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THE FLYING SYRINGE

*Ten years of Immobilising
Wild Animals in Africa*

by
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slowed the progress of the research work, it was not entirely detrimental as it provided facilities in the form of laboratories, apparatus and workshop that would not otherwise be easily available in East Africa, and certainly not in Uganda.

Subsequent expeditions followed in rapid succession during our long recess, and entailed the capture of kob, Rothschild giraffe, and later also black rhinoceros.

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The kob exercise was particularly rewarding as we now felt confident of our drugs and equipment, and therefore could treat this as a practical exercise in conservation, rather than a tentative exploration into uncharted pharmacological territory. It had already become plain at that time that the herds of Thomas kob at Lugari were doomed if the plans for evicting the farmers and cutting the land up into small holdings for peasant cultivators matured. The accuracy of this forecast was bitterly vindicated when in 1965 only sixty kob could be counted and in 1966 they had been hunted to extinction by dogs, and the use of snares. The fact was that these animals could have supplied the local Africans with a continuous source of meat had males only been harvested, and apart from ethical considerations, to preserve this species in Kenya, a natural resource had been squandered.

The projected exercise was financed by the Elsa Trust, and the key persons were George Adamson and the local Game Warden Julian Meckand. It was not an easy task as we were still relying on the gas gun, and the wily kob soon learned to keep just out of range. The mature territorial males of the Semliki had been relatively easy as they wanted to stay on their hard won territorial ground. Now we wanted females and these drifted about like flocks of sheep, playing a game of hopping over or through farm fences when the car was almost within range, thus entailing a long detour to the nearest gate, after which the joke would be repeated in the opposite direction. George had stripped the Land-Rover of everything above door level, including the wind-screen, to give an all-round field of fire, and then had heaped on branches for camouflage, with a tarpaulin over the whole structure. Moving

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infinitely slowly round and round the playful herds, the contraption looked like a parody of a Boer trek wagon in the last stages of its journey. Whatever its looks, it worked, and soon a dozen kob, mainly pregnant females, were in the enclosure. We learned a great deal from this exercise, but particularly that it was one thing to catch a kob and put it into an enclosure, and quite another to get it out again when required for the relocation move.

The female kob, weighing about 140 lbs, has slender legs that look delicate, but are capable of catapulting this weight some ten feet into the air. This means that every care must be taken during the initial journey to the enclosure immediately on capture, to prevent kicking. A kick may do two things; it may break the bones of those holding the animal, or the leg itself, if it hits the side of the truck. The kob were therefore not only tranquillised as they came round from the incapacitating compound, but securely tied. The tying itself was a special exercise as the breathing of an animal immobilised with Scoline is hampered, and the bunching of the fore and hind legs would constitute a marked additional strain. On the other hand, such was the pattern of recovery that the animal could well be up and away unless tied at the critical moment. The front and hind legs were therefore tied separately with short lengths of soft nylon rope and held by two game scouts, so that the animal was extended and comfortable. As soon as recovery was advanced, the tranquilliser was given and the front and rear legs firmly locked by passing the ropes between the opposite legs and tying them together. The animal was then lifted on to a bed of sacks in the back of a Land-Rover pick-up, great care being taken to hold the head of the antelope carefully in the hands to prevent its knocking against the metal of the car body and to protect the eyes. The tranquilliser used was Largactil, generously provided free by Messrs. May and Baker Ltd., and the effect soon quietened the animal so that it ceased to struggle during the journey and did not damage itself by leaping when released into the enclosure.

Once in the enclosure, the kob had not to be disturbed after the tranquilliser had worn off, as even the release of new animals through a minute doorway tended to cause stampedes. We had built a multiple section enclosure, so that the animals never felt cornered. If this occurs,

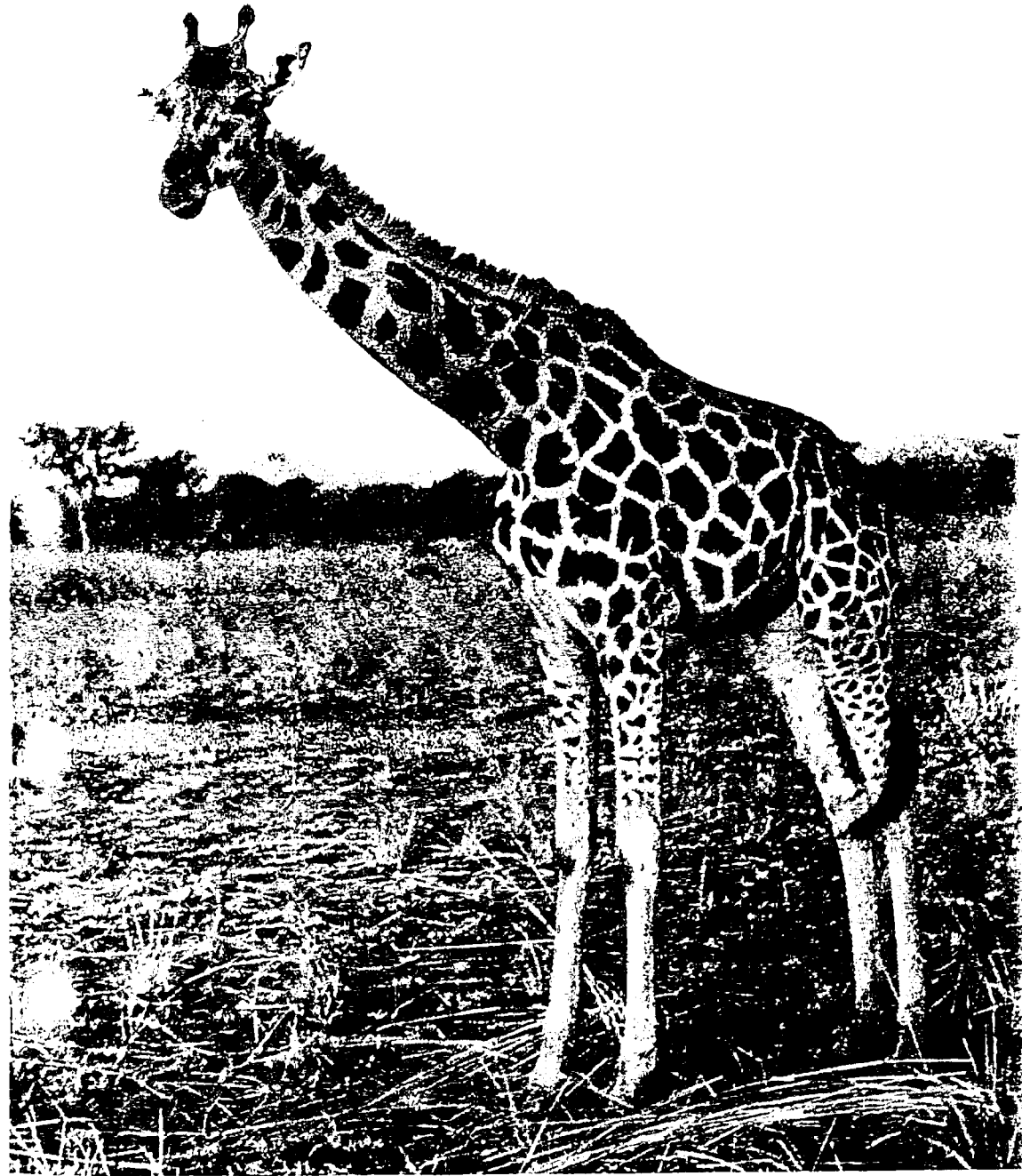
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Judging by the extreme poverty of the subsistence farming in the area, it seems likely that the Wakamba would have made a good deal more profit by farming their rhinoceros and permitting these to be taken by sport hunters at a rate approximating to their natural increase. Since the numbers of black rhinoceros were being rapidly reduced in most areas of East Africa, it was decided to open the area to trappers, who paid for their licences by moving one rhinoceros to a game park for every one they caught. This was a reasonable arrangement, since there was then no capture unit as part of the Game Department. Also, the chemical capture of rhinoceros was still a totally unknown venture.

Most of my time was spent with one of the most successful trappers in East Africa. Carr Hartley ran a thriving business with the help of four robust and likeable sons, and there was no doubt that the whole family was highly expert at the job of chasing and roping. A ride on their converted army four-wheel drive Ford truck through the bush after a big rhinoceros was an experience never to be forgotten. Whoever of the four sons was driving stuck to the rhinoceros through thick and thin. Whole trees three inches or more in diameter would snap off at the base and come tumbling into the back of the truck where the passengers and scouts hung on for dear life. Great leaps would be taken over holes in the trackless bush as the vehicle roared over and through everything at thirty miles per hour and faster, often completely airborne as it hit boulders and anthills. The chase went on through ravines, river beds, up and down steep hillsides, until either something vital gave way on the truck or the noose was put over the neck of the panting rhinoceros with the help of a long bamboo pole. Then the battle really started as the frantic beast rammed the lorry time and time again, rocking the heavy chassis and bending or denting the metal. Eventually ropes would be thrown round the feet and the animal thrown to be securely tied and then winched up on a following vehicle.

It was all most efficient, and the endurance and bravery of the men engaged on this work is beyond question. At that time it could also be said that there was no other way in which rhinoceros could be caught, and certainly the few attempts I made with Scoline were quite ineffective. It was only in potential that these two methods differed widely.

Soon afterwards the Game Department started a small capture unit



7. The first marked giraffe



(a) (i) *Top left.* Cow rhinoceros turns at biv
 (b) (ii) *Top right.* The rhinoceros is roped and snagged to the truck

8. CONVENTIONAL RHINOCEROS CAPTURE

(c) (iii) *Left.* The feet are securely tied . . .
 (d) (iv) *Bottom left.* . . . and the animal is winched on to the truck for the journey back to camp



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mainly to move rhinoceros, and this was a most laudable beginning of something which was only to develop its true potential years later. Carr used to be humorously scathing about the lack of results, and about the rumours of high mortality. The warden at whom this was aimed had made himself very vulnerable by releasing no information, so that stories of secret burial of carcasses circulated freely among the trappers.

The controversy has not entirely died to this day, as to whether it is better, quicker, safer and more humane for an expert trapper to catch by noose and motor car, than to immobilise by chemical compound, although to any knowledgeable person there is little doubt. Even in those days, however, the answer was clear. In the hands of expert trappers with a lifetime of experience and a livelihood at stake, conventional capture with a rope could be quick and humane. The men who were capable of doing this were very few. They charged high fees, and the breakage of vehicles was appalling. The method could only be applied on a small scale to supply zoos to cover their annual wastage or expansion. For conservation purposes the method and system were bound to be entirely insufficient to meet the growing need. After all, if one rhinoceros has to be sold to a zoo to pay for every one caught for relocation, not many rhinoceros are going to be moved to safety. Furthermore, it was obvious, even then, that a satisfactory method for rhinoceros was going to be evolved in the very near future. Once a wild rhinoceros could be safely and effectively tranquillised the whole process would be infinitely more humane, and cheaper, and the wild cross-country, metal-shearing race could be obviated.

The movement of Rothschild giraffe from farm land in the Kapenguria area fell into much the same category. The chemical capture business was not yet ready to deal with this problem of a particularly beautiful, and in Kenya rare, giraffe which was damaging crops. Undoubtedly the young giraffe could have been lassoed, although the older bulls would have to be shot. Eventually, however, these same giraffe were moved with tranquillisers. It was in fact to be less than a year before we could effectively capture giraffe, and not many more years before yet better compounds made capture a simple and routine business.

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To get back to the rhinoceros, it was only a few months before the request came to start moving rhinoceros from the Kariba Islands, forced as a result of the new dam. There no trapper could help, as vehicles could not reach the areas where the marooned rhinoceros remained, and the former hilltops, now islands, were mostly too broken to be negotiated by any vehicle then evolved. With the successful move of the first black rhinoceros to the mainland it was plain that the chemical capture method was doing a job that could be done in no other way, and many other examples were to follow. Soon there were instances of game wardens rescuing animals from snares, the capture of wounded animals for diagnosis and treatment, and in particular there was genuine scientific work performed by biologists through using methods of capture and marking. All this would have been quite out of the question if no cheap and readily available method of animal capture was possible.

Kariba was the next big step, and for this a better drug would be required. Tubarine had proved disappointing, and Flaxedil had only been tried experimentally on a few species of wild animals. Yet it gave indications of being more suitable and much safer than Scoline for the larger animals, and of being the most suitable substance tested up to that time.



CHAPTER FOUR

PRE-KARIBA

I

Our work at Kariba was not to commence until early in 1960. Fortunately the opportunity arose to make a fairly extensive field test of Flaxedil nearer home before this, when numbers of animals, and particularly giraffe, were threatened by plans to cultivate hitherto unused land in the northern regions of Uganda and eastward towards Kenya. Travelling in north-east Uganda, one sees the cultivated country give way to wilder terrain soon after passing Tororo, and particularly north of Mbale – the name itself meaning “far”. Beyond this settlement became sparser until eventually, north of Mount Elgon, one entered the semi-desert region of Karamoja inhabited by the nomadic pastoralists such as the Karamojong and Karasuk. Part of this magnificent wild country, which lies against the Sudan border, is now enshrined in the Kidepo National Park.

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the more populous areas. The intention was to plough land, to sink boreholes, and to dig latrines as incentives for the tribesmen to stay and farm. In this area were a number of giraffe. Whereas it was expected that the other animals would move out, it was hoped that at least some of the giraffe could be moved before the bush on which they lived was to be cleared away. From the ecological point of view, the settlement project was apt to do more harm than good. In my field notebook I made the following comment:

“We are working in the Chipsikunya and Nabagut areas of Nabiswa. This is just south of the Debasian Game Sanctuary and separated from this by the Greek River. Settlement is being encouraged by the Bugisu Administration and subsidised by clearing and the provision of water. Dams are also being built in the sanctuary itself, presumably not only for the game. Settlement of the south of the river will deny the use of this to wild animals. This means that a large southern section of the sanctuary will be lost. In any case the game is already being pushed out of the sanctuary by the increase in the numbers of Karamojong cattle, and the wild animals are being pushed into the Sebei in the dry season due to decreasing water in the sanctuary. If the plans to settle the south bank of the river are proceeded with, the whole area will be dislocated as a Game Reserve. A controlled area extending for two miles south of the river is the only hope of maintaining the sanctuary.”

This prediction unfortunately proved to be correct and the area was eventually de-gazetted in favour of a Reserve farther to the north.

The plan was to meet at a camp somewhat north of the area, the Game Department personnel having already gone up to build stockades or *bomas* to house the animals we hoped to catch. I called in at the headquarters, situated at the old administrative capital of Entebbe, to make a final check, and received the sort of directions all too often given to travellers in East Africa where information is usually impossible to obtain on the road, and a wrong turning might well result in a hundred-mile detour into complete wilderness. Dick Newton, the second in command of the Game Department, was a keen pilot, and famous for his instructions to passengers rash enough to fly with him in

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his rickety plane. They went rather like this: “Doors closed? Seat belt tight? Said your prayers?” His directions to me to get to the camp, way out “in the blue” were characteristic and classic: “Well you know the form: bear left round the mountain for fifty miles and then keep on going. You will come to some forks, but take no notice of those.” I did get there, somehow!

In my car I carried the usual assortment of equipment: projectile syringes with all the parts, and the instruments needed to prepare and repair, were all carried in the drawers of a metal tool-box. Basic quantities of drugs and laboratory ware for carrying out field dispensing were also carried in the tool-box, and larger quantities in a somewhat more elaborate wooden chest. This time the projector was a powder-charge gun, which could speed the syringes with fair accuracy over a distance of sixty yards or more between marksman and target, very necessary as the animals in the Nabiswa area had been hunted and were wary of man. Besides the drugs needed for immobilisation and resuscitation, the usual fairly extensive medical kit was aboard. In those days medical stations were very few and far between, and wherever one camped the word soon made the rounds: “*Iko Daktari* – A doctor is here”. Soon one would be greeted by a patient queue of people, old men with chronic sores, babies with fly-encrusted eyes carried by hopeful mothers, and sufferers from chronic malaria. The main ingredients of our stock in trade were mepacrin and sulpha drugs, castor oil, chlorodyne, and a huge pot of ointment and dressings. Extensive wounds were borne with stoicism and without the least attention in the form of simple washing to promote healing. Real tragedy often made its appearance, such as when toddlers fell into cooking fires, or children were left to die of pneumonia lying completely naked and without covering on the earth floor of a hut, while the family went about their business. On the whole, most patients responded amazingly to even the crudest treatments, having a real natural resistance and recuperative power which would rapidly assert itself with a little assistance from modern medicaments. The apocryphal story of the man standing smartly before the busily working bush-doctor’s table with a spear transfixing his chest is possible, and not quite as unlikely as it sounds. Without looking up the doctor asks, “Well, what is the matter with you?” and the patient,

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pointing at the spear blade protruding from his chest, answers, "This hurts me when I laugh".

The new powder-charge gun was a simple affair and consisted of a smooth sleeve of the requisite bore for the syringe, which was designed to fit into the barrel of a shot-gun. Small charges of black powder were weighed into 28-gauge shot-gun blanks and firmly packed down with wadding. To take the punch of the discharge so that it would fly true, the syringes were provided with a special metal tail and three flight feathers, which tended to catch fire so that the missile flew rocket-like with a trail of smoke in its wake.

It was a great improvement on the gas-gun, although still far from perfect. The thick wadding needed to prevent complete incineration of the tail feathers tended to coat the sleeve, so that extensive cleaning was necessary if the subsequent syringes were to fly the required distance, and the small quantity of powder, spread over the cross section of the shot gun cartridge, frequently resulted in uneven burning, so that the syringe would fall short. The fletching of the syringes with new tail feathers was a tedious and time-consuming business, and good feathers were not easily obtainable. Most annoying of all, the greater impact tended to distend the syringe barrel, so that leakage occurred at the threads of the nose-piece. The latter defect was only rectified when a better alloy was used for the syringe barrels, and a much larger nose-piece that screwed more deeply into the barrel. In spite of these problems that inevitably go with development, the proportion of hits was good and the overall results gratifying.

As we now had a drug with an antidote (see chapter 2), the safety margin of the immobilising drug was considerably extended, and the control over the state of immobilisation reassuringly increased. The animal could be restored or got to its feet as soon as the various procedures such as marking and measuring were completed. When relocation was the object of capture, the antidote could be given as soon as the animal was secured and tranquillised, thus eliminating much of the uncertainty and tension. Previously we had worried, when the animal went down, in case not all the drug had been absorbed, and the depression would become deeper as more entered the bloodstream from the place of injection. In this respect the remote injection system was more

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difficult to accomplish safely than anaesthesia in the surgical theatre, where the drugs are injected into a vein until the patient is unconscious and then immediately stopped. Once injected into the muscle the drug could not be retrieved, even though it should become apparent that the depression was sufficiently deep when only a part of the dose had been absorbed and entered the bloodstream. Now we had at least some control over the subsequent course of events.

Other means of first aid were not very practicable. Artificial respiration is almost impossible with a creature weighing over three or four hundred pounds, because of the physical impossibility of moving the rib cage. Secondly, the pressure of the heavy intestines of herbivores and the dead-space of the breathing tract of most animals is so very much larger than that of man. The dead-space is the hollow part of the breathing tract containing air which is not used by the body for oxygen, such as the wind-pipe and nose. If artificial respiration is only sufficient to move the dead-space air in and out of the nose or mouth, no oxygen will actually enter the lungs. A portable resuscitator had been designed, but the species that we dealt with varied so greatly in size and shape between one exercise and another that its use was limited. The availability of antidotes was also reassuring in case of inadvertently injecting one of the team. Not that any of us were likely to be mistaken for a hippo or giraffe, but the direction of the syringes was always a little uncertain, and an accidental discharge of a projector was always remotely possible in spite of all precautions. The nearest we got to such a misadventure was when the gun discharged itself as I closed it after loading. The barrel was pointing upwards according to routine, and the syringe eventually fell to earth I know not where. But we all looked upwards rather anxiously for several seconds, wondering if the missile would come whistling down at us from the sky – complete with elephant-dose contents.

A somewhat more serious event occurred when the cook-boy working for a pair of American scientists thought to turn doctor during their absence. To his way of thinking the possession of a hypodermic syringe was all that was necessary. When a local Masai came to the tent complaining of an infection that was causing him much concern, this resourceful man cast about and apparently took a little of

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everything he could find, which probably included some nicotine alkaloids which had been used for immobilising purposes. He mixed these thoroughly in a tea cup, then took a syringe and injected the concoction – presumably after a suitable fee had been levied – whereupon the Masai sank to the ground to remain unconscious for several days in spite of the ministrations of the local hospital. Unfortunately not even the cook himself could reveal the exact procedure he had followed, so that the ingredients of this obviously most effective human immobilising mixture will never be revealed.

2

The compound we were now using for the larger mammals was similar in its effects to Scoline in that both immobilised by paralysing the voluntary muscles of the body. That is, the muscles which move the skeleton as required, rather than the muscles of the intestine, which are not under voluntary control. As a result, the animal is incapable of locomotion or to support his weight. The muscles are affected selectively: firstly, the groups supplying the face and tail, then the muscles of the legs.¹ The muscles which enable the animal to breathe, those which move the ribs, abdomen and diaphragm, are affected later. In theory, therefore, it is possible to paralyse the animal sufficiently to stop it running or standing, while it is still able to breathe. This is difficult owing to three factors: the difference in individual reactions, the variations in body weight, and the speed of absorption from the place of intramuscular injection.

All these are largely unpredictable. Individual differences in reaction between apparently identical animals is well known in veterinary practice. Consequently the calculated anaesthetic dose, based on the body weight and physical condition of the patient, is used only as a preliminary guide. During administration each dose is adapted biologically in response to the patient's reactions as it is administered. Most veterinarians would be very loath to administer an anaesthetic compound intramuscularly, even though the patient could be accurately weighed, premedicated, tested for debilitating conditions, and prepared by special dieting for anaesthesia. Field work with wild animals not only renders



9. CONVENTIONAL RHINOCEROS CAPTURE. (a) (v) Above. Releasing the ropes calls for smart footwork to scale the 8-foot walls. (b) Below. In contrast a drugged white rhinoceros shows no reaction





10. Judy Carr Hardie and the smallest African antelope

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the intramuscular route mandatory as the only feasible way to inject from a distance, but the exact place in the body musculature cannot be selected accurately. Consequently the injection may be made in places from which the drug is absorbed so slowly that it never reaches effective blood levels. At other times it may inadvertently be injected into a vein so that the animal becomes deeply affected and its recovery jeopardised.

The actual difficulties encountered when incapacitating animals under field conditions are thus considerably greater than the problems of weight estimation, although this is in itself formidable. In fact the dice are loaded heavily against us in that we know nothing about the animal we intend to capture except the reaction of the species, and possibly the particular variations in the local race. In addition to the problems already mentioned there is the lack of control over the physical activity of the animals either before or after the injection; nor can we be certain of being able to render assistance when the drug takes effect. In many cases the injected animal will run fast. If it goes down suddenly, as it tends to do if immobilised with paralyzing compounds, it may take us half an hour or more to find it by following tracks or by random search.

Paralysing compounds do not ordinarily affect the central nervous system. Both sensation and the normal brain activity of the animal remain unaltered. If it is frightened at the time of injection it will run and only stop when its muscles become so relaxed that it becomes immobilised. In this process there is very little in the way of an intermediary stage; the animal is running one moment and completely stopped the next. This effect is brought about by blocking the nerve impulses to the muscle at the place where the nerve and muscle join. The exact mechanism of action differs, however, in one important main aspect. The Scoline acts by mimicking the effect of the chemical normally released at the nerve ending during muscle contraction, so that subsequent nerve impulses become ineffective until the Scoline at the nerve ending has been destroyed by the body processes. The Flaxedil forms a block so that the chemical nerve substance cannot get through, but a breakthrough could be achieved with assistance.

Little could be done to hasten the destruction of the Scoline, a process which had to rely on normal body functions. The removal of the

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Flaxedil block could be hastened by inducing a rapid build-up of the normal chemical formed at the nerve endings. This was possible with the use of the substance Prostigmin. It can be injected, and actually functions by inhibiting the enzyme that normally destroys this chemical nerve transmitter, thus permitting its rapid increase. As it increases it can overcome the Flaxedil block and so restore movement to the paralysed muscles, that is, if the excess of immobilising drug was not too great. In any case the judicious use of Prostigmin should improve the breathing, so that the body has a chance to eliminate the immobilising compound by the usual excretory channels.

Prostigmin, however, does not act in the sense of a chemical antidote. It does not neutralise the drug in the body in the manner that an acid is neutralised by an alkali. The effect is obtained by a physiological antagonism; the body is assisted in overcoming the drug, and there is no action by the antidote on the drug itself. The understanding of this mechanism is important in relation to the limitations of this immobilising method which will be discussed later, and also to appreciate the difference between this and the action of other antagonists such as those to morphine.

3

A somewhat different type of game rescue operation was set up about this time in the more central part of Uganda around the Nabashose area. This was mounted as an attempt to save animals destined to be shot for tsetse control. The intention was to eradicate game over a large part of the country in order to deny food to the tsetse fly, in an attempt to eradicate this fly and so make more land suitable or available for cattle. The animals scheduled to be killed were buffalo, waterbuck, eland, reedbuck, oribi, duiker, warthog, giant forest hog, topi and lion, and some 900 head a month were eventually to be killed by a hundred hunters. There was a large body of scientific opinion which condemned this shooting as wasteful and largely useless. Detailed studies such as those by Dr P. E. Glover² in Kenya, showed that the tsetse could be controlled more effectively and ultimately more cheaply in other ways. Furthermore shooting without prior fencing or the use of natural

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boundaries to game movement, was a process that would end only with the extermination of animals over an ever larger area. While sound scientific opinion built up against this appalling slaughter, the whole system became part of Government procedure, and was to go on year after year unchecked. The larger animals, such as eland and buffalo, soon disappeared, but as predicted the fly fed on wild pigs and small antelope such as duiker, which were difficult or less attractive to hunt. In my 1959 field notebook I made the following comment which was the result of detailed discussion with scientists who knew the area and the situation:

“The area scheduled to be shot out comprises that bounded in the north by the Katonga River, to the east the township of Masaka, west the Mbarara-Kahunge Road, and south the Mbarara-Masaka road – in fact the area mainly round Nyabashosi Zaza.

“However the areas to the north and south of the Mbarara-Masaka road form *one ecological game unit* stretching down to the Nakivali Lake System in the south.

“In any case the land north of the unit would offer ample space for increased production if the land was used properly. The provision of too large a land area for indiscriminate settlement will encourage wasteful land use, while the potential income from hunting is irretrievably lost.”

As the Game Department failed to influence the Government decision on this eradication policy, it was decided to launch a large-scale drive with the object of capturing at least some of the larger game such as eland, topi, hartebeest and waterbuck. Many rallied to this cause with funds and offers of physical help, and a battalion of the Kenya African Rifles was sent to assist. With their help huge enclosures were built in a valley with long arms of carefully constructed and camouflaged fencing spreading out in the shape of a funnel across the valley sides. When this was completed the herds were to be driven into the arms and eventually into the enclosure itself, with the help of an aeroplane. It was a magnificent venture, and the fact that it did not work detracts nothing from the concept. In retrospect it is possible to say that mistakes were made, but the greatest mistake was that the attempt was

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not repeated regularly until we knew exactly what the mistakes were and the way in which they could be remedied. Greater use could also have been made of those who had already achieved successful drives on a smaller scale.

The work of the aeroplane pilot was particularly impressive, and time and time again he brought herds of eland near and even into the arms of the enclosure, with great skill and daring. The animals would come at a great pace, but tended to flee uphill instead of keeping to the valley floors. When they were forced along the valley by careful herding they immediately perceived, by smell or sight, the brand-new structures and broke back against all attempts to force them on.

One of the principal differences between John Seago's corrals and the Nyabashosi structure was the newness of the latter. The scheme might well have worked had we been able to allow the whole thing to weather for a year or so. As it was, the ground was trampled and churned by the well-meaning army battalion and its transport. Platoons of men were dispersed behind the arms of the funnel. These men were obviously not hidden from the animals and could probably also be heard and smelt.

Several times it seemed as if success was in our grasp and the herds ran well into the funnel, only to break back or even jump over the heads of the men closing the funnel mouth. The aeroplane flew back and forth like an aerial sheepdog, taking considerable risks and being flown in a way that could only have been achieved by an ex-wartime pilot. Passengers in the plane assisted with thunderflashes. Eventually a shot-gun was inadvertently discharged in the excitement, blowing off most of the single strut that was essential to hold on the right wing. Irv Buss, a tall, laconic Fulbright scholar who had come to Uganda to study elephant, described his reaction in a way that was to become a classic. Over tea that evening he related in his western drawl how he had suddenly become aware that most of the strut had gone: "I looked at that strut," he intoned slowly with masterly understatement, "and I said to myself, My, oh! My."

As the animals broke back yet once again on our last attempt, a frantic Game Warden leaped from his car, and with a rugby tackle brought down a zebra foal. The exercise was not in vain, we were not

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to go back empty-handed. The little zebra, our single trophy, was photographed by flocks of reporters from every possible angle. At least they had something to show for their trip and days of waiting. We wended our way homewards saddened by the failure and having to leave the doomed animals to their fate. Once more I cogitated on our extraordinary inability to communicate with animals, and wondered if our approach was not radically wrong. After all, in what way did our emotions differ from those of the trophy and meat hunter, and the predator, from whose depredations these very animals were the survivors. True, our ultimate aim was radically different, but probably not our approach, which was one of coercion backed by several hundred men and far too many internal combustion engines. Perhaps one day some gentle, insignificant unknown Dr Dolittle would succeed where force, funds and Government Departments had failed. Meanwhile it seemed fairly clear that game drives should be possible, and that it was only a matter of time and the expenditure of the necessary effort in research into the right methods; we had so much to learn.

4

Once more my old Vanguard pick-up, in which I had driven from London to Nairobi across the Sahara Desert in the spring of 1956, was loaded. The desert trip had been tough, but mainly because of the uncertainty of its outcome, and the thought that a burnt-out clutch would probably mean leaving the car and its eight hundredweight of luggage, spare springs, shovels and sand mats as a landmark in the desert, as others had done before. Such directions as were available at that time did, in fact, give compass bearings on car wrecks. An added thought was the possible loss of the substantial deposit extracted in Algiers against just such an eventuality. The subsequent journey through Central Africa had, in many places, been rougher, and the shipment across wide, deep rivers in canoes on to which the heavily loaded car had to be negotiated from steep muddy banks, while the paddlers leaned back to watch with lazy indifference, often more hazardous. But somehow there was always the hope that something could be salvaged from a river bottom, or an essential spare might be obtained, although there

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was little to be seen that might instil such confidence anywhere between Kano in Nigeria and the Belgian Congo border. Except, let me hasten to add, in the then British Cameroons, where a delightfully pleasant young English District Officer greeted us with the words, "I expect you would like a bath." This bit of homely hospitality, following on border after border where the curt, rasping demand "Passeport" had been the form, was most overwhelming. While still not fully comprehending, in my battered state, I waved my passport at him, he added, "My dear chap, I should keep that till after breakfast tomorrow." In East Africa, at that time, such hospitality was by no means unusual, but this was certainly not the case in all countries in Africa.

The various places to which I now took this excellent but tortured vehicle were rougher than anything on that trip. Good though the pick-up was, it had no low gears, so that I had to take muddy and flooded patches at considerable speed to avoid getting stuck, instead of at the stately crawl in low ratio four-wheel drive of the Land-Rover or Jeep. Hidden rocks in the mud or water would then cause the whole conveyance to leap up in the air, or sometimes come to a shuddering stop as the dirty water hid a washed-out culvert, and I carried a five-pound hammer specifically to beat track rods and other parts back into a semblance of shape commensurate with continued progress. It was not until 1961, when the Wellcome Trust gave support to my work, that I was provided with a Land-Rover to facilitate my work, and this machine was to give me trojan service for the next eight years and to this day.

That November in 1960 I followed the now familiar 198 miles out of Kampala almost due west through Mubende to Fort Portal, to try once more to capture elephant. There, petrol would be bought to fill up the tank and the spare cans. A small café called the Glue Pot, because those who entered were likely to stick, was used as an unofficial post office for messages such as a change of venue or news that the road was impassable. If all was well we took the road to Bundibugyo which led past the Kichwamba Hotel, perched on the side of the Ruwenzori massif.

From Fort Portal the Portal peaks loom darkly, completely hiding the glaciers behind when seen from that near distance. In fact it is a muddy

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three days' hard trek on foot through giant nettles and along winding game trails, and eventually through giant heath almost forty feet high, before the mountain proper can be seen. Even then a further ascent through slimy giant groundsel and ragwort is necessary before reaching the snow. Travelling in the Ruwenzori – especially the day we got temporarily lost – one has the overwhelming feeling that one step off the narrow trail lies ground that has never yet felt the print of human foot. And why should it? The local people had little cause to enter such inhospitable country. As my safari boy expressed very eloquently on a later occasion when I decided to stop off at Moshi for two days to make a quick dash up Kilimanjaro: "I cannot understand why Europeans always want to climb mountains." He continued, while struggling up as far as the top hut to which he was carrying rather less than half our pack, "Every one of them, men, women, children, they all want to climb mountains: and then what? They come down again. To what profit? Nothing!" The last with a profound shake of the head.

It is extremely doubtful if any of the mountains in Africa had been climbed before the advent of the Western explorer, who, imbued by curiosity and an incomprehensible feeling of competition, climbed to the peaks, to give them names of a patron or monarch to figure later on the maps of Africa. Some of the mountains have a steel box on the top in a suitable cache, containing a book in which successful climbers can sign their names. A jovial farmer laughingly told me a story against himself, relating how he had taken a well-known mountaineer up Mount Elgon on to which his farm abutted. Elgon is only just over 14,000 feet, and, until quite near the top, an easy walk; the book is on top of a vertical rock standing like a volcanic plug on the apex. A farm boy carried the picnic hamper. "Here we are," the farmer said when they reached the base of the final rock. "There is a book on top of that stone, but I'll send the boy up to get it for you while we have some beer." Then with a chuckle, "and before you could say 'knife' there he was himself clambering up that rock like a blooming spider." The adventurer in question later acquitted himself extremely well on Everest, and clearly took mountaineering much more seriously than did my farmer friend.

On the road to Bundibugyo (the "u" is pronounced like the double "o")

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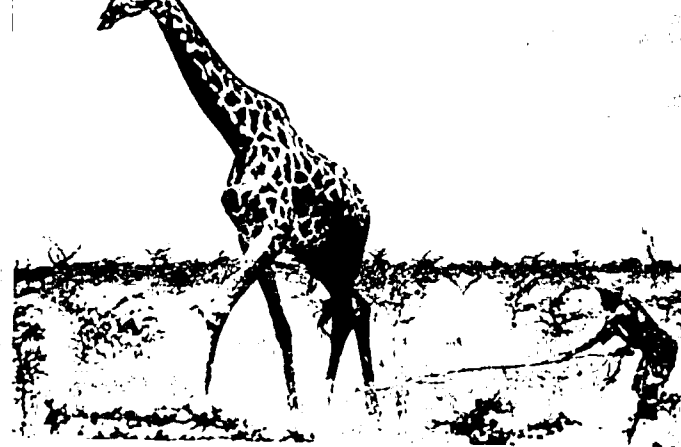
in look) is a fig tree, and here an almost invisible track leads right to the Semliki proper. It drops down steeply from the shoulder of the mountain, with many hairpin bends round which the local village bus or a Works Department lorry full of stone may come roaring along more than half out of control. The West African habit of writing religious aphorisms on the front and sides of their trucks could be singularly apt in East Africa too, although it might be clearly more unnerving to see a bus or lorry come careering down a steep narrow track with a vertical wall on one side and a drop on the other side, emblazoned with the words "Prepare to meet thy Maker", as I had seen in West Africa.

The Semliki was wet, and great stretches were covered with a green slime. I carefully watched the milometer, all the while making a continuous mental calculation of the decreasing number of miles I might have to walk in the increasing darkness if the mud proved deeper than my wheels. We were to meet at a certain waterhole where a tent was provided, first Hal Buechner and I, travelling separately, and later Bill Pridham. Hal and I arrived at much the same time, and found the waterhole, and the discouraging fact that elephant had recently found it too. The supposedly clean water was a churned-up mass of mud that smelt strongly of elephant and we recalled ruefully that elephants' bathing habits leave something to be desired. We desired to make tea, and added several extra spoonfuls of the strong local brand called Simba Chai or Lion Leaves. The resulting brew was a curious elephant grey, but tasted surprisingly of tea. But this was deceptive. The elephant effluvia had been bound by the tannin. In contact with our stomach acids, this bond was disrupted, and the elephant extract being freed, rich, pure, indisputable elephant then came roaring and trumpeting down our noses.

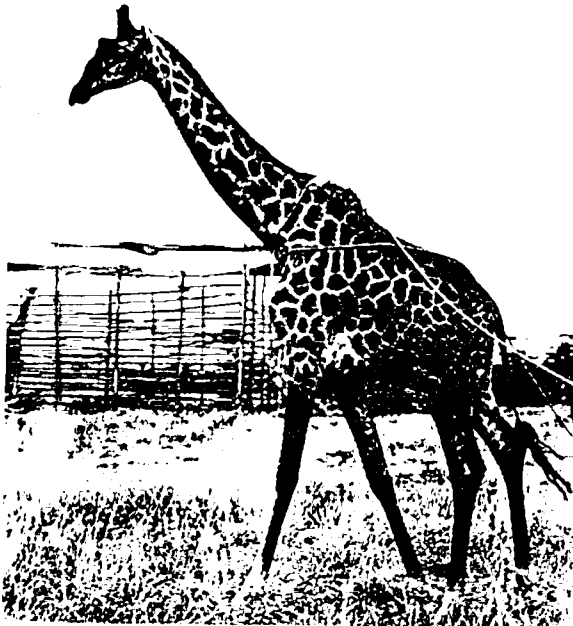
We had come after elephant, and we were not to be disappointed. Three smallish but mature elephants went down at the calculated dosage rates. Thus, on Wednesday, 16th November, I was able to make the following notes:

"Female with well-grown calf several years old. Estimated body weight 5,500 lbs. Dose of 7 ccm Flaxedil solution at 800 mgm per ml.

"At 09.43 hours injected in right shoulder from about 16 paces.



(a) (i) *Left.* Placing the first rope on large bull

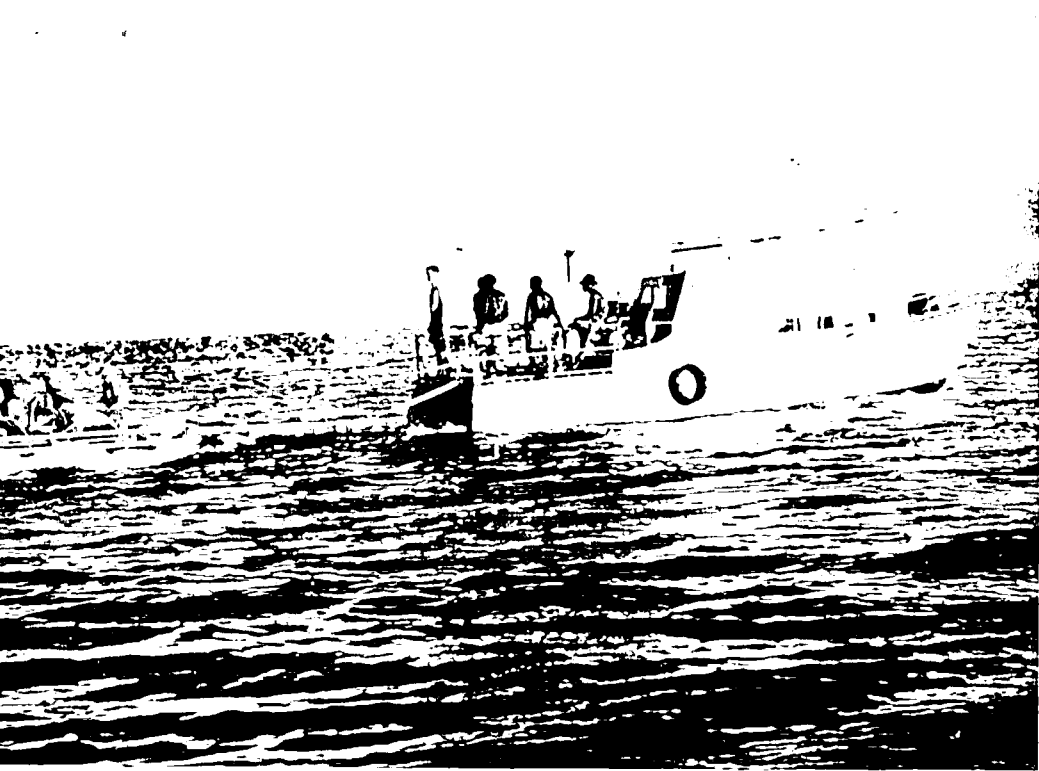


(b) (ii) *Left.* Brought to a halt, a neckline is placed in position

II. GIRAFFE ARE READILY CAPTURED AND LED WHEN ONLY LIGHTLY NARCOTISED. KENYA



(c) (iii) *Bottom left.* He may kick straight out from the shoulder with devastating effect
(d) (iv) *Bottom right.* Direction controlled he reaches the enclosure several miles away



12. KARIBA RHINOCEROS RESCUE. (a) The first rhinoceros rescued at Kariba
(b) The Kariba rhinoceros rising after the raft has been pulled ashore



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Undisturbed and continued feeding after moving only a short distance away.

"10.02 hours unable to lift trunk above the horizontal, later hanging limp.

"10.12 hours rocking on feet, could be approached for painting.

"10.15 down. Measured, marked. (i.e. ear-marked and by painting an identification number on its rump). Calf was very troublesome and tried to see us off.

"10.30 one ccm Prostigmin at 100 mgms per ml injected intravenously.

"10.35 active. 10.46 up and away."

So it was possible, and "S 1" (Semliki 1) now roamed the Semliki and possibly the Congo, or north towards the Butiaba flats or south into the Queen Elizabeth Park. Perhaps she would not be seen again, perhaps she and others would give us vital information. At least the Rubicon had been crossed, and elephant capture and marking was now possible. During that trip two more were added to our score.

Later, on a subsequent visit with Cecil Luck, we achieved eight and did some exceedingly interesting experiments on standing elephant by measuring the blood flow through their ears as they flapped, and also the difference in temperature between the blood flowing in the arteries and out through the veins. This was a preliminary to other work that was to establish the elephant ear as an important cooling or temperature regulating organ. The tractable but standing elephant was achieved through a further advance in the technique. The addition of potent tranquillisers to the Flaxedil reduced the elephant's will to resist an immobilising drug, so that the dose could be reduced from about 1.2 to 0.8 or 0.9 milligrams per pound of body weight. Even the sober Bill Pridham was surprised and happy to add flourishes to the numbers painted on the rumps with Sadolins Rubberized Road Paint; an experimental adjunct to our other marking systems. Bill's calm was not disturbed in the least, and a full inch of ash at the end of his cigar attested to his complete mastery of the situation and faith in our alchemy. This female also had a big calf, and was therefore mature.

The difference in size between these Semliki or forest elephant and a big savannah bull is startling. Fortunately we did not get around to

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doing the latter until several further steps in the evaluation of drug technique had been taken. With the techniques then used the physical bulk of the drug for even a small bull was very great, and the quantity of fluid and the strong concentration of the drug made absorption difficult and slow. In fact the quantity of Flaxedil which one would have to inject as compared with the amount of drug which was used in later years was about 3,000 times as great, or 12 grams for a fairly large bull, as compared to only 4 milligrams by the later method.

The end of this year, 1960, was to take me to Zululand, on the first and pilot exercise to move the White Rhinoceros to other places; this served as a stimulus to the evolution of the more potent drugs.

5

We had made some progress during the last two years, but we still considered ourselves as beginners. It came, therefore, as a great surprise to be asked to assist with a venture outside East Africa. The request came from A. D. (Archie) Frazer, Director of the Rhodesian Game Department, and it brooked no denial. Although the possibility of rhinoceros capture and relocation had already been discussed at a recent meeting in Warsaw of the I.U.C.N., and I had stated my belief that it should be possible, certainly in the not too distant future, we were taken somewhat off our guard when the invitation came, particularly as the time in relation to our academic year was not good. Only one air passage was provided, and clearly it was not to be squandered on a visit of only a few days. It was decided to share the passage monies to pay for the petrol for two trips by car. I was to go first, to start the move off, and John Lock was to follow some weeks later when I was due to return.

It was a substantial journey from Uganda to Kariba, and would comprise hard driving with very few stops during daylight hours. The first stop was to be after 450 miles of the rather bad road, as it was at that time, to Nairobi in Kenya. The route then turned south into Tanzania, past the farming centre of Arusha, past the road that leads off to Ngorongoro Crater and the Serengeti Plains, to the almost indescribably bad road leading to the railway centre of Dodoma for the second night stop. Onwards by almost equally bad but more scenic road over the

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Southern Highlands of Tanzania, through Iringa and Mbeya, to the border town of Tunduma. This, in those halcyon days, was the first true border where passports had to be produced. From there, avoiding the Copperbelt, a good but dusty and corrugated road ran due south for some 600 miles of unrelieved Mopani bush to Lusaka. Only one small hotel *en route*, euphemistically called the Crested Crane, had fuel, and the treacly stuff they sold was a good test for any car's filters. From Lusaka the way led over two parallel strips of hard-top, on which the mesmerised driver had to keep his near and off wheels, so that the possibility of collisions with on-coming cars trying to do the same seemed very real indeed. On through Livingstone to Kariba township; a long journey but worth every dusty mile, for the privilege of taking part in the grandiose, daring and magnificently executed Kariba Animal Rescue Operation.



CHAPTER FIVE

OPERATION NOAH

I

When the Zambezi River dam was closed to form Kariba Lake (eventually creating 2,500 square miles of water) it was thought, in so far as serious thought had been given to the problem, that the animals in the basin of the new lake would move away from the rising tide to safer ground. The area involved stretched approximately 175 miles upstream towards Livingstone, as far as the Devil's Gorge in the west.

The impact on the wildlife, however, was far greater than anyone had imagined. Not only would a large number of wild animals be displaced or drowned, but the riverine vegetation of the Zambezi, which was the source of food for animals from far afield during the dry seasons, would be inundated; at the same time it would become desiccated for

another fifty miles below the dam. In addition, many animals would have to be killed to make way for the Batonka tribe which had to be resettled after eviction by the mounting flood from their homesteads on the Zambezi banks.

Very soon after the closure, the plight of the wild animals became evident. It also became apparent that although a formidable sum of approximately £80 million had been voted for the construction of the dam and power houses, there were no financial provisions within this budget for rescue operations! The rapidly rising waters (in the first week the waters rose 48 feet against the dam wall, and 85 feet by the end of the first month) flowing down the 2,000-mile-long Zambezi, ran outwards between the hills in a series of channels. These curved alongside and eventually behind areas of high ground on which the animals sought refuge, forming a number of islands. These islands would in turn be bisected and reduced in size until they were eventually completely overwhelmed by the rising waters. The waters advanced upon the stranded animals from all sides rather than outwards from the river, so that most were marooned and subjected first to starvation, and then to the threat of drowning. They had as little chance of escape as the human populations in the biblical flood between the Tigris and the Euphrates.

Public conscience was eventually stimulated by press reports and in 1959 a sum of money was made available, principally by the Southern Rhodesian (now Rhodesian) Government. The raising of funds elsewhere was largely due to men such as Colonel R. A. Critchley, D.S.O., M.C., who, as President of the Game Preservation and Hunting Association of Northern Rhodesia (now Zambia) launched an appeal, locally and indirectly, through the Fauna Preservation Society of London. £14,000 was raised for the Northern Rhodesia Volunteer Service and the Fauna Preservation Society collected £10,000.

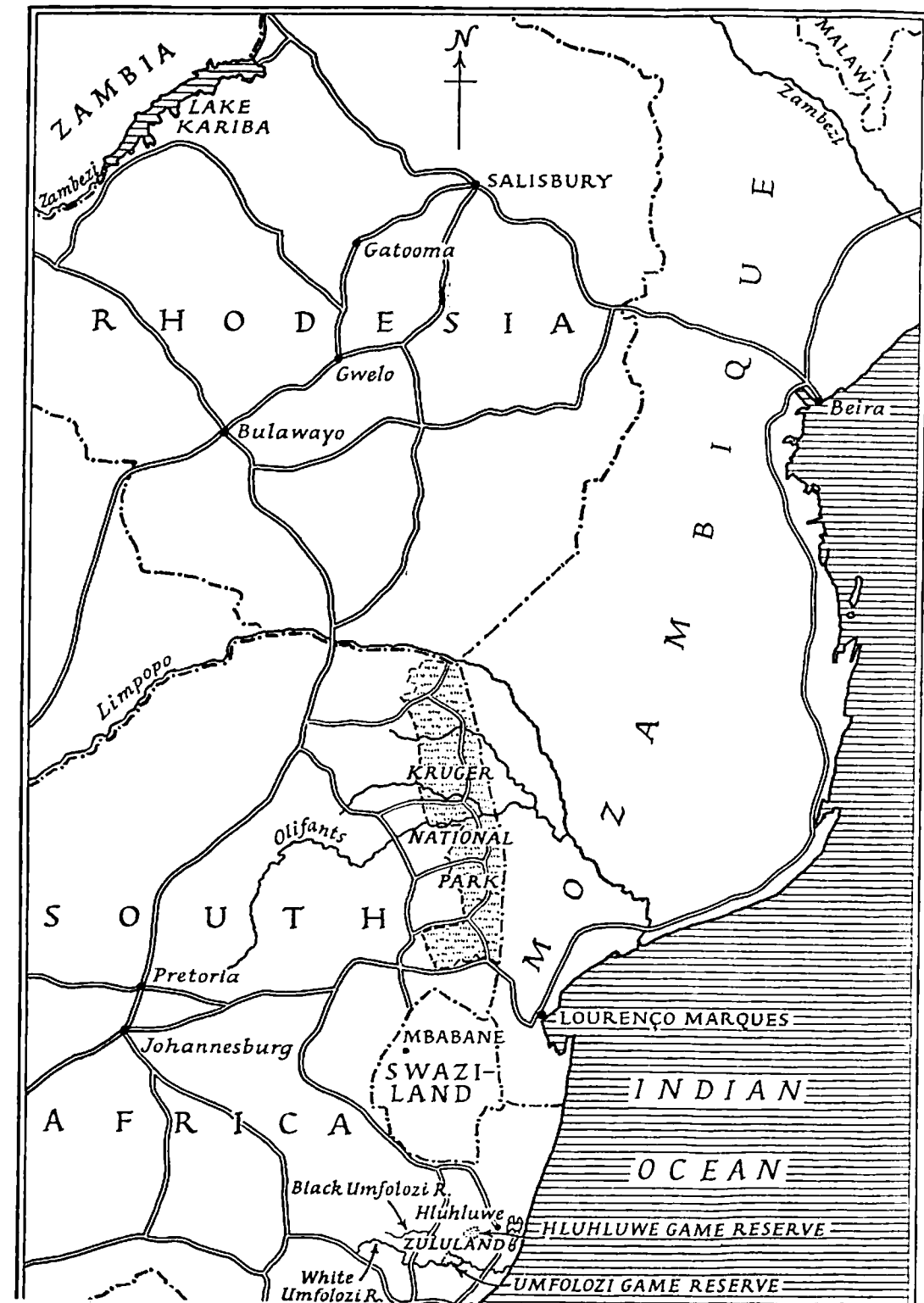
By September 1959 about 150 islands had been submerged, and an estimated 500 remained to be cleared of animals. It became apparent that the whole project was to be one of fantastic magnitude, a challenge to be equalled only by men totally dedicated to their task. But more than this was needed. Boats, fuel and food supplies to the various camps necessitated a large financial undertaking. The Fauna Preservation

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Society's contribution provided for the essential purchase of a metal parent ship.¹ The Game Preservation and Hunting Association provided a number of volunteers, and three 18-foot steel boats powered with 40 horse-power engines. A similar fleet was procured for the team from Southern Rhodesia which was largely government sponsored.

At the time the rescue operations were commenced, many factors were yet unknown. The swimming ability of the animals concerned was only one of these. This was far less than had been thought. Revised estimates gave a distance for good swimmers such as waterbuck as one and a half miles, followed by kudu, one mile, down to 300 yards for impala. Male kudu, however, had difficulty in keeping their heads above water owing to the weight of their horns. Others, such as buffalo and adult elephant, seemed able to cope and get to the mainland unaided. The disorientation of the denizens of the area must have played a part; they just didn't know where to head and in which direction safety lay. Also most of the animals were strongly territorial, and some, when moved, made their way back to the very islands from which they had been rescued, and would have been strongly disinclined to make their own way through strange country and the territories of other animals. In other cases the animals did not leave their habitat in time. This happened even to birds such as guinea fowl; they stayed until they were too weak from hunger to reach the mainland.

When animals perished, they did so only in spite of superhuman efforts on the part of the small handful of men dedicated to saving them. Visiting the many small islands which were getting too small or too bare to sustain the animals marooned upon them was a colossal task, which entailed long journeys over the lake, starting well before dawn and ending sometimes well after midnight. During that time the party would be exposed to intense heat on rocky islands, rising to about 110°F or more during the day (the altitude is about 1,500 feet) and bitter cold in spray-drenched clothing while battling against a headwind at night. Shortage of rations was commonplace; on week-long trips, old-timers had a problem to keep up morale amongst their younger helpers when rations got low, or for days on end offered nothing better than stale bread and fig jam. The endurance of those engaged in the rescue operations was beyond praise, the resource and quality of leadership of the



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team leaders such as Rupert Fothergill, Tad Edelman and Richard Owen, of the highest standards of attainment.

The method of collecting animals from the islands was simple but effective, and was gradually developed through trial and error. To catch the small antelopes, such as impala, nets were used. These rope nets, about 150 yards long, had been employed hitherto for tsetse control operations and the less reputable activities of poachers. They could be arranged in a circle, with an entrance which could be pulled up. These nets were usually strung across a narrow part of the island and camouflaged with grass and branches so that they were not seen by the animals until it was too late for them to take effective avoiding action. Once entangled in the net, the antelope were seized and slung across the catcher's neck, front and hind legs held in each hand on either side of the chest; sometimes the head was held separately by an assistant. Larger antelope proved more difficult to handle, and were found to survive better if first driven into the water. This seemed to have a remarkable taming effect, and they would permit a degree of handling which would have been resisted to the death on land. Some even appeared almost grateful to be hauled on board the boat. This method had a double saving action. Reduced struggling reduced the threat to life, and the water kept the body temperature from rising excessively. Captured animals tend to die of the abnormal temperature rise induced by struggling, especially in animals that do not normally sweat to keep cool. The essential body processes become impaired; circulatory efficiency decreases and constraint contributes further to this, causing local excessive overheating and eventually death.

Even the small animals benefited greatly from being put into water, so that they could swim ashore while the boat was still some distance from the mainland. Thus a degree of orientation was provided which would otherwise be lacking in an animal "dumped" on land after suffering the trauma of being overwhelmed and held by that predatory beast - man!

Some animals, far from being grateful, returned to attack. The bush pig was one of these. Rupert Fothergill, imperturbable as always, developed the casual habit of throwing his bush hat in the path of one of these formidably ferocious little animals, which would then vent its

Operation Noah

rage on this object instead of on the legs of members of the team. The multiple triangular holes in his hat attested to the sharp teeth and razor-pointed tusks which can inflict instantaneous and grievous damage on luckless persons not quick enough to escape.

Rupert Fothergill, with three helpers, had been the first in this animal rescue, due largely to the foresight of Archie Frazer as Chief Game Officer. In the areas to be flooded, shooting was attempted to try to scare the animals away. This met with very little success, although the greater amount of hunting that had occurred on the northern bank over the years made for smaller concentration of game animals to be rescued.

2

When the dam was closed in December, 1958, these four men were the only ones ready to fight against the potential disaster of many thousands of animals drowning in the rising waters. By the second month, the lake was 100 miles long. By June of the following year already 1,000 animals had been rescued in spite of the shortage of equipment and tremendous difficulties. The islands were often hard to locate and distinguish from the surrounding acres of Mopani forest; sometimes no islands remained in the half-submerged labyrinth of bush and trees. There was considerable danger of going adrift in the maze of changing contours. The vegetation through which the boats had to be forced was often crawling with poisonous snakes and scorpions. The animals to be rescued, such as bushbuck, were inclined to try to find refuge in the densest scrub. Inadvertent lacerations suffered by the rescue team would remain unhealed through continued contact with water. Besides antelope there were warthog, bushpig, porcupine and antbear, as well as baboon and predators such as civet, and of course snakes. Also resentful elephant, rhinoceros and buffalo, loath to leave the islands, were ready to vent their displeasure on the rescuers. Crocodile constituted an ever present danger, and no doubt devoured a great number of drowned carcasses as well as taking live animals from flooding islands. On some islands the antelope became extremely emaciated from lack of food, or died from eating unsuitable vegetation.

Far from assisting rescue operations, some animals hid in holes and

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had to be dug out. Rupert relates how he found a big baboon, a warthog and a porcupine in one antbear's hole! The antbear's whereabouts at the time were not divulged. The honey badger or ratel also proved most formidable to handle, being fierce and well-armed, of a height when standing to attack that was just right to cause intense dismay to the men of the team, far more so than if the indefatigable little assassin had been somewhat larger or smaller. Monkeys could most safely be picked up in the water, often by individuals swimming after them. The large antelope, such as kudu and sable, were also more easily and much more safely handled in this way. The most difficult animal to handle was the zebra, which was prone to drown and die of heart failure while barely out of its depth, but which would fight with hooves and teeth against rescue attempts.

In October 1959 a 45-ft. all metal vessel powered by two Perkins diesel engines, arrived for duty as parent ship. This enabled operations to be undertaken farther afield, and valuable time was saved by reducing the distance for refuelling and supplies. It also lessened petrol consumption as the diesel-powered boat could take smaller craft in tow until near their scene of operation.

Two new nature reserves had been allocated to take the displaced animals and to replace the areas in the lake basin. These were the Chizaria Reserve, which bordered the lake for 75 miles and for a total of some 3500 square miles, largely created as a functioning unit by Leslie (Greg) Gregory, and the Matuziadona Reserve of some 200 square miles administered by F. H. (Lofty) Middleton-Stokes, who stood some 6 ft. 5 ins. in his socks and thus, apart from other reasons, was a most agreeable man for me to talk to! Some of the animals rescued by the northern team were taken by road to the Livingstone Game Reserve some 300 miles away. It was most important that they should be released in safe areas, as the disturbed and battered beasts readily fell victim to the spears of waiting tribesmen.

Elephant were rescued mainly by making life on the islands unpleasant for them with thunderflashes and by using beaters, which moved off buffalo too, although occasionally these had to be shot. The one animal which resisted all persuasion or force to enter the water was the rhinoceros. Schemes to dig pits or lasso them were discussed

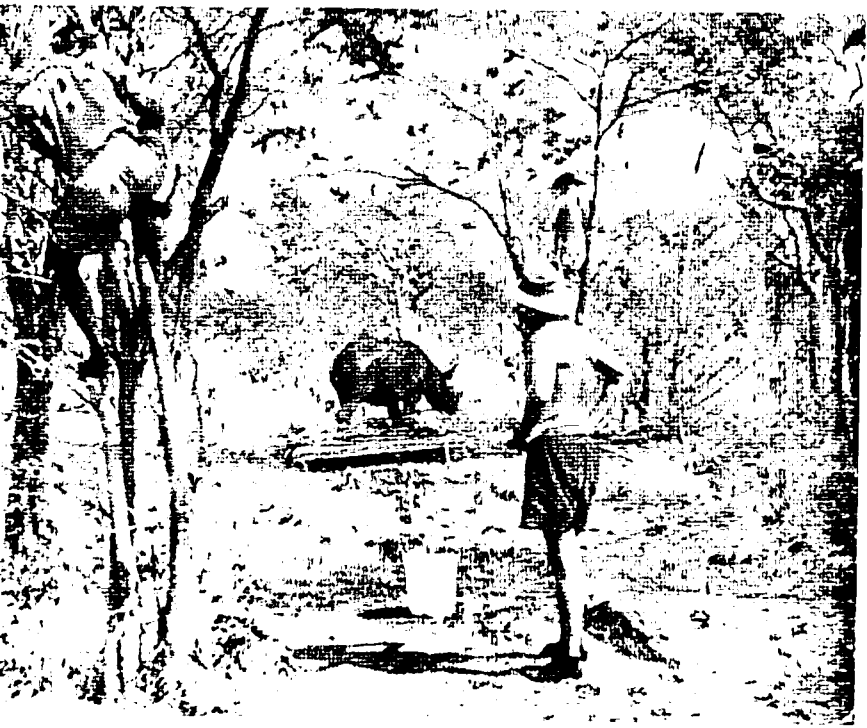


13. (a) Ian Player with two simultaneously tranquillised rhinoceroses
(b) John Clark moving a tranquillised 4,500 lb rhinoceros





14. (a) A rhinoceros slows down while the rider watches warily



Operation Noah

but abandoned as impracticable. One rhinoceros, which the team named Greta, was subjected to an intensive rescue campaign which she resisted ferociously. Even a small aeroplane, used to reconnoitre the floods, was employed in a final attempt to persuade her to try to swim. She was eventually left in peace pending more sophisticated methods, but regrettably died soon after, probably from water which had been inhaled during the fruitless chases while she pursued her well-intentioned tormentors into the lake.

Tranquillisers had already been employed at Kariba to quieten antelope caught in nets. At various stages injections of adrenalin and heart stimulants such as Coramine were advocated to combat exhaustion, although cortisone or adrenocorticotrophic hormone might have provided more rational treatment. The Capchur gun had, however, not been used, since the necessity of catching numbers of animals quickly was what counted most. In addition, the only immobilising drug readily procurable with the capture equipment was nicotine salicylate, and this was rightly regarded as unsuitable for rescue operations. The plight of the rhinoceros, and the knowledge that many more of these animals would be found, made it mandatory that chemical capture methods should be used. It was Colonel Critchley who took the initiative in suggesting that an invitation should be sent to us so as to bring to bear on the problem first-hand experience in capture methods for large animals. Many incidents in the future were to show the wisdom of this decision, as the chances of immediate success were otherwise very slim, and the difficulties and dangers many.

3

Early one morning we set off to "Rhino Island", the motor cruiser *Ark* towing the newly constructed raft, in happy anticipation of capturing our quarry. The construction of the raft had been an interesting exercise, especially as there was little in the way of materials at our base camp. By dint of expert scrounging from Kariba engineers, we managed to collect what we needed, mainly eighteen 44-gallon oil drums, and a number of beams, planks and rolls of wire. With these, a design made by Rupert Fothergill, and an expenditure of considerable

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sweat on the part of the team, we managed to construct a raft calculated to buoy up a hefty rhino as well as the superstructure and several assistants. To get the animal on the raft from wherever he might choose to go down, a skid or sledge of smooth tree trunks was built, laid in a "V", apex foremost, and with planks nailed across. We thought that about thirty scouts should manage to pull this contraption with its load towards the shore and then on to the raft.

Rhino Island lay in early morning splendour, reflected in the calm waters of the lake. Previously, as a break from engineering, we had reconnoitred the island and had already been charged by its occupant, an irate bull rhino weighing, in our estimation, about 2,500 lbs., possibly slightly less. The half-mile long strip of land was a dense tangle of bush and thicket studded with trees. Being a hilltop, it was far from level, and rocky with various outcrops.

A temporary camp was made on a neighbouring island and a passage, cut through the *mopani* the day before, facilitated the mooring of the *Ark*. A small party of rangers set off in the dinghy with Rupert, myself and Ray Hancock, the photographer making the Caltex film *Zambezi Story*, who was understandably avid to film the intended rhinoceros rescue.

We landed on Rhino Island as quickly as possible, Rupert grumbling good-humouredly about the disadvantages of taking photographers along, while the younger rangers presented the bright side – that rhinoceros invariably charge the camera lens to the convenience and safety of the rest of the party! Only a few of us went ashore at first, while Ray, in the boat, quietly whistled the opening bars of Chopin's funeral march to cheer us on our way.

Our quarry was soon located, since we heard him just in front of us; but to see him, and above all to get into firing range, was quite another matter. We would see a small patch of grey hide, anatomically unidentifiable, or sometimes an eye or an ear. Occasionally we heard an ominous crackling as he charged, rhino-like, obliquely away or towards us. Eventually, at midday, we held a council of war and decided on other tactics. Since the rhinoceros clearly knew he was being hunted, stealth could be abandoned, and methods used of a more direct and forceful nature.

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As marksman I was to be hidden in a tree on the waist of the island. The rest of the party, reinforced by several scouts, were to drive the quarry past the ambush. In this way the chances of at least seeing the target should be increased.

The syringe was reloaded, the gun checked and the tree position occupied. In twenty minutes the sound of the beaters approached. It was a tense time, as the target would be in view for a few seconds at the most, possibly too far in the bushes at the edge, or too near and below the tree. This was the last chance today. Suddenly he emerged, dark with sweat from the excitement and effort of running from the beaters. He came fast, but to my relief he momentarily slowed to a trot to negotiate some boulders, at a comfortable range of thirty yards. Swinging the gun amongst the foliage as well as I could in best army tradition, I fired. To my instant relief I saw that the dart curved after him as if guided by the hand of providence, inserting itself in a favourable spot on the lower haunch where the skin is thinner and the blood supply good.

Seconds later the rangers were there. Looking up with questioning faces, too tactful to ask directly "hit or miss?", they displayed delighted grins at my thumbs up sign. I had very mixed feelings, for something could yet go wrong, since the drug used was at that time wholly untried on rhinoceros.

They paused only for seconds; then everyone fanned out to look for the animal. I had explained that I wanted to know immediately it stopped. Rupert, it later transpired, almost ran into it and had to rush up the nearest tree while the rhino followed rather unsteadily to take up its position glaring fiercely upwards. At last it sank to the ground. Rupert's whistle blast soon brought everyone to the spot. I looked apprehensively at the animal, struck as I have so often been by the shrinkage that a large and powerful animal apparently undergoes when it has fallen, but I was reassured by the movement of the heaving flank. A little antidote injected into an ear vein soon brought more life, and necessitated tying the legs for safety. A tranquilliser now brought sleepy indifference, and quite regular breathing; the embarkation could begin.

The raft had meanwhile rounded the point and had been paddled

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ashore. The skid was dragged to the recumbent colossus by thirty or more scouts, who immediately crowded around as they voiced their admiration at the tops of their voices. Thoroughly roused, the rhino struggled to rise, and quietened only when silence was restored. The skid was pulled alongside, and after being pushed on to his brisket, "Rupert the Rhino" was lowered on to the planks and bedded down with grass-filled sacks we had brought, before being securely tied.

The 300-yard pull to the boat was accomplished, but not without the rhythmical chanting that seems essential to all physical work in Africa. With a great feeling of achievement we felt the raft move off and gather speed. Rupert Fothergill sat at the head in command. Stuart Klassen, an aspirant biologist and my understudy for future tranquilliser operations at Kariba, was taking the rectal temperature. The other two rangers, Ray (Tinky) Haslam and Peter Jones, skippered the *Ark*.

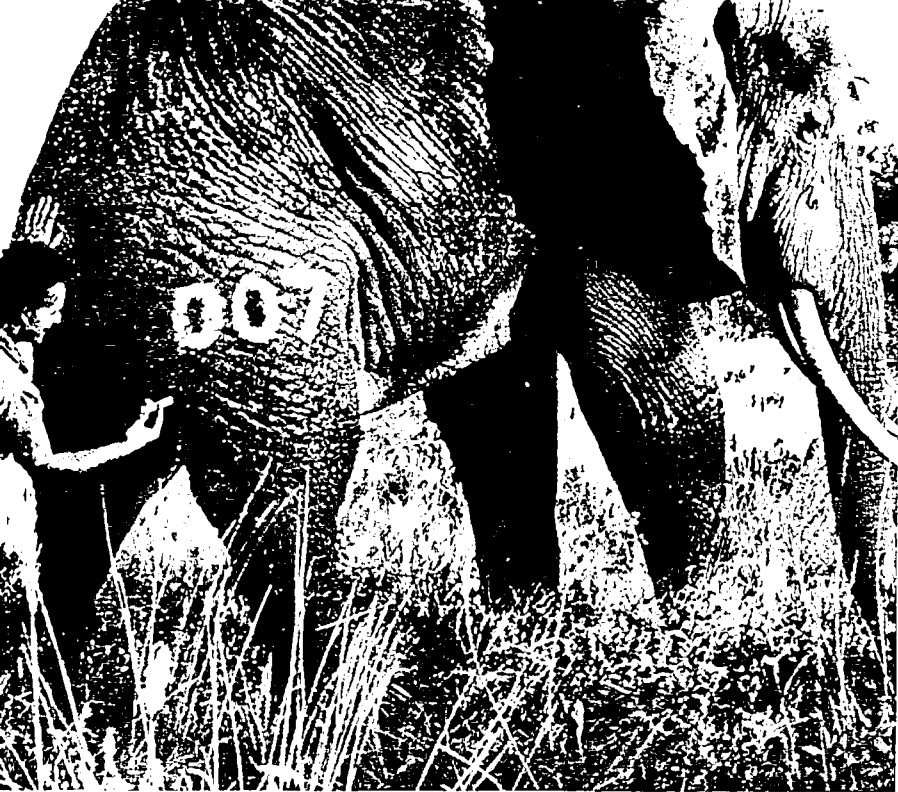
4

The distance to the mainland was twelve miles. At the time of launching, about four o'clock, the waters were slightly choppy. To our chagrin several fast motor boats with press photographers approached and circled us noisily. We were considerably worried about the stability of our untried raft, and made unequivocal gestures to them to keep away. Eventually, as the journey was proceeding without mishap, I boarded one of the boats and took some snaps. Ray Hancock nervously fingered his Bell and Howell cine camera, worried in case the sun would sink too rapidly towards a bank of clouds on the horizon before the boat was beached and the rhino released.

About one and a half hours later we landed with little difficulty, pulling off the skid at a distance of thirty yards inland before releasing the bonds. The tranquillised beast continued to sleep. Rupert filled a tin with water which, when thrown, instantly galvanised the rhino into action, scattering men in all directions. Only Rupert remained standing, imperturbable as always, with various scouts hanging from trees like overripe fruit. To the delight of the photographer, standing in the prow, the rhino charged the boat, splashed into the water and tossed a 4-gallon oil drum into the air. Ray was jubilant until we



15. Black rhinoceros caught for relocation



16. VARIOUS ASPECTS OF IMMOBILISATION. (a) (i) An elephant stands calmly while he is marked. Barrie Chappell, Kiboko, Kenya. (b) (ii) Eland often fail to stop completely and have to be caught



Operation Noah

pointed out the fact that the drum clearly was a Mobil-oil and not a Caltex drum, and that this would gravely displease the sponsors!

Two more rhinoceros were moved in the course of the following weeks, one of these swimming a distance of twenty-five yards to attack an approaching boat. He was low in the water, nose barely visible, with only his hump and fore-quarters showing. Once released he swam out again to attack, and nearly drowned after tackling the outboard motor. Then he rested for over an hour, lying half in and half out of the water, his feet still in the lake. The large dose of tranquillising drug and the thick water weed may well have reduced his ability to carry out a more prolonged attack.

Later a cow rhinoceros called Chippy, endowed with a very sharp horn, also retaliated by attacking the boat and this time really inflicted damage.² Like the first rhinoceros she remained passive after being untied, and once more the intrepid Rupert Fothergill doused her with a bucket of water. Struggling to her feet she turned and charged the boat, before turning her attention to Rupert standing on the raft. As Chippy tried to get at him, he took off his much-abused hat and slapped her repeatedly across the face and head until she got tired of this indignity and retreated into the bush. When challenged with this story, Rupert only conceded that he had waved good-bye with his hat as she went.

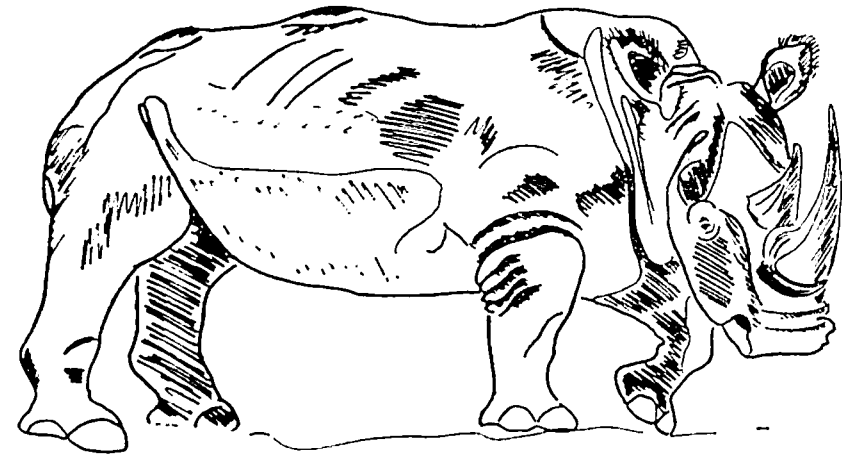
Eventually a whole series of rhinoceros were removed, and Drs. John Lock, Graham Child and Harold Roth added their quota of experience at various stages. When the Themalon mixture (p. 106) became available the details were transmitted to the team, first in the confines of a small aircraft cabin, where the Chief Game Officer and I met by chance, and later in greater detail by post. The moving of rhinoceros became a routine, and the team soon became as expert in the use of chemical compounds as they had previously been at moving animals by other means.

The Kariba rescue operation was an outstanding success and a blueprint for other similar operations that are likely to occur as the world's water resources are tapped for irrigation and hydro-electric power*. It

* In 1966 it was reported in *Oryx* that 8,000 animals were rescued in fourteen months from the islands created by the closing of the Affobakka Dam in Surinam. This operation, called Operation Gwamba, was organised by the International Society for the Protection of Animals. *Oryx* Vol. 8 (No. 4): 218, 1966.

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was particularly successful in capturing the popular imagination and bringing home to people in Africa and elsewhere that animals in jeopardy due to man's action must be rescued, and that humanity has an obligation in this respect. Cynics have criticised the operation and compared the figures of animals rescued to others of animals shot on tsetse control operations. But statistics do not apply to moral issues, and the story of Kariba will always remain as a bright page in the annals of African history.



CHAPTER SIX

RHINOS GALORE

I

The "white" rhinoceros is a truly impressive creature, huge and peaceful. Some bulls weigh as much as 5,000 lbs. This massiveness seems to be enhanced by the folds of skin over the legs and shoulders. Seen easily as he grazes out in the open, he is placid and unafraid. He is quite unlike his fiercer cousin, the "black" or hook-lipped rhinoceros, which prefers to browse and is mostly found in thorn bush or forest.

The white is larger than the black rhinoceros, the latter rarely exceeding 2,500 lbs in body weight, and is also different in general appearance. It has a prominent fleshy hump, with three smaller crests in older animals situated forward on the shoulders and reaching towards the ears. The head is carried lower in accordance with its grazing habits, and is relatively larger than that of the black. The eyes are placed high and far forward, and the ears stand right on top of the skull. Two usually splendid horns arise from the lower half of the long head, the front or anterior horn being straight rather than curved. Both the white and the black rhinoceros have two horns, and in this they are distinct from their Indian cousins which have one and are consequently designated as *unicornis*.

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The term "white rhinoceros" is a misnomer; these animals are in no way whiter than the so-called black rhinoceros. They may look white when they are caked with dry mud, and their habit of feeding in the open makes them seem paler in colour as the bright sun is reflected off the powdery remnants of their last wallow. There has been much speculation as to the origin of the name. Many authors have explained it to be a derivation of the German or Dutch word for wide. This, it is said, refers to the wide mouth or square lip of the grazing animal which contrasts with the hooked or prehensile lip of the browser. This is not a very likely explanation. The Boer word for wide is *breed* and the term *Wit renoster*, literally translated, means white rhinoceros. There is no valid reason why we should not have adopted this translation. Other explanations are largely conjectural; in any case the term "white" is better replaced with "square-lipped" and "black" with "hook-lipped" for scientific purposes, although they would enjoy more popular usage if they rolled a little more easily off the tongue. Since these names are not so familiar, the out-dated and unscientific term "white rhinoceros" will be used here as being accepted common usage.

There are two subspecies of white rhino; one is found in the Northern and the other in the Southern Hemisphere, or in the northern and southern ends of Africa. The northern variety (*Ceratotherium simum cottoni*) is found in the area made up by the extreme west of Uganda, in the Garamba Reserve of the Congo, and in the Southern Sudan. The exact number is not known, and political problems and skirmishes in these places make accurate estimations extremely difficult. Until recently they were infrequent denizens of zoos, as they were difficult to catch with ropes and permission to capture calves was not easily obtained.

The southern white rhinoceros (*Ceratotherium simum simum*) once had a wide distribution from Angola and Rhodesia in the north, through Portuguese East Africa and Botswana (recently Bechuanaland) and Zululand down to the Orange River in the Orange Free State and the Transvaal. A map of the distribution around the year 1800 has been compiled by Player and Feely.¹

Soon after the year 1800 the destruction of the southern white rhinoceros began. It was an easy target for firearms in the hands of European

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and African hunters, particularly through African hunters working for traders, one of whom is reported to have employed 400 native hunters. Player and Feely write, "By 1800 the species had disappeared from the Northern Cape Province, South-West Africa and Bechuanaland. In 1896 it had become extinct in the Transvaal and Southern Rhodesia. At the turn of the century only a few bleached skulls remained in Portuguese East Africa." In only eighty years a numerous large mammal had been reduced to virtual extinction, apparently entirely by over-hunting! The last few survivors of the southern race were given protection in the area of the present Hluhluwe and Umfolosi Game Reserves in Zululand, and until recently were found wild nowhere else in the world.

By the 1920s the number of rhinoceros had been reduced to a level hardly consistent with survival, estimated by Vaughan Kirby to be no more than twenty-five animals.² The results of counts made later suggest that this figure was rather low, and that the residual number was probably 100 or so. However, in view of the almost pathological desire that appears to have existed at that time to eradicate what are now treasured wild animals, a conservative estimate was doubtless prudent as a shock to such naturalists as could be rallied to the cause of conservation.

A hard and evidently bitter fight was waged for many years to establish and retain the reserve between the two arms of the Umfolosi River as a rhino sanctuary. In fact the point at which a species dies out due to lack of numbers must have been very nearly reached in this case. In view of modern and more enlightened opinion it is difficult to understand a struggle to retain an area amounting to only some 300,000 acres, about one third of this in fact constituting the official game reserve. Even now the battle for the long-cherished dream of the Chief Conservator, to add a corridor of land linking the Hluhluwe and Umfolosi Game Reserves and so create a more viable and ecological unit, seems to have been abandoned to political expediency.

In 1930, fifty white rhinoceros were thought to remain, but again the reliability of this figure is uncertain. In 1959, however, careful aerial counts revealed 567, some 86 of which were calves, while more rhinoceros were thought to reside in various localities just along the borders

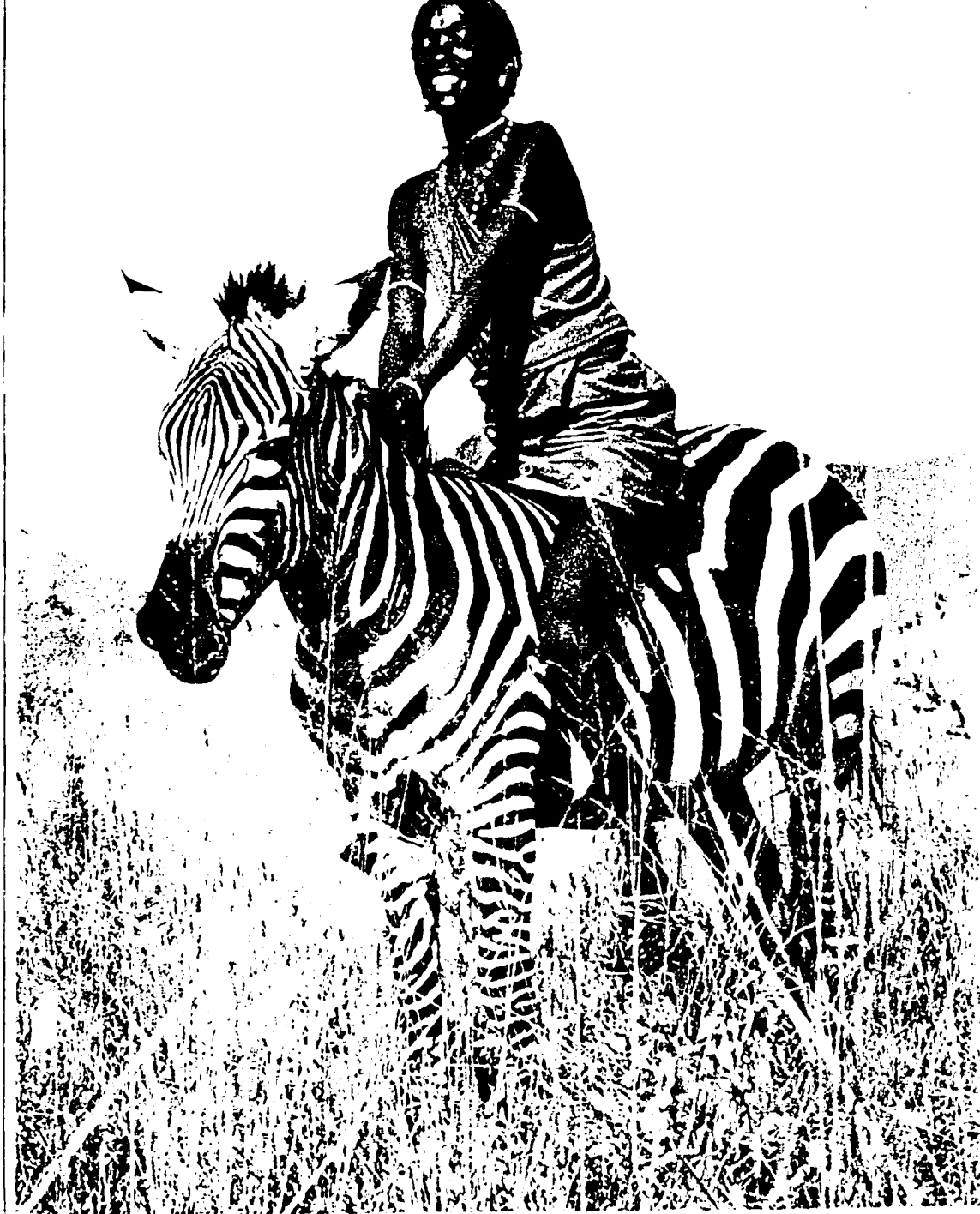
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of the reserve itself. The figures shown in this count were a triumph due to many years of devoted and careful conservation practice. On the other hand, the figures caused grave concern. From the aspect of actual numbers and breeding potential, the southern white rhinoceros was safe. Other hazards, such as disease or starvation due to drought or competition from other animals had not diminished. While they remained together in only one relatively small location, these dangers would remain, and even increase year by year.

2

At this time Colonel Jack Vincent, M.B.E., who was Director of the Natal Parks and Fish Preservation Board, had built up this department to a thriving and highly respected organisation. A short man, of forceful personality and speech, he had the rare distinction of embodying most of the better aspects of military training and experience while retaining the flexibility of mind and outlook essential to a successful conservation policy. His authority over the rangers and senior rangers in the several reserves in Natal was undisputed and complete. He received from those working under him a mixture of awe, veneration and affection that was as remarkable as it was unusual in the permissive climate of the post-war years of this age. It is exceedingly doubtful if a lesser man could have persuaded the Natal Parks Board to take the unprecedented and radical step of sanctioning the capture, by a new and little known method of chemical immobilisation, of numbers of the unique and by then highly valued southern white rhinoceros.

The reasons for the move were clear. The density of the rhinoceros was dangerously high, and concentrations of over forty per square mile had been recorded. About twenty-five years previously a severe drought had resulted in the deaths of many rhinoceros. Now the threat posed by a drought was greater, for illegal squatting on adjoining crown land and vastly increased human populations pressing on the borders of the game reserves, would certainly result in invasion of the sanctuary if the cattle started to starve. As do the pastoral tribes of East Africa, so the Zulus keep cattle to the maximum density permitted by good years. No provision is made for the lean seasons, and if food is short, cattle,



17. VARIOUS ASPECTS OF IMMOBILISATION. (iii) A Masai Morani astride a tranquillised zebra. Kiboko, Kenya, 1964

and eventually man, will succumb; but not before the last trace of vegetation has been denuded and trampled underfoot. Even the present density of wild stock in the reserve is maintained only by a policy of carefully controlled burning, painstakingly worked out to foster the maximum growth of the best grasses by the staff ecologist C. J. (Roddy) Ward. The stark difference between the overgrazed, eroded and evidently deteriorating lands on the one side of the fence, and the flourishing Themida grassland on the sanctuary side, was a favourite topic of conversation of the Parks staff.

Together with an increase in numbers and the greater density of animals came a further threat. When natural regulation of numbers comes from a shortage of the food supply it is often manifested through disease. This may take many forms: it can be an insidious increase in parasitism, it can be chronic debilitating enzootic disease, or it could take the form of a major epizootic which could kill off a large portion, if not all, of the animals in a matter of weeks or months. Colonel Vincent asked the Board for a mandate "to move forthwith no less than 100 rhinoceros", so as to relieve some of the pressure on the land as well as to safeguard the race against possible extermination. In his own words, "so as not to leave so many valuable eggs in one basket."

The feasibility of the question was first broached when I met Jack Vincent at the conference held in Warsaw in 1960 to discuss conservation methods, including immobilising techniques. The concept of the use of capture by chemical means of the world's largest land mammals, in the context of such an important conservation plan, held great appeal. Later, when the official letter of invitation arrived, the immensity of the undertaking took on appalling dimensions. I was to take the responsibility for incapacitating – in full view of a world rightly critical of a new and possibly harmful procedure – a number of animals whose market value at that time of £5,000 per beast was alone a sufficient deterrent. To be responsible for instructing a team of rangers in the complexities of the physiology and pharmacology of the methods was an even more intangible task. This added a further dimension to the problem which seemed vastly greater than the task of moving the otherwise doomed black rhinoceros from the immersing hilltops of the Kariba Lake. The now obvious groundlessness



18. VARIOUS SYRINGES. (a) (i) Blue wildebeest immobilised by means of a syringe fired from a crossbow. Kruger Park, 1963. (b) (ii) A young greater kudu captured for marking with a syringe fired from a crossbow



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of my trepidations in this respect did not alter the reality of their nature at the time.

The first visit to the Umfolosi Game Reserve in 1960 was to serve as a pilot experiment to evaluate a new situation, a strange animal, and a relocation plan whose elastic dimensions were to be adjusted according to the degree of success of this exercise. During this time we achieved little but learned much. We spent a great deal of time in discussion, designed crates capable of holding fully adult and quite wild rhinoceros, and modified suitable loaders to take these in and out of thick bush country. Long evenings were spent in discussing projectile syringes and animals' reactions to drugs. Most important of all, and very disturbing, was the discovery of the unsuitability of the Kariba rhino mixture for the free-living bushveld animals, and particularly for a large relocation exercise conducted by a ranger team. This pilot work laid the foundations for the start of the exercise some months later. It delineated the basic requirements, and gave the impetus for the research work that was to result in the finding of the immobilising mixture that eventually proved so successful for this purpose.

The intervening months were a challenge and a worry. I had investigated the problem and the area. I had met the men dedicated to remedying the situation and who were ready to exert themselves to the utmost. The equipment and funds were there; all we lacked were suitable drugs. A large question mark seemed to hang in the air – could one be found in time? The range of compounds available in East Africa was very limited. Weeks and months went by as I tried to import possibly suitable compounds for experiments. Most difficult was the lack of a rhino-like animal to work on; all that was available was a number of steers and donkeys, besides the six rather intractable wild buffaloes I kept for growth and feeding trials. All the time that could be spared from the administration of a University Department was spent in the laboratory and in the animal stalls. The problem remained elusive. Anaesthetics and paralysing compounds could only be used if the weight of the animal was accurately known, in captive surroundings with all the paraphernalia of veterinary anaesthesia. Tranquillisers tranquillised, but did not control or prevent the animal from running off. Narcotics seemed only to excite so that no sedative or restraining action was

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evident. Suddenly, almost casually, the answer became obvious, as if it had been there all the time but I had not been aware of it. What was needed was a narcotic substance together with a powerful tranquilliser to prevent the excitement it was likely to induce – and a hypnotic to link the two.

That evening I gave a dose of morphine to a steer in an amount that would normally have induced only excitement, and combined this with a small amount of the tranquilliser Phencyclidine and some Hyoscine.* Without real faith I walked away to wash the syringe, when the stockman called to say the beast was down.

It was down, and many animals had been immobilised under the watchful surveillance of the stockman before. But this one was different, for instead of lying with eyes closed, in deep sleep, or limply on his side, the steer was on his brisket, upright, and the head and neck were held in a normal position as if he were lying comfortably under a shady tree in a meadow, and yet he could not rise. When I tried to push him over on his side he resisted strongly, but hardly seemed to feel a large hypodermic needle inserted into his jugular vein. Tentatively I injected an antidote to the morphine fraction of the immobilising mixture, and he was able to rise on to his feet apparently unhampered by the other two drugs.

Further trials revealed the same pattern. I changed the mixture and used other tranquillisers and replaced the morphine with synthetic morphine-like substances, and the effect remained largely the same. The only question now remained – would it work on the white rhino? With some misgivings I packed nine different drugs in rhino-quantities and, hoping fervently that the Customs would not scrutinise my baggage, set off for Zululand.

3

Ian Player, a man entirely dedicated to his work, was then the Senior Ranger in charge of Umfolosi Game Reserve. Tenacious and unsparing of himself, but humorous and easy to talk to he was happiest when walking or riding through the more remote parts of the Umfolosi,

* Scopolamine (U.S. usage).

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tirelessly expounding the various plans and theories for improving the condition and status of the Sanctuary. The reserves and parks in this part of the world had reached, for better or for worse, a chapter in evolution in advance of those in East and Central Africa. This was partly because they were in the aggregate so much smaller, and partly because they were ecologically isolated from other game areas. Particularly because of their turbulent history they had adopted an advanced and intensive management policy. It is rather startling for one used to conditions where the balance of nature is largely left to adjust itself, to hear of relatively large areas of bush being cleared by painstaking hand-application of aboricides. Where measures like this were undertaken it was usually to correct the mistakes of the past. Bush encroachment due to over-population of grazing animals such as warthog, had followed on the extermination of the lions in the area. The loss of that superlative gardener, the elephant, the checking of the devastating grass fires that used to sweep over the veld – all these factors brought about such changes that the scales had to be readjusted.

Ian was a strong protagonist of conservation, especially in relation to water supplies, and he had found an infallible method of abstracting funds for his undertakings from wealthy businessmen. A great walker, Ian would gather his perspiring party around him explaining that time for lunch had come and cold drinks were available in the ice-chest, "but before we sit down let us just spend a few moments in considering the problems around us, particularly that of water for the game". Here, with the heartfelt agreement of his wilting audience, he would deliver a long exposition on the need for water for animals and the virtues of ensuring the necessary conservation measures.

One aspect that never failed to amaze was that funds were sent in even long after the victims had gone back home, presumably to adequate hydration, and that these self-same portly businessmen returned on subsequent occasions to endure another spell of torment. To those who have probably never felt the pangs of real thirst, the relatively mild discomfort of a dry hike through the bush opened up a window of reality that must have made a deep impression*.

* One course of the Natal Wilderness Leadership School, also at Umfolosi, features a day's waterless trek, at the end of which the boys have an hour-long talk on water conservation before being allowed to drink.

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The proposed relocation scheme had the full and unqualified support of Ian Player. In his own way he must have had his doubts as to the feasibility and efficacy of the method, and the competence of a man from that almost unexplored part of Africa north of the Rhodesias. But nothing of this was ever apparent in his demeanour, which was one of respectful and competent agreement, or in the enthusiastic and disciplined leadership of his team. His planning was thorough and his instructions were accepted without question, although occasionally misunderstood by the rangers. Tangles would mysteriously arise just at a time when the Colonel's representative was with us to glean a first-hand account of what was happening.

John Geddes-Page, current Director of the Natal Parks Board, then Secretary, always seemed to bring something of the Head Office with him, and an advanced plan which, though excellent in conception, could somehow never quite be made to work. On one occasion he brought a tape recorder of imposing dimensions scheduled to immortalise the discussions of a day's exercise and to record intelligent questions and answers. The result was that the entire assembly was struck dumb so that little was taken back except a thin and tedious discourse that I produced rather inappropriately to fill the embarrassed silence. On another occasion an observation post was installed on a hilltop to facilitate communications and to direct the operations on the plain below. This was an excellent idea, designed to facilitate and expedite the exercise, but in the initial stages seemed to have the reverse effect. On the first day that we had changed our methods to fit in with the new procedure, the observation post reported a rhinoceros apparently close in front of our Land-Rover. We were, however, quite unable to see the beast and began seriously to doubt its substantial reality other than in the mind of the viewer. To my irreverent question, "Ask them what colour it is," came the serious reply in a strongly nasal accent from a young Afrikaans ranger, "Well, Mr Player, I don't quite know but it is sort of a whitish-greyish colour." This had the curious effect of convulsing us with helpless laughter which we felt free to indulge in, considering the isolation of the Land-Rover cab and the extinguished wireless. Tall and spare, and slightly saturnine, John Page took our somewhat thinly

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veiled comments very well, and as liaison officer probably had to suffer worse at the other end.

The first rhinoceros which we injected with our mixture was a young bull nearly half grown, with a body weight of some 2,000 lbs. The team had mastered the drill of loading and firing the syringe and were familiar with this rather curious procedure. With a number of combinations and permutations of drugs to try, we decided to start with our earliest and simplest mixture: that of morphine, tranquilliser and hyoscine. All the drugs were bulky, and morphine fairly insoluble. The largest syringes I had been able to procure were of 20 c.c. capacity. As in the Southern Hemisphere the month of May is cold, it was a long job to dissolve the morphine, which for various reasons could not be readily carried in solution. To conserve space it was dissolved in the tranquilliser solution, and the hyoscine added later. On account of the cold, the whole mixture was heated by placing the loaded projectile syringe on the Land-Rover radiator. I noticed that the team watched this complicated procedure with some misgivings. They wondered, no doubt, on whom would fall the role of alchemist after I had left, and if all the rhino would be prepared to wait pending this lengthy concocting of the medicine.

The young bull, unaware of these thoughts, was asleep in company together with a large cow, probably his mother, in the lee of a small bluff which lay half way between them and us. Working on the basis of a dose necessary for my steers, I had computed the customary increase in proportion for heavy herbivores, the result of which was 1.25 grammes of morphine and a comparable amount of antidote for resuscitation. The latter was in short supply in Kenya and I had brought what I could, intending to buy more in Durban or Pietermaritzburg. Much to my surprise it was even harder to get an adequate supply of the drugs in the large cities of the South, and I had only minimal quantities for the work at hand.

Eventually the mixture was sufficiently warmed and we set out for the bluff, travelling bent double so as not to show ourselves. Our approach was unobserved and we were grateful to see the long syringe fly, albeit somewhat erratically, to the right spot and inject into the shoulder muscle. Now it was all action. The rhinos awoke with a

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snort, swivelled round to cry and see the intruder, and then set off at a gallop, providentially not towards us. As they receded into the bushy near-distance, we ran for the Land-Rover and followed at a discreet interval, having to make considerable detours to keep the quarry in sight as they crossed small streams, gullies and thick thorn scrub.

After fifteen minutes the young bull slowed down; the cow, after running off and returning several times, left him standing still, with lowered head and legs spread wide. As we approached and stopped the car about thirty yards away he slowly reeled over on to his left hams and then rolled on to his side and lay peacefully without kicking or struggling. We approached quietly on foot, any feeling of achievement tempered by the knowledge that an animal down is less than half the object achieved. No other rhinoceros had ever been caught with this mixture, and certainly none had as yet been resuscitated. The breathing was slow and shallow, but a little of the antidote nalorphine injected into an ear vein gave immediate results and we all watched happily as breathing quickened and the eyes opened. Soon after this he tried to rise on his brisket and we assisted so that he came to lie in a more natural posture. We put in ear tags which he didn't seem to notice, made measurements and a photographic record, and eventually gave the full computed and available dose of antidote. But he remained too sleepy to rise.

He was obviously in good shape and not unduly alarmed. We sent off a ranger with an empty vial of antidote to get the basic stock from camp, while we watched the progress of the rhino. Two hours later the man returned to say that it could not be found: the error was mine, and I recalled the other bottle had only the chemical name and not the simple name we had been using. Once more we split up, most of the team now returning home in the fading light, leaving only myself and one ranger for company. Soon after this the rhino got up from the bed of dry grass we had built up to protect him against the wind, but was disinclined to walk. Casually we leaned against his grey bulk as we discussed the day's happenings.

About four hours later the team returned, having experienced some difficulty in locating our spot in the darkness. Seeing us and not the rhinoceros they approached carelessly, asking where he had gone. We

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grasped the rhino's tail behind us and passed the tassel forwards with the invitation, "Would you hold this for a moment?" The ranger who obligingly grabbed it, stared at us in disbelief as he realised that he had got hold of a rhino who, although clearly immobile, was now no less equally clearly on his feet. We gave him more antidote and with considerable excitement watched the patient amble off into the bush and the gloom of the Zululand night.

We had learnt much during this exercise, and two things were clear. The dose could be considerably reduced, but the antidote had to be given in proportionately greater quantities than had been administered to a steer. Armed with this knowledge we made another successful capture the next day. On the day after, a third capture was particularly interesting as this was a fully grown bull of some 5,000 lbs, or two and a half tons body weight. We injected the amount used to capture our half-grown bull on the first day. Although lightly dosed he went down quickly, travelling only 300 yards before coming to a halt. He fell on a hillside and rolled on his back between some large round rocks. Fearing injury and hoping to get him up immediately, we tagged him quickly and gave him a full dose of antidote, but his legs only waved impotently in the air as he bellowed and struggled on, realising his predicament for the first time. Anxiety gripped us as the rangers tried to pry the stones out. This proving impossible they built up the space underneath the back with smaller stones, finally using a car jack and pieces of wood to lift parts of the huge animal, and with much trepidation I saw enthusiastic young rangers crawl like miners right underneath the heaving overhang of rhino body to fill the space with stones in spite of a real possibility of being crushed by the ponderous bulk, in their genuine concern for one of their charges. Few of us had time to think about whether they could get out of the way of the clearly furious animal should he suddenly roll back on to his side and doubtless regain his feet with the well-known agility of an irate rhino. As it happened the work took longer than we had anticipated, and when he eventually went over, exhaustion kept him on his side for several minutes. It was an enormous relief to see him get up. After swinging his massive horn this way and that as if drawing a bead on the various members of the party, he chose the better part of valour, and ran down the hillside with

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the remarkably graceful and characteristically callypygic light trot of a white rhinoceros.

4

The exercise began to gather momentum and organised complexity. The relocation proper was now about to start. Crates had been designed on the lines of the shipping crates used by trapper friends in Kenya, and a tipper-lorry with a winch procured. Long heavy ladder-like structures with roller bearings were constructed to act as inclines for the crates and rhino which might together weigh some four tons. Suitably sized brackets were welded on to the back of the truck to take the structures when fitted for use. The speed and competence with which such engineering jobs could be done was most impressive and seemed almost miraculous for someone perforce accustomed to the more pedestrian pace of less developed parts of the continent.

Following up the injected rhinoceros became an increasingly streamlined process. It became clear that a Land-Rover was noisy and inefficient and frightening to an animal who feels hunted and puts on his best pace to get away from the rattling and snorting contraption behind his tail. Fortunately some of the younger rangers were keen horsemen, and two were selected as followers. Rangers Owen Lethley and Nick Steele were to follow the animal on their horses as soon as a hit was signalled by the marksman. The use of two horses permitted following at greater distance; the rhinoceros, emerging from coppice or scrub, would then be visible to one or the other of the two riders, to right or left. The advantage of their extra height enabled the animal to be kept in view more easily and the horsemen could travel well to the right and left of the tracks and circumvent the thick thorn that the rhinos tended to go through to seek escape and cover. The thud of hooves was more familiar and apparently less frightening than the rattle of engine and metal body, and the noise made by the passage of horses through bush was only a small fraction of that made by the motor vehicle. Consequently the rhino went less far and at a slower speed and also there was someone carrying emergency vials of antidote to assist as soon as the animal stopped. These proved life-saving on several occasions when

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partly incapacitated animals tried to cross streams but failed to negotiate the far bank. After the animal was judged safe, one rider would return to guide the Land-Rover and team to the spot.

The work of the horsemen in this context was beyond praise, and exceedingly hard. Hours before the main party set out, long before dawn, Owen and Nick would be slowly making their way to a rendezvous in the particular area designated for the day's exercise. Long after we got back to camp at night they would be wending their way home, often having to ford rivers to do so in darkness with crocodiles as an additional hazard. Clothes and skin were torn by the murderous thorns, and the horses would require careful doctoring and grooming before they could be stabled for the night. Hard training and complete dedication are prerequisites for this type of work, both being essential in high degree.

For the wider exercise we were joined by two rangers of the Hluhluwe Game Reserve, Senior Ranger Norman Deane, and Ranger Hugh Dent, a slim, bearded, slightly older man who painted well, and whose bearing and the way he sat his horse were almost uncannily like that of an Amerindian.

The first rhinoceros we hoped to catch and also crate was intended for Mkuze Game Reserve, situated about one hundred miles away, but where no rhinoceros had existed for well over a century. We chose a young female two-thirds grown, and the injection and tracking were followed through with almost business-like routine. We were now using a synthetic morphine which dissolved more easily and we had switched to a different and more effective tranquilliser*. The lorry and crate were in wireless contact with the command car, waiting at a point not far from the scene of operations. It arrived within the hour after our rhino had gone down but not before she had become somewhat restive at the delay, and perforce had to be tied by her hind legs to a tree. This, however, in her tranquillised state, was not irksome, and merely prevented her wandering slowly off through the bush. Once captured, the administration of more tranquilliser by hand syringe was a simple matter and the graduations between the narcotised and tranquillised states could be controlled with fine precision. The effect of an entirely foreign

* Themalon (diethylthiambutene).

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object, such as the crate, on a sensitive and doubtless temperamental female rhino was, however, yet to become apparent. We unloaded the monstrously large box on to the rollers with as little noise as possible, while the rhino once more lay down for a doze, apparently oblivious of the clang of metal and the creak of ropes and winch. We put the open end before her while she responded with a snore. We pushed and slapped with as little effect as if we had been tick birds. We injected more antidote into an ear vein and she rose, walked forward, stopped to sniff the grass placed on the crate floor and with the help of a few encouraging pushes from behind, walked in.

Feverishly we put the door in its place, and screwed down the nuts, but we need not have hurried as she appeared to acquiesce to her incarceration with good grace. Even when winched up on the incline of the truck the new experience seemed to hold little fear for her; and when the ride started she gave every appearance of tranquil enjoyment.

The rhinoceros relocation exercise had started, and this small success augured well for the future. In high spirits we set out for Mkuze Game Reserve, and in our pardonable enthusiasm already envisaged the unloading of a brand new unique white rhino as something virtually achieved.



CHAPTER SEVEN

COCKTAILS AND CONTRABAND

I

Ten rhino, twenty, thirty, forty! The rhinoceros relocation exercise was succeeding beyond all reasonable expectations. The routine had become streamlined and highly efficient – a task that only a short time ago had seemed impracticable was now accepted as a feasible possibility. Even a big bull rhinoceros weighing almost three tons could be tranquillised and led into a crate without force, struggle or discomfort. Any discomfort suffered, in fact, was ours alone!

It took over thirty sleepless hours of uninterrupted labour to move our first rhinoceros. Once our quarry was in the crate and we were satisfied that all was well, we set out for Mkuze 100 miles away where she was to be released into an enclosure. But it wasn't that simple. The truck became stuck in the mud of the soft road flanked by fields of sugar cane and had finally to be extracted by a road grader. We had cut more grass to even the floor of the crate as the wheels on the side of the truck had sunk crazily into the mud, and had tenderly wrapped a huge tarpaulin round the crate to protect the inmate from the keen night wind. Seeking to give her water and more tranquilliser we found that the crate lacked sufficient openings and made notes to modify the design at a later date. The thrill of the undertaking, our apprehension as to the

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outcome, and the bitter cold wind of the Zululand winter had kept us perforce awake and on our toes.

At Mkuze we had further difficulties in unloading the crate and eventually could not open the door as the rhino's strong co-operation kept it firmly jammed. For future use we learned that rhinoceros should be released backwards to curb their enthusiasm for entering their new domain. Also we found that they travelled better with their tails to the engine, for several reasons but particularly so that when brakes were applied sharply, as the huge vehicle negotiated a deep stream-bed or gully for which it had surely never been designed, the tail end rather than the head and neck would be bumped, as the occupant lurched in the crate, tail first.

On our return in the cold grey early morning hours we decided to try to collect another rhino that day. If the team was in any way appalled by this decision they certainly did not show it. There was much to learn as had been shown by our first passenger, and only by catching more could we learn how it must be done and how the various problems were to be surmounted. I was very conscious of the two air tickets that the Parks Board had subscribed for my passages and of the short time that I had available to justify this expenditure. Only recently I learned that my unwillingness to rest until the job was done, and my consequent reluctance to call a halt, was ascribed by the others largely to the fact that I was reading Montgomery's memoirs during any spare moments, and that my judgement was unduly influenced by the spirit of those times.

After the twelfth rhino I left and reluctantly returned to more mundane duties at home. The team carried on and surpassed, in little more than a year, the target of one hundred rhinoceros. They were sent to other game reserves in Southern Africa, especially the Kruger National Park where the last white rhinoceros had been shot in 1896. The first rhino to re-enter the Park after this lapse of time was cause for considerable celebration and nationwide, even worldwide interest. More than ninety rhinoceros were eventually sent to the Kruger National Park and have since not only produced calves, but calves that were clearly conceived in their new surroundings, an anxiously awaited event.

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One scientist, clearly motivated neither by genuine knowledge nor scientific reasoning, had declared that all animals captured by the drugs used would be sterile. Strangely enough this caught the public imagination, and headlines proclaimed the news in the press. Cuttings and letters streamed northwards. I dictated a five-page letter and tore it up, and instead wrote: "Wait and see." Not so long afterwards the calves started to come, healthy and unblemished, first those of mothers pregnant when captured, of whom none aborted, and later calves from females that became pregnant only after release.

Rhinos were sent to all the major game parks in Southern Africa: eighteen to Ndumu where six calves were subsequently born and eight to the Willem Pretorius Reserve. Ten others were sent to zoos in Europe and the United States where they will doubtless breed, as for the first time in history real knowledge of sound balanced feeding, size of enclosure and exercise needed for the behavioural play essential to successful breeding, is becoming available. Later six more were to reach as far north in Africa as the Meru National Park in Kenya.

Not only was the target figure realised in a time interval no one had seriously dared to forecast, but an even more astounding record was achieved: not only the first 100 rhinoceros captured, but in fact the total 180 actually injected with the synthetic-morphine/tranquilliser/hyoscine cocktail, survived the shock of immobilisation. This record would be remarkable for a team of veterinary anaesthetists; but for a team of rangers without the benefit of basic training in the medical sciences, anaesthesiology or pharmacology, it was truly astounding and could only have been achieved by continuous and meticulous dedication to detail, deserving of the highest praise.

The cocktail was satisfactory in that it fulfilled its chief purpose: that of enabling rhinoceros to be caught safely by Parks personnel. It also proved suitable for other purposes, and soon after the Zululand operation had gathered momentum it was possible to demonstrate to the authorities of the Ngorongoro Crater conservation area in Tanzania that the black rhinoceros could be captured as easily and safely with the same synthetic morphine mixture. Another target was the young elephants who were at this time being caught too early at the suckling stage, often entailing the shooting of the mother as the youngster was

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almost literally torn from her breast. We showed that in East Africa, where twelve youngsters of one foray had died of loneliness, unsuitable food, dirt and despair, weaned youngsters could be caught with negligible suffering, mortality or danger, by a method very similar to the way we had learned to catch rhino in Zululand.

Finally the cocktail was used to move giraffe from farmland, to rescue the black rhinoceros still remaining at Kariba and to catch animals such as hippopotamus and antelope for scientific purposes.

The mixture was safe, but still far from ideal. The principal disadvantage was the long immobilisation time, which was the time lapse required for the injected animal to stop. The long interval was due entirely to the bulk of the solution that had to be injected. A further disadvantage was associated with the necessarily large syringes that had to be used. These were difficult to project with accuracy over a suitably long distance. The impact of a large syringe was frightening and somewhat painful for an animal, a large needle being required for a comparably large syringe. The necessarily thin metal of the syringe became distorted on impact due to its weight, causing leakage as well as slow absorption into the blood of the large amount of fluid from the tissues. The latter resulted in too long an interval of time between injection and eventual drowsiness. The animals would keep moving for half an hour or longer, sometimes quite rapidly, and had to be followed closely in often difficult terrain if they were not to be lost. A full solution to this problem was not to be found for another two years.

The capture and relocation of the first 100 rhinoceros in the Umfolosi Reserve had brought no respite to the team. Apart from those already moved, others had been marked to obtain a clear picture of rhinoceros distribution. By this method the presence of unsuspected numbers, especially of old bulls on adjoining lands, was established. The mounting demand on these lands by expanding human populations, and the relief of pressure in the reserve would cause an influx of animals into the sanctuary. The object of reducing the numbers in the reserve itself would thus remain elusive. The only solution was to move more

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rhinoceros, tackling those outside as well as those inside the Umfolosi and the Hluhluwe Reserves.

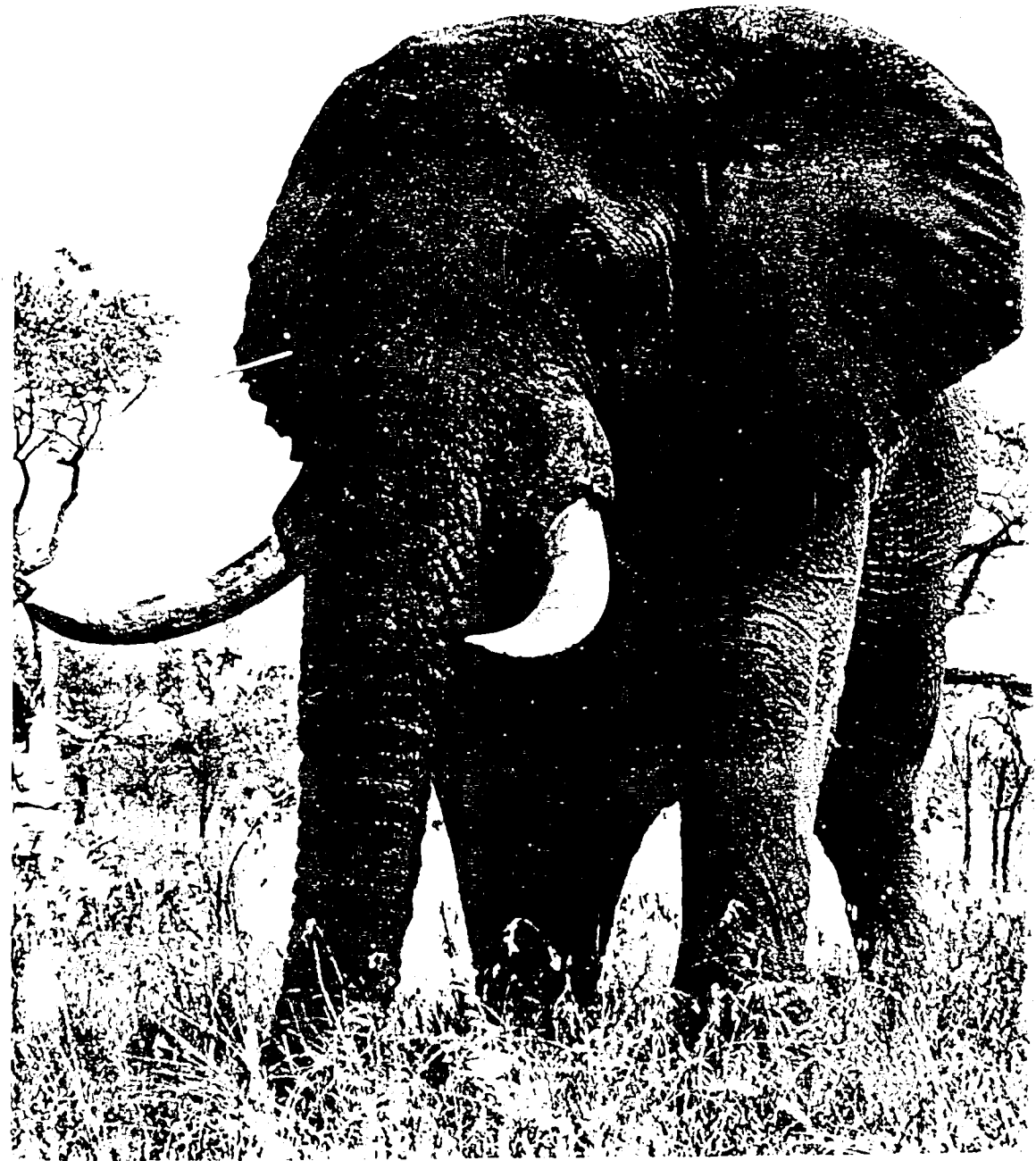
More was to come for the overburdened team. The corridor of Crown Land that lay between the two small reserves had long been considered as an integral and ecological part of the rhinoceros habitat, but the position remained uncertain (see chapter 6). The situation was aggravated by the increasing numbers of squatters, and this led to more poaching and conflict between animals and man. The board offered to fence the reserve with rhino-proof materials such as lift-cable but stressed the need of the corridor of land as an ecological necessity if fencing was put up to restrict the rhinos' movement.

The controversy of the corridor was to rage for many years without decision, although all remained hopeful of its incorporation in the Hluhluwe and Umfolosi Reserves. However, white rhino had to be removed from the eastern and western section of the corridor because they were damaging native crops. Sections to the south and west of Umfolosi had also been allocated to the Africans and pockets of rhino had to be moved or be killed.

Once more a call was made upon the long-suffering team who, far from being able to devote their time to the business of rhino capture, did this as a sideline beside and beyond their normal range of duties. The capture and relocation was speeded up. New drugs worked faster and the men harder. The figure of 200 was reached, then 300 and still there were more to be moved.

To speed up the process darts were delivered from a motor vehicle after a short chase, to eliminate time-consuming and sometimes unsuccessful stalking. The dangers now increased comparably, for the team had to dash after rhinos through land full of earth-pig holes and rocks which were usually completely hidden in the grass. Under these circumstances the marksman leaning forward and intent on his target was highly vulnerable and likely to get thrown from the vehicle if it stopped suddenly against a rock or crashed into a hole or gully.

The whole operation received a temporary setback when just such a mishap occurred. With a resounding crash the vehicle stopped and the passengers were flung either over or through the windscreen, to lie sprawled in a state of semi-consciousness at various distances from the



19. VARIOUS SYRINGES. (m) Immobilised elephant: Kruger Park, 1963. An abertan crossbow syringe has caught in the ear.



20. VARIOUS SYRINGES. (iv) An 8,000 lb young bull elephant captured for radiotelemetric tracking. It was two syringes fired from a Capebar gun

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Land-Rover. Ian Player relates how one ranger, a real old-timer, cantered up on his horse and surveyed the scene dispassionately. Dismounting, he stepped over bleeding and groaning victims and then proceeded to examine the side of the car. Shaking his head, he was heard to murmur, "You've wrecked your springs." He looked underneath and muttered, "Transmission's gone," and then completed his tour at the front with a "Radiator's finished." At this stage Ian, who had damaged his knee and hurt his back, could stand no more and exploded "Go for a doctor," with such intensity that the man rode off with a hurt expression, presumably to seek some help!

Up to this stage the rhinoceros destined for long journeys had been tamed in holding enclosures, while those travelling only 100 miles or so were taken immediately and in a tranquillised state to their destination. With the increased numbers to be handled the taming stage became an administrative and financial burden, and losses that were suffered during the operation occurred almost entirely during this interval between capture and relocation.

The taming process was an achievement in itself, and much of the credit for the success of this important transition stage in the rhinos' life was due to ranger John Clark. John loved his rhinos to the exclusion of all and every other interest, and virtually lived with them. He had long discarded shoes as an unnecessary hindrance, and we realised with some concern that his feet already closely resembled rhinoceros hooves. Possibly as a reward for his devotion he was sent to the United States to accompany a shipment of rhinoceros, and on his return was questioned closely by his somewhat envious colleagues who would have given much for such a chance to see the world. John was unforthcoming. "But how was the sea trip?" he was asked. Without hesitation the answer came, "The rhino didn't think much of that." "But New York must have been exciting," another added. "Naw, the rhino hated it," came the uncompromising reply.

Clearly John was able to identify himself with his charges to an extent that enabled him to see through their eyes. This was probably the reason for his success, for there appeared to be a real understanding between man and beast and few could equal his patience and indeed success in nursing the sick and taming the bad-tempered with very little

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failure or loss of life. Not only did John have to care for the physical health of his charges but also pander to their psychological idiosyncrasies. Ian Player relates how one rhino was fed at midnight after reaching the enclosure, its attention directed to the food by rattling the gate. Thereafter this animal would refuse to eat food of any kind in daylight, or at night, whenever placed before him, unless this "dinner bell" was first sounded. Another rhinoceros did not eat for some time after capture and was force-fed lying down. Eventually eating spontaneously, he would no longer eat in rhino fashion but always reclined at his board like a Roman emperor! John found that the rhinos loved music and this settled the wilder ones which had only recently been captured. He went to a great deal of trouble and did considerable research into the type of music these rhino liked and played it to them from his transistor radio at all hours of the day and night.

In spite of every care a disastrous flood swept through the compounds and killed many animals. Later an epidemic of virus pneumonia accounted for more. Other animals did not take to the captive life and eventually had to be released as they got thinner and thinner due to eating little or no food. It was clear that a concentration of rhinoceros in this way was unnatural and conducive to disease and loss of life.

Much had been learned in the intervening time about tranquillising and the combination of tranquillisers. The design of crates had been improved and more knowledge became available on loading and transport. Many journeys were undertaken straight from the bush, and the rhinos appeared to stand these without detriment. In fact, they appeared to have greater reserves of strength immediately after capture than after a month or so in a holding enclosure where they often ate only sparingly and tended to suffer from lack of exercise and constipation.

Longer and longer journeys were therefore undertaken with freshly captured rhinoceros, thus cutting down the time of captivity for those that were destined to go to game reserves. Eventually two pairs of rhinoceros travelled 800 miles from Umfolosi to Kyle Dam Game Reserve in the Rhodesias immediately after they were caught, representing a journey of well over thirty hours of continuous driving during which injections of tranquillisers were administered every six to eight hours.¹ All went well. A large enclosure had been constructed

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at the receiving end, designed to accustom the new animals to the climate and area while under supervision and also to settle them before release. Once rhino become used to a territory they will move only slowly, and away from it in stages, but if released in strange country they are likely to march for one hundred miles or more in a straight line out of the game reserve - usually in the approximate direction of home.

3

Transportation of the new drug M99, or Etorphine as it came to be called some three years later, was an adventure in itself. The M series of compounds ranged in activity up to 10,000 times that of morphine itself and as such represented narcotics of high potency and of considerable interest to the authorities. On the other hand it was, at the time, entirely unknown to more than a dozen or so scientists, until in September 1963 I reported in Pretoria to a somewhat larger number of biologists the experiences in the use of this substance for animal restraint and capture.

On my earlier flight to South Africa I had been seriously worried as to how to import the morphine I needed. The quantity required for rhinoceros capture was so absurdly large compared to the amounts used for medical purposes, that I despaired of either officially importing the quantity I needed or obtaining it on arrival. In any case the problems I was due to face in Zululand were large enough without the additional complications of official inspection of my stocks of chemicals and of complying with numerous government regulations. After all, it is most difficult to make a convincing case for the loss of half an ounce of morphine that represented two dozen darts that had missed their mark and thus discharged their contents irretrievably into the veld. I therefore optimistically labelled my small gramme bottles of morphine with the euphemistic title of "Rhinoceros Immobilising Compound", and wondered what the inside of an African jail would look like.

Fortunately I also had a capture gun, for the new powder-charge gun was not yet available elsewhere in Africa, and I wished to demonstrate this new projector. The sheaf of paper I had acquired to take this out of Kenya and into South Africa was so formidable that it formed a

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substantial part of my luggage. So absorbed were the Customs in checking and rechecking this weapon and finding that I had only blank ammunition to hunt with, that they completely forgot to ask me what else I had to declare. It probably became a classic amongst customs officers' stories. The crank who came all the way to the Republic to hunt rhino with a clearly outmoded gun and blank ammunition. I commend a gun to anybody who has serious intentions to smuggle contraband past normally vigilant Customs authorities.

To carry M99 was a far different, and in those days a much easier matter. A short note to the Government Licensing Authorities asking if I would be allowed to import only one gramme of endo-etheno-tetrahydro-pentylhydroxy-oripavine-hydrochloride* elicited an equally short note to the effect that this compound figured neither on the dangerous drugs nor the special import permit sections, and I could do as I pleased.

The use of M99 both simplified and complicated the catching operation. About 300 rhinos were captured with the use of this drug. They stopped more quickly and more certainly than before. The losses of two cases due to heart failure, subsequent to suspected inadvertent injection into a vein and therefore into the circulation, certainly gave no cause for alarm. The mortality figure for losses due to drug injections stood below one per cent, which was as good as could be expected by the most expert team of veterinary surgeons under conditions of field anaesthesia.

The drug, however, was more difficult to handle. Small changes in the hydrogen-ion concentration tended to destroy it, or reduce its activity. Traces of alkalinity in the glass would gravely reduce its keeping qualities. A whole series of letters flowed back and forth between Natal and Kenya presenting problems and giving answers, all too often only guesses or suggestions. Conditions in the field 2,000 or more miles away were very different to those in one's own laboratory. Bottles used in the latter were first soaked for twenty-four hours in a mixture of acids for routine chemical cleaning. Could it be the lack of such a procedure that caused a drop of activity in the drug, or was the manufacturer who now supplied a batch direct to Zululand at fault? Perhaps

* This formula was later slightly modified.



21. (a) Sue examines the syringe puncture on an immobilised elephant. Amboseli, 1967

LION CAPTURE. (b) (i) Male lion with mate ten minutes before capture





22. LION CAPTURE. (a) (ii) Immediately after going down August, 1962
(b) (iii) Tranquillised animals may be weighed. Kruger Veterinarian Johan van Niekerk weighing zebra



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some local chemist who put the batches into the bottles had been inaccurate. Letters do not always give all the facts about the age of the batch in question, or if it was derived from stock which was of sufficient activity.

A number of reasons had been suggested that might or might not have been the real ones. In the routine I had originally established we put the tranquilliser Acepromazine into the syringe first, followed by the M99. Later this routine was changed, and as a result the hyoscine knocked part of the M99 out of the solution by common ion effect, as the former had actually been more soluble in the tranquilliser solution than in water – but this was only realised later when much valuable time and drug had been wasted. Procedures which are casually adopted in the laboratory may cause many problems in the bush, such as the use of buffered water, adjusted to the exact liking of the delicate chemicals to be dissolved. Finally we simplified matters and abrogated many problems by devising water as a solvent adjusted to a pH 4.5 with hydrochloric acid; and this did the trick.

4

One of my last official visits to Zululand was to capture nyala antelope with M99. Zebra and antelope such as wildebeest posed few problems, but the graceful and nervous nyala showed only excitement and remained elusive after injection. This beautiful animal, an inhabitant of thick bush country, would appear and disappear like a wraith and unless the drug worked quickly could not be found in the dense vegetation.

On this occasion, as on many others before or since, we were amazed by the intense perspicacity of the wild animal, the use of extra sense in a mysterious way unknown to us. On our arrival, my wife Sue and I were taken with some ceremony round the reserve and shown with justifiable pride some of the magnificent nyala rams while Norman Deane, then the senior warden of Hluhluwe, extolled their remarkable lack of shyness. Once we got to work we did not see these rams again and had to search long and far and wide, day after day, to get the animals we needed for our work and demonstration. Coincidence? Maybe.

During this stay at Hluhluwe we again met Jan Oelefse, formerly a

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trapper in Tanzania, whom I had met during the making of the film *Hatari*. For this, black rhinoceros had been required to be captured by the chemical method. I had been struck by Jan's excellent manner of handling animals and the way in which he had devotedly nursed a female rhino we had called Gallamine, named after the drug used for her capture. Largely due to our inexperience, and partly due to the vagaries of the film world, Gallamine had developed pneumonia, and Jan had nursed her back to health.

I was glad to see him settled and appreciated in his new abode where he later did excellent work particularly with the capture of antelope, eventually evolving a method which seemed to depend entirely on inducing sizable herds of wildebeest, and even zebra, to run into waiting lorries, guided solely by strips of coloured plastic. Truly an exercise in applied animal psychology. One day we paid the Oelefses a visit. Having waited for their arrival for some time, we were a little concerned to see his wife enter, apparently deep in conversation with herself, and wander round the house talking volubly. Later it transpired that the conversation was with her pet baby hyaena of diminutive size but all too clearly a predator by temperament, a curiously elusive creature usually hidden under the chairs or settee. We had experienced large tame hyaena that behaved like placid dogs, but this little beast fixed us with a beady glare and weaved his head continuously from side to side while he regarded us from his lair. I wondered what would become of him as he grew up, and we have been relieved to hear from time to time that Jan and his wife were well and unharmed! Too rarely do we realise the tremendous individuality of wild animals. A fruitful field of research awaits the student interested in the peculiar variations of temperament and behaviour amongst the animals broadly categorised as predators and scavengers.

More than five years have now elapsed since the white rhinoceros relocation exercise gathered momentum. More than five hundred rhinos have been moved to new homes. As a species the southern white or square-lipped rhinoceros has been saved and a standard set in conservation practice that will be hard to better. Changes were made in the original drug mixture, with consequent and very evident improvements. Changes also occurred in the original team. Ian Player is now Chief

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Conservator, Zululand, and as such still holds a close watch over the rhino exercise which he himself got under way with his enormous drive and energy. John Geddes-Page replaced Colonel Jack Vincent as Director when the latter left to join the International Union for Conservation of Nature at their headquarters in Morges, Switzerland. Nick Steele is now Senior Warden at Umfolosi. Many of the results collected by the team have yet to be fully processed, such as the weights and detailed measurements of all rhino captured, measurements unique in every way.

Apart from the extreme sparsity of statistics of any sort no measurements had ever been taken on live and standing wild rhinoceros.

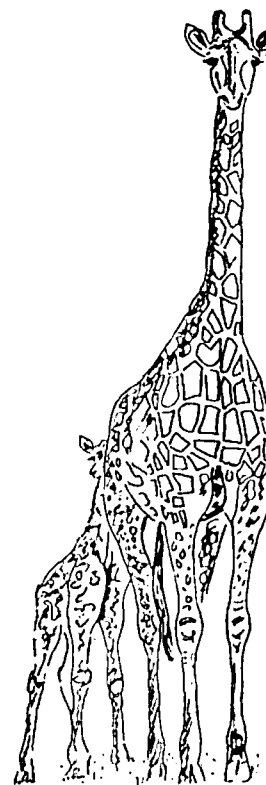
The operation was certainly not without hazards, although those engaged in it would hardly admit it. One incident recorded was of a horse, not quick enough to get away from a medium-sized cow rhino, being tossed eight feet into the air.² The horse was reported to have survived and perhaps characteristically there was no mention of a rider. It does illustrate the prodigious strength of the head and neck muscles of these usually placid beasts, and also what they may do if sufficiently roused, and before the injected chemicals have taken effect.

Some of this operation has been written up and some recorded in the excellent film, *To Catch a Rhino*, made by Sven Person, then of the South African Tourist Organisation. Later also, a film company from America arrived together with crate upon crate of capture drugs. The chemist of the group was convinced of the efficacy and superiority of a curare compound, abandoned in fact as unsuitable at the time of the Kariba rescue five and more years earlier. He was eventually allowed to try it on a zebra. More drugs were left behind by the group than we had ever been able to afford throughout the course of the research on immobilisation compounds, but I noticed that an entire crate labelled L.S.D. was conspicuously empty! Perhaps injected secretly into rhinoceros.

We came soon after the film group had left and heard of the many episodes recounted pithily by Ian in his characteristic way as he suppressed his laughter till his eyes bulged out like bullfrogs', and suddenly became bloodshot with tiny veins as his merriment could be contained no longer. I later noticed an article in an American magazine with

pictures of an immobilised rhino and other animals posed with their captors. Negligible mention, photographic or otherwise, was made of the team who had been doing the work for several years and would continue to do so long after the interruption of the film had been forgotten.

This is perhaps the deep attraction that conservation has for many, the reason why those working in the field are often more dedicated and more prepared to act for smaller immediate physical reward than probably those in any other profession. It is a feeling of the permanency of nature and the things for which they are striving – the hope that long after our contemporary civilisation may have collapsed, and names or titles are forgotten, the animals, forests and veld will remain. It will not matter, then, who did this or that. What will matter is whether a species has been lost or saved for posterity, and whether another thousand or more square miles have or have not been added to the already vast deserts of the world, to become useless to man and beast alike.



CHAPTER EIGHT

YEAR OF PROGRESS

I

“The common zebra has no stamina. When you chase them some always die”. This statement greatly interested us as it clearly required investigation.

We were at Carr Hartley’s 30,000-acre ranch at Rumuruti which he used for the dual purpose of raising cattle and catching numbers of the antelope and giraffe that lived there naturally. In this way it was an interesting demonstration of multiple land use, as the game brought in a lot of extra money without interfering with the cattle ranching.