not inevitable in your life. You can do something about it. Be alert, have a plan. Having confidence in your ability to handle a situation will give you a greater sense of personal security. Make decisions based on fact and preparation. Trust your instincts. You have options. Your mind is your best weapon against criminal assault.

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Author Profiles

Marge Gibson has been a wildlife rehabilitator for over 30 years. She has served on the IWRC Board of Directors for 5 years, the last 3 years as Vice-president. She presently serves on the Wisconsin Wildlife Rehabilitation Association Board of Directors, and is founder and Executive Director of Raptor Education Group, Inc., Antigo, WI. Marge is the author of several scientific publications, and frequent contributor to the Journal of Wildlife Rehabilitation.

Hope Douglas holds a BA in Psychology and a MA in Rehabilitation Counseling. She has served as a law enforcement investigator for many years. She is a certified mental health counselor and national speaker and author of articles on child and family protection. Hope has served with IWRC Board of Directors since 1993 both as vice-president and as interim Executive Director. She is founder and Executive Director of Wind Over Wings, Inc., Clinton, Connecticut.

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Trichomoniasis in Raptors, Pigeons, and Doves

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ABSTRACT

This is a general look at the genus *Trichomonas* with a focus on *Trichomonas gallinae*, pathogenic in some avian species, particularly domestic and feral pigeons and doves (Columbiformes). Information is included concerning *Trichomonas vaginalis*, pathogenic in humans, to dismiss confusion over zoonosis between the two diseases.

KEY WORDS: *trichomonas gallinae*, *trichomonas vaginalis*, frounce, canker, columbiformes, raptors

Introduction

Wildlife rehabilitators should have a particular interest in any parasitic organism that is pathogenic to wild bird species. To properly understand *Trichomonas gallinae*, it is useful to first look at the genus as a whole.

History

Other than a few free-living forms that are infrequently reported, all members of the order Trichomonadida are parasitic. This is a wide-spread parasite of both vertebrates and nonvertebrates, but only a few of the many species are actually pathogenic.

Schmidt and Roberts [1985] report that the genus itself was first described by Donné in 1837 when he initially isolated *Trichomonas vaginalis*, a species pathogenic to humans. In microscopic viewing, it appeared the organism was covered with hairs, which prompted Donné to give the generic name *Trichomonas*, after the Greek *thrix*, hair. Noble and Noble in a 1964 parasitology text state the name was given because the organism was first thought to possess three ("Tri-") anterior flagella. Though subsequent research showed that the original group actually possessed *four* flagella, the original genera name, *Trichomonas,* was retained.

Three trichomonads are found in humans, *Trichomonas tenax, T. vaginalis*, and *Pentatrichomonas hominis*. These are morphologically so similar that many taxonomists previously considered them to be conspecific. At present, *P. hominis* has been found to be significantly different and is placed in a separate genus. The genus *Trichomonas*, as currently defined, contains only three species: *T. vaginalis, T. tenax,* and *T. gallinae*, an avian parasite [Schmidt and Roberts, 1985].

Morphology

The basic morphology is similar among all Trichomonads. They are structurally complex flagellates that reproduce asexually and exist only as trophozoites (the adult, active stage). The organisms are piriformes (pear-shaped), usually longer than wide. General mean size is 20 μm in length and 8 μm wide, but these measures vary 5 to 30 μm in either direction depending on the species [Mehlhorn, 1988].

Trichomonads are zooflagellates (animal flagellates). Their flagella distinguish them from other protozoans. Pelczar, [Jr., et al., 1993] offers the easiest means of recognizing them: the anterior tuft of flagella. Trichomonads are aerotolerant anaerobes, and are heterotrophic: they do not possess cytostomes but feed via phagocytosis. Once attached to the epithelium, they feed on bacteria, leukocytes, and cell exudates. Some species are themselves susceptible to ingestion by macrophages, as is *T. vaginalis* in human hosts.

Life Cycle

Trichomonads have neither a cyst nor sexual stage. Like other mastigophorans, they reproduce by a special form of longitudinal binary fission, which leads to a great number of organisms in a brief period of time. No intermediate host is required; transmission is always dependent upon direct contact with the final sites of parasitism (e.g., mouth, digestive tract, respiratory tract, copulatory organs and/or urogenital tracts).

Pathogenesis

Trichomonads exist as nonpathogenic, facultatively pathogenic, and regularly pathogenic parasites; the pathogenic species are closely related to

one another [Mehlhorn, 1988]. Many *Trichomonas spp* are harmless commensals; only a few are regularly pathogenic. In vertebrates they generally inhabit the reproductive/urogenital tracts, digestive tract, and sometimes the respiratory tract within the nasal passages. In both domestic and wild animals, these flagellates are often more abundant in diarrhetic feces than any other material and, in general, seem to be more pathogenic in these animals than in man [Noble, 1964]. Cattle are hosts to a trichomonad from a different genus, *Tritrichomonas foetus*, which can easily enter the uterus. Cattle are thus susceptible to temporary infertility or spontaneous abortion. This strain can even enter the fetus and appear in the fetal membranes, the amniotic and allantoic fluid, and often in the stomach of the fetus. Other species are common in the intestines of amphibians, fishes, reptiles, birds, and mammals, with varying degrees of pathogenicity [Noble, 1964]. Human hosts are infected in the sexual/urogenital tracts by *T. vaginalis*, and *T. tenax*, which lives in the mouth where it feeds on the fluids of the host, on leukocytes, or on bacteria [Mehlhorn, 1988]. *T. tenax* is reported to be a harmless commensal, kept under control by normal oral hygiene. In a few rare instances respiratory infections and thoracic abcesses were found, but most reported cases occurred in Western Europe [Garcia and Bruckner, 1993].

Lastly, a number of trichomonads are found in invertebrates. They have been described in the gut of termites; *T. limacis* occurs in the liver and gut of slugs; and the large hog ascarid *Ascaris suum* carries a species in its intestines [Marquardt, 1985].

Name of Organism and Disease Caused

Trichomonas vaginalis
Cause of trichomonad vaginitis in women and urethritis and prostatitis in men.

A cosmopolitan parasite, *T. vaginalis* is one of the world's most common STDs - sexually transmitted diseases [Pelczar, Jr., et al., 1993]. About 2.5 - 3 million American women get vaginitis annually.

Morphology

T. vaginalis is the largest trichomonad in the genus (about 10 by 30 μm).

Transmission

T. vaginalis is transmitted from host-to-host via sexual intercourse. Some evidence suggests that soiled clothing, towels, and washcloths, under poor hygienic conditions, may transmit the parasite. It has also been transmitted by contaminated toilet seats and bath water.

Some newer rehabilitators voice concerns about contracting the human disease from infected pigeons. It is for this reason that the author has included this brief section on *T. vaginalis*. When looking at the epidemiological factors of trichomonads, *T. vaginalis* and *T. gallinae* are two distinct species, and are not zoonotic.

Name of Organism and Disease Caused

Trichomonas gallinae
SYNONYMS: *Cercomonas gallinae, C. heaticum, T. columbae, T. diversa, T. halli* [Levine, 1985].
Also referred to as "canker" in pigeons and as "frounce" by falconers.
Cause of avian trichomoniasis, upper digestive tract trichomoniasis.

History

This trichomonad infects birds and has many strains, some of which are highly pathogenic [FIG. I]. It was first reported in captive Mourning Doves *(Zenaidura macroura)* and Ring-necked Doves *(Stretopelia risoria)* by Cauthen in 1936. In 1946 Harwood described the disease in feral mourning doves, and the infection was later found in wild band-tailed pigeons *(Columba f. fasciata)* in 1950 [Stabler, 1950]. The Jones' Barn (JB) strain isolated by Stabler in 1948 is the most virulent, killing twenty-six of twenty-seven recipients, with death occuring at 9.3 days on average [Stabler, 1948a].

The order Columbiformes is the most susceptible to infection. Pigeons and doves are raised domestically by many breeders, and these birds are particularly susceptible to infections from feral birds that congregate near domestic flocks. It is because of the domestic/economic implications that *T. gallinae* has undergone such scrutiny.

Hosts and Location

T. gallinae principally resides in columbiformes, who act as both reservoir and host to this organism. It also infects falconiform and strigiform birds, though diurnal raptors are more often infected than owls, for whom columbiformes are not a major food source [Pokras, et al, 1993]. Experimental transmissions have been achieved in a number of birds in different orders, including the Bobwhite quail, canary, House Sparrow, Barn Swallow, goldfinch, and Song Sparrow. Parenteral infections have been experimentally produced in kittens, mice, guinea pigs, and rats. [Levine, 1985]. Hawks, eagles, and falcons are infected through ingestion of infected feral pigeons and doves. Infections have also been found in chickens and turkeys, but there is debate about whether these infections are caused by a different species. *T. gallinae* principally infects the upper digestive tract, including the mouth, esophagus, crop, and proventriculus [Marquardt, 1985], but the organism may spread to the liver, lungs, and other internal organs.

Levine [1985] describes infections in the lungs, pharynx, and air sacs, reporting large, caseous masses that invade the roof of the mouth and

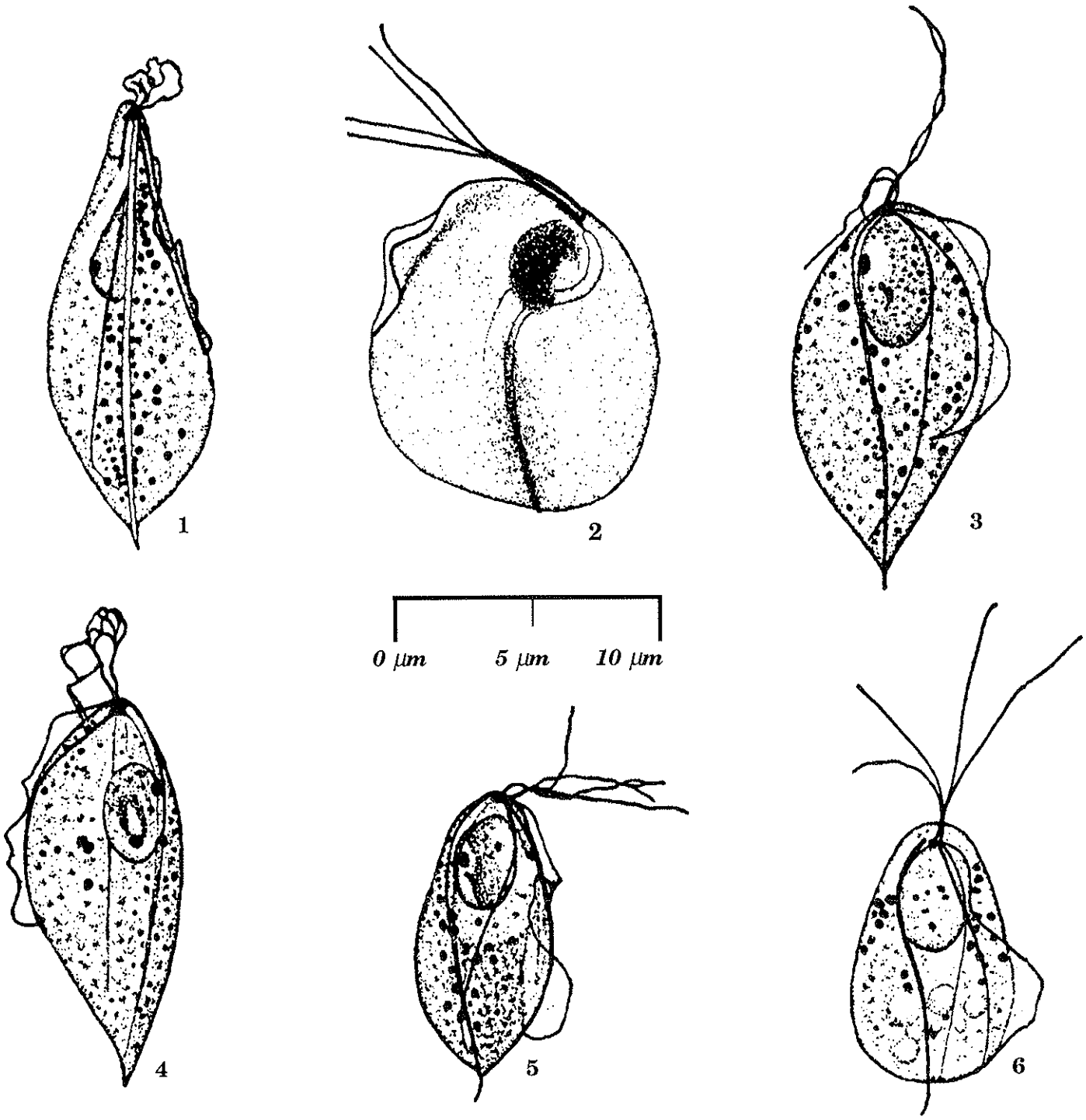


FIGURE I. ***Trichomonas gallinae*** from the intestine of poultry and other birds.

1. Domestic pigeon. Note concentration of granules in axial area.

2. Domestic turkey. Dried smear, stained with Giemsa; courtesy Dr. Hawn. Note double marginal filament.

3. Red-tailed hawk.

4. Golden eagle.

5. Sparrow hawk (kestrel)

6. Red-shouldered hawk.

Raptors acquire T. gallinae through ingesting infected prey

(Stabler, courtesy of *Jour. Morphol.*) [Noble and Noble, 1964]

IWRC 1995 Annual Report



President's Message by Marnie Allbritten

1995 was a challenging and rewarding year for IWRC. The Board and staff were faced with the dual challenges of continuing to serve our members while the Board embarked on a search for a new Executive Director. Hope Douglas, our interim Director, did a magnificent job of communicating cross-continentally with both staff and the Board over a period of six months while we carefully reviewed the candidates for the Executive Director job. During this time our office staff never missed a beat and continued to serve the membership flawlessly. If I sound proud of the job they did, it's because I am. As I'm sure most of you know, it's not the triumphant or easy times that test an organization's mettle, it's the tough times. And during the past year, IWRC has gone through a number of changes that would test any organization's strength of character. Through all of the glitches and grinds that occur during any transitional time, our staff has proved steadfast and dedicated.

Mary Reynolds, whom many of you only know as a friendly voice on the phone, proved to be at her finest under pressure. Her coordination of the conference was so smooth that she made it look easy. She took over the duties of editing the conference proceedings and did a marvelous job. And she continued to keep the IWRC office running like clockwork. Given the distances involved, she and Hope worked amazingly well together and the Board and I truly appreciate all her hard work.

Hope Douglas, who served for six months as executive director, used her awesome communication and organizational skills to pilot IWRC through some perilous waters. She kept our ship afloat through Board meetings, turned faxing into a new art form, and kept her sense of humor through the entire process. Now that she has retired, she has consented to serve on the Board for which we are grateful.

I think that we can honestly say that this year, your staff and Board worked very hard for you. And the hard work paid off. We had one of the most successful conferences in the history of IWRC. People were uniformly enthusiastic about the quality of the presentations and the opportunities to network with other rehabilitators. With the energy that I see building among the staff and members, we're bound to make the 1996 conference another wonderful experience for our attendees.

During the 1995 conference, we presented our first Giraffe Award to Jo Balliet for her outstanding work in developing protocols for use with rabies vector species and her tireless efforts in educating her local health professionals and fish and wildlife agents.

The list of progress goes on.

We have received many compliments on recent issues of the IWRC *Journal of Wildlife Rehabilitation* and appreciate all the hard work that our editor, Dr. Jan White puts into the journal every quarter. Our state representatives program is growing and now has representatives from most of the provinces in Canada as well as an additional 6 states.

Our research comittee has completed their charter and enrolled 5 members from the sciences who are willing to guide grant applicants through the process. The first year of the diet study had one dedicated center completing the protocol and Susan Heckly and I hope to continue the study with your help. We appreciate Penny Elliston's staunch support for the program and hope to secure some financial support for participants in the coming year.

Of course, our final accomplishment for 1995 was the Board's selection of Veneita Porter as our new Executive Director. Veneita is a remarkable woman with a wonderful combination of strength and wit which can only add to IWRC's strength as an organization. She comes from a long history of commitment to wildlife as well as extensive experience in administration. The dynamic combination of energy and intuitive understanding which she brings to IWRC will serve us well and we are looking forward to a long and happy affiliation.

Looking back, I can say that it has been an amazing year of highs and lows for me as president. As always, when I look at the caliber of the people I serve, I am overwhelmed by your compassion and dedication to our wildlife. You make it all worthwhile. Thank you for your support an your loyalty over the past year. Though this job is not always easy, I remain profoundly grateful for the opportunity to serve IWRC and its members. I look forward to working with you in 1996.

Dear Members:

I have now had the good fortune to be onboard for six months as the new Executive Director of IWRC. I felt this would be a good opportunity to share some of my ideas and experiences with you.

As is the case with most rehabilitators, my experience in the field is largely volunteer-based. Originally my home-base was New England and this is were I began my work with wildlife over two decades ago. My first attempts at rehabilitation were with urban wildlife such as raccoons and skunks, which led to my long association with "Audubon's Trailside Museum" in Milton, Mass. At this facility I worked with large mammals and cats, as well as a wide array of raptors. During the summers I worked on Cape Cod with marine mammals and seabirds.

I have had long-time involvement with the zoological societies in both Boston and London. In these situations I was able to expand my orphan and newborn skills by working in the nursery. This was a wonderful time! My work with primates and other large mammals allowed me to participate in an artificial insemination project which took me to Africa and South and Central America. While at college at Cornell University, I worked with the Peregrine Falcon Program and had the satisfaction of releasing these beautiful birds back to their natural wild habitat. Since my move to the west coast, my volunteer time has mainly focused on marine and small mammals and birds.

My hopes for IWRC include expanding our funding sources, educational programs and hosting an international leadership conference. I realize that the future of rehabilitation will need to include stronger working relationships and collective agendas where we work on building coalitions that represent our diversities and talents. I have enjoyed meeting the amazing people involved in rehabilitation around the United States and our counterparts around the world. With your help and input I hope to see IWRC continue to grow and diversify. It is important to us at IWRC that our membership is involved in the evolution of our future. With your continued help and support I hope for a bright and progressive year. I wish you the best for this Spring.

Veneita Porter
Executive Director

Research Committee Report

Marjorie Gibson
Research Committee Chairperson

Over the past year the research committee has been busy collecting ideas and monies to start some very worthwhile projects that will benefit wildlife rehabilitation.

We have developed the Charter Statement which reads: "The purpose of the research committee is to produce objective scientific research on wildlife rehabilitation and to enhance the knowledge and technical capabilities of wildlife rehabilitation."

We have secured committments from respected scientists of varied disciplines throughout the country to serve as working members of the committee. This step is the foundation of our research projects, and allows us access to the most recent scientific thought and criteria from the major universites throughout the country. The working members are helping us develop criteria for research techniques that will stand up to the scientific community as a whole. This is significant as papers that come from these research projects will be accepted by the scientific community and stand up to the rigors of scientific publishing, elevating wildlife rehabilitation professionally.

If you are interested in submitting a proposal for a research project, packets will be available to describe the proposal submission by May 1, 1996. No deadline for submission has been set. The committee members will be available to assist you in your submission.

Office Reports

Mary Reynolds, Office Manager

The office has been very busy this past year keeping up with skills seminars, memberships (new and renewals), journals, jobline requests, literature orders, conference, correspondence, and training of new staff.

This past year has seen the coming and going of two Executive Directors, Jan White and Hope Douglas (interim director). We want to welcome our new director, Veneita Porter, to the organization for what we hope will be a long and productive career with IWRC.

Christina Casey, Skills Seminar Coordinator for the past two years, has been recently replaced by Susan Troutt, who will be taking on the skills program. Susan has recently returned to the states from Germany, where she and her husband Eric were stationed for several years. She comes to us highly recommended, with excellent administrative skills. We know that she will be a great addition to the office staff!

Skills Seminars 1995

Mary Reynolds

Last year we taught 17 Basic 1AB courses to almost 700 students, covering 8 states and 3 Canadian provinces! This program continues to grow each year and reaches more and more rehabilitators. We are very proud of the quality of this program and have had much positive feedback on it. In 1995 we also held 8 advanced sessions in 3 states and 1 Canadian province.

We would like to take this opportunity to say a special "Thank You" to all of our outstanding 1AB instructors who help to make this program the success that it is! We appreciate their expertise and their willingness to bring this important information to rehabilitators everywhere! So, thanks to: Becky Barron, Curt Clumpner, Debbie Daniel, Kathy Hobson, Jill Hunter, Jeanne Wasserman, and Jan White! Thanks also go out to our advanced instructors: John Huckabee, DVM, Jessica Lainson, DVM, Scott Newman, DVM, Stan Newman, DVM, Jan White, DVM, and Janna Wynne, DVM.

We are in the process of training 3 new basic instructors to assist with the skills seminars and hope to have at least one of them ready to start with the fall season.

Conference 1995, Virginia Beach,VA

Mary Reynolds, Conference Coordinator

Last year's annual conference, hosted by Wildlife Response, Inc., was held in picturesque Virginia Beach, Virginia, with beautiful, affordable accommodations right on the Atlantic Ocean and the Chesapeake Bay! We had a great turnout, with over 300 registrants and over 50 speakers! Topics ranged from basic care to surgical techniques. Attendees had a spectacular visit from *Veedor*, an Andean Condor presented by John McNeely, a naturalist from Sharon, Ct.

Field trips included a bus trip to the nearby "Virginia Marine Science Museum" and a birding tour of Virginia Beach led by Guy Hodge and Don Schwab. Our Exhibit Hall was completely sold out and the banquet was one of the best attended ever, with over 200 participating! Dr. Allen Rutberg did a slide and oral presentation at the dinner on the wildlife contraception program at Chincoteague Island, which was very informative.

The host committee did an outstanding job and we greatly appreciate all of their hard work and effort, which helped to make this a successful conference. Special appreciation to Tracey Hassler, who really outdid herself!

Thanks to all of the speakers who made presentations at the meeting, especially those who filled-in at the last minute for cancelled workshops or papers, specifically Dr. Rutberg, Juanita Heinemann, Laura Simon, and Becky Picton. Thanks are also extended to Dr. Scott Newman and Dr. Stan Newman for their additional efforts in our advanced seminars and to Scott for stepping in when one of our other instructors was delayed.

The 1996 Conference, *Wild Today, Wild Tomorrow*, will be held in Niagara Falls, New York and is being hosted by the New York State Wildlife Rehabilitation Council. Make your plans now to be there, October 10-13, 1996.

State and Provincial Representative Report

Marnie Allbritten, Board Representative

The end of 1995 saw the beginning of real growth for the IWRC State and Provincial Representatives Project. This is the year that we finally broke into the magic "20's" with 24 representatives from Alberta, Canada to Anna Maria, Florida. The state/provincial reps. meeting at the IWRC conference was very well attended and during the discussion, we discovered that the major concerns for people who attended was the move by states to regulate wildlife rehabilitation without consulting with the constituency involved. Many rehabilitators were feeling taken advantage of by state fish and wildlife agencies and felt that communication among wildlife rehabilitators needed to be nation wide in order to instill consistency and fairness into state regulations.

In addition, we heard from Trish O'Connell, our Pennsylvania state representative, who conducted a brief survey of states to find out how many have state wildlife rehabilitation organizations and how active they are. As of November 2, 1995, Trish had received 26 reply cards. An additional 16 responses have been received since the conference. Of the 57 states and provinces surveyed, only 16 have active state or provincial organizations. It looks like it's pretty tough going out there! We hope by next year to have a packet of information put together for any individual wishing to start a state/provincial organization which will include organizational materials and contacts for similar existing organizations. Our thanks to Trish for doing such a tremendous job of organizing the survey.

For the first time this year we experimented with having a team of reps. in Nevada. It seems to be working so well that we've decided to extend the team approach to Michigan as well where Cathy Gidner and Louise Sagaert have just signed on as dual reps. We also have new representatives in Texas, Oklahoma, British Columbia, Maryland, New York, Quebec, and Wisconsin. Welcome to all these dedicated folks.

It's been a good year for the project. We're excited about exploring avenues for serving IWRC's members in every area of North America. If you are interested in becoming a part of our team or in participating in our survey, please contact Marnie at 541-440-3353 or Trish O'Connell at 215-482-8217.

Treasurer's Report

IWRC
Revenue & Expense Statement
January 1, 1995 to December 31, 1995

REVENUES	
Skills Seminars	57,593.58
Conference	31,843.67
Literature	23,888.62
Membership	61,920.00
Standards & Accreditation	0
Oil Spill Survey Grant	1,200.00
Research Contributions*	4,134.00
Interest Income	795.41
Miscellaneous	434.49
	$180,809.77
EXPENSES	
Acct. Fees/Bank Charges	$ 3,736.82
Skills Seminars Expenses (partial)	18,625.45
Conference related costs (partial)	11,117.11
Equipment Rental	2,736.53
Health Insurance	1,450.15
Liability/Board Insurance	2,597.49
Office Expenses	2,598.68
Payroll Taxes	5,260.19
Postage/Shipping	15,559.89
Printing/Xerox machine costs	29,240.15
Journal of Wildlife Rehabilitation	9,170.05
Office Rent/Utilities	8,402.72
General Supplies	4,079.18
Sales Taxes	2,469.21
Communications	3,363.48
Travel (Skills Seminars, Conference, BOD)	11,306.41
Wages (4 Part-time Positions)	36,394.46
	$168,107.97
*1995 Net Income**	*$12,701.80*

**IWRC matched the research funds on a 1:1 basis out of the net income.*

Standards & Accreditation Program

The standards committee worked this year on proposed changes in raccoon housing standards. The process is on-going and has not concluded.

Our first out-of-state accreditation visitation has been planned for April of 1996. The organization, the Texas Wildlife Rehabilitation Coalition is based in Houston.

In California, new Administrative Title 14 regulations which govern wildlife rehabilitation require that licensed organizations either become accredited or submit to department sanctioned cage inspections no later than June 30, 1997. In advance of those new requirements, we are working with several facilities who are planning to become IWRC accredited.

The accreditation program is non-profit. The administrative program fee is $100. All other costs are directly related to the costs of team visitation. Team selection is a joint decision between the applicant and the committee. If your organization is interested, contact the IWRC office for an informational packet and application.

sinuses and may even extend through the base of the skull to the brain. Rehabilitators have found caseation extruding from the nares and, during necropsy procedures, blocking the nasal passages. While avian pox and other pathogens can cause these nasal lesions, one hesitates to preclude, as do most sources, the possibility that *T. gallinea* also infects portions of the respiratory system. The lower digestive tract is reportedly not involved with the infection once the proventriculus is passed [FIG. II]. The organism does often occur in the liver, and to a lesser extent in other organs including the heart and pancreas. On rare occasion infection has been found in the spleen, kidneys, trachea, bone marrow, and navel region [Levine, 1985]. It has also been found in the cytoplasm of host cells, such as macrophages and epithelial cells [Noble, 1964].

Distribution and Importance

T. gallinae has a cosmopolitan distribution, though it is not indigenous to North America; it was brought by European settlers with pigeons and doves [Pokras, et al. 1993]. The organism was relatively unknown until it began infecting domestic flocks (few native wild bird organisms received much attention at that time). Along with major economic impact on those who breed doves and pigeons (both hobbyists and entrepreneurs), bird hunters are also affected because trichomoniasis may be a major selective factor in control of game bird populations [Marquardt, 1985]. The organism is also a concern to wildlife rehabilitators because it can be a common cause of preventable death in raptors and columbiformes.

Transmission

The *T. gallinae* trophozoite is transmitted from one bird to another by close contact. Strains of varying pathogenicity are chronic in most columbiformes; the more virulent strains are generally kept under control by the immune system. Squabs are most susceptible as they are fed "crop milk" by both the mother and father.

Most sources state that adult-to-adult transmission is only via shared drinking water. However, it is likely that infected seed-eaters, unable to swallow, may regurgitate contaminated seeds at feeder sites. That seed now carries the parasite from the first bird, and if ingested *immediately* by another bird, a dose of live parasites may be delivered. Adults also present food to each other during courtship behavior.

The fecal/oral route is generally precluded because the anaerobic trophozoites are thought to quickly dessicate and die after excretion. However, the author's case records involving over 300 feral pigeons and doves (1988-1992) may reflect fecal/oral transmission. Like chickens, pigeons walk through seeds as they ingest them, defecating on the ground as they go. Any birds who feed on contaminated seed can thus ingest the trophozoites within a short-enough time that, though the parasite is anaerobic, it may still be alive. Once the parasite had infected a single member in a flight cage, the disease spread rapidly to other pigeons through either mode of transmission.

Pathogenicity

T. gallinae infections range from benign and asymptomatic to an acute disease that is rapidly fatal. Secondary infections can also occur due to immune suppression. In domestic populations where data can be obtained, mortality rates have approached 90%, with young birds most at risk [Marquardt, 1985]. Some references report death can occur anywhere from 4 - 15 days after infection, though rehabilitation experiences place death at the latter end of this range. Infected birds present with weight loss, huddled "rousing" behavior, loss of coordination, and general malaise. Closer examination may reveal a yellowish-green fluid in the mouth which contains large numbers of trichomonads if microscopically viewed. Early lesions found in the mouth are small, circumscribed areas in the mucosa. In the pharynx, esophagus, and crop the early lesions are small, whitish nodules that grow, ranging from 1 mm to approximately 1 cm in size. Emanuelson [1983] reports that lesions are thought to originate from tiny excoriations in the mucous membrane, and can therefore appear in aberrant sites, such as the tip of the tongue.

In a study of eight Barn Owls infected with *T. gallinae*, all but one had large distinct lesions in the roof of the mouth [Pokras, et al. 1993]. Small nodules were present as well as extensive necrotic plaques. Severe necrotizing, inflammatory lesions were revealed by microscopic examination, often extending well into adjacent tissues, underlying musculature, and sometimes involving the palatine bone. Pokras, et al [1993] also describe a Barred Owl in which the infection deteriorated the hard palate to such an extent that the infraorbital sinuses and the oral and nasal cavities became continuous. Pieces of food and regurgitated pellets consistently lodged in the thus-enlarged oral-nasal cavity. The owl was euthanized.

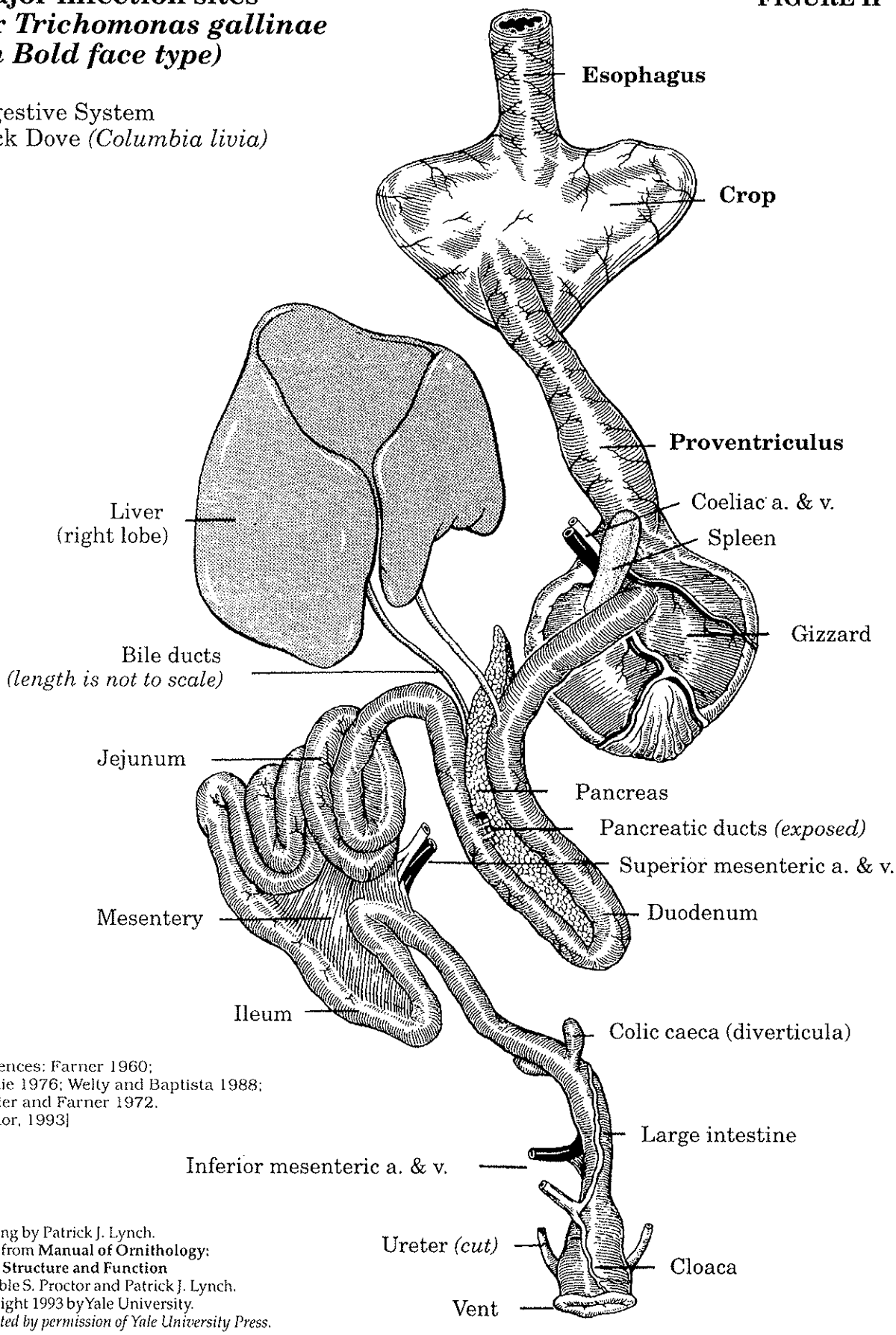
Diagnosis

If a large involvement has already developed in the mouth, esophagus, or crop, a noticeable foul odor is present, and visceral caseation (which looks like cottage cheese) may be seen in the oral cavity. Avian species produce heterophils (as do reptiles) instead of neutrophils. Rather than the more-fluid pus seen in human and most mammalian infections, the heterophils form a "cheesy" exudate (caseation). Visible caseous lesions can indicate a *T. gallinae* infection but, as they can be caused by other organisms, gross identification is not a definitive diagnosis. Finding the organisms in infected tissue is the principal and most effective method. This can be done through direct examination or by swabbing the throat of birds and

Major infection sites for *Trichomonas gallinae* *(in Bold face type)*

FIGURE II

Digestive System
Rock Dove *(Columbia livia)*



References: Farner 1960; Sturkie 1976; Welty and Baptista 1988; Ziswiler and Farner 1972. [Proctor, 1993]

Drawing by Patrick J. Lynch.
Taken from **Manual of Ornithology: Avian Structure and Function** by Noble S. Proctor and Patrick J. Lynch.
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cultivating the suspect material to encourage the growth of trichomonads [Levine, 1985]. Microscopy will show a piriform, flagellated organism approximately 6.2 to 18.9 μm x 2.3 to 8.5 μm. There are four anterior flagella and a fifth flagella that trails posteriorly [Emanuelson, 1983]. However, by the time caseation is readily visible, the infection has already progressed to a stage that is difficult to treat before resulting in death.

It is difficult for many rehabilitators to obtain proper diagnostic materials. BioMed Diagnostics, Inc. in San Jose, California has developed a field kit that can be used for avian trichomoniasis. The **InPouch™ TF** test kit was developed for the *T. foetus* organism that is pathogenic to cattle, but works as efficiently for *T. gallinae* diagnosis. The kit includes pouches for 20 individual tests and is relatively easy and inexpensive to use (price as of Feb. 1996 is $78.00 for 20 tests). You receive a box of 20 pouches, one microscope clip, and a product insert that explains diagnostic procedure. The rehabilitator must have a pipette, syringe, and access to a 37°C incubator and a light microscope. The pouch itself contains all necessary culture and reagent materials. A paper detailing use and effectiveness of this product appeared in the *Journal of Wildlife Diseases* [Cover, et al, 1994] and can be read for further information. BioMed Diagnostics, Inc.can also be contacted at 1430 Koll Circle, # 101, San Jose, CA 95112, or by calling toll free at 1-800-677-2855.

Continued on next page.

TREATMENT

Generic Name	Form	Route	Dosage	Frequency/ Duration	Notes
Carnidazole 1. [HARRISON & HARRISON, 1994]	Tablet (10 mg/tab.)	Oral	1 tablet	SID one time	Prophylactic Administer in an empty crop.
Copper Sulfate 1. [EMANUELSON, 1983]	Soluble powder	Water	100mg/ 100cc H_2O	20 days	Can cause liver damage
Dimetridazole (EMTRYL) *No longer available in U.S.* 1. [HARRISON & HARRISON, 1986]	Soluble powder (182 gm/6.42 oz.)	Water	1 tsp/gal.	5 days only	May be toxic if this dosage is exceeded. For treatment of trichomoniasis, giardiasis, histomoniasis, and hexamitiasis. Do not treat birds when breeding. Extended therapy may result in toxicity or overgrowth of *Candida.*
2. [EMANUELSON, 1983]	Soluble powder	Oral	50mg/kg	5 days	Was considered safest, most commonly-used drug for trichomoniasis when still available in U.S.
	Soluble powder (36.4 gm/pouch)	Water	1 pouch/ 200 liters H_2O	5 days	
Enheptin 1. [EMANUELSON, 1983]	Capsule (5mg/cap.)	Oral	up to 40mg/kg/ day	6 days	Enheptin will kill organisms in an infected or carrier bird. Enheptin is somewhat unpalatable when administered in drinking H_2O.
Ipronidazole [IPROPRAN] 1. [HARRISON & HARRISON, 1986]	Soluble powder (61 gm/2.65 oz.)	Water	500 mg/ gal.	7 days	For trichomoniasis, giardiasis, and histomoniasis.
Metronidazole 1. [PLUMB, 1995]		Oral	50mg/kg	SID for 5 days	For susceptible anaerobic infections.
2. [HARRISON & HARRISON, 1994]		Oral	10-30mg/ kg	BID for 10 days	
		IM	10mg/kg	SID one time	IM administration can be necrotic to tissues

Treatment

Metronidazole, used for treatment of human vaginitis, is equally effective with avian trichomonads. Metronidazole is a synthetic antiprotozoan agent that is also used against *Entamoeba histolytica* and some anaerobic bacteria. The brand name "Flagyl" indicates this is an effective chemotherapeutic agent against flagellate organisms. Quinolines, arsenic acids, and tetracyclines have also been used, but metronidazole appears to be the most effective. "Spartrix" (Carnidazole) is favored by some pigeon fanciers, both preventatively and prophylactically.

Metronidazole is an imidazole derivative, nitro-imidazole to be specific. The imidazole moiety has exhibited some carcinogenicity in humans, but the risk is considered too low to prevent use of the drug [Marquardt, 1985]. No reference was found concerning the carcinogenic properties of metronidazole in relation to avian physiology. Overdoses may occur: one wild pigeon was inadvertently given too strong a dosage over an extended period of time, and exhibited feather stress marks at a later date. An overdose may also be indicated by neurologic difficulties not present prior to drug administration.

Breeders of domestic pigeons generally administer metronidazole to flocks in their drinking water. However, social behavior within flocks can prevent some members from obtaining sufficient water. Birds should be monitored for symptoms to determine if direct oral medication is thus required.

Stress and the Immune System

It is known that various strains of *T. gallinae* are chronic in columbiformes. Emanuelson (1983) reports the disease is asymptomatic in approximately 80 to 100 percent of domestic pigeons *(Columbia livia)*. The birds' immune systems generally control the organism, preventing pathological infection. However, the immune system cannot singularly handle the parasite during periods of extreme stress. Several key factors produce high levels of stress in feral populations.

Pigeons are monogamous and highly social; flock members feed each other's young. When mates or offspring die from poisoning, infection, or other causes, stress levels quickly rise. Overcrowding presents another stress factor, particularly because pigeons are one of the only avian species to mate and raise young on a year-round basis; this leads to food shortages during periods of snow, compounding population-induced stress.

Heidrich [1995] explains how stress affects the immune system. Endogenous steroid production, induced by stressful situations, inhibits cell membrane motility. Consequently, fewer heterophils are able to migrate to infection sites. When stress (and steroid production) is reduced at a later time, the infection may have reached a level that can no longer be dealt with by normal immune response. Extended or frequent episodes of stress in feral pigeons result in a *T. gallinae* infection that can quickly become endemic within the population. Rehabilitators must therefore deal with this parasite both with columbiformes and the raptors that may ingest infected birds.

Epidemiology and Control

On a large scale, *T. gallinae* infection can only be prevented by those who raise pigeons and doves. Metronidazole is given in the water if any member of a captive flock is diagnosed with the infection, and many treat it prophylactically by continuous drug administration in shared drinking water. The concern is to treat adults so the infection is not passed on to squabs in crop milk; even a low level of infection may later precipitate an epizootic. For rehabilitators, common procedures should be followed if columbiformes are in rehabilitation. Most specifically, cross-contamination should be avoided by using separate feeding syringes (for nestlings) or dishes for each adult bird. Hand-washing is of course mandatory before handling food that will be given to any strigiformes or falconiformes.

Some immunity has been demonstrated by those recovering from less-virulent strain infections. This further complicates control of the organism. Stabler [1948b] found that infection with an isolate of low virulence confers immunity to that strain, as well as to other, more virulent strains – particularly the Jones' Barn strain. Immune adults, when infected with highly lethal strains, remain asymptomatic but pass the organisms on to their offspring. Pokras, et al [1993] speculate that Stabler's results suggest the possibility of immunization for falconry birds or those involved in endangered-species reintroduction programs. Generally, however, there is no control of this organism among predator species that may ingest an infected pigeon or dove, and a potential immunization program would have no effect on feral pigeon and dove populations.

No effective means exist to catch and medicate feral birds - and consequently the birds that ingest them as a prey species - thus no controls are available for these bird populations.

There has been dialog concerning the wisdom of feeding columbiformes to raptor species undergoing rehabilitation. One would have to be sure the bird was free of *T. gallinae* infection, which may be impractical and expensive unless the rehabilitator has access to laboratory equipment. It has also been questioned if the parasite would be destroyed by first freezing the bird before feeding it to a raptor. Research reported by Huttner [1964] froze *T. gallinae* in a concentration of approximately 10^6 organisms per ml. The parasite survived up to at least 4 hours of freezing at –150°F in tap or glass-distilled water, pH 7.2, and at least 16 hours in Gey's or Earle's balanced salt solution (BSS). It is perhaps wisest to simply find another source of food, and not use pigeons or doves.

Trichomonas: A cross-specific comparison

NAME:	***Trichomonas vaginalis***	***Trichomonas gallinae***
DISEASE:	Trichomonas vaginitis, urethritis, prostatitis	Avian trichomoniasis, "canker" or "frounce"
SIZE:	10 - 30 µm (largest trichomonad)	7 - 20 µm
LIFE CYCLE:	Trophozoite only; no sexual or cyst stage; reproduce via longitudinal fission	Trophozoite only; no sexual or cyst stage; reproduce via longitudinal fission
DISTRIBUTION:	Cosmopolitan	Cosmopolitan
HOST:	Homo sapiens	Avian species; Columbiformes, Falconiformes, and Strigiformes
TRANSMISSION:	Sexual intercourse; contact with contaminated fomite surfaces; neonates via vaginal birth	Close contact, re: contaminated shared drinking water; orally via parent feeding squabs; possibly fecal/oral in food supply
HABITAT:	Reproductive tract; urogenital system *specifically:* vagina urethra prostate seminal vesicles *rare infections:* liver	Upper digestive tract; respiratory tract *specifically:* mouth pharynx esophagus crop proventriculus *occasional infections:* lungs & air sacs trachea sinuses brain liver heart pancreas *rare infections:* spleen kidneys bone marrow navel region in cytoplasm of host cells, specifically macrophages and epithelial cells
INFECTIONS:	Majority remain asymptomatic; if symptomatic, inflammation and tenderness, disharge	Range from benign, asymptomatic to an acute disease that is rapidly fatal, after first presenting with loss of coordination; huddled, "rousing" behavior; general malaise; weight loss; and eventual death via starvation or respiratory system failure
DEFINITIVE DIAGNOSIS:	Swab of secretions, microscopic examination	Swab of secretions, culture, microscopic examination

TREATMENT:	Metronidazole *(antiprotozoan chemotherapeutic agent)* oral/systemic application vaginal douches and suppositories to restore pH levels	Metronidazole *after infection diagnosed:* oral/systemic application via shared drinking water *prophylatically:* treat shared drinking water
CONTROL: **SOURCE:** *This is a* compliation of *information already cited in paper.*	General course of oral medication; simultaneous treatment of partners to prevent recalcitrant cases from reinfection	*DOMESTIC FLOCKS:* prophylactic treatment of shared drinking water if organism is suspected *FERAL AVIAN SPECIES:* no control measures available

GLOSSARY

anaerobe: any organism that lives in the absence of oxygen; obligate anaerobes being unable to live in even low oxygen concentrations, facultative anaerobes being able to live in low or normal oxygen concentrations as well.

Ciliates ("Ciliata"): Class of protozoans of complex structure, bearing cilia, often in rows or grouped in compound structures

cloaca: the common chamber into which intestinal, genital and urinary canals open in birds and reptiles

commensal: a partner, usually the one that benefits, in a commensalism (as in a parasite and its host)

conspecific: belonging to the same species

crosspecific: belonging to different species

cytological: regarding structure and function of cells; activity

cytostome: the opening through which food is ingested in ciliates

endocytosis: a process by which eukaryotic cells take up material from the outside by invagination of the plasma membrane to form vesicles enclosing the external material

endogenous: originating within the organism

epithelium: the layer of cells lining body surfaces and body cavities

epizootic: a disease attacking many animals of the same kind at the same time and place

exudate: any substance released from a cell, organ, or organism by exudation, e.g., sweat, gums, resins.

facultative: having the capacity to live under different conditions; e.g., aerobes, anaerobes, pathogenic parasites, organisms that can live this way but are not obliged to and may under certain conditions adopt another mode of life.

flagellum (sg.): a long whip-like or feathery structure borne either singly or in groups by the motile cells of many bacteria and unicellular eukaryotes...which propels through a liquid medium [pl. **flagella**]

heterotroph: an organism that must obtain certain necessary organic molecules from other organisms *(autotrophs)* which provide them readymade; includes parasites, carnivores, and others

leukocytes: commonly known as white blood cells, which include monocytes, granulocytes, and lymphocytes

macrophage: tissue phase of a monocyte; a type of large phagocytic mononuclear white blood cell also widely distributed in tissue, and which ingests invading microorganisms and also scavenges damaged cells and cellular debris

Mastigophora: a superclass of protozoans including the plant and animal flagellates

mastigophoran: any of a class (Mastigophora) of flagellated protozoans that may be parasitic but are seldom found *within* cells

monocyte: largest form of white blood cells in vertebrates (leukocytes; actively phagocytic, ingesting cell debris and bacteria)

parenteral: introducing a substance by injection through the skin; also refers to something passed from parent-to-offspring, either through placental barrier or by direct contact with neonates

pathogenic: disease-causing

phagocytosis: uptake of large, solid particles (including other cells) into a cell by the process of endocytosis

prophylactically: giving a medication to reduce or inhibit infection after exposure as opposed to preventative which is given pre-exposure

proventriculus: in birds, the glandular stomach anterior to the gizzard

pseudopodia: (pl.) a temporary extension of the cell body; used in amoeboid movement

subcutaneous: under the skin

trophozoite: the adult stage of a sporozoan or protozoan

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Update on the Wildlife Rehabilitation Coloring and Activity Book

A discount schedule for ordering the book has been established as follows: 1 copy $7.95; 2-10 copies $6.37, 11-20 copies $5.57; and 21+ $4.77. Shipping costs are $2.50 for each order plus $ .25 per book. New Mexico residents must add 5.5625% tax. Orders should be sent to Wildlife Rescue, Inc. of New Mexico, P.O. Box 13222, Albuquerque, New Mexico 87192-3222.

Jobline Offering

The Wildlife Center is seeking a resident care-giver at their beautiful Pythian Rd. location. The successful applicant will exchange living accomodations at our volunteer center, adjacent to the Wildlife Hospital, for volunteer services caring for injued, sick and/or orphaned wildlife. The resident care-giver may maintain a day job and should have their own health insurance. Applicants with experience in wildlife rehabilitation will be given priority. No pets allowed. For more information or to submit a resume, please write to: The Wildlife Center, P.O. Box 670, Kenwood, CA 95452 or call (707) 575-1000.

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Rehabilitation of Wildlife in East Africa

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Keywords: wildlife rehabilitation, East Africa, *Aquila wahlbergi, Kinixys belliana, Varanus* spp.

Introduction

The three East African countries, Kenya, Tanzania and Uganda, although neighbours, differ in many ways. All have impressive fauna, ranging from primates to invertebrates, and all have set aside extensive areas of land for the conservation of wildlife. However, each territory has a different history, different ethnic groups, different terrain and different problems. Uganda has been through a prolonged period of civil war which has had profound effects on its human population as well as its animals. Tanzania fought a war against Idi Amin's army in the late 1970's and for some years also suffered economically. Kenya continues to have political unrest and has attracted criticism from a number of international bodies. These and other factors are relevant to the management and rehabilitation of wildlife.

Rehabilitation Considerations

Rehabilitation in the narrow sense of the care, treatment and attempted return to the wild of sick or injured wild animals is practised on a fairly limited scale in East Africa. Individuals carry out such work, especially in Kenya where there is a large expatriate population and where the KSPCA (Kenya Society for the Protection and Care of Animals) has considerable influence in matters relating to the welfare of captive and wild (free-living) animals. Veterinary surgeons may undertake a certain amount of wildlife rehabilitation and the veterinary schools (there is one in each of the three countries) often receive casualties for treatment. As in Europe, however, much depends upon whether there is a member of staff in the practice or school who has a particular interest in wild animals.

Rehabilitation can be considered in a broader sense to encompass veterinary attention for, and translocation of, wild animals and these activities are increasingly practised in all three territories. Treatment of individual animals is not routine and indeed, in many parks and reserves, the rule is that sick or injured creatures must either be shot or left to their fate. Nevertheless, intervention in wildlife populations is becoming more commonplace and increasingly necessary (Kirkwood, 1993).

Many species of animal are caught and marked for study by biologists in East Africa and the procedures they use usually necessitate anaesthesia or chemical restraint. Samples may be taken for disease diagnosis and vaccines may be administered. Translocation (movement of animals from one place to another) is often carried out. This may be part of a planned management programme or requested because animals are damaging crops or posing a threat to human safety and must either be moved or killed. Veterinarians play an increasingly important role in such work (Franzmann, 1993). They help to ensure that humane techniques are used and that every opportunity is taken to obtain scientific samples and to carry out health monitoring.

Returning to the question of care and treatment of individual animals, it seems likely that this work will attract more attention in future as Africans develop a greater awareness of the value of wildlife and as improvements in their own living standards permit them to view the suffering of animals in a more compassionate way than has been customary in the past.

Important considerations in rehabilitation in East Africa are:

1) Who is going to pay for the medicines, dressings and other expenses involved? At present it is mainly expatriates who finance and carry out rehabilitation although the veterinary schools can usually justify a certain amount of expenditure on the grounds that it provides practical experience and scientific material for students.

2) Are suitable facilities and personnel available? Often the answer to this question is no or if it is yes, because again either expatriates or the veterinary schools are primarily involved.

3) Is it legal to keep the species in captivity for treatment? In all three countries most species of animal are protected by law and specific authority is required from the relevant government body if casualties are to be retained in captivity, even for veterinary treatment.

4) Is release of the animal after treatment either feasible or desirable? Returning casualties to the wild successfully is as difficult in Africa as it is in Europe or North America and the risk of introducing pathogens that may threaten free-living populations is possibly even greater. The locality for release has to be taken into consideration, not only in terms of terrain but also because the animal may be of a particular subspecies with a restricted distribution. Some species, such as snakes and baboons, are unpopular with Africans and their return to the wild may present a real or perceived danger to local people and jeopardise public relations.

In East Africa there is also the moral dilemma as to how much care, and especially expensive equipment and drugs, can justifiably be devoted to a wild animal in countries where medical services for humans are severely limited. At the Faculty of Veterinary Medicine, in Tanzania, we took this into account in our calculations and often used conservative methods of treatment - for example, external fixation of a fractured wing in a bird - on the grounds that:

a) Pins, wires and plates are expensive and in short supply and therefore ought to be reserved for domestic animals.

b) Human patients in the local hospital are sometimes denied internal fixation of fractures because of cost and availability.

c) While an important justification for work with wildlife is training African students, once they graduate and go out into the field, they will find that their facilities are limited and they have to resort to the least expensive techniques.

Rehabilitation in Tanzania

To conclude this article, a precis of our work with sick and injured animals at the Faculty in Tanzania may be appropriate. We received fewer casualties here than when we worked in Kenya, almost certainly because there are not so many concerned expatriates locally. The wild animals we see tend to be birds, reptiles and small mammals. The majority of those presented have been injured, sometimes intentionally (e.g. shot or trapped) but often accidentally (e.g. road casualties). Some have been captured and we are asked to provide a health check before release. Each animal was assessed clinically and with the aid of laboratory tests a decision is made as to whether or not it should be treated. If the decision is to proceed, the patient is subjected to standard care - nursing, investigative procedures (e.g. radiography) and specific treatment (surgery, chemotherapy, etc.). At all stages Tanzanians are involved.

Students play a particularly important part in clinical assessment, in nursing, and in day-to-day provision of fluids and medicines. Supporting laboratory tests such as bacteriology and cutting of histological sections are performed by technicians in the various departments. Tanzanian veterinary colleagues participate in the diagnosis and treatment of cases. When release is feasible this is carried out as near to the University as possible so that staff and students can participate and, since all released animals are marked or identified, there is a chance of monitoring their success and survival. The exact locality depends upon the species and the circumstances. Thus, an injured Wahlberg's eagle (*Aquila wahlbergi)* was released in Mikumi National Park, which is only 80 km from the University and where there was little likelihood of its being killed by local people in defense of their chickens.

Monitor lizards *(Varanus* spp.), on the other hand, are usually released within the Faculty grounds. They live in the drains and provide an opportunity for follow-up observations. All animals are given a full examination before release and routine haematology and other tests are performed. Animals that cannot be released are either euthanized or found a home, preferably where they can serve an educational role.

There are a few well managed sanctuaries in East Africa where injured animals are properly looked after and can be viewed by the public: one of these has provided an outlet for our permanently disabled birds of prey. Our injured Hinged-backed tortoises (*Kinixys belliana),* on the other hand, have been kept in private hands as a breed-

Book Review

One Bird

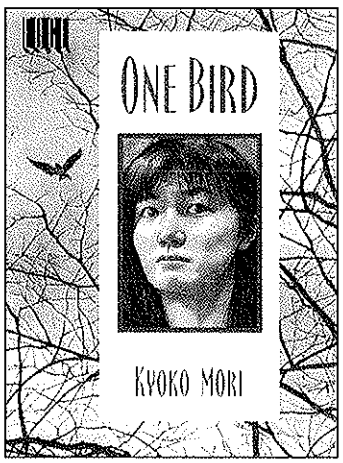
Kyoko Mori
Henry Holt & Co., Inc.
115 West 18th Street
New York, NY 10011
1995
242 pages
$15.95 US or $22.50 CN

One Bird is a down-to-earth, insightful, coming-of-age novel about a fifteen year old girl in modern-day Japan. But, in this well written story, Kyoko Mori deals with life issues and dilemmas not only inherent to teenagers. Mori realistically involves her main character with the emotional pain and confusion of lost friendships; a deceitful father; separation and loss of a banished mother; and the deciphering of shattered, false-idealism masked by tradition.

A wildlife rehabilitator herself, Mori cleverly uses the care of orphaned and injured birds to provide meaningful direction for her main character's search for her own "wings," in a seemingly disheveled life. And most importantly, Mori paints a true-to-life, realistic picture of the responsibilities of being a wildlife rehabilitator. Even before the story begins, Mori makes this statement: "The rehabilitation of birds and other wildlife in the United States is regulated by the United States Fish & Wildlife departments in individual states. Only licensed rehabilitators are permitted to care for wildlife."

A creative writing teacher at St. Norbert's College, Mori lives in DePere, Wisconsin. She has turned part of her home into a nursery for injured birds — a scenario which we can relate to, all too well. I highly recommend this book to young and old alike. It's a good read and is an excellent book for young, budding wildlife rehabilitators.

-Trish Drum-



ing herd and as a result healthy young have been produced which can be released in a suitable locality.

Conclusion

Wildlife rehabilitation is a controversial subject, even in Europe and North America where there are many people from different disciplines involved and where facilities are generally good (Cooper, 1990). In East Africa rehabilitation is still at an embryonic stage and must take into account many extra factors. Nevertheless, as Kenya, Tanzania and Uganda develop economically and socially, rehabilitation is likely to attract increasing interest and importance and may well contribute in time to the overall goal of conservation of wildlife and the environment.

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To use the hotline: call (707) 864-1762; leave a message detailing your question, problem or what specific information you need. The Wildlife Hotline will return your call COLLECT with the help you need.