By the mid-1970's, it was obvious that modern hunting techniques were rapidly depleting the stock of Houbara bustard in Saudi Arabia. When he heard of the problem, Jacques Renaud, a French bird breeder, decided to try to raise chicks. A few years later he attempted to breed from adults that had been caught in the wild. Eventually, in 1985, after 6 years of patience and frustration, he managed to obtain a first clutch of Houbara bustard.

By this time it had become apparent that Saudi Arabia was in urgent need of a comprehensive ecological conservation programme. It was not just the Houbara bustard that was in trouble: the whole ecosystem was under severe pressure. Some species that were once common, such as the ostrich, no longer existed in Saudi Arabia; others were becoming very rare indeed. Largely due to overgrazing, the flora of the Arabian Peninsula was in a similar predicament. Although it was obvious that things were in a bad way and were getting worse, few attempts had been made to assess, let alone arrest, the problem. The National Commission for Wildlife Conservation and Development was, therefore, established, and in April 1986 the Research Center, 30 kms from Taif, was constructed. Naturally, Jacques Renaud was involved in this project. To assist him, he gathered together 7 French scientists. These have been gradually augmented so that there is now a well-balanced team of 17 Saudi and French scientists working at the Center. The team covers a wide variety of disciplines: zoology, ornithology, botany, entomology, herpetology, and pathology are all represented. The Center has the following as its objectives:

The breeding in semicaptivity of endangered wildlife of Arabia.

The undertaking of research on these species both within and outside the Center.

Participation in the policy of nature conservation in the Kingdom.

The reintroduction to protected areas of those species bred at the Center.

The promotion of wildlife conservation in general.

The main buildings of the Center were constructed between January and March of 1986. In April, the first animals arrived. These were 57 oryx from the herd of the late King Khalid at Thumama. At the same time, Houbara bustard chicks arrived from Algeria. Since that time there have been many new arrivals. Sixteen ibex, a gift from the San Diego Zoo in California, arrived in July 1987, and since then, a total of 10 indigenous gazelles were obtained from private collections. Other mammals now at the Center include baboons, gennets, sand cats, wild cats, hyrax,
and mongooses. Before long, these should be joined by sand gazelles and, hopefully, onager.

The birdlife of the Arabian Peninsula is being equally well catered to. In addition to the Houbara bustard (fig. 1), the pens at the Center are already home to guinea-fowl from a wadi in the Jizan area, Philby's partridges, Arabian partridges, and cream-coloured coursers. Before long, it is hoped that ostriches will arrive, along with Bald ibis and Arabian bustards.

Reptiles are also well represented, approximately 20 being housed in the laboratories. There are even some freshwater fish, Gara buttikeri, new to science in 1983, that have come to the Center from wadis in the south.

Once the animals began arriving, the work of studying and breeding could begin in earnest. Oryx had the first priority. When confronted by a predator, groups of oryx tend to gallop away for about 50 meters and then stop and turn to face their pursuer. To a lion, a group of oryx with their long horns ready to be used as lances must look pretty formidable. But when men with rifles arrived on the scene, this method of defence tended to be less than effective. Oryx numbers rapidly dwindled, and the world herd is now down to just a few hundred. The oryx that arrived from Thumama soon started showing symptoms of bovine TB, and by the end of the first summer about 25 had died from the disease. This was offset to some extent by the birth of 10 calves. Bovine TB is very contagious and tests for its diagnosis are not wholly accurate. In normal circumstances any animal known to have contracted the virus would be destroyed, but with animals as rare and valuable as the oryx this is not possible. Therefore, a completely new and unique line of research is being undertaken at the Center. Four veterinary scientists are working almost full-time on a programme that at the end of a 9-month course of treatment should contain the disease. Newborn calves are immediately taken from their mothers. Even though calves may contract the disease during birth, the other two methods of contagion, from the mother's milk and her breath, are avoided. If after two generations the young animals show no symptoms, it is expected that they will be considered to be free of the disease and then released to breed with other animals that are known to be healthy.

Now the future of the oryx appears to be bright. An area of 3,000 km², needing 220 km of fencing, is being prepared. The area will be cleared of the few people who, with their animals, now inhabit it, and 17 oryx soon to arrive from Shaumari Wildlife Reserve in Jordan and the San Diego Zoo in the U.S.A. will have a large area of protected free range on which to establish themselves.

The second major project is the rearing and breeding of the Houbara bustard. The Houbara bustard is probably the most symbolic species of Saudi Arabian wildlife. For centuries they were the favourite quarry of nomadic falconers. This the population could withstand. But when hunters armed with rifles and transported by modern vehicles arrived, the pressure became more than the population could absorb, and like the oryx, their numbers have been decimated. Eggs were collected and hatched in both Algeria and Pakistan. After a few days of hand-rearing, the young chicks were flown to the Center where specially designed pens had been constructed prior to their arrival. The hand-rearing continued, the birds becoming very tame. Some birds that had been caught in the wild were pinioned and released.
into one of the large open areas at the Center. By 1987, the birds were showing signs of maturity, the male courtship display being performed for the first time. 1988 was eagerly awaited. As the breeding season approached, the birds were left as undisturbed as possible. The males performed their display: although mating was not observed, eggs were laid. Then came the disappointment: all the eggs were infertile. Otherwise, the birds are all extremely fit and healthy. Unfortunately, the birds loose in the large enclosures were eventually taken by foxes that managed to get into the Center from outside. But they did provide a great deal of behavioural information and, even though they had to fend for themselves in what is a fairly arid environment, their average bodyweight was greater than those being reared in the pens. Even though 1988 has not lived up to the highest expectations, there is little doubt that the Houbara bustard at the Center will breed before very long, and already there is an air of ill-contained anticipation for the 1989 breeding season. Once a successful breeding programme has been established, the next step will be to release birds into the large reserve now being prepared for the oryx in the hope that a wild population will be reestablished.

The Center is situated where there is a considerable amount of local wildlife. Hyrax are fairly common. The wild cats at the Center were caught locally, and white-tailed mongooses, fox, porcupine, wolves, and hyena are known to inhabit the area. In fact, a man from a local village brought in a kangaroo that he had just caught. No doubt an escapee from a local private zoo.

The local wildlife does cause a number of problems. Prior to the establishment of the Center, rabies had not been recorded in the wildlife of Saudi Arabia. Two of the first three foxes caught at the Center proved to be infected. It is essential that animals at the Center remain disease free, but if they come in contact with animals from outside, infection of some sort is bound to occur. Every effort is made to limit this contact. The fence that borders the Center is 2.5 m high and is topped by electric wire. To prevent burrowing animals entering, the wire extends into the soil to a depth of 50 cm. Although animals may find it difficult to enter, it is obviously impossible to exclude birds, for which the Center, with its relatively abundant supplies of food and water, acts as something of a magnet. Carrion eaters present the greatest danger as they can bring in contaminants on their claws and bills. Crows in particular are trapped in large numbers.

Without man’s interference, nature manages to strike a balance between the number of animals in an area and the available food supply. In some places, species migrate twice a year, either from upland to lowland and back, or from north to south, both so that they have a constant food supply and to let their food plants have a certain period each year during which they rejuvenate without being damaged. Man the world over tends to upset this delicate equilibrium, and the environment suffers as a consequence. Saudi Arabia is no exception. Scientists at the Center are doing everything possible to ensure that the flora and the land itself is not subjected to any stress that it cannot comfortably tolerate. Just as an example, vehicles within the Center stay on surfaced roads wherever possible, even when by doing so extends the distance travelled. Offroad driving is limited to narrow, well-defined, fenced tracks, thus leaving the rest of the ground surface and its plant life undamaged. Some parts of the Center are kept free of all animals so that information may be gained as to how well the flora would do if left free from all grazing. In other areas, the number of animals is restricted to that of an environment where man and his animals do not exist.
The results of these experiments are both obvious and startling, especially if one stands by the Center's perimeter fence. Outside the fence, where the Bedouin farmers take their sheep and goats to graze, the plant life is sparse. There is no grass; the ground-hugging bushes appear lifeless, being woody and leafless. Taller bushes are in slightly better shape. Although any new vegetation that is within the reach of the sheep and goats soon gets eaten, that which grows higher up survives fairly well, even though the camels can still get at it. Inside the perimeter fence it is like another world: grass is growing and the low-growing plants have flowers, leaves, and healthy young shoots. The taller bushes are noticeably more lush and green. This is proof enough that the reason that many parts of Saudi Arabia appear so barren is not due to lack of water, but to constant overgrazing by domestic and semidomestic livestock.

The Center's next project is to discover just how much livestock the land will comfortably support before it becomes overgrazed. Then comes the hardest job of all, that of persuading the local farmers that they will get better returns in the end if they restrict the numbers of their livestock on grazing lands by using some method of rotation of usage. The concept of conservation and of leaving areas fallow so that the plantlife can recover is not new to the tribes of Saudi Arabia. Such areas, known as himas, have existed throughout recorded history. For this reason, education and persuasion may prove easier than is anticipated.

The National Wildlife Research Center at Taif has made remarkable progress in the short time since it was established. The plans for the future would have to be regarded as over optimistic if one was not aware of what has already been achieved. In two years, an area that was barren, parched, overgrazed scrub has been turned into a scientific research centre of international importance and acclaim.
Figure 1.--The Arabian oryx, *Oryx leucoryx*

Figure 2.--The Houbara bustard, *Chalmydotis undulata*