

Conditioning Unrestrained Black Rhinoceroses (*Diceros bicornus*) For Venipuncture

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Introduction

There are many benefits to having voluntary cooperation of animals while attempting husbandry and medical procedures. Behavioral management using positive reinforcement is proving to be a useful tool in managing zoo animal health care needs. Traditionally stressful events are being reduced with the increase and reliability of the desired trained behaviors. Research projects and routine procedures proceed in a more orderly fashion (Bloomsmith, 1992; Priest, 1990). The consistency in which samples are collected can be completed in a shorter time compared with the traditional methods (Laule, 1992; Mellen, 1991).

Acclimating and desensitizing a rhinoceros to the various procedures required for venipuncture can lessen the need to modify the institution's physical structure. Unless your institution has a restraint chute incorporated into its caging, some modifications may be necessary to ensure the safety of personnel and animals. You can start with limited facilities and the patience of a few keepers and senior animal staff.

Methods

In order to decide on the best approach for the venipuncture, several variables should be considered. You should try to use your institution's physical structure to your advantage.

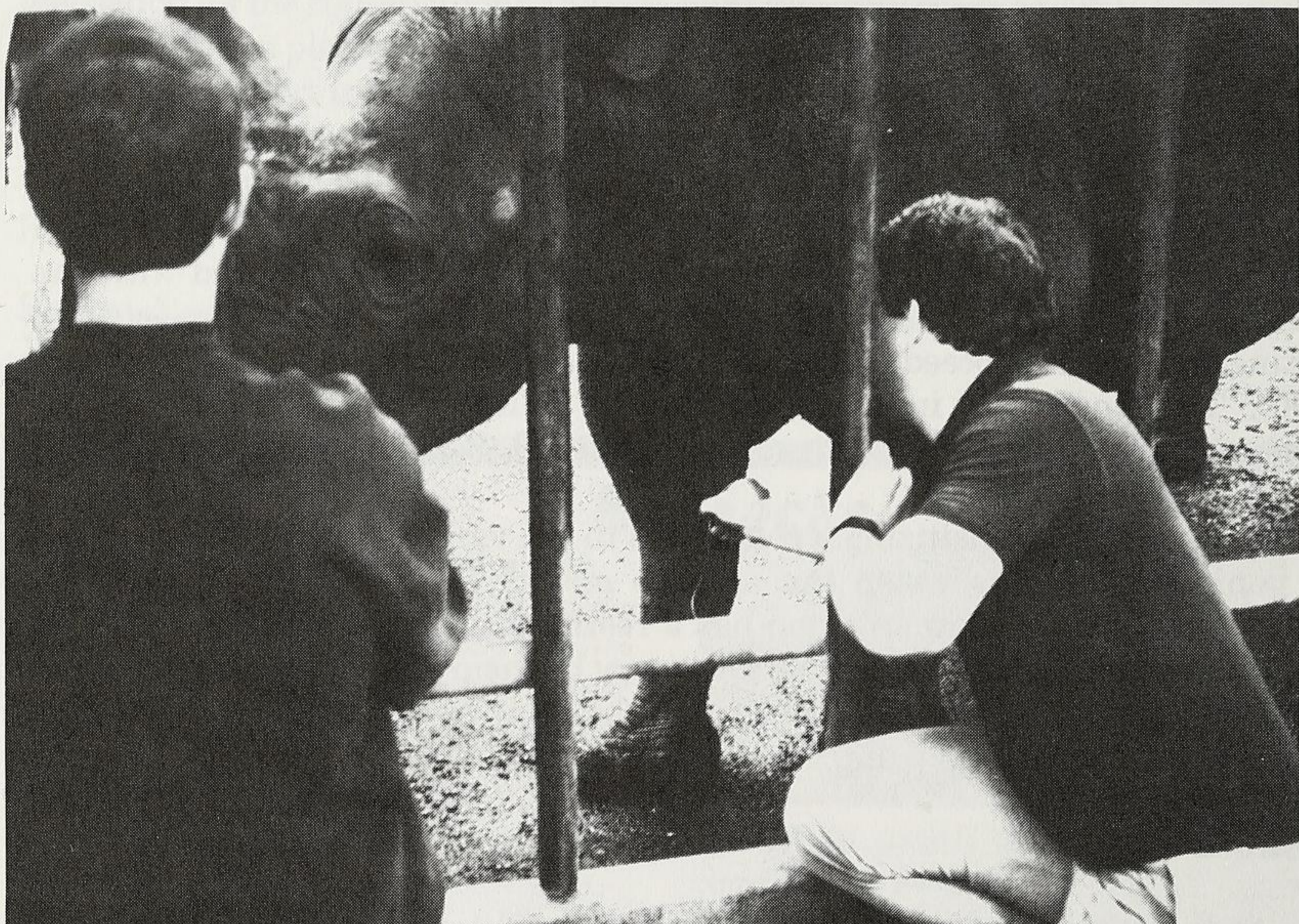
The tractability of the rhinoceros is the first major concern. If the animal is not comfortable with the close contact from keepers, your first goal will be to habituate it with several zoo keepers. Most likely, food and to a lesser extent, tactile stimulation, can be used as a primary reinforcer.

Start out with 10-minute training sessions with the keeper putting an emphasis on developing a relaxed body posture in the animal. After a short period of time, you should begin to notice considerable cooperation from the rhinoceros. The development of a consistent training program is important in gaining the trust of the animal and will assist in future husbandry and medical applications.

After you have the ability to maneuver the rhinoceros by using positive

reinforcement, the best structural location in your facility will have to be determined in order to start work on the venipuncture technique.

A barrier with either vertical or horizontal bars may be used. The animal can be maneuvered parallel to the bars and stopped when the opposite medial cephalic or radial forelimb vein is exposed (Figure 1). If your particular animal is manageable, one keeper will reinforce the animal while the other person can start the desensitizing process for needle insertion. A butterfly catheter works the best, since it allows for some movement of the animal.



Veterinarian Andrew Teare is shown inserting a butterfly catheter into the right cephalic vein of our male while parallel to the bars. The author is rewarding the rhino for being relaxed and remaining stationary.
(Photo by Joan Mauer)

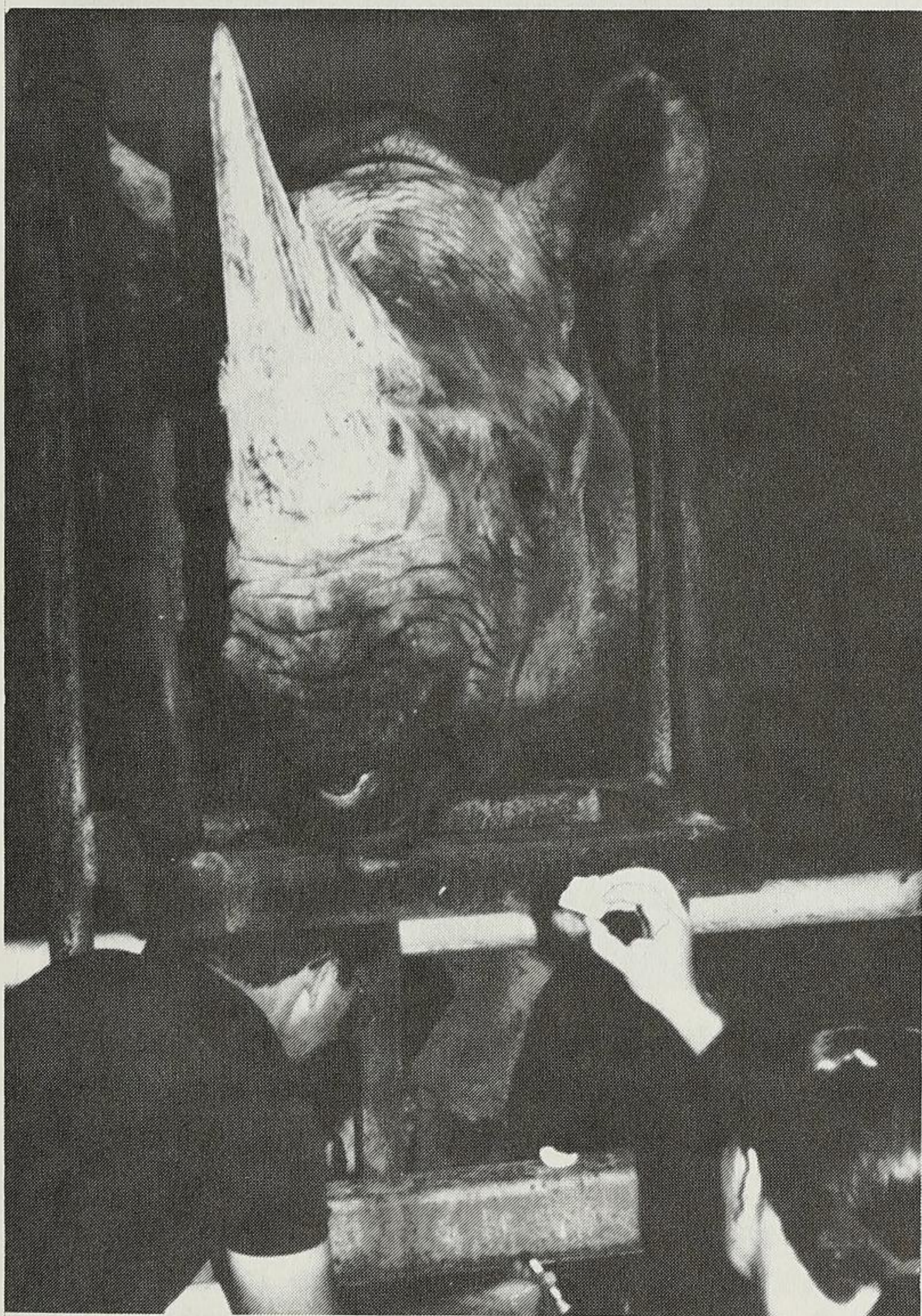
The systematic desensitization for a venipuncture is straight forward. After the trainer has gotten to the point where the animal allows access to the medical forelimb area, alcohol swabs can be introduced. You can then start several exercises of occluding and applying pressure to the vein. Using your fingernail or a key are good ways to simulate a needle prick. When you feel the animal is ready for a venipuncture, try a catheter with a 21 gauge needle. This size seems to be tolerated the best and allows sufficient quantities of blood to be taken.

If your animal has had a previous negative history to aversive situations, the

desensitization process is more critical in neutralizing those experiences. Only when the rhinoceros is totally relaxed with the initial steps should the trainer proceed.

There are several important points to remember. The first several times you stick the animal, be prepared to heavily reinforce the behavior. In some cases expect regression. You may have to go back to a point in the training where the rhinoceros is comfortable, and then slowly proceed with the desired behaviors. Finally, once the procedure becomes routine, the trainer should practice the venipuncture behavior periodically without actually inserting the needle.

If you have an animal that tends to be nervous, minor modifications can be done to construct a head chute with a minimal amount of welding. Once the rhinoceros becomes familiar with the head chute, blood collection is easily obtained from either front leg (Figure 2). If the animal becomes upset, it can easily back out of the head chute. This method will provide complete safety to the person attempting the venipuncture.



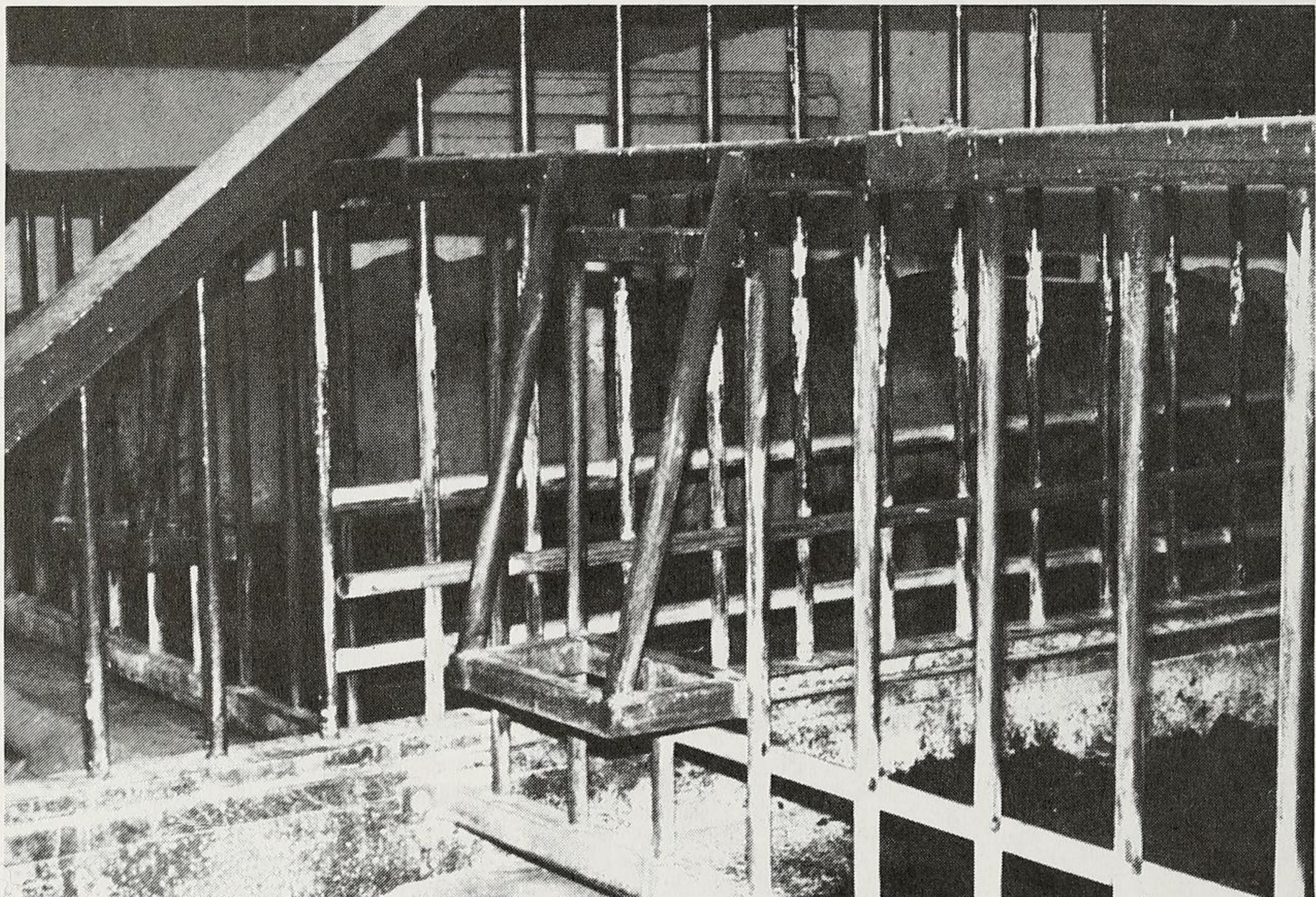
The author is in the process of bleeding our female while she is positioned in the head chute. Keeper Claire Hubmann is rewarding the rhino for maintaining her position. (Photo by Joan Maurer)

Design Considerations

In finding the best location for head chute placement, it is best to have the animal in an elevated position in relation to the keeper. In front of a dry moat

or elevated display stall is ideal. This provides good access to the forelimb veins while the animal has its head through the chute. When the rhinoceros is at the same level as the person, venipuncture has to be done from either side and in more of a crouched position.

The design is simple and consists of front and side bars (Figure 3). This allows work to be performed directly underneath the head of the rhinoceros. The head chute gives the animal a defined area and allows for little up and down or side to side movement of the head.



Side view showing simplistic design of the head chute. (Photo by Joan Maurer)

The trainer will have the animal enter the head chute, then the person doing the blood draw can move into position from either side while remaining close to the barred wall.

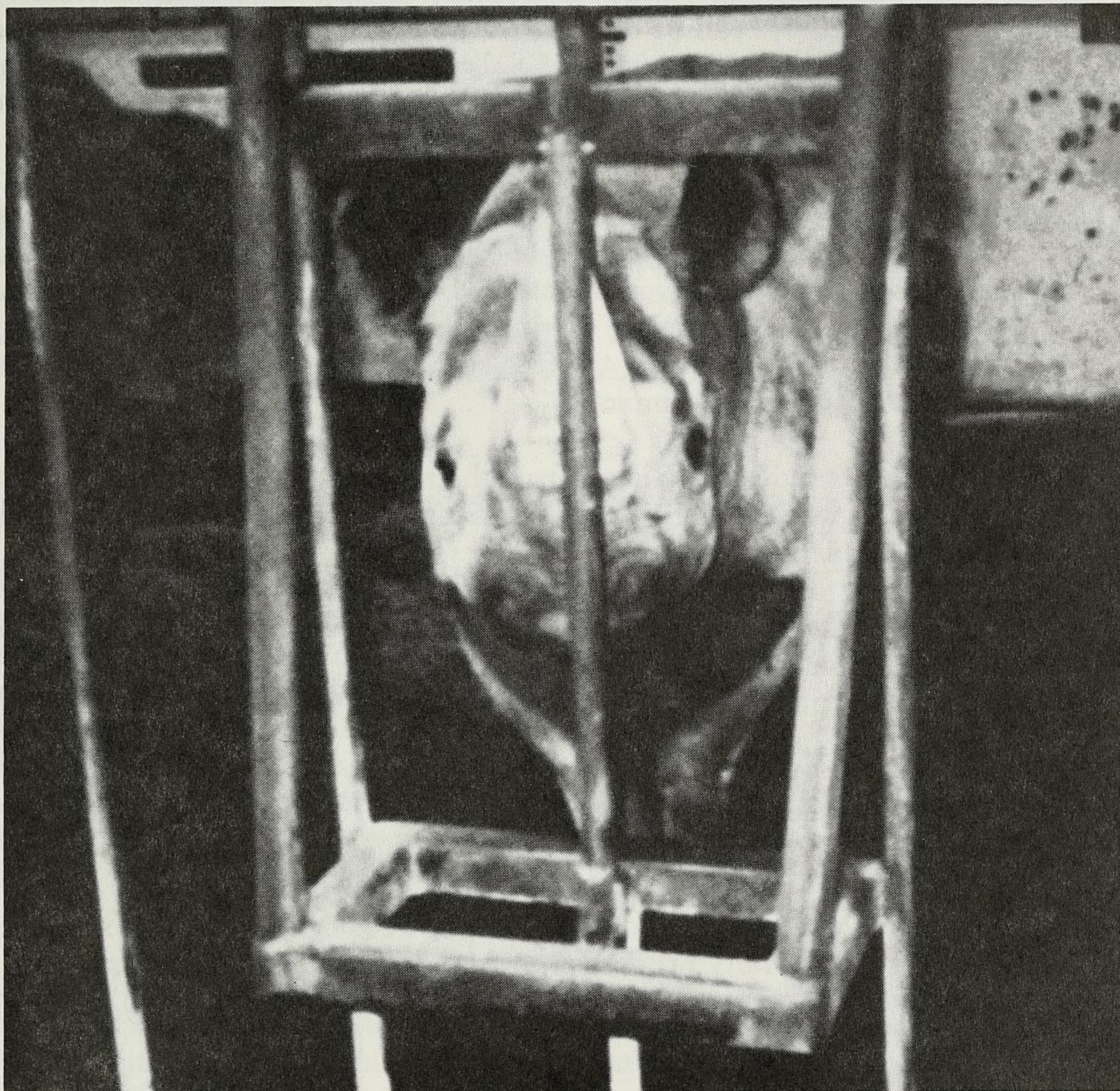
The space where the rhinoceros puts its head through will have one or two removable bars (Figure 4). This will allow the head chute to become an integral part of the structure, taking up very little actual space and not visually hindering the exhibition of the animal.

Results

The time span involved from our program's inception to the point of reliably obtaining blood samples varied between animals. Our adult and juvenile males

required about three months of consistent training and the adult female required almost five months, due to her nervous nature.

The length of the blood collection process is dependent on the amount required. We draw directly into the various types of blood collection tubes. Generally, the time span from getting the animal into the head chute to removing the catheter is less than five minutes. We try to work the animals prior to starting other duties, since there tends to be fewer disruptions and the noise level is at a minimum.



Front view of the head chute with the removable bar in place. (Photo by Dana Nicholson)

At the present time, we are collecting monthly blood samples to monitor their blood counts and serum chemistries. Serum is also being evaluated for Vitamin E levels in conjunction with supplementation and titer data regarding leptospirosis. We were able to confirm from blood sampling that our female was pregnant with her second offspring using serum progesterone measurements. Multiple blood samples were collected three weeks before the

birth until two weeks after parturition. The serum will eventually be assayed to determine the pre and post parturition levels of progesterone. We have been successful at integrating the six-month-old female calf into the venipuncture routine.

Comments

With increased sampling of rhinoceroses, a broader database can be compiled by more institutions. Hematology values can be collected on a monthly basis. Along with monitoring blood counts and serum chemistries, basic endocrinology and nutritional studies can be conducted. Research can also be conducted on ovulatory cycles. This will assist artificial reproductive techniques. The data that is collected will also contribute to research being done on health-related diseases.

During the early winter months of 1994, our adult male rhinoceros developed generalized cutaneous eruptions. We had been working on some preliminary conditioning leading towards venipuncture. Desensitizing him to the procedure was accelerated. After a week of working this animal several times a day, a blood draw was attempted using the free standing method. The venipuncture procedure proved to be anticlimactic.

Initial test results indicated a low-normal hematocrit. We tried to monitor his blood values on a weekly basis. Subsequent results showed that the hematocrit levels were decreasing.

After a month of depressed hematocrit values, his anemic condition, along with the vesicular dermatitis, improved. Since that episode, he has remained clinically normal. Monthly blood samples are being obtained to help monitor the health of our black rhinoceroses.

Conclusion

The use of positive reinforcement techniques in a zoological setting is a valuable management tool. Many other training and enrichment programs can be implemented from the simple conditioning techniques used with the venipuncture procedure.

The initial stages of a training program will require time and patience. In some cases, scheduling of keepers or exhibiting of animals may require adjustments. The overall benefit allows for a more reliable and less stressful method to perform a wider variety of husbandry or medical procedures.

These procedures will also have a very profound and positive effect on public perception concerning the required care of these extremely endangered animals.

Acknowledgments

I would like to thank our Deputy Zoo Director, Bruce Beehler, D.V.M., Andrew Teare, D.V.M., and Pachyderm Supervisor, Dave Sorensen, for their encouragement and support in this project.

References

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Information Please

I am investigating alopecia (hair loss) in neonates, in particular Maned Wolf puppies. Three hand-reared litters of maned wolves at Western Plains Zoo, Dubbo, Australia have seen some form of alopecia in the initial weeks of care, despite changes to management. These changes have included the laundry detergents used on their bedding, the cessation of hand antiseptics and quicker reductions in temperatures the puppies are exposed to. Any kind of alopecia experiences would be greatly appreciated. Please send to: Janet Gamble, P.O. Box 831, Dubbo, 2830, New South Wales, Australia; or you can Fax Aust. 068-841-722.

The Bombay Zoo, Bombay, India is requesting information which would assist them in designing an updated feed collection, preparation and distribution unit for their zoo. There is little information in the literature dealing specifically with setting up such a unit. While any information, articles, design sketches, etc. are welcome, please keep in mind that conditions in India are not like those in the U.S. - specifically the availability of exotic animal food manufacturers, the widespread use of fresh carcass meat as opposed to processed carnivore diet, and the considerable problem of electrical failures in the country which might well preclude long-term storage of perishable items. Any information sent will be shared not only with the Bombay Zoo, but with any other zoos in India seeking information of this type. Please send what you can to: Sally Walker, Zoo Outreach Organisation/CBSG India, Box 1683, Peelamedu, Coimbatore 641 004 INDIA.

Many thanks.