



*By Courtesy of K. W. Green, A.R.P.S.*

# **Chester Zoo News**

## **AND GUIDE**

**THE NORTH OF ENGLAND ZOOLOGICAL SOCIETY**  
**ZOOLOGICAL GARDENS, UPTON - BY - CHESTER**

February 1972

Price 6p



# The North of England Zoological Society

ZOOLOGICAL GARDENS, UPTON-BY-CHESTER

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COVER: *Orang-utan "Paul"*.

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ANNUAL SUBSCRIPTION — NINETY FIVE NEW PENCE POSTAGE PAID

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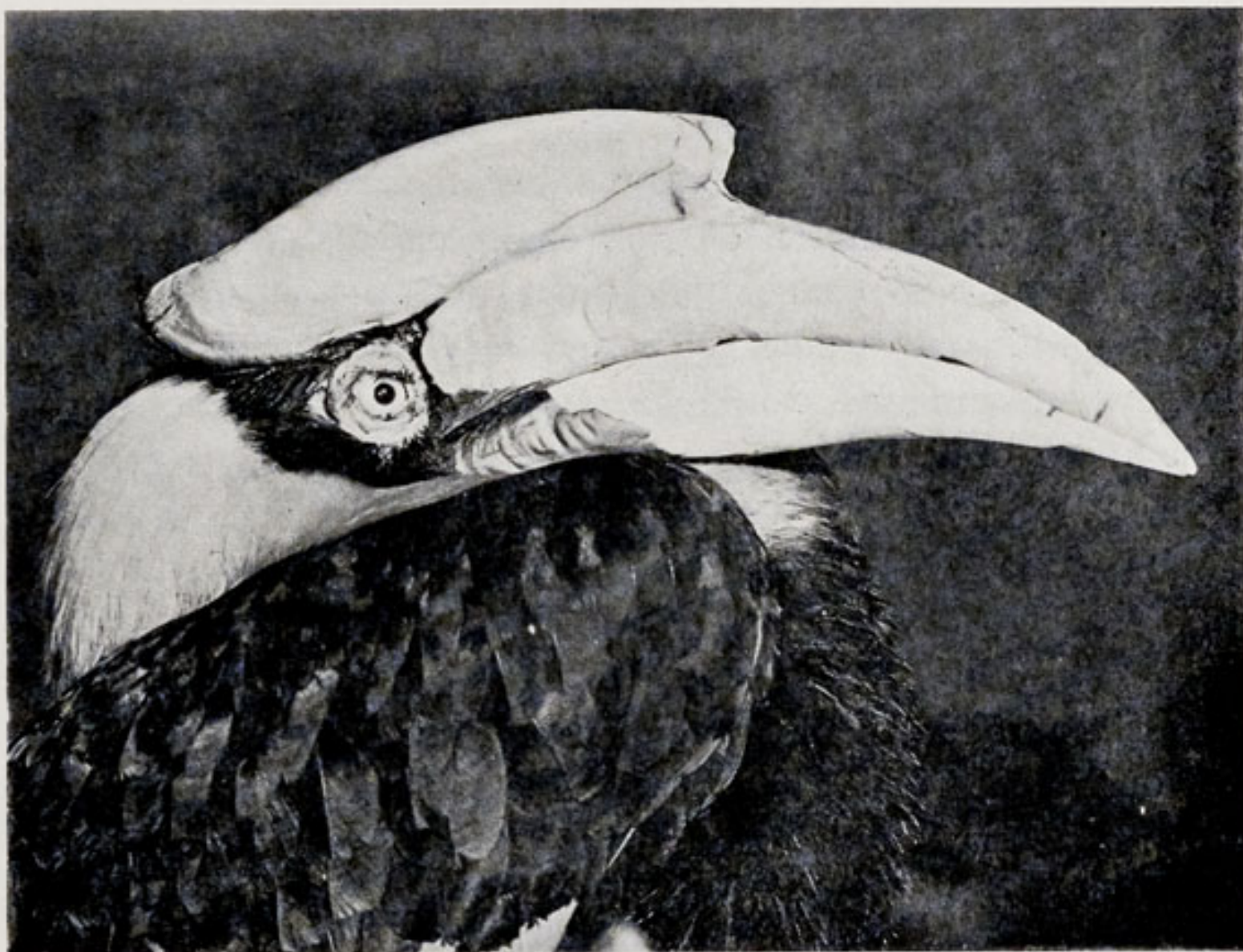
### BIRD NOTES

A Senegal Parrot has been presented and in the Temperate Bird House visitors can see a new pair of Great Indian Hornbills (*Buceros bicornis*).

These beautiful birds have a distribution from India to Sumatra and grow to a length of five feet. They have striking black and white plumage and a huge yellow bill, on top of which is a bony casque. The male can be distinguished from the female by his red iris and larger casque; the female has a white iris. Looking at the photograph on the top right, the Hornbill's casque appears to be solid but as the X-ray below shows, in fact this and the bill are honeycombed with air sacs which serve to strengthen the whole structure.

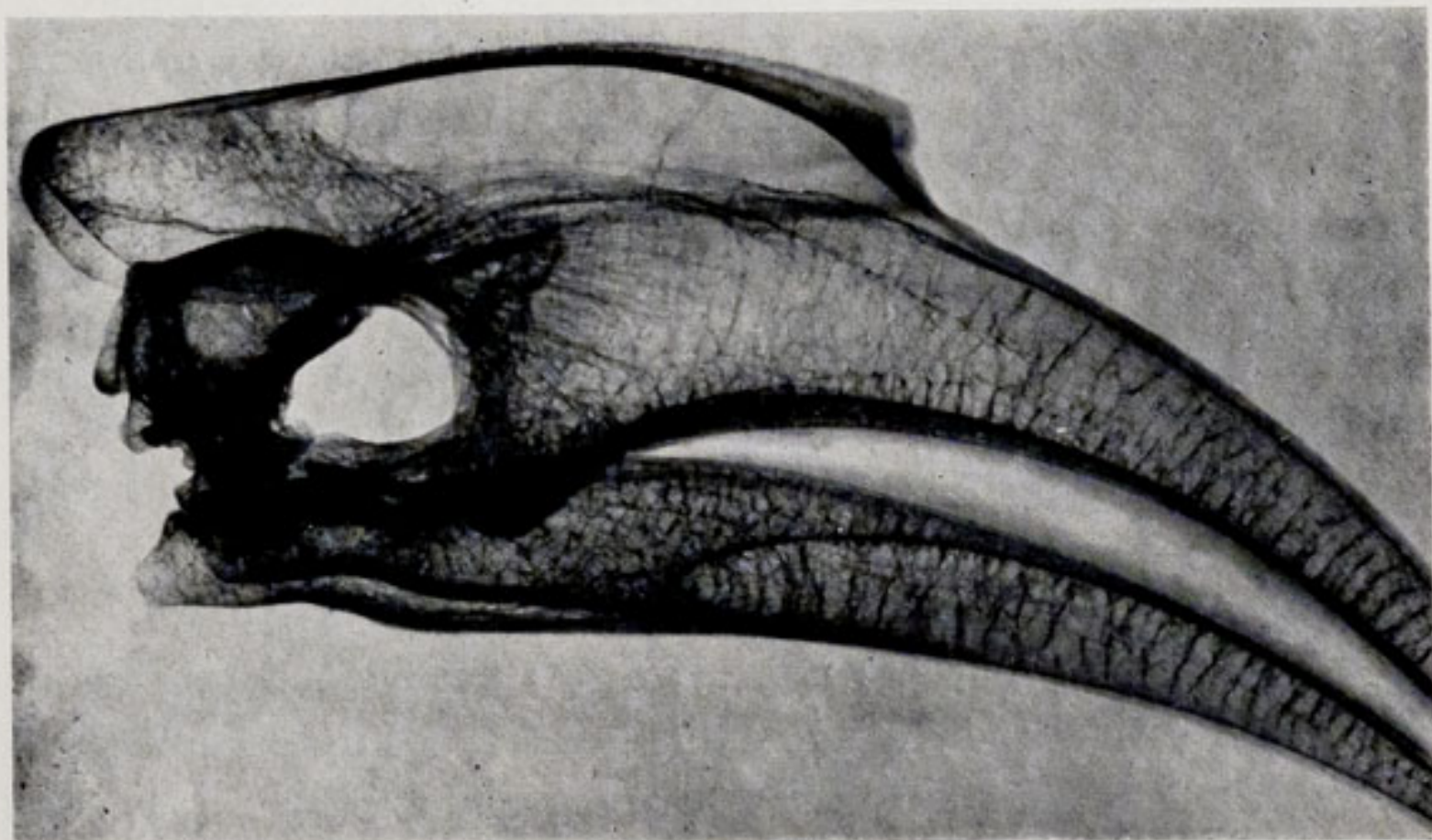
Hornbills live in small flocks of about twelve birds in forested areas and feed on fruit, insects, small animals and even snakes. If visitors are present when our Hornbills are feeding they will be able to observe them picking up pieces of food in the end of the bill and tossing these to the back of the throat.

Pairs of Hornbills are said to mate for life and they have fascinating nesting habits. The nest site is a hole in a tree which often is used year after year. In this the female Hornbill imprisons herself by plastering up the entrance hole with excrement while her mate assists from the outside. All that is left is a slit through which the male passes food to her and she expels droppings from the nest. There she remains, undergoing a full moult, until the chicks, usually two, are almost ready to leave. Throughout this period the male is kept busy collecting food for his family and it is not until the chicks are well grown that the female breaks out of the nest to assist him. Because of her long period of confinement, her initial movements on liberation are stiff and awkward but she soon recovers. These peculiar nests provide very effective protection from marauding monkeys, tree snakes and other predators which consider eggs and nestlings as delicacies.



J. Glyn Jones

GREAT INDIAN HORNBILL (*Buceros bicornis*)



W. H. Timmis

X-RAY OF HORNBILL'S HEAD SHOWING STRUCTURE OF AIR SACS

### FLYING SQUIRREL RECORD

A Flying Squirrel (*Glaucomys volans*) died recently after having lived in the collection for ten years eleven months. It was from one and a half to two years old on arrival which puts its final age at a minimum of twelve and a half years. We think that this may be a longevity record and would be interested to hear from anyone who knows of a Flying Squirrel having lived for a longer period.

### TRANSFERS

The introduction of Orang-utans Lola and Rajang to the group of four in the New Ape House was conducted without incident. Lola, a seven year old female whose arrival was reported in the December "Zoo News" was the first to join Dennis, Martha, Barry and David and was accepted by them very quickly. She was not a complete stranger however as for several weeks prior to her move she had occupied an adjacent den at the Ape House.

For a while the young male Rajang was also accommodated nearby to enable the older Orang-utans to become accustomed to him. He was born at Chester Zoo and is only three and a half years old, so their reactions towards him and his to the large enclosure had to be noted more closely. It was Lola who was rather rough with him at first but Rajang, having lived with two boisterous Chimpanzees in the Monkey House, was quite able to fend for himself and a quick nip on the hand soon put the older Orang-utan in her place. Once or twice Rajang tested the electrified fence which separates the Orangs from the moat but decided that he did not like the sensation and has since ignored it.

There is no doubt that the two new members of the group appreciate their spacious surroundings with its complex of climbing frames. In fact Rajang played so hard during the first few days that he tired himself out and we were obliged to leave him in his sleeping quarters for a day.

The Bennett's Wallabies have an excellent breeding record at the Zoo, last year rearing nineteen young. However their growing numbers have rather overtaxed the condition of the paddock and in recent weeks most have been transferred to other parts of the Zoo, several going to the spacious enclosure occupied by the Blesbok, No. 108. At first the antelopes were extremely suspicious, peering at these new hopping creatures from as far away as possible. Now they ignore them, though the two factions prefer to keep to themselves. The Wallaby paddock will be limed and left to rest until April at least.

With the removal of the Arabian Gazelles to winter accommodation we were able to transfer a number of Emus to the row of enclosures marked No. 87 on the Zoo plan. In turn this has enabled us to separate the five Cassowaries which were becoming increasingly aggressive towards each other. By the time the Gazelles are due to return from winter quarters, our new Zebra enclosure will be completed. This is being constructed for the herd of Grevy Zebras on the site of the Highland Cattle paddock, No. 95 and follows the aha principle of moat and wall confinement which has been practised in many parts of the Zoo. More details about this new construction will be included in a later issue. At the present time it is our intention to transfer the Cassowaries to the old Zebra House when the Grevy Zebras have been moved.

The earlier part of the winter was so mild that some of our more delicate specimens, including the Gazelles, could be left outside into December. Now that the inevitable frosts have arrived only the hardier species remain in the large flight aviary and the Herons, Ibis, Storks, etc., can be seen in the Temperate Bird House.

Our large colony of Cockatiels has been liberated in one of the long Rainbow Aviaries, No. 21. Last year 76 chicks were bred (at stocktaking our earlier figure of 69 was found to be incorrect) and naturally their original aviary near the Oakfield Restaurant was then too small. Screens have been erected at two corners of the Rainbow aviary and these roofed over to provide the birds with protection

from the elements. They make a wonderful show and we are looking forward to another successful breeding season.

### REPTILE NOTES

Two species of Rattlesnake were among recent additions to this section. Specimens of one, the Western Diamond-backed Rattlesnake (*Crotalus atrox*), are already on show and have bred but the other, a Pacific Rattlesnake (*Crotalus viridis oregonus*) has never been exhibited in this collection before.

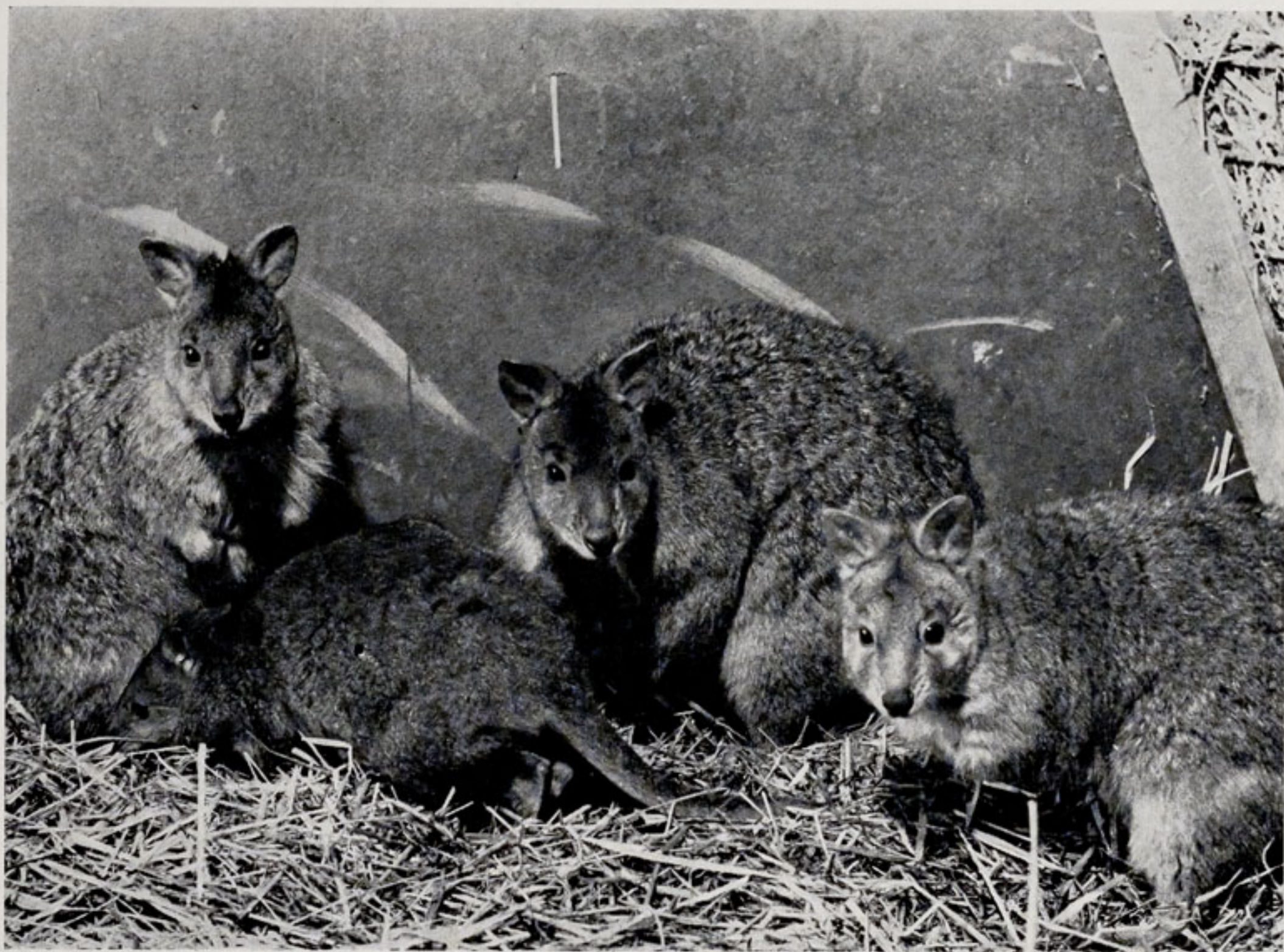
Both are extremely venomous species but the Western Diamond-backed is the more aggressive and consequently more dangerous snake, accounting for a high percentage of bites in the United States. It is also larger, averaging up to five and a half feet long, compared with the three to four feet lengths of the Pacific Rattlesnakes. The Pacific species has a range from southern British Columbia along the Pacific Coast to California and hibernates in winter in the northerly parts.

A young specimen of Siamese Crocodile (*Crocodylus siamensis*) has been acquired but will not be on show for some time.

Our female Ruwenzori Three-horned Chameleon has been joined by a pair of a closely related species, the Owen's Three-horned Chameleon (*Chamaeleo oweni*) which originates from the tropical forests of the Congo.

### RED-BELLIED WALLABIES

The photograph of Red-bellied Wallabies (*Thylogale billardierii*) on the right, the first of this Tasmanian species that we have included in the magazine, shows a family group of two adults and two young females that were bred last year. They are accommodated in enclosure No. 87.



RED-BELLIED WALLABIES (*Thylogale billardieri*)

K. W. Green, A.R.P.S.

# CHESTER ZOO

THE NORTH OF ENGLAND  
ZOOLOGICAL SOCIETY  
ZOOLOGICAL GARDENS

1. SOUTH ENTRANCE
2. Peacock Enclosure
3. Wapiti Paddock
4. Lesser Pandas
5. Aviaries
6. Milk Bar
7. CORONATION HALL
8. CLOAKROOM, FIRST AID, TOILETS, MOTHER and BABY ROOM
9. CAFETERIA
10. Picnic Lawn
11. Bears
12. Animal Enclosure
13. Kiosk
14. AQUARIUM
15. NORTH ENTRANCE
16. PUSH CHAIRS, WHEEL CHAIRS, LOST CHILDREN
17. Parrot House
18. Free Flight Aviary
19. APE HOUSE
20. RAINBOW CAFE AND SHOP
21. Aviaries and Picnic Lawn
22. TOILETS
23. Tuatara Exhibit
24. Peccaries
25. Waterbus Halt
26. Birds of Prey Aviaries
27. Owl Aviary
28. Jackal and Hyaena Enclosures
29. Animal Enclosure
30. Porcupine Enclosure
31. Coypus
32. Beavers
33. Giraffe House
34. Camel House
35. Waterbus Halt
36. TROPICAL, NOCTURNAL AND REPTILE HOUSES
37. CHIMPANZEES
38. Floribunda Rose Garden
39. Zebra House
40. Gibbon Island

41. H.T. Rose Garden
42. Aviaries
43. Flamingos
44. Waterfowl Enclosure
45. Waterfowl Enclosure
46. Capybara and Waterfowl
47. Penguins
48. Sealions
49. Rock Garden
50. Polar Bears
51. Tigers
52. Waterfowl Enclosure
53. Anteaters
54. BIRD HOUSE
55. FOUNTAIN RESTAURANT
56. Ape Nursery
57. TOILETS
58. Lions
59. SOUVENIR SHOP
60. TOILETS
61. OAKFIELD RESTAURANT
62. G.P.O. Telephone
63. Gibbon Pen
64. Animal Enclosure
65. Cheetahs
66. Ornamental Rock Garden
67. Malayan Bears
68. Animal Enclosure
69. Aviary
70. Wallabies
71. WATERBUS BOOKING OFFICE AND KIOSK
72. Waterbus Halt

73. Fountain Flower Gardens
74. Rose Garden
75. Red Lechwe
76. Red Lechwe
77. Deer or Antelope Enclosure
78. Waterbus Halt
79. Zebra and Deer Enclosure
80. Kamchatka Bears
81. ELEPHANTS
82. Hippos
83. Tapirs
84. Small Mammal House
85. Waterfowl Enclosure
86. Ankole Cattle
87. Gazelle Paddocks
88. Storks and Ostriches
89. Baboon Pens
90. Cat House
91. Lions and Tigers
92. Antelope Enclosure
93. Antelope Enclosure
94. Antelope Enclosure
95. Highland Cattle
96. MONKEY HOUSE
97. Waterfowl Enclosure
98. Wallabies and Waterfowl
99. Cranes and Waterfowl
100. Llamas and Alpacas

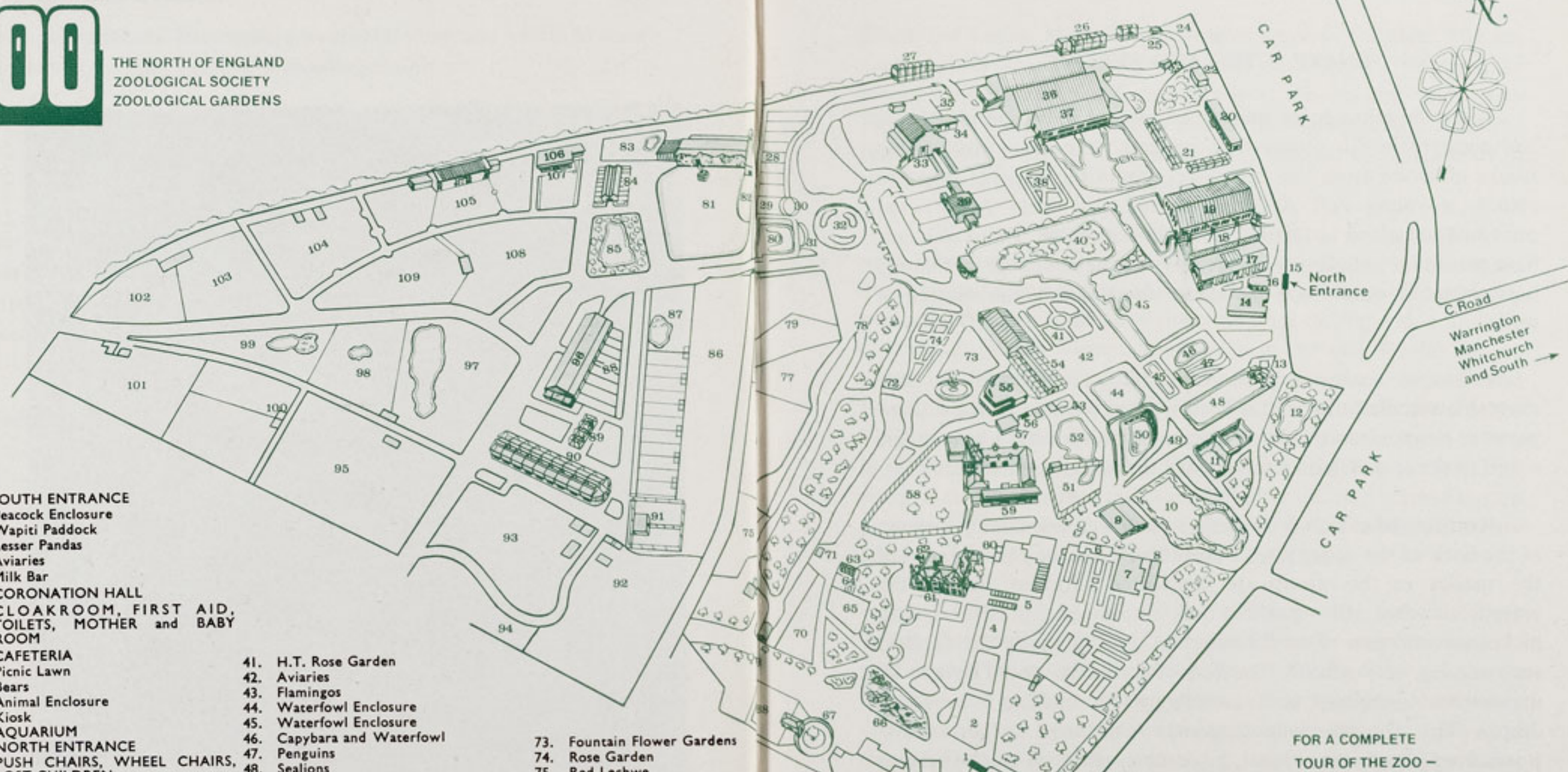
101. Zebroids
102. Bison Paddock
103. Pere David's Deer Paddock
104. Eland and Marmots
105. RHINO HOUSE
106. TOILETS
107. Mpila Snack-bar and Kiosk
108. Antelope Enclosure
109. Antelope Enclosure

Animals may be moved from time to time.

## ANIMAL FEEDING TIMES:

LIONS—3 pm except Fridays  
BEARS—3-15 pm  
POLAR BEARS—4 pm  
SEA LIONS 3 times daily—  
2-40 pm, 3-40 pm, 4-40 pm

FOR A COMPLETE  
TOUR OF THE ZOO —  
Follow Nos.1-109  
from South Entrance  
or Nos.16-109  
from North Entrance  
then return to  
Nos.1-14



## SNAKE BITES AND SERUMS

A few months ago we mentioned two snake bite accidents that had occurred in this country. In one case we became involved, as stocks of serum from the Zoo were sent to the patient; later the culprit, a young Puff Adder (*Bitis arietans*) from Africa, was presented to us and in fact is still in the collection. These incidents have prompted us to describe to readers a little about the fascinating topic of snake venom and the manufacture and administration of serum.

Poisonous snakes may be rear-fanged, front-fanged or have moveable erectile fangs and a keen student wishing to draw comparisons in appearance between the three groups would have ample scope to do so at Chester as we have several of each on show.

Rear-fanged snakes have teeth with venom-conducting grooves at the back of the upper jaw or "maxillae", but the vast majority of the species in this group are considered harmless. One of the reasons is that the position of the fangs in the mouth makes the infliction of an effective bite on a relatively flat surface, such as a leg, very difficult. The flesh of the victim would have to be manoeuvred to the back of the snake's jaws for the fangs to penetrate deeply. The only positively dangerous rear-fanged snakes are the Boomslang (*Dispholidus typus*), a specimen of which can be seen at the Zoo, and the Bird Snake (*Thelotornis kirtlandii*), both of which are found in Africa and have been the proven causes of fatal bites. Boomslang venom is estimated drop for drop to be more toxic than that of even the Vipers or Elapids, which makes it a formidable reptile indeed. Fortunately bites from this snake are few and far between.

With a world-wide distribution, the group of front-fanged snakes or Elapidae contains many deadly species including the Cobras, Coral Snakes, Kraits, Death Adders and Mambas. They are characterised by venom-conducting fangs which are fixed at the front of the jaws and at Chester among the snakes represented are

Black and Green Mambas and several species of Cobra. The sea snakes or Hydrophidae also fall into this category. Many have highly toxic poisons but fortunately most are shy and swim away rather than attack. Since they inhabit coastal shallows, accidents result usually from the sea snakes being stepped on or startled. In any event they are very rare in captivity.

Finally there are the snakes with long fangs at the front of the jaws. When not in use these are folded back into the roof of the mouth but if the snake is preparing to bite the fangs pivot forward to an active position. The two families in this group are the Viperidae and the Crotalidae. Of the Vipers, found only in the Old World, we are exhibiting Puff Adders, Gaboon and Rhinoceros Vipers, and Daudin's and Russell's Vipers. The Crotalids are also known as the Pit Vipers and differ from the true Vipers in having a small hollow in the scales between the eye and the nostril known as the loreal pit which is sensitive to heat and is employed in locating warm-blooded prey in the dark. Besides three species of Rattlesnake visitors can see American Copperheads and Pope's Pit Vipers.

Different venoms have varying effects on the bodies of their victims though nowadays it is recognised that two or more reactions may result from one bite. Basically the venoms are either neurotoxic acting on the central nervous system causing paralysis, particularly of the respiratory apparatus with death usually through asphyxia if untreated, or haematotoxic, destroying the blood cells and causing massive haemorrhaging. Bites from Vipers tend to have the latter effects while Elapid and sea snakes bites are more often neurotoxic.

To produce serum or antivenene, quantities of venom are first obtained from the species for which the antidote is being manufactured, by a process known as "milking". The snake is held by the neck and induced to bite on a thin rubber dam stretched tautly across the mouth of a beaker. Poison dribbles through the rubber into the beaker and the venom is then chemically dried in a desiccator under vacuum. Once the watery venom has been dried to pale, creamish crystals it assumes a most dangerous form. The handler must be masked and gloved as these brittle crystals powder easily

and inhalation of a microscopic amount could cause a serious sensitivity.

The venom is injected into horses in gradually increasing doses over a period of eight months or more, the animals building up a resistance to the poison. Tests are made to measure the amount of antivenene in the blood and when this is judged to be of sufficiently high titre, the horses are bled. The blood is then treated chemically to make a highly concentrated antivenene. Some serums are called polyvalents which means that they are effective against the venoms of a number of species while others, monovalents, are useful for only one.

Once manufactured, serum has a limited life span of a few years and the expiry date of a particular supply is printed clearly on the manufacturer's label. Each ampoule contains ten millilitres of serum, which ultimately can be in either dried or liquid form, and several ampoules may be needed to counteract a serious bite. Antivenene should be stored at a temperature of 4°C; at the Zoo a refrigerator is stationed in the Reptile House for this purpose. We maintain an adequate stock of all the serums that might be needed and a check is kept on their expiry dates, with new supplies being ordered well in advance. Centres for the production of serums are dotted throughout the world, each tending to specialise in a few types, as manufacture is a costly business. Most of our supplies come from two sources, one in Paris and one in the United States.

One particular misconception is that when venom has been extracted from a snake it is left temporarily innocuous. This is not true. The venom glands are the equivalent of our parotid glands, one of the sets of salivary glands. Therefore snake venom is a modified saliva and like saliva it is constantly generated and losses are made up rapidly. Although it is not known for certain just how much venom is needed to kill a man, it is a very small quantity—maybe half a milligram in the case of Coral Snake venom or as little as a couple of grains of sugar—and snakes' glands always contain more than the minimum amount required.

Tests at the Commonwealth Serum Laboratories in Melbourne, Australia, have shown that it takes .005 milligrams of tiger-snake venom per kilogram of body weight to kill a horse. This means that roughly speaking a tiger-snake producing 30 milligrams of venom in one bite is potentially capable of killing about 20 stock horses or more than a dozen draught horses, weighing 1,000 lbs each.

Administration of an antivenene is not a straightforward matter, as some people experience violent reactions to horse serum, particularly it seems individuals who have suffered from allergies, such as asthmatics. Therefore it is advisable that anyone coming into contact regularly with dangerous snakes should undergo a test to measure his or her sensitivity to horse serum and the results of this together with the person's blood group should be made readily available in the event of an accident with a snake. For someone who had demonstrated unfavourable reactions, alternative methods of treatment might have to be sought. It is also wise to be immunised against tetanus since the mouths of snakes are full of bacteria and even a bite from a harmless species may cause a nasty infection.

From films and novels has arisen the popular notion that the vast majority of poisonous snakes strike without provocation and their unfortunate victims have barely minutes to live unless a speedy shot of antidote is administered. The facts are rather more complicated and even today there is tremendous controversy among leading physicians and herpetologists as to the best methods of treating snake bites. There is no snake whose venom kills a person within two or three minutes though in some species, notably the Mambas, serious symptoms may arise soon after the bite and in a number of cases, without proper treatment, the patients have died after about six hours. Genuine snake bite accidents are rare. They are more usually the result of a snake being provoked, an injured specimen defending itself or a captive snake resenting being handled.

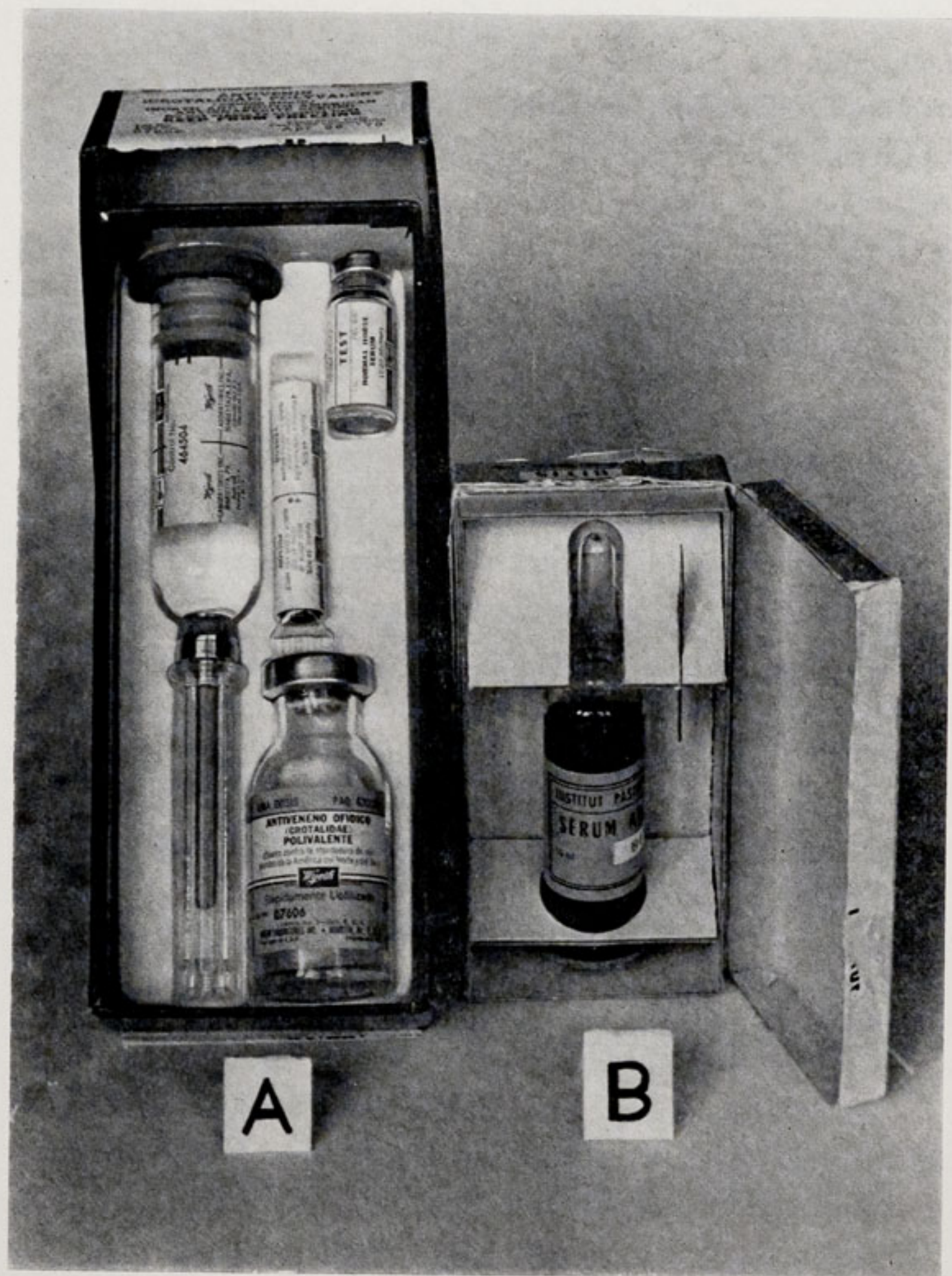
Various factors govern the gravity of a bite. On a cold day there is a greater chance of stepping on a wild snake than on a warm day when the snake is sufficiently alert to keep out of the way but on a hot day the snake will inject more venom. A snake striking from

its own position will inject less venom than one held in the hand or one wounded or trapped in some unnatural position. Thus yields of venom extracted from snakes for scientific purposes are proportionately larger than would be injected normally by a striking snake. If the reptile snaps, merely scratching the skin, rather than achieving the penetration of both fangs, the victim will probably escape with mild symptoms and recover without the need of serum. Finally the action of injecting venom is voluntary and not automatically concurrent with biting, so it is by no means impossible for a snake to strike but not release venom at all.

The physical condition of the victim is also significant, a young healthy individual having more resistance than an aged or ill person. Generally speaking, a bite on the right side of the body will take longer to produce effects than one on the left because of the proximity of the heart. If the victim has drunk alcohol prior to the bite the effects will be seen more speedily as the blood will be diluted. Another important factor which will be stressed in all snake bite manuals, is that the patient should remain as calm and still as possible, walking only if absolutely necessary and never running, the reason being of course that excitement increases the heart beat and blood flow, consequently hastening the action of the venom.

The photograph on the right shows the basic items in the snake kit kept at the Zoo, with preparations of both dried and liquid serum. In Box A there is a syringe (left) containing sterile water, a vial of tincture of iodine (centre) for cleansing the skin prior to injection, a test vial of horse serum (top right) and 10 ml. of dried serum (bottom right). When required, the serum is reconstituted by adding the sterile water to the dried contents of the bottle and shaking. Box B is 10 ml. of liquid Bitis serum.

In the context of zoos and private collections there should be no difficulty in establishing the identity of a snake which has caused a bite and thus in prescribing the correct antivenene. However this is one of the major problems facing doctors who are treating bites



A

B

SNAKE SERUM KIT

K. W. Green, A.R.P.S.

from wild snakes, especially in areas where a diversity of poisonous species occur. Patients may not have had chance to study the snake or may be too ill to describe it if they are unfamiliar with reptiles. Sometimes the offending snake is quite innocuous but the psychological impact of being bitten brings on symptoms in the patient which initially could be taken for the effects of a poisonous bite. In such cases the doctor often makes the usual tests and other preparations but waits for reactions to arise before injecting with serum. In Mamba bites for instance, reactions develop quickly and their specific nature makes recognition fairly accurate.

There are many arguments for and against making incisions across the fang punctures and the use of tourniquets. It would appear that the proper course of action depends very much on the species of snake and the nature of the venom it secretes, which is a subject needing more discussion than can be given here. However from all the controversy emerges the fact that to be of any value a tourniquet should be applied as soon after the bite as possible. After 30 minutes its introduction would be futile as of course its purpose is to hinder the flow of venom from a limb to other parts of the body. Fortunately the majority of bites do occur on the legs and arms. If a tourniquet hinders the circulation for any length of time, gangrene can set in and it is therefore essential that it is applied correctly and released every few minutes. Once the antivenene has been injected the tourniquet can be removed gradually.

Besides being very dangerous, snake poisoning can be an intensely painful affair, sometimes resulting in permanent injury. Up to the present time we have never had occasion to use the kit in the Reptile House, the only times it has been required being for outside cases. Even the most experienced herpetologists have been bitten, so an amateur would be well advised to think twice before attempting to keep so deadly or unpredictable an animal as a Rattlesnake or Cobra.

The following notice is displayed on several boards in the grounds

Please comply with it at all times.

## FEEDING OF ANIMALS AND BIRDS

**IT IS AN OFFENCE** for any member of the public to offer food of any description to any Animal or Bird in Chester Zoo.

This regulation is made for the sake of the health of the Animals and Birds. Since the NO FEEDING rule was introduced, the number of deaths has dropped appreciably and sickness, due to wrong feeding has been virtually eliminated.

What you may be offering to an animal may only be a sweet or an inoffensive piece of bread, but it can mean a death sentence for the animal. For example, a cough drop, which may relieve your cough, can cause instant death to many Animals and Birds in the Zoo.

You must not lose sight of the fact that you are only one of over a million visitors who visit the Zoo annually. If for instance an elephant had one bun from only one tenth of a day's visitors during the summer, it would eat between three and four thousand. You can guess the result.

We realise what a temptation it is for visitors, particularly children, to feed our Animals and Birds and this is why we invite members of the public to be present at the official feeding times.

This is a polite warning to you, asking you not to feed the animals. If you ignore it, the Keepers are authorised to ask you to leave the Gardens.

**If you really love Animals and Birds, you will appreciate the wisdom of the ruling — No Feeding by members of the public.**

**PLEASE HELP US TO KEEP OUR COLLECTION OF ANIMALS NOT ONLY ALIVE BUT IN FIRST CLASS CONDITION.**

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Printed in England by  
G. R. Griffith Ltd,  
Castle Printing Works  
Chester

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