

# Parks & Recreation

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# ZOO CONSTRUCTION PERTAINING TO HEALTH AND FUTURE HANDLING OF EXHIBITS

*Paper By EDWARD H. BEAN, Director Chicago Zoological Park, before the Annual Meeting of the American Association of Zoological Parks and Aquariums.*

*Photographs by HUGH S. DAVIS*

During the week end at the Deroit Zoological Park, we have seen and no doubt countenanced with appreciation the more interesting and possibly more useful purpose this new conception of a zoological park makes available—available for the better husbandry of the collection and for its more interesting presentation to both the casual visitor and the visitor with some serious intention. The principal device of the conception is the use of the barless cage and the use of all possible details to stimulate a natural background or stage, such as an association of gregarious animals and a reproduction of the habitat scene in both plant material and terrain. We have always been amused at how fantastic this construction has seemed to a few; their opinions and impressions of it, especially when they are unfavorable, have been usually limited to their own experience and their own possessions. Mr. Millen's Detroit endeavor has encouraged others, his work and the work of the Chicago Zoological Society suggest this paper.

The barless cage or enclosure as lately constructed in the States and Europe is not a new idea. The first truly remarkable barless cage was that built by Emperor Maximus in Rome. Not only animal combats were held here, such as the baiting of lion, bear, leopard, elephant, and hippopotamus but the slaughter of barbarians and Roman Christians by animals is better known. The smooth and encircling parapet wall, higher than any of the animals could scale or jump, was the only protection to the gallery of spectators above. Still later, the pit, a smaller barless enclosure, where animals

were kept in by steep smooth walls, was built in many European cities. In these dark cavernous wells bears were usually shown. Similar construction has been copied in this country as late as the past year, I am sorry to say. Like enclosures for the Felidae, particularly leopard, were used in England and Italy for the execution of felons, usually court offenders. Here the accuser in private audience could watch the slaughter from the open gallery above.

It may be seen how quite impossible and unfair it would be to attribute dates and innovations of devices in barless cage construction to certain individuals. It is well known, however, that the first moated cage in the modern manner was built in Zurich, Switzerland, by Ursus Eggenschwieler for lions, animals in his own collection. After some time, he became associated with Carl Hagenbeck in the building of the private park at Stelligen. The interesting idea of associating animals of the same origin was the thought of Hagenbeck. The African scene and Polar panorama for example. This work was completed soon after 1900 and to date no finer rock work has been built and no more ingenious arrangement and association of animals have been accomplished. Yet the plans of Hagenbeck and Eggenschwieler were much ridiculed by their contemporaries and it was not until recently that the employment of their plans have gained favor. The dry moat was used exclusively by Eggenschwieler, since then the water filled moat has come into use and will probably become more extensively used especially in localities with little experience in freezing temperature. Lately one reason-



THE BARLESS BEAR ENCLOSURES AT THE CHICAGO ZOOLOGICAL PARK ARE NEARING COMPLETION

able and general objection to the barless cage has been removed; Carl Reisinger, architect for the Dusseldorf Garden, has constructed a barless cage for the great apes in which they may be viewed from a distance of about eight feet. A moat for a barrier is not used in this arrangement, and yet the visitor has an unobstructed view of the animals. In the foreground of the cage and counter-sunk in the floor is a copper plate, this extending the full width of the cage. Parallel to the plate, and strung taut and horizontally from one cage partition wall to the other, are four or five number eight gauge copper wires on twelve inch centers. Both plate and wires are charged with direct current and should the captive animal attempt to escape any manner of doing so would necessitate his touching both plate and wire and the circuit is then closed. The experience of the first shock, we are told, is usually remembered and only on one occasion was the experiment repeated. This device has been patented by Reisinger and although arrangements for its use may be made, park men, even in Europe where it could be studied, are reluctant to use it. Certain mechanical defects are at once apparent and there is always the possibility of the failure of the electric current. Current failure has been somewhat removed, however, by the use of wet cells.

Although many of us here are quite enthused in possibilities of the barless cage and are building after this style, nevertheless there are many just criticisms of the idea, especially in the limitations it enforces because of its great cost. I shall enumerate some of them later on and at the same time offer in a cautious way some suggestions for improvement or at least for minimizing or discrediting certain criticisms, especially as to cost.

Barless cages have been built for animals of nearly every motive, habit, agility and strength. With ingenuity there is probably no form that could not be detained and shown in them. There is great opportunity for originality in constructing them. There has been little attempt to group social animals as Hagenbeck has done; Heinz Heck at Munich is very forward in this experi-

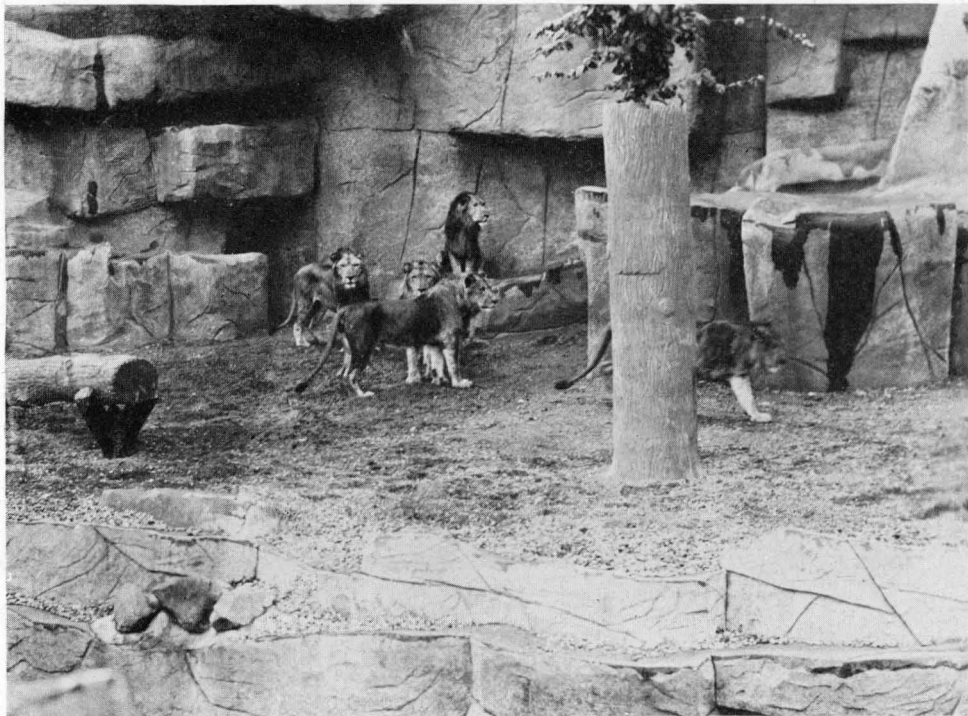


WORKING ON THE LION GROTTTO AT THE CHICAGO ZOOLOGICAL PARK

ment of grouping animals and there is probably no more successfully kept collection in Europe.

In some instances barless cages may be constructed for considerably less than the cost of the conventional type of enclosures. In most instances however, the plans and models include the excavation of deep and wide moats, their fabrication and provision for necessary sewage disposal and of a good deal of rock work. Backgrounds, partitions and floors may be built up of real stone, but this method is a very costly one and has perhaps a more artificial appearance than the work of skilled tradesmen and sculptors. The relief and texture of artificial stone has been accomplished in two essentially different ways. Borchart's process first used in Denver and then in St. Louis offers, I believe, the only method by which an accurate reproduction of rock work can be made, and that is from casts, negatives taken in the

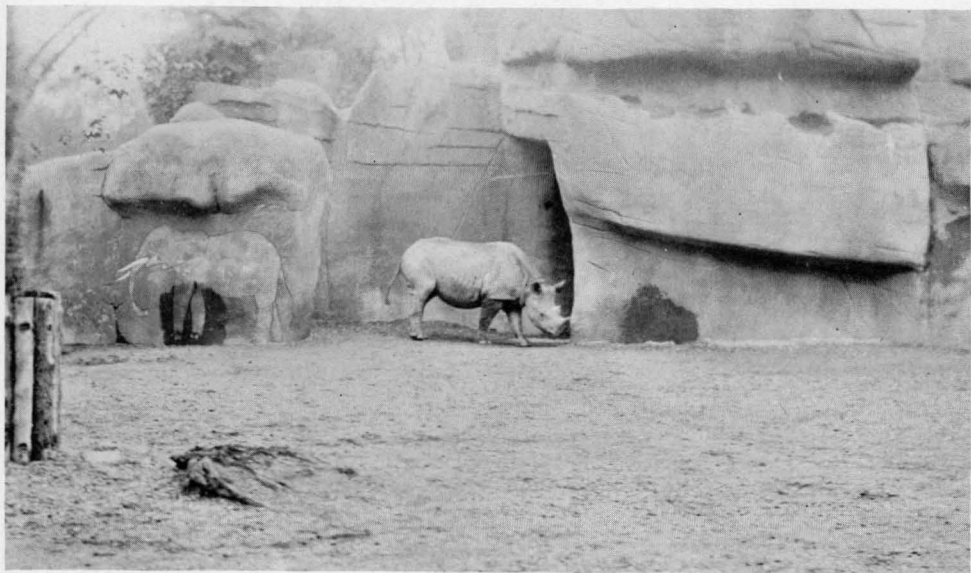
field. Borchart reproduced stratified limestone with such care and knowledge that the deception is perfect. He was a very skilled artist and it is to be regretted that he did not attempt a reproduction of granite, too, for granite because of its texture surface and size finds greater and more acceptable use in barless cage construction, providing a number of pieces and a wide variety of animals are to be shown. It seems important to me that the same formation be used throughout the entire park, and that can be accomplished only if granite or sandstone is used. Papers on the building of the St. Louis rock and a more recent paper in *PARKS & RECREATION* on the San Antonio project, (bear dens and monkey paradise) excellently explain Borchart's process. Pieces built by Mr. Millen and the Chicago Zoological Society use the process initiated by Eggenschwieler. This has been widely used in Europe.



THE BEAUTIFUL LION GROTTO AT DETROIT ZOOLOGICAL PARK

A few details of its construction may be of interest. Small models, rather than plans of the project, are first prepared and as they are in constant use by the tradesmen in detailing and shaping of the steel and the sculpturing of the exterior cement surface, it is best they be prepared on a scale of one-half inch to the foot or better still one inch to the foot and that they be of hard surface and carefully reinforced. The sculptor of this small model must have some knowledge of the animals for which the enclosure is being built and must be prepared to accurately reproduce the formations. Photographs of pieces in the field are of a great deal of use in accurately preparing a model. Of still greater importance is the necessity of a correct grouping of the selected pieces to be reproduced so that the entire composition will be geologically correct. The first model, insofar as composition is concerned, should be shown for criticism to geologists. The animal houses or dens, and

the surrounding moats have usually been constructed before the rock work veneer is built. It is preferable to suspend this veneer from the structure itself rather than build it from independent footings upward. The rising and falling action caused by frost is of no concern when it is hung from the building walls and only lateral expansion need be provided for. Building tradesmen, metal lathers, claim the work of shaping the steel skeleton. Smooth mild round steel is used, steel in as long lengths as can be handled making a more rigid and better reinforced job. The steel skeleton when finished has the appearance of a huge cage, all steel being tied on ten or twelve inch centers depending on the weight of the final load. Steel of three gauges is used, vertical members are of one-half inch and three-fourths of an inch thickness; very little of the latter is used. All horizontal members are of quarter inch gauge. The steel skeleton is then covered with black dipped three pound



DETROIT EXHIBITS THE ONLY PAIR OF RHINOCEROSES IN CAPTIVITY IN BARLESS ENCLOSURE AT ITS ZOOLOGICAL PARK



AN INDIAN AND AN AFRICAN ELEPHANT DWELL TOGETHER PEACEFULLY IN THE DETROIT ZOOLOGICAL PARK'S BARLESS ENCLOSURE



A SPECTACULAR EXHIBITION OF ONE HUNDRED AND FIFTY HAMADRYAS BABOONS AT DETROIT ZOOLOGICAL PARK

diamond mesh metal lath. It is important that the lath be tied snug so that no relief be lost by rounded corners. It is necessary that bronze screening ten inches by ten inches square be inserted in certain concealed places of the rock work for air ports; in a sense this rock work must breathe. Large pieces which have been completely sealed have frequently exploded. The erection of this skeleton represents about sixty percent of the entire cost of the work.

As soon as fabricated with lath, it is advisable to apply the first cement scratch coat. Experience recommends the use of as little dehydrated lime as possible in this coat; a rich lime mixture may be more easily and quickly worked, but the leaching of white chemicals through the final sculptured coat is not desirable. This may be partially overcome by frequently moistening the scratch coat. It is well to back plaster immediately

so that the steel may be covered to prevent rusting and so that the bond of the scratch coat will not be broken in walking over it or moving scaffolding. At Detroit and Chicago, this has been accomplished by the use of the cement gun. A very dense concrete, concrete which is waterproof may be quickly and economically applied with the gun. This gun coat varies in thickness; on low rocks and rock bearing no load a coat of such thickness as will just cover the steel is all that is necessary. On formations of height and formations which must bear weight an engineer's advice is required. The outside coat, the one to be sculptured, is often applied with the gun. Certain architects and sculptors recommend that the outside final coat be applied by hand. In this method, and it is the one used in Chicago, a doubling coat is troweled over the original coat and given a deep scratch. It has been thought

advisable that no greater area be doubled than can be stuccoed and sculptured the next day. This doubling coat deteriorates very quickly if not covered. It should always be slightly dampened before the stucco coat is applied. In both scratch coats and the gun coat, the cement and sand ratio have been one and three; in the final coat, the one to be sculptured and colored, a one and two mixture permits finer cutting of detail. One objection to this mixture is that it sets up too rapidly in hot weather. This last coat, the one to be sculptured, is applied in the manner of stucco and its thickness varies from one-half inch to one and one-half inches in thickness. Of course, most of the relief is gained in the shaping of the steel and lath, yet the

sculptor may desire greater detail and at this point it can only be had by increasing the thickness of the cement. Experience here and elsewhere recommends that the rock be colored while the cement is "green" All colors used either dissolve in water or remain suspended in it and if the tinting is done before the cement sets up, the colors are absorbed in the crystalization of the cement as part of the moisture content and will remain fast over a period of time to any exposure.

We are indebted to Mr. Millen for he has always been generous in placing at our disposal his experience and suggestions for the improvement of this construction.

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## THE ZOO MUSEUM

*Paper by ROGER CONANT, Educational Director, Toledo Zoological Society, before the Annual Meeting of the American Association of Zoological Parks and Aquariums*

One of the outstanding services which a zoological park can render to its community is to serve as a bureau of information on animal life and to identify correctly for the curious civilian the specimen which he has chanced to find. Objects ranging from dead snakes and insect cocoons to fossils and Indian relics are frequently brought to the zoo staff's attention with the request that the finder be told what he has. One of the best ways of building interest and good-will toward the park is to be able to name the specimens for the visitor and to tell him in a courteous manner something about it. Such has been the policy at the Toledo Zoological Park and many new friends have been gained in this way.

Almost always the object in question is left at the zoo and very soon there accumulates a collection of odds and ends, some of them worthless and others quite valuable. If the culls be discarded there still remains an assortment of material which if properly labeled and exhibited can become a valuable

addition to the zoo's display. The day when the zoological park was simply a menagerie of living animals has long since passed and the public is beginning to realize that the park it supports is in fact a real educational institution.

A zoo museum is the natural way in which to care for inanimate donations and the proper manner in which to begin preparing, for the visitors' information, interesting exhibits illustrating phases of natural history which it is practically impossible to show with living animals. Many instructive details of life histories of insects and small animals may be presented in this way with very little expense and very little effort.

Unfortunately all animals must die, but some of them may be so rare or so expensive as to prohibit their immediate replacement. For a few dollars a capable taxidermist can change a worthless carcass into a lasting asset. Perhaps he may also be able to save some of the disappointment of visitors who, for example, have traveled long distances to