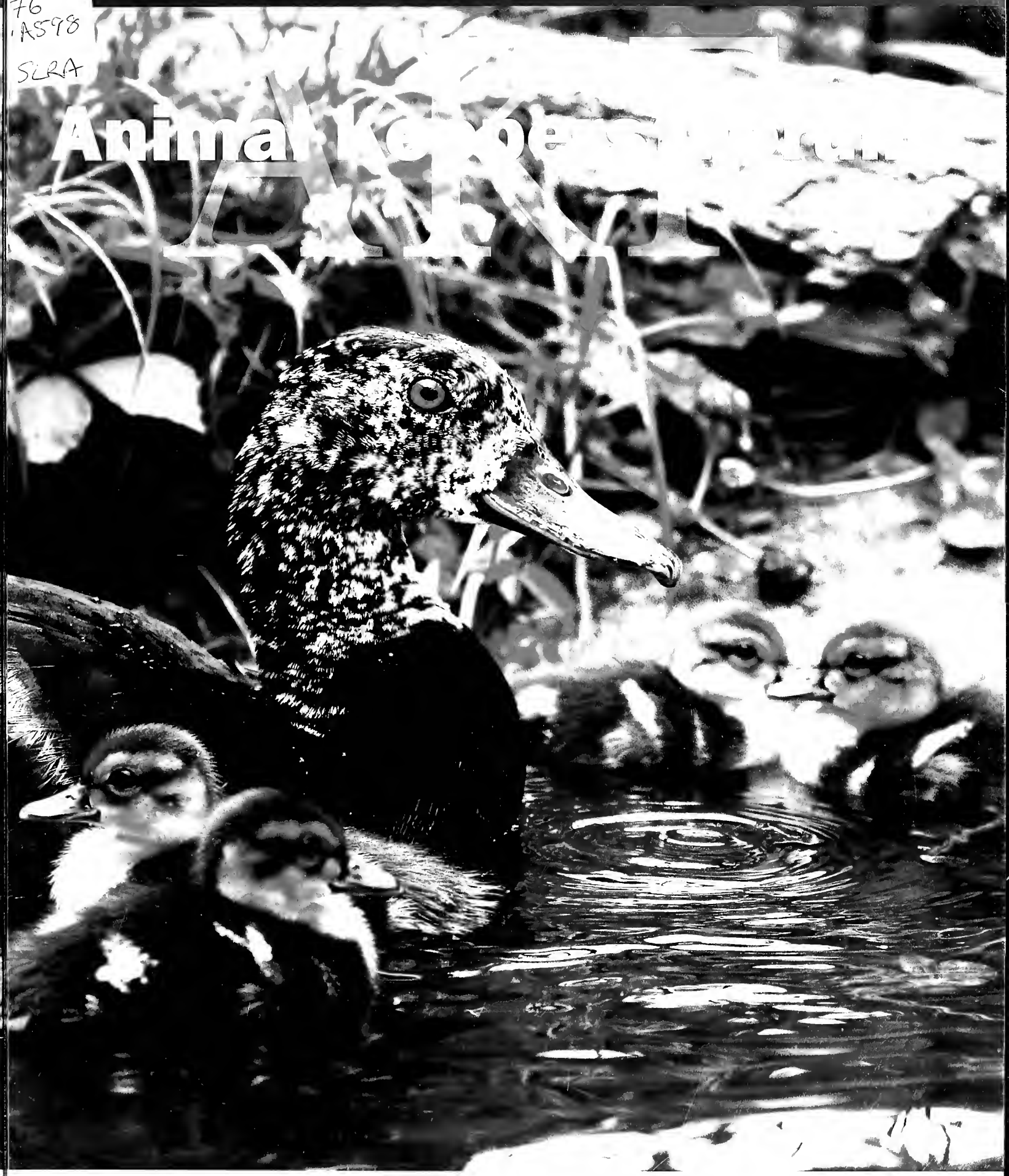
The Journal of the American Association of Zoo Keepers, Inc.

Animal Keepers



September 2014, Volume 41, No. 9

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In This Issue

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MISSION STATEMENT

American Association of Zoo Keepers, Inc.

The American Association of Zoo Keepers, Inc. exists to advance excellence in the animal keeping profession, foster effective communication beneficial to animal care, support deserving conservation projects, and promote the preservation of our natural resources and animal life.

About the Cover

This month's cover features a white-winged wood duck (*Asarcornis scutulata*) by Nick Hill at Sylvan Heights Bird Park. The white-winged wood duck is an endangered species, historically found throughout southeast Asia, India, Bangladesh, and Sumatra. It is now extinct on the island of Java. It is estimated that only 800 exist in the wild. They are one of the largest species of ducks; adult males can weigh between 6-8 pounds. They are a very secretive species in the wild, known for feeding mainly in the evening. White-winged wood ducks roost in trees and lay their eggs in a tree cavity, hollow, or fork.

White-winged wood ducks share the same habitat as Sumatran rhinos (*Dicerorhinus sumatrensis*) and these ducks have been seen in Bukit Barisan Selatan National Park and Way Kambas National Park. These two parks receive protection through AAZK's flagship conservation program, Bowling for Rhinos, with help from our partner International Rhino Foundation. It isn't difficult to understand what we mean when we say that Bowling for Rhinos is "so much more than rhinos". Through Bowling for Rhinos, we achieve *biodiversity conservation,* and this includes white-winged wood ducks, Sumatran rhinos, and countless other endangered species. Thanks to all of you who participate every year in this incredible conservation effort.

Back home in North America, Sylvan Heights Bird Park, Akron Zoological Park, and Hiram College are collaborating to solve the reproductive and biological questions that might help sustain ex *situ* populations of white-winged wood ducks. Only through the collaborative efforts of dedicated individuals and their zoological institutions can we save these endangered species for future generations.

Articles sent to ***Animal Keepers' Forum*** will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for ***AKF***. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the Editor. The Editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed, appropriately-sized envelope. Telephone, fax or e-mail contributions of late-breaking news or last-minute insertions are accepted as space allows. Phone (330) 483-1104; FAX (330) 483-1444; e-mail is shane.good@aazk.org. If you have questions about submission guidelines, please contact the Editor. Submission guidelines are also found at: aazk.org/akf-submission-guidelines/.

Deadline for each regular issue is the 3rd of the preceding month. Dedicated issues may have separate deadline dates and will be noted by the Editor.

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Amanda Ista, Milwaukee County Zoo
Mary Ann Cisneros, Disney's Animal Kingdom

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FROM THE PRESIDENT

"If your actions inspire others to dream more, learn more, do more and become more, you are a leader."

John Quincy Adams

When I grow up

During the 1999 Super Bowl, Monster.com, one of the largest employment websites in the world, aired one of the best Super Bowl commercials, known as the "when I grow up..." commercial. It featured youngsters sharing their career dreams in a most unusual way. "When I grow up, I want to file all day," says one child. "I want to claw my way up to middle management," says another. Other children pipe in, "Be replaced on a whim; I want to be under-appreciated; be paid less for doing the same job." The commercial ends with the script "What did you want to be?" The commercial, filmed in black and white for added drama, was a distortion of how we actually looked at the future when we were kids.

As children, we all had aspirations of greatness at the highest level. Many of us dreamed of being an astronaut, the President, or some other figure of importance. That's what made that commercial so effective; the absurdity of dreaming small and insignificant dreams as a young child. Nobody aspired to mediocrity as young children, why should we as adults? Its negation of the childhood dream was the effective message that Monster.com was able to generate: work your way towards the greatness to which you once aspired.

That's what AAZK did back in 2011, when the Board of Directors and Association leadership went through our strategic planning session. One of our first strategic tasks was to examine our mission and vision. Already satisfied with our mission, we asked ourselves, "As an Association, what do we want to be?" Obviously, not in the direction of the Monster.com commercial. Instead, AAZK chose to inspire greatness in the animal care profession.

AAZK will be the leader in the zoo and aquarium industry fostering professional development and personal connections that advance animal care, animal welfare and conservation.

Inspiring others

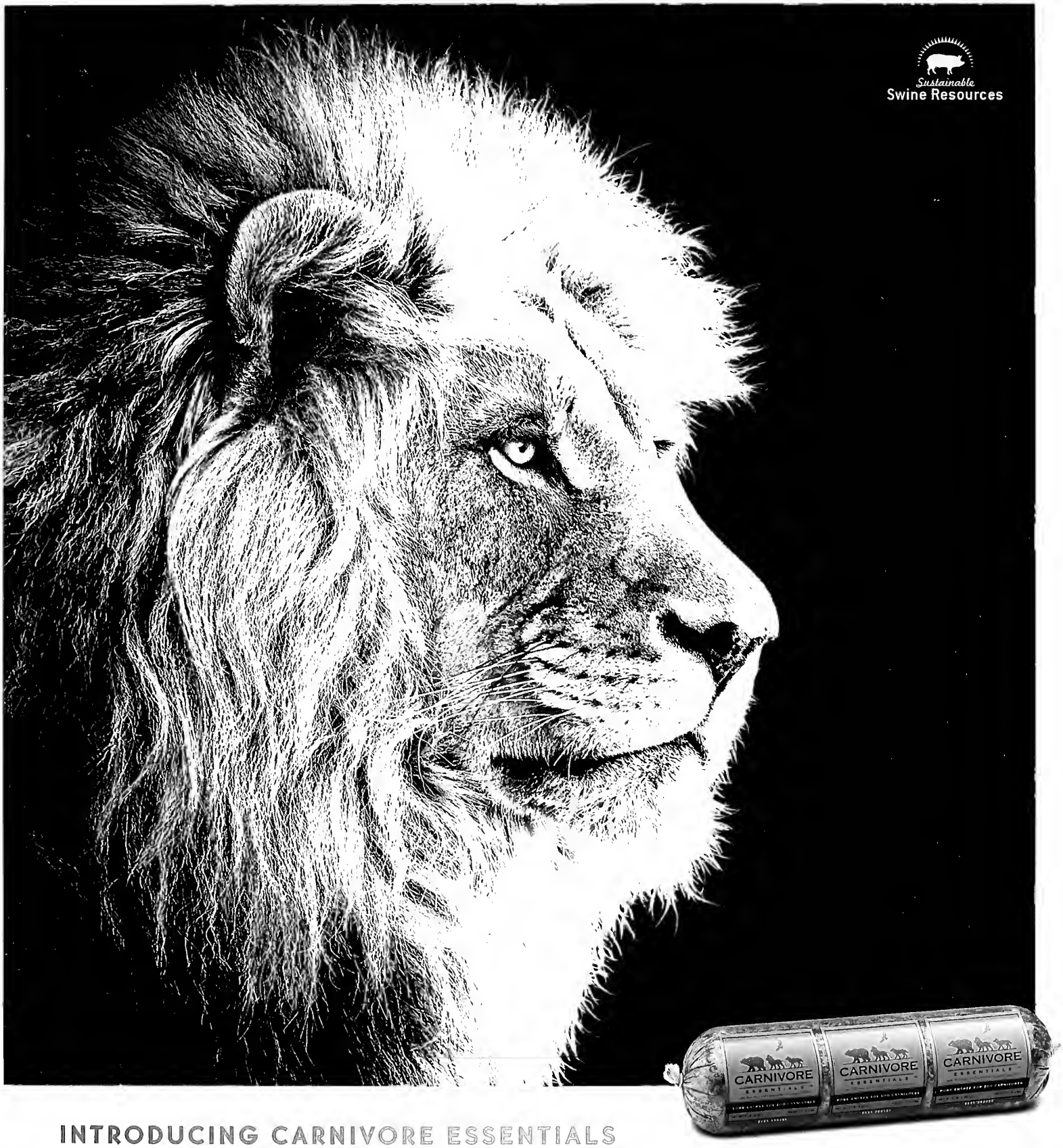
I am reminded of our vision every year when I attend our National Conference. In a ballroom filled with approximately 250 animal care professionals, each attendee becomes part of that leadership by either sharing advances in animal care or by gleaning valuable information and returning to their institution with both vision and direction. It's basically two forms of leadership: active leadership where one teaches and inspires and potential leadership where one actively participates in learning with the goal of inspiring others to achieve great things in animal care.

There are many forms of leadership, but the one which I hold fast to is the one which states that leadership promotes hope, effects positive change and helps others become successful in achieving those changes. The relationship between active and potential leadership is a great example of this. At our conferences, our speakers inspire others to shape innovations into their own successes, returning to their institutions as leaders of change. When this occurs, we find ourselves aligned with our mission of advancing excellence in the animal keeping profession and fostering effective communication beneficial to animal care. With each conference, we come closer and closer to fulfilling our vision. We know what we want to be.

We are ambassadors of hope and leaders of change. We are the American Association of Zoo Keepers and we are striving to achieve great things.

As always, I welcome your thoughts and input. E-mail me at **bob.cisneros@aazk.org**; I would love to hear from you.

Bob Cisneros



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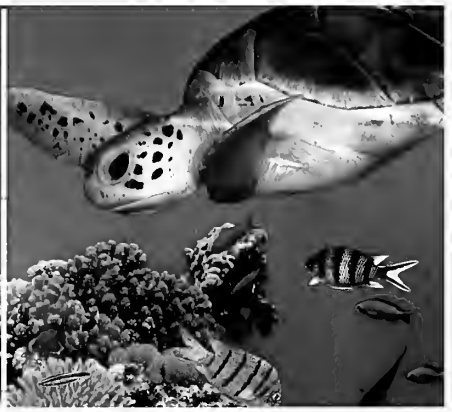


October 1-5, 2014
From Good Care to Great Welfare Workshop
Detroit, MI
Hosted by:
Detroit Zoological Society's Center for Zoo Animal Welfare
For more information contact:
czaw@dzs.org

October 6-8, 2014
3rd International Flamingo Symposium
San Diego, CA
Hosted by SeaWorld San Diego
For more information contact:
laurie.conrad@SeaWorld.com.

October 6-9, 2014
Orangutan SSP Husbandry Workshop & Conservation Summit
Hosted by the Houston Zoo
Houston, TX. For more information go to:
http://www.houstonzoo.org/orangutan-husbandry-workshop-and-conservation-summit/

October 7-11, 2014
National Conference of the Association of the Zoo and Aquarium Docents and Volunteers (AZADV) Hosted by the Zoological Society of Milwaukee and the Milwaukee County Zoo and Zoo Pride. Milwaukee, WI.
For more information go to: http://www.zoosociety.org/azadv2014/

October 8-11, 2014
Advancing Bear Care 2014
Brasov, Romania
For more information go to:
bearcaregroup.org.

November 10-13, 2014
ZAA National Conference
Gulf Breeze, FL
Hosted by Gulf Breeze Zoo
For more information go to:
zaa.org.

December 8-12, 2014
Training and Enrichment Workshop for Zoo and Aquarium Animals
Galveston, TX
Hosted by Moody Gardens
Presented by Active Environments and Shape of Enrichment. For more information contact:
dolsen@moodygardens.com.

February 16-20, 2015
Marine Mammal Behavior and Conservation
Los Cabos, Baja California, Mexico
For more information visit www.abcanimaltraining.com/los_cabos or contact Shelley Wood at swood@abcanimaltraining.com.

September 27 - Oct. 1, 2015
AAZK National Conference
St. Louis, MO
Hosted by Saint Louis Zoo and St. Louis Chapter of AAZK

More details to come!

FIRST AID for Injuries Caused by Captive Animals

Jane Kelly, Student
America's Teaching Zoo
Moorpark, California

INTRODUCTION

Out of 1,943 animal-related injuries that were reported to the Center for Disease Control (CDC) in the United States from 2000 to 2001, captive animals in a zoo or animal park were responsible for nineteen of them (Langley 2005). Of these nineteen, three were fatal (Fletcher 2010, Langley and Hunter 2001). Although injuries caused by captive animals are rare, they can be serious and potentially fatal if signs of injury are not recognized immediately. Eckstein et al. (2000) reported that a severe trauma patient is 3.9 times more likely to survive if proper medical care is given before the patient reaches the hospital. In the United States, average response time for Emergency Medical Services (EMS) is 7.5 minutes (Davis, 2005), and during that time, initial treatment is often provided by a partner or coworker. Proper training in safety and first aid can help to identify an injury and provide the first steps in treating that injury before medical personnel arrive (Ritter et al. 1985). However, more training may be recommended to ensure efficient and correct treatment.

The four most commonly reported injuries caused by captive animals are: envenomation, puncture wounds, laceration, and blunt trauma. However, as many as 50% of animal-related injuries may go unreported each year (United Press International, 2010), this may be because they are usually not serious enough to seek immediate medical attention. Those types of injuries are not covered in this paper. Most likely, an injury caused by an animal in captivity will be complex and may be a combination of the above injuries.

Basic first aid is often the beginning of treatment but more training is required to fully understand and treat the injury. The average animal handler does not have the skillset necessary to treat a traumatic injury beyond basic first aid as defined by the Red Cross (American Red Cross 2010). If an EMT course is not available, any specialized first aid skills will help in an emergency. A strong relationship with local first responders and hospitals is also crucial to patient survival, as the local hospital will have the necessary supplies available to treat an injury caused by an animal housed at the nearby facility.

Captive-animal caused injury is variable; consequently, there is no checklist for how to treat each specific type of injury. Most injuries are of different severity and type, and are often a combination of types. The most important thing that can be done to help an injured person is to remain calm. Allowing a situation to get out of control could lead to further injury of the victim, yourself, or the animal. Treating symptoms as they appear reduces the chance of overlooking an injury and may allow EMS to monitor for additional symptoms indicating undiscovered injuries or conditions. This can alter the course of action necessary for EMS. In this paper, I will demonstrate methods aimed at increasing survival potential in victims of an animal-induced trauma in the time before EMS arrives.

ENVENOMATION

When working with and around venomous animals, such as reptiles (e.g., snakes and lizards), arthropods (e.g., insects, spiders, and scorpions), amphibians (e.g., frogs and salamanders), and marine organisms (e.g., sea anemone and marine snails), the possibility of envenomation is always present. When assisting a victim of envenomation, the first thing that should be done is to locate and contain the animal that caused the injury. Knowing

the species will also give insight as to the type of venom that is present.

There are three classifications of venom: neurotoxic, hemolytic, and cytotoxic (Fry 2009). Neurotoxins can affect the central nervous system, more specifically the nerves that control muscle movements, such as breathing (Chudler 1996). When left untreated, death from a neurotoxin occurs within five to fifteen minutes and the patient's cause of death will most likely be from asphyxia due to respiratory failure. Although some neurotoxins are not always life threatening, medical attention is often required. Hemolytic toxins affect the victim's blood by breaking down the principle clotting factors. From a predatory standpoint, this toxin aids the animal in digestion (Bottrall et al. 2010). Cytotoxic venom is very similar to hemolytic toxin and in fact they are usually classified together. Cytotoxic venom prevents phagocytes, which would normally clear away dead tissue and promote healing, from locating necrotic tissues. This causes a buildup of dead tissues, often characterized by bleeding, blistering or possible development of a blood-filled swelling called a hematoma (Vohva et al. 2008).

After the animal that caused the injury has been contained and EMS has been summoned, the victim should be placed in a supine position, on their back, and the affected area should be immobilized. To assist EMS in the event of an envenomation injury, draw a circle around the initial injury and mark the time. Repeat this every two to five minutes to track the rate of swelling. Do not use a cold compress, as this will cause injured tissues to die more quickly. Next, keep the person calm; an increased heart rate can speed the spread of venom and increase the likelihood that the patient will go into shock.

While waiting for EMS, a detailed patient assessment can be gathered. This information should include the time of injury, type of injury suspected, current heart rate and heart rate at time of initial injury. Differences in these rates can help EMS determine how quickly the venom could have spread. If the patient is conscious, ask them about allergies to medication, a history of conditions, and if they have any additional sources of pain. Facilities that house venomous animals often also carry the specific anti-venin for that species. Only people trained on how to use the anti-venin should use it or it should be transported to the hospital with the patient to be administered by EMS. Once EMS arrives, the information that you provide will help determine if there have been any drastic changes between time of injury and EMS arrival.

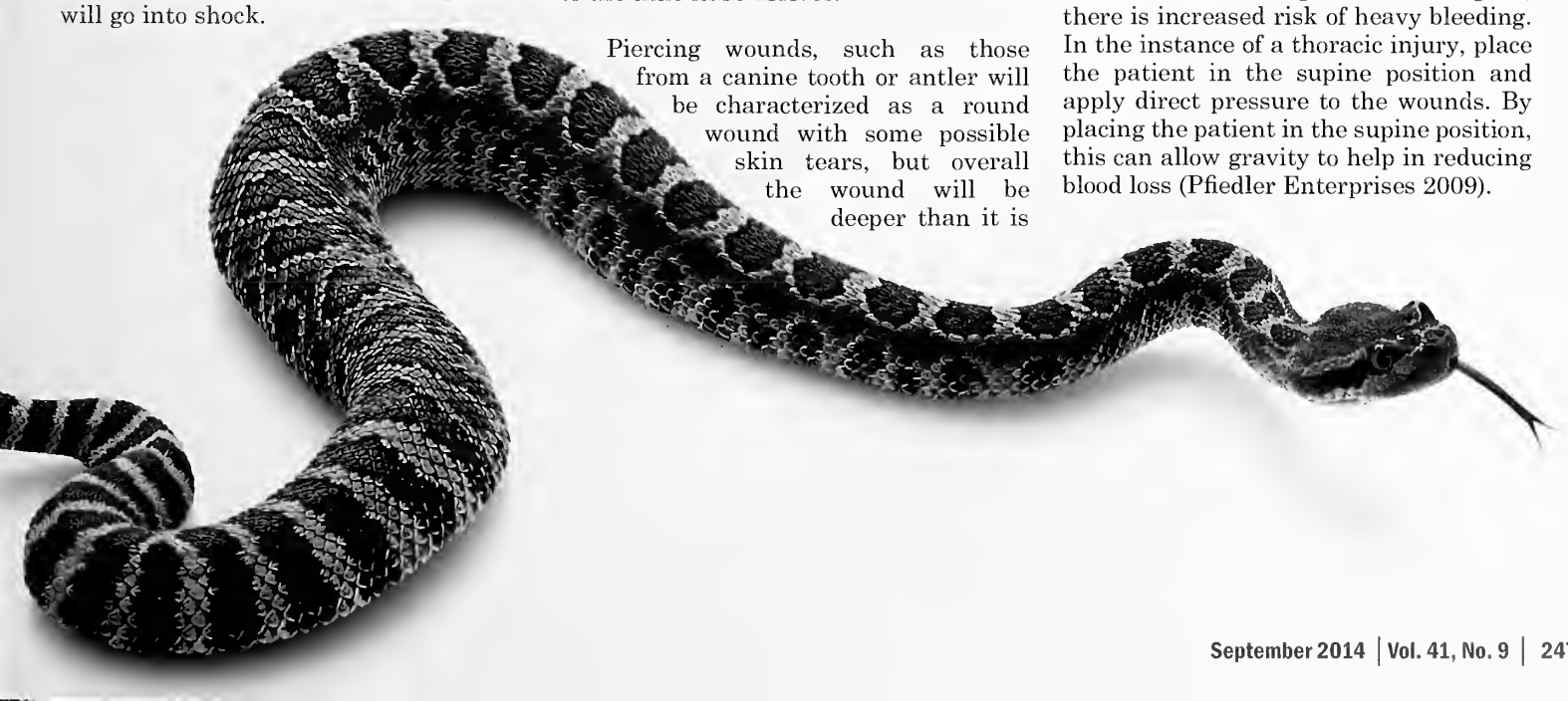
PUNCTURE WOUNDS

Puncture wounds occur when an object pierces the patient's skin (Blasko and Rudkin 2011). Although not often large, punctures can become dangerous if they damage something vital below the skin. Puncture wounds are often paired with different injuries such as lacerations or envenomation, but a puncture wound requires additional care due to what lies below the surface of the skin. Puncture wounds have less bleeding than a laceration, mainly due to the surface area of the injury (Smith and Meadowcroft 2001). The exception would be an injury where a major blood supply is involved. Puncture wound injuries will consist of primarily damaged muscle tissue which should be treated by immobilizing the injured area and applying direct pressure to the wound to slow any bleeding (Boriskin 1994). If there is any injury that involves bleeding, vitals should be monitored from the time the injury occurs to the time EMS arrives.

Piercing wounds, such as those from a canine tooth or antler will be characterized as a round wound with some possible skin tears, but overall the wound will be deeper than it is wide. It may ooze blood without severely bleeding, especially if there are no critical organs or blood supplies involved. Puncture wounds also have a higher risk for infection because of the lack of active bleeding. Bleeding, although dangerous, also flushes out a wound that could have hazardous debris within it.

Pulse, motor function, and nerve viability are the three functions that will indicate the severity of the injury. In the absence of proper monitoring equipment, it may be necessary to monitor these functions manually. When the injury is musculoskeletal, often the only way to tell if an area distal to the injury is receiving a blood supply is to check for a capillary refill rate. To do this, squeeze the nail beds until they blanch, once the pressure is released, the beds should return to normal color within two seconds, or the time it takes to say the words "capillary refill". This technique provides blood pressure assessment without the use of a blood-pressure cuff. If the nail beds do not refill, the systolic blood pressure can be assumed to be less than 90 (EMS Agency 2010). If the systolic gets below 80, the pressure is too low to supply the brain with the necessary amount of oxygen. Motor function can be noted by asking the patient to move an area below the injury. If they are unable to do so, relaying their inability to EMS can notify them of possible connective tissue damage. Asking the patient if they feel touch can test nerve viability. Nerves may be temporarily compromised, however, and the patient will feel a sensation of "pins and needles," a condition called paresthesia. Monitoring these vitals in increments of two to five minutes until EMS arrives will alert them to any changes in the vitals.

In the case of damaged internal organs, there is increased risk of heavy bleeding. In the instance of a thoracic injury, place the patient in the supine position and apply direct pressure to the wounds. By placing the patient in the supine position, this can allow gravity to help in reducing blood loss (Pfiedler Enterprises 2009).



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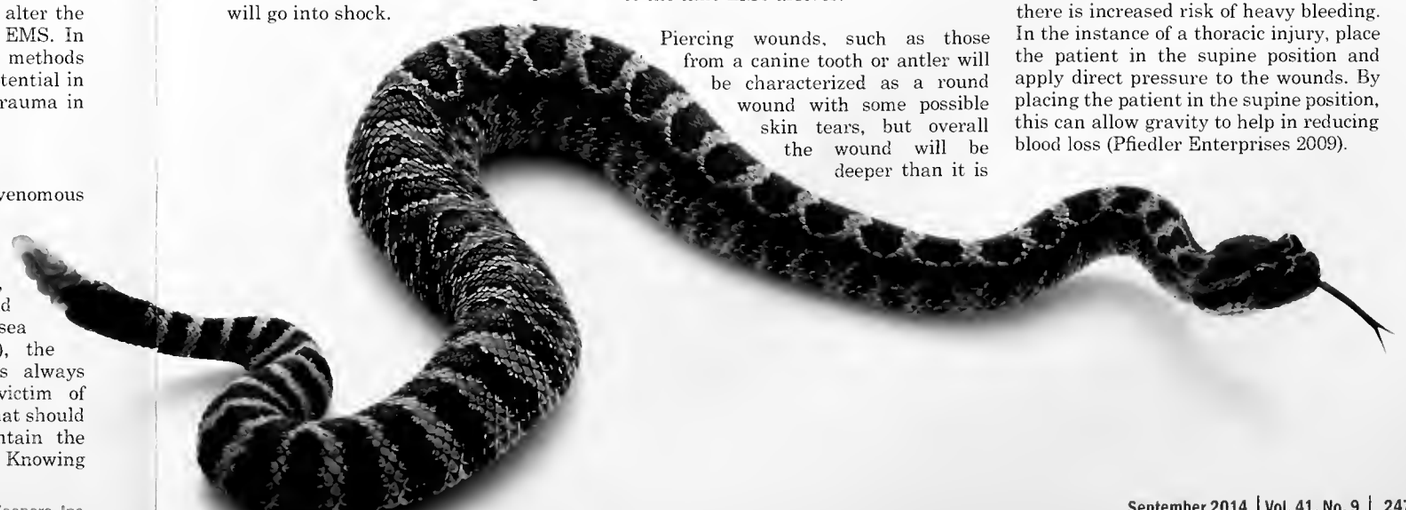

LACERATIONS

Lacerations are one of the most common injuries caused by animals, but because they are so rarely reported, it is difficult to determine how common they are (Garth 2010). They can be caused by a variety of species, which means they can also vary in complexity based on where the injury occurs and what animal causes the injury. Although lacerations caused by different animals may look different, treatment of a laceration wound is somewhat standard (Alibardi 2009).

Victims of multiple lacerations require a specific and detailed analysis. The most severe lacerations must be treated first, followed by less critical injuries. Classification of these injuries should take less than two minutes and should be done in tandem with the initial assessment. Standard treatment for a laceration with active bleeding is to apply direct pressure with a clean, dry, towel. Lacerations may present with more bleeding than other injuries, but often the wounds are superficial. For example, lacerations that occur in the adipose tissue may not bleed heavily but may be extremely serious, on the other hand, lacerations on the face or hands may be minimal, but bleed heavily. The vasculature, or arrangement of blood vessels, below the surface of the skin determines how heavy the bleeding presents.

Superficial lacerations should be rinsed with tap water and properly bandaged. Medical personnel (EMS) should bandage any injury deeper than the dermal layer (approx. 3mm), but before they arrive, the wound should be covered with a sterile dressing to avoid further contamination. Clean, cool tap water should be used to moisten and clean wounds. Flushing the wound before covering it helps to get rid of potential contaminants. Keep patient supine with knees and hips flexed to relieve pressure in the abdomen while waiting for EMS to arrive. With any laceration, the patient should be placed in the supine position. Positioning of a patient can help manage bleeding, but if the patient's injury occurs on or around the face, procedures are modified in order to maintain a proper airway.

If the patient has facial lacerations, especially around the mouth, the airway might become compromised. Before the patient is moved in any way, the head and neck should be supported. In order to prevent a compromised airway, the victim should be placed on their side, in the left lateral semi-prone position. When the patient is placed on the left side, it is easier for them to expel any swallowed blood. Bleeding should be controlled with direct pressure, unless it will in any way compromise the airway.

Lacerations can come in all forms and severities. It is important to treat what is seen. Laceration injuries can also be traumatic emotionally for the patient. Not only because of the amount of blood usually present, but also because laceration victims often remain conscious through the incident. Maintaining patient comfort as well as the safety of you and the patient is critical. If the patient becomes stressed, their heart rate will increase, and this can increase bleeding to the point where amount of blood lost gets to a dangerous point. Monitor the patient's level of consciousness for any changes that could indicate dangerous levels of blood loss.

BLUNT TRAUMA

A blunt trauma is defined as any injury sustained from a blunt force related to falls or jumps, blows or crush injuries from animals, blunt objects or unarmed assailants (Segen's Medical Dictionary 2011). In the case of injuries caused by animals, this includes ramming, kicking, or in rare instances, crushing. Usually there is no active or visible external bleeding, but bruising or rigidity can be a sign of internal bleeding. Blunt trauma occurring from force sufficient to severely jar the victim may result in spinal cord injury.

A spinal cord injury can be caused by a dislocation or fracture of vertebrae (NINDS 2011). Damage is caused when pieces of the dislocated vertebrae tear the cord tissue or block nerve channels, both of which inhibit signals from continuing past the point of injury. This leads to paralysis of limbs or parts occurring below the injury. If a spinal cord injury is suspected, refrain from moving the patient's head, neck, or back. This reduction in movement reduces the amount of damage the vertebrae can cause to the spinal cord (Adams et al. 1980). Their head and neck should be kept immobilized yet supported, with either hands or a towel, until EMS arrives and can backboard the patient. Monitor the patient's pulse, level of consciousness and any changes in the patient's condition. Be prepared to relay this information to EMS when they arrive. In addition to spinal cord injuries, jarring or blunt force may cause a concussion or traumatic brain injury.

A concussion is classified as a mild to severe traumatic brain injury. According to the American Academy of Neurology guidelines (1997), any loss of consciousness should be closely monitored. Although the guidelines for treating head injuries are improving all the time, the initial treatment if a concussion is suspected has remained similar. Symptoms of a concussion include: confusion or disorientation, nausea, difficulty balancing, blurred vision, and light sensitivity (Randolf 2009). If a head injury, such as a concussion, is suspected, keep the patient in a supine position, awake and focused. Monitor their vitals, paying particular attention to their level of consciousness. Monitor their eyes and pupil dilation, if pupils are dilated differently from each other, a more traumatic brain injury may have occurred.

Seizures can also be associated with the onset of a traumatic brain injury. If the patient starts having a seizure, do everything necessary to make sure they do not hurt themselves. If possible to do safely, turn the patient on their left side to help maintain an open airway. Along with turning them on their side, loosen any clothing around their neck that could possibly make breathing difficult. Do not restrain them, as someone else might also get injured, but support their head and neck, so no further damage is done as they are riding out the seizure. It is also important to time the seizure so that you can tell EMS how long the patient was seizing. Remain with the patient through

Employees working with or around captive animals, who know medical procedures, maintain a safe environment for not only their coworkers, but also the animals they are caring for.

the duration of the seizure, do not leave them alone. Once the seizure has passed, keep the patient calm and in the supine position until help arrives.

If a traumatic injury occurs inferior to the head and neck, such as a crush injury, there is a risk of compartment syndrome, which can lead to rhabdomyolysis. Compartment syndrome can occur when there is raised pressure, from internal bleeding, within a muscle compartment (Salcido and Lepre 2007). Circulation to areas below the injury is compromised causing tissue necrosis. The excess pressure on the muscles and nerves in an affected compartment can cause permanent damage without a timely pressure release. Symptoms of compartment syndrome include: severe pain, often un-localized and out of proportion to the injury, as well as paresthesia, the "pins and needles" feeling caused by lack of oxygen to the nerves. Also the skin will be tense, swollen, and often shiny and bruised. Rhabdomyolysis is when the necrotic muscle tissue begins to release built up toxins into the blood stream. Unfortunately, there is no field treatment for compartment syndrome or rhabdomyolysis, as the pressure must be relieved surgically.

CONCLUSION

This paper is meant as a guide for possible injuries, but does not cover every possible instance. Most animal care facilities only require basic first aid training, however more is recommended. Emergency Medical Technician (EMT) training will give a knowledge base strong enough to most efficiently treat a patient in the seven and a half minutes before paramedics arrive. Envenomation, puncture wounds, lacerations, and blunt traumas are the most likely injuries to be encountered when working with captive animals, therefore the more knowledge regarding these types of injuries greatly improves the probability of patient survival.

Maintaining composure when interacting with a patient also improves treatment efficiency. Employees working with or around captive animals, who know medical procedures, maintain a safe environment for not only their coworkers, but also the animals they are caring for. Reporting injuries caused by animals to authorities such as the Bureau of Labor Statistics (BLS) or the CDC, will allow for a much more comprehensive database that facilities can reference in order to provide optimal safety conditions. Reported injuries can lead to inter-facility protocol changes and ultimately decrease the overall injury rate for that facility. If employees working in high-risk environments have necessary training to temporarily handle a medical emergency, there are further benefits that apply.

Increased training indirectly results in a safer working environment, because employees know how to manage or alter a dangerous situation. Especially emergency training specific to the animals on site, emergency training that does not apply to the facility will not be as beneficial. Not all animal care facilities require employees to further their first aid education because of the extra time and cost, however all animal care employees can benefit from the additional training in the unlikely event that an injury will occur.

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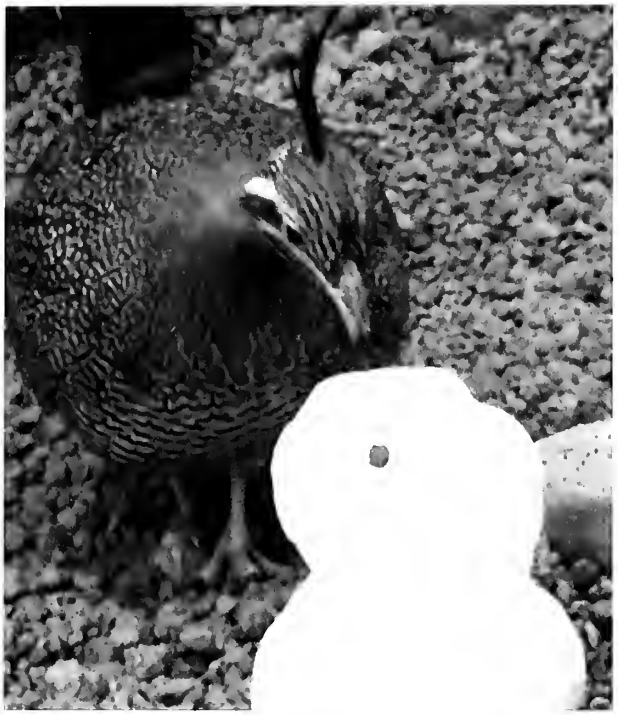
Your source for enrichment ideas, support, data and inspiration!
ENRICHMENT OPTIONS EDITORS
Julie Hartell-DeNardo, St. Louis Zoo;
Ric Kotarsky, Tulsa Zoo;
Casey Plummer, Caldwell Zoo

Ratite Enrichment

By Dana Urbanski, Ratite TAG
North Carolina Zoological Park

In 2011 I became the Enrichment Coordinator for the AZA Ratite and Tinamiformes TAG. My first project was to e-mail all zoos holding ratites and ask what enrichment was being used. In doing this I was able to create a "master list" of enrichment ideas for each species of ratite. Ratites can often be overlooked when it comes to enrichment, but their curious nature provides for great enrichment opportunities. My next project was sharing these great ideas with everyone. With lots of help from Sara Hallager, AZA Ratite and Tinamiformes TAG Chair, a monthly enrichment feature was started. As time went along a quarterly feature replaced the monthly one. Here (on the following pages) are a few pictures from some of the past features.



Smithsonian National Zoological Park

Elegant crested tinamou (*Eudromia elegans*) are not ratites but are included under the umbrella of the Ratite TAG because they are paleognaths (all other bird orders are neognaths; the distinction between ratites and tinamous and all other birds is related to the structural anatomy of the jaw). This tinamou from the Smithsonian .National Zoological Park is checking out a snowman with some pieces of scenic pellet diet (a pelleted diet from Marion Zoological Inc.). (Above) Photo courtesy of Lori Smith, Animal Keeper, Smithsonian National Zoological Park.

Kiwi (*Apteryx sp.*) have an excellent sense of smell and a long probing bill. Kiwi at the Smithsonian National Zoological Park in Washington D.C. were given these nifty feeding tubes (60cc syringe casing tubes) which provide for natural foraging opportunities. These tubes also can be a useful tool for weight monitoring. Since male kiwi have shorter bills, food can be pushed farther down to allow the birds to receive their appropriate diet ration. (Below) Photo courtesy of Kathleen Brader, Animal Keeper, Smithsonian National Zoological Park.

Detroit Zoo

A great summertime idea for all ratites is an ice treat filled with goodies. This rhea (*Rhea sp.*) from Detroit Zoo is enjoying some frozen broccoli. Other suggestions are grapes, insects, corn, and melon pieces. Photo courtesy of Bonnie Van Dam, Associate Curator of Birds, Detroit Zoological Society.

Milwaukee County Zoo

Another great summertime idea is a mud wallow. Emu (*Dromaius novaehollandiae)* will especially appreciate this. Sprinklers or mister systems can be added to exhibits or back areas to help create the wallow. A plastic kiddie pool works for some species. Cassowaries (*Casuarius sp.*) also appreciate sprinklers during warm weather. Photo courtesy of Dawn Fleuchaus, Milwaukee County Zoo.

A hanging royal palm frond enrichment device was a huge hit with this cassowary from Zoo Miami. Palm fronds are probably hard to come by for many cold climate zoos but cardboard tubing or even papier-mâché would be good substitutes. The palm frond is the leaf that wraps around the trunk of the palm. It was cut into strips at the bottom and woven together to hold food. Holes were also drilled into the sides allowing more fruit and produce to be used in the enrichment device. Then it was hung from a tree in the exhibit and the fun began.

(Above) Photo courtesy of Julie Lindenmayer, Senior Keeper Amazon and Beyond Birds, Zoo Miami/Susan Kong, Senior Keeper Birds, Zoo Miami

Oklahoma City Zoo

At Oklahoma City Zoo an ostrich (*Struthio camelus*) interacts with a PVC tube with rope attached at the bottom. Feathers could also be used instead of rope. Ostrich are naturally curious and this kind of enrichment offers ostrich the chance to display natural behaviors. (Above) Photo courtesy of Jaimee Flinchbaugh, Supervisor of Giraffes, Oklahoma City Zoo.

Ratites can often be overlooked when it comes to enrichment, but their curious nature provides for great enrichment opportunities.

With all enrichment, safety comes first. Large ratites are strong and can easily pull apart enrichment devices if not properly secured. Please discuss and evaluate all enrichment before using it. Some enrichment ideas may not be suitable for your particular set up or for some individual animals.

If you would like to join the AZA Ratite and Tinamiformes TAG listserve and to receive the quarterly enrichment feature please go to **ratite@lists.aza.org**. The listserve is a great way to network and share ideas. It is also a great tool when questions arise.

These features have been a huge success thanks to everyone who has shared their ideas and photos! I have enjoyed receiving pictures and ideas from others and with everyone's help I intend to keep the quarterly feature going as long as possible. Please contact me at dana.urbanski@nczoo.org if you have ideas or suggestions for ratite and tinamou enrichment. Thanks to all those listed above who gave photo consent for sharing these photos. A huge thanks goes out to Sara Hallager who has been extremely helpful in making the features aesthetically pleasing!

Enrichment Editors Comments by Julie Hartell-DeNardo

Huge thanks to Dana for sharing these wonderful highlights from the Ratite TAG quarterly enrichment features. Keepers caring for these unique and amazing birds should contact the TAG to sign up for their newsletter. Not only will you learn more about enrichment and behavioral husbandry for this taxonomic group, you will also learn about the TAG's activities including conservation efforts for these specialized species. Many of the AZA TAG's have listserves that share information and promote the advancement of all management aspects (husbandry, population management, conservation, etc.) of specific taxonomic groups. Hopefully more will share some enrichment highlights right here in the Enrichment Options column. We would love to hear other ideas for ratite enrichment: Post a comment to the AAZK Behavioral Husbandry Facebook page (and be sure to "like" us!). The Enrichment Options Column is always looking for submissions by keepers like you – if you have an article about enrichment that would be great to share with your peers send it to **bhc @aazk.org**.

Where you can share your training experiences!

Training 1.1 Eastern Black Rhinos (*Diceros bicornis michaeli*) for Voluntary Head Radiographs

Lou Keeley, Large Mammal Keeper Supervisor
Blank Park Zoo
Des Moines, Iowa

INTRODUCTION

The Blank Park Zoo, located in Des Moines, Iowa, is home to 1.1 eastern black rhinoceros (*Diceros bicornis michaeli*). Acquired in 2012, Ayana the female and Kiano the male, both three-years-old, are part of the zoo's newest African expansion, 'Jamaa Kwa', which opened in the spring of 2013. Since their arrival, the pair has been participating in a daily training program. The goal of the training program is to improve management and welfare through voluntary participation in all aspects of daily husbandry and medical procedures. To date, both rhinos participate in voluntary blood draws, body desensitization, walking through/standing in a restraint device, and several other body positioning behaviors. Their most recently trained behavior was to allow head radiographs to be taken.

Our veterinary staff encouraged training for head radiographs on these individuals for a couple of reasons. First, as a calf, the male received an injury to his soft palate and veterinarians suspected this could be contributing to his labored breathing on hot days (≥30°C) and during strenuous exercise. Secondly, the female displayed excessive horn rubbing, which has the tendency to cause significant wear to her anterior horn, leading to cracks and raw spots. By training the rhinos to accept the head radiographing, it provided the veterinary staff with additional diagnostic tools to determine if there are any medical issues affecting their sinus cavities.

The purpose of this Training Tale is to outline the steps of how the Blank Park Zoo's rhino staff trained Kiano and Ayana to participate in a successful head radiograph procedure.

TRAINING STEPS

The desired behavioral response was for each rhino to safely position its head through restraint bars and hold steady long enough to capture a clear radiograph image. Before training could begin, a safe place for the procedure was located, shaping plans were written, as well as a plan to desensitize the rhinos to novel equipment.

The training took place in the restraint device (Fauna Research Inc. Hippo/Rhino TAMER) located in the zoo's rhino barn. This area proved ideal because of the rhinos' familiarity with it, personnel and rhino safety, as well as the ability to modify the area to suit our training needs. The bars located at both ends of the restraint device could be moved from a vertical position to a "V" position, creating just enough space to allow the rhinos' heads through, but not their entire bodies (Figure 1). Since Kiano's head is not as wide as Ayana's, two-inch washers were taped together and mounted on the pin supporting the moved restraint bar to create the necessary smaller space.

Loading onto and standing steady on the device were previously learned behaviors. The goal behaviors to train for the radiograph procedure were as follows:

- To position the head out through the restraint bars
- To hold head steady in the proper position
- To desensitize rhinos to novel equipment and people

Once the rhino stepped up into the restraint device, training for proper head positioning through the modified restraint bars began. The trainer gave the previously learned 'come' command (rhino targets to the trainer's fist), gradually increasing the distance their head was extended outside the bars. When reliably presenting their head outside the bars, trainers progressed by asking for head holds (Figure 1).

The most important behavior to be established was the head hold, necessary for obtaining a clear radiograph image. Initially, head holds for both rhinos were trained and established in areas other than the restraint device. Because of their training ability, different methods were utilized for each rhino. The following method was successfully used to train Ayana, who is more compliant and focused than Kiano. To train 'hold,' the trainer brought the target pole to the rhino's upper lip (an inch or two below the anterior horn), commanded 'hold,' bridged after one second of holding the head steady and then slowly increased hold duration as training progressed.

Kiano, who is more excitable than Ayana, had a difficult time holding his head steady using this method, so a different, less conventional method was used. We had noticed that Kiano would keep his head still while he was chewing on produce, which could allow the trainer to capture the 'hold' behavior rather than shape it. After Kiano successfully performed a simple behavior (such as 'target' or 'head up') he was given a few extra pieces of produce, providing the trainer ample time to capture a 'hold.' This method worked well with Kiano, and the movement of the jaw would not affect the radiograph image of the sinuses. The final steps were to establish the head hold with their heads positioned through the restraint bars. To ensure no accidental radiation exposure occurred to the trainer, the rhinos were then conditioned to the trainer backing up a few feet after asking for a 'hold'.

To accurately mimic a head radiograph procedure, a number of props were required: cutting board supported on concrete blocks, cardboard radiograph machine with flashlight, hay cart, lead aprons, and a few extra people. We started with the cutting board on the concrete blocks, which mimicked the radiograph plate (Figures 1 and 2). The goal was for the rhinos to ignore the plate while being comfortable with it positioned right next

Figure 1 (opposite page): Training head hold; desensitizing to all props and large numbers of people present.

Figure 2 (right): 1.0 Kiano's radiographing procedure.

Photos courtesy of Blank Park Zoo

Figure 3: 1.0 Kiano's head radiograph
Photo courtesy of Blank Park Zoo

Figure 4: 0.1 Ayana's head radiograph
Photo courtesy of Blank Park Zoo

to their heads. Kiano ignored the cutting board and blocks from the beginning, but Ayana's head would constantly drift towards the objects, likely seeing them as potential enrichment. We fixed this by rewarding her for ignoring the cutting board and focusing on the trainer. We also asked for simple behaviors ('target,' 'head up,' 'open mouth') on the opposite side of the cutting board, which seemed to help as well. We continued desensitizing by adding in the hay cart, which represented the laptop cart, a laptop, the cardboard radiograph machine with flashlight, and lead aprons. Each session lasted 3-5 minutes per rhino and always ended positively.

To gauge the rhinos' progress, we decided to incorporate all props and rhino staff to mimic a complete procedure. Kiano did well with all aspects, while Ayana was nervous throughout the session. We suspected the reason for her nervousness may be due to the lead aprons and additional keepers standing behind the trainer. The aprons were removed and the keepers repositioned, which calmed Ayana enough to reposition her head through the bars, and perform a few good head holds. After that day, keepers wore the lead apron during shifting and interactions, helping create a positive attitude toward the novel item. Though initially timid, Ayana eventually grew comfortable with the lead aprons.

In the late stages of training head radiographs, we invited large student groups (~10 people) to watch and take part in training sessions to mimic the large group that would be present for the procedure (Figure 1). The vet staff also participated in another session, which helped trainers understand how the actual procedure would transpire, and allowed us the opportunity to reposition equipment as needed.

On the day of the procedure, everything went smoothly. The rhinos stayed focused on the trainers and performed the head holds as trained despite the presence of an unforeseen piece of equipment, a chair to support the radiograph machine (Figure 2). The dedication to the training program by rhino keeper staff and the voluntary participation from the rhinos helped reduce any stress or errors, and made for solid, clear radiograph images (Figures 3 and 4).

CONCLUSION

Overall, the procedure was successful and helped veterinary staff identify issues with Ayana and Kiano's sinuses. The deep horn grooves caused by Ayana's excessive horn rubbing were getting within inches of the sinus cavities. With this finding, changes to rhino housing and husbandry practices were made. Ayana focused her rubbing on the lips of the concrete drinkers. PVC or epoxy was added to the lip to create a less-abrasive surface (Figure 5). Additionally, the water levels were lowered in the drinkers to discourage head dunking. Head dunking appeared to stimulate the horn rubbing. And since head dunking in the water stimulated horn rubbing, we lowered drinker water levels enough to greatly reduce the head dunking behavior. These changes have almost eliminated the excessive horn rubbing! As far as Kiano is concerned, there did not seem to be any significant or long-term damage resulting from his earlier injury. No changes to housing or husbandry were made, but we still monitor his breathing rates during particularly warm days.

We feel Blank Park Zoo's rhino training program has opened various opportunities for more complex behaviors that may be essential in the future. Through teamwork, cooperative rhinos, time and patience we can greatly improve the rhinos' welfare, one behavior at a time.

BHC Comments by Kim Kezer

This month's "Training Tale" shares the importance of developing a partnership between the animal care staff and the veterinary services staff. Our goal at anytime is to reduce stress and increase safety when handling our animals for either routine husbandry or while performing veterinary procedures. To help with this we gradually condition our animals to tolerate varying levels of discomfort. A few examples may include being enclosed in a restraint chute, accepting injections and unusual sensations like gel on an ultrasound probe, maintaining a position for an extended period of time, or feeling comfortable during procedures that include additional staff and unusual pieces of noisy equipment.

Collaborating with the veterinary staff helps to set behavioral goals addressing medical needs for individual animals. With this collaboration you can obtain vital information to help reach those goals, particularly in regard to positioning, location, access to body parts (veins, etc.), and duration of a particular procedure. Asking the veterinarians ahead of time, for example, the angle they need to x-ray from, is helpful to know in the planning stages rather than having to change in the middle of training. Additionally, it fosters improved animal/veterinarian rapport when they are able to participate in training sessions, and also helps animal care staff to have a better understanding of their veterinary practices and procedures.

This article also is a great example of how each animal is different in its ability to learn as well as its threshold level for being able to cope with unfamiliar experiences. It is our job as trainers to keep an open mind and adjust our training approach to work within the abilities of the individual rather than our own personal expectations for what we think the animal should be able to do. What works with one, does not always work the same for the other. Additional time may be necessary to reduce the nervousness of an animal to novel items or sensations that may not fit into our time frame. It is far better for your final goal if you take the time to help the animal be successful rather than jeopardizing the future of the behavior.

Congratulations on your successful training and thank you sharing your Training Tale!

Breeding Report
on Bali Mynahs in Amsterdam Zoo by Hans van der Sluis




The now critically endangered Bali mynah (*Leucopsar rothschildi*) was estimated to number between 300-900 individuals when first reported to science in 1912. By 1990 the number had decreased to around 15 birds, primarily because of illegal trade. Captive-bred birds were added to the population, but nevertheless it further dropped to a low of six individuals in 2001. More birds were released, and the population had risen to approximately 50 birds by 2008. The population's small size, habitat loss and illegal trade continue to impede its growth.

Bali mynahs are held in two locations in Amsterdam Zoo; a group of five females are on-exhibit in the bird house and a breeding pair is held off-exhibit in a recently renovated building. The pair is housed in a 2 X 2 x 4 m indoor aviary, with a mesh width of 20 x 20 mm. Light is received through a sun roof that can be opened to get fresh air, and there is also artificial lighting that the keepers can regulate. The floor is covered with bark chips, and the enclosure is furnished with many branches; the highest ones near the roof are preferred by the starlings for perching. The starlings can drink and bathe in a dish of water, and twice a week the enclosure is thoroughly sprayed to clean it and increase the humidity. Because these starlings can carry Toxoplasmosis they have a Sulphachlorpyrazine (Esb3) treatment every three weeks, and when in a stressful situation. The birds are generally healthy. To reduce chances that they pluck each other they are fed multiple times a day, for example live insects may be tossed on the ground or in an open container with leaves that the birds have to search through to find the food items. They are housed alone to avoid aggression with other birds.

The pair began showing courtship behaviours soon after being placed in this enclosure at the end of 2012. A 40 cm high and 25 cm wide nest box (25 X 25 X 40 cm) with a 5 cm diameter entrance hole 30 cm from the nest floor was provided, and the starlings made a nest cup of cocoanut fibre and other plant material. Egg shell was found on the ground on 7 August 2013, and a nest inspection revealed that two of the three eggs had hatched. The young grew well and were fitted with 6mm closed rings on 15 August. They fledged on 3 September and were initially still fed by the parents. The young had to be removed from the exhibit on 23 September because the parents were chasing them; fortunately they had already been observed eating independently. The EEP coordinator has already made recommendations for where the chicks, both DNA sexed as males, will go to form new pairs. The parents began a second clutch shortly after the young were removed.

The parents receive a standard diet of finely chopped fruit, an insect mix en fruit paté (Avian©), T16 fruit pellets (Versele Laga©) and thawed frozen wax moth larvae supplemented with vitamin mix (Avian+©). During chick-rearing they were also given buffalo worms ad lib throughout the day, 60 live wax moth larvae three times a day, as well as crickets, recently moulted meal worms and 10 chopped baby mice (pinkies) daily.

This article first appeared in the De Harpij journal, the national journal of the Dutch Zoo Keepers' Association. De Harpij and AAZK are both partners in the International Congress of Zookeepers.

WELFARE Behavioral HUSBANDRY COMMITTEE ENRICHMENT • TRAINING

"The AAZK Behavioral Husbandry Committee (BHC) is excited to announce it's new logo. We would like to send a huge THANK YOU to everyone that submitted a design and give special congratulations to Julie Felton for her winning design! We are also excited to announce our **new Facebook page** — be sure to "like" our group titled "AAZK Behavioral Husbandry Committee" and share your training and enrichment ideas, questions, photos and videos."

The First Annual Cinco De Rhino Walk-n-Ride: Chapter Collaboration for Conservation

Wendy Lenhart, BFR Coordinator, Greater Philadelphia AAZK
2013 Recipient of the AAZK Conservation, Preservation and Restoration Grant

RAISING MONEY FOR OUR SIGNATURE CONSERVATION PROJECT

Fundraising has historically been a huge part of being active in an AAZK Chapter. Many of us have great support from our host institutions, but also spend a substantial amount of time finding ways to find the money to attend professional conferences and receive other training. In addition, we have our very successful, almost 25-year-old conservation legacy to continue in Bowling for Rhinos to remember and prioritize. We pride ourselves in enhancing our professionalism, yet also remember our deep commitment to protecting and ensuring the future of our wild charges.

Thanks to the AAZK Conservation, Preservation, and Restoration Grant, the Greater Philadelphia Chapter of AAZK (GPAAZK) was able to explore a new option of fundraising for Bowling for Rhinos via their 2013 Cinco de Rhino Walk-n-Ride. By teaming up with a neighboring Chapter, the Elmwood Park Zoo Chapter of AAZK (EPAAZK) to hold a joint event, additional monies went towards each Chapter's BFR total. (Each Chapter held their own, separate bowling event later in the summer.) EPZ recently created their own Chapter after being a part of GPAAZK, so this event served as a social opportunity as well as one for rhino conservation. Keepers, docents, volunteers, and family members all pitched in to donate snacks, order event t-shirts, and to don the emblem of the event on their heads: a bright red plastic rhino horn from the Rhinose Foundation in South Africa. If there were an award for looking ridiculous for conservation, these folks would have all qualified! Read on to see what they were doing while they wore it...

(Above) The Cinco de Rhino logo artwork is by Philadelphia (now Houston) tattoo artist, Billy Ho

Manayunk section of Philadelphia on the home stretch of the Cinco de Rhino Ride

Cinco De Rhino 5K Walk at the Elmwood Park Zoo

THANKS, AAZK CONSERVATION, PRESERVATION, AND RESTORATION GRANT!

The AAZK Conservation, Preservation, and Restoration Grant covered the $745.00 cost of purchasing 100 rhinoses for the Cinco de Rhino Walk-n-Ride. Rhinoses were granted with each registration for a 5K Walk around the Elmwood Park Zoo or an 18-mile bike ride along the Schuylkill River Trail. The 5K event began after Elmwood Park Zoo had closed for the day and followed a figure-eight pattern around the grounds to get in the 3.3 miles. Cyclists started at the Elmwood Park Zoo after the walk ended and then biked to the Philadelphia Zoo along a well-traveled bike path. Whenever anyone from the public looked questioningly at the cyclists' "helmet ornament," they were simply wished a "Happy Cinco de Rhino." When at rest along the path, the merry little group shared their mission and the plight of the rhino with passersby. The event was attended by approximately 70 (40 walkers, 30 cyclists) people including not just "zoo people," but students from Penn Veterinary School who were newly engaged with AAZK's signature conservation project after a recent school visit from Bill Konstant of the International Rhino Foundation. Wherever each participant was from, the vibrant rhinoses were worn on heads, hats, and helmets ensuring a very unique experience for the random spectator. In total, it raised over $2,000 which was split between the two Chapters.

CHARGING FORWARD

The Rhinose Foundation campaign in South Africa focuses on catching the attention of passersby via mounting the stylized plastic horns on the front of vehicles. Each one is made in South Africa from recycled polypropylene and sold at participating CNA stores (a South African retail chain). The Rhino Action Group Effort (RAGE) and the Endangered Wildlife Trust (EWT) have been the beneficiaries of the rhinoses sold in South Africa to date. Additionally, the Rhinose Foundation recently supported a delegation of ambassadors and celebrities from Vietnam to witness the plight of the rhino in South Africa first-hand. They will continue to campaign against the use of rhino horn for medicine back home in Vietnam. Rhinose horns were sold to GPAAZK at a discounted rate due to the immense shipping cost, but the Chapter is still proud to support and spread the word about the Rhinose Foundation's conservation efforts.

GPAAZK and EPZAAZK are planning another Cinco de Rhino Walk-n-Ride for the fall of 2014. It will not correspond with May 5 this time around, but we anticipate that it will be fun and well-attended because people keep asking us about it! Cooperating with another Chapter increased enthusiasm and also helped to lighten the load of planning the event. Less money was needed for costs up-front as well. Only t-shirts and rhinoses needed to be purchased. Elmwood Park Zoo graciously opened their gates to 5K walkers at no cost so all proceeds could go to conservation. In South Africa, a rhino is killed every 14 hours for its horn. GPAAZK and EPAAZK will continue to work together to raise public awareness of this problem, celebrate rhinos, and raise more money for AAZK's signature conservation project, Bowling for Rhinos!

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Celebrating the life of

'Mama' Delia Craig

Delia Craig, fondly known and remembered as Mama by the Lewa fraternity, quietly passed away in her home last week on Thursday. She had just celebrated her 90th birthday a few days before.

Mama inherited Lewa Downs, the land that Lewa sits on from her father, Alexander Douglas. Along with her husband the late Mzee David Craig, they promised Alexander that there would always be room for wildlife on Lewa, a promise which they saw fulfilled when they established the Ngare Sergoi Rhino Sanctuary with the late Anna Merz in 1983. Ngare Sergoi was later reinvented as the Lewa Wildlife Conservancy in 1995.

Of all the people who have shaped Lewa into the world-class conservation initiative it is today Mama reserves a special place. She was bold, vivacious and loved the wildlife as much as the land it inhabited.

Mama's life story was immortalized in a biography by Natasha Breed, titled From Oxcart to Email.

"Everyone called her Mama because she was not just our mother, but mother to the entire of Lewa." Ian Craig, Lewa's co-founder and renown conservationist.

Rest in Peace Mama, you will forever be missed.

Mama and Mzee Craig

Photo courtesy of the Lewa Widlife Conservancy

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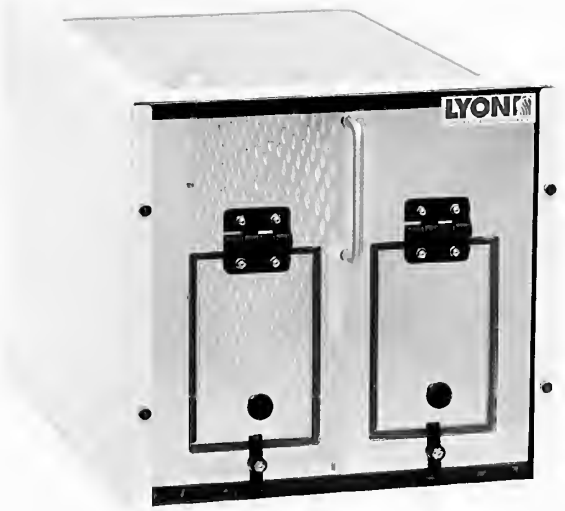

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