CROCODILE SPECIALIST GROUP

NEWSLETTER

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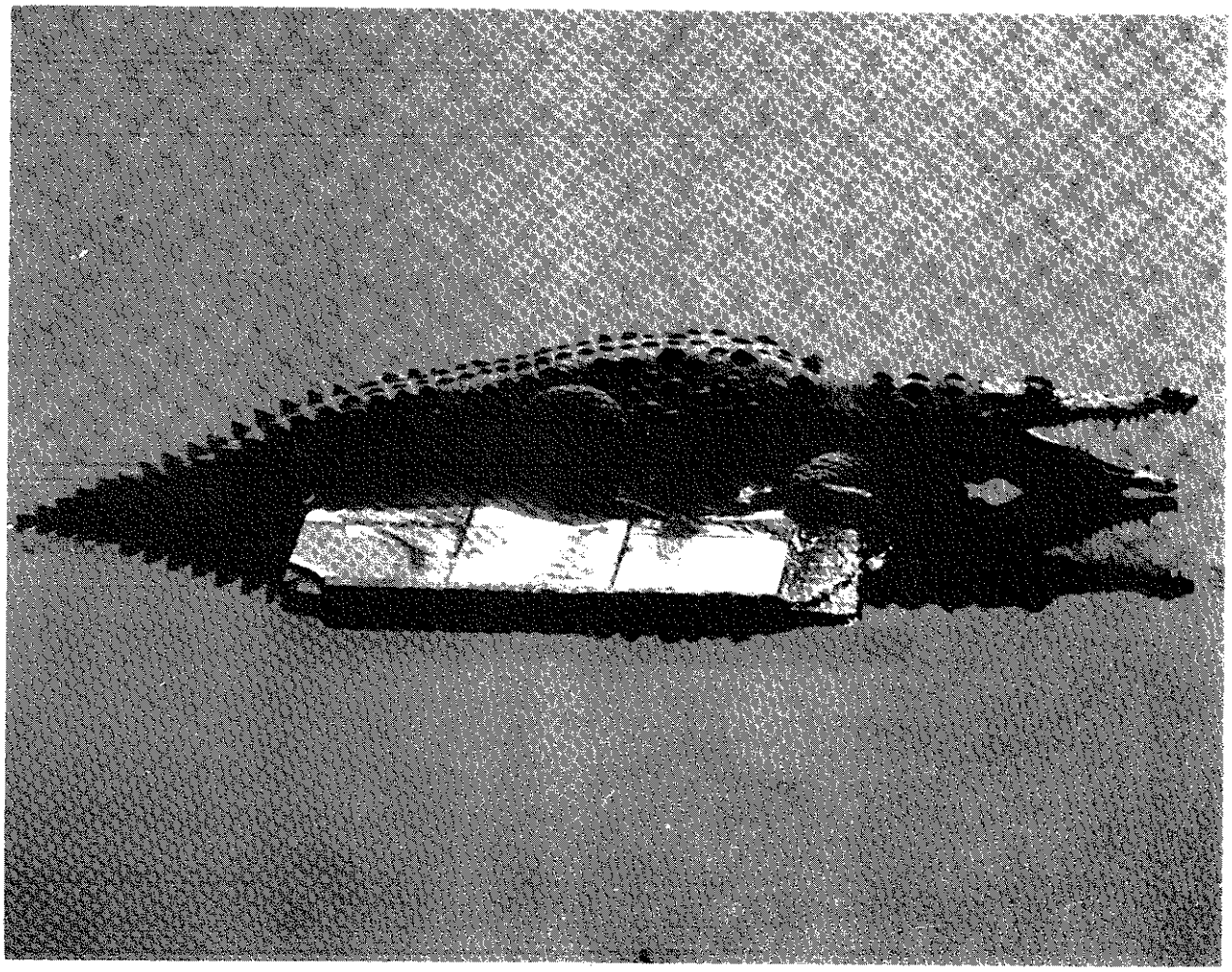

IUCN World Conservation Union ■ Species Survival Commission

CROCODILE SPECIALIST GROUP

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IUCN--The World Conservation Union
Species Survival Commission

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COVER PHOTO: "Coqui," a 2 m *Crocodylus acutus* from the Pacific coast of Guatemala, raised from a hatchling by Enrique Fernandez. C. R. Fernandez photo.

PATRONS

The following Patrons of the CSG have contributed more than U.S. $500.00 during the past 12 months and are listed by size of donation, largest first. The funds donated have been deposited with University of Florida Foundation, Inc., and are used to support the CSG program:

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Jonathan Politano, Miami Beach, Florida, U.S.A.

EDITORIAL

CONSERVATION AND TAXONOMY. Some recent and pending developments in crocodilian taxonomy raise interesting questions about the conservation status of newly described, or newly differentiated taxa. The effects of taxonomic changes on the stability of the existing mechanisms for regulation of trade in endangered species deserves attention. For example the newly resurrected *Crocodylus raninus* is automatically listed on Appendix II of CITES as are all the family Crocodylidae not on Appendix I. The value of these broad listings is immediately demonstrated. However, the status in the wild of *C. raninus* is unknown; it is described from three museum specimens. The ugly specter emerges that unscrupulous traders could label shipments from the Indo-Pacific region as *raninus* to confuse enforcement authorities and circumvent CITES trade controls. Customs and enforcement authorities should be alert for this possibility.

The object of taxonomists is to accurately describe the variety of crocodilians in ways that reflect their evolutionary origins and affiliations. The object of conservation, however, is more readily served by an unambiguous list of species whose identification is clear and whose status with respect to trade is clearly defined. One mechanism to resolve these diverging goals is the CITES committee on nomenclature. This committee makes recommendations to the CITES parties to maintain agreement between CITES listings and current taxonomy. There is already some discrepancy between various versions of taxonomic reality and the CITES list. CITES lists 22 species. The Crocodile Specialist Group Action Plan recognizes 23 species. There is continuing debate about the status of *'yacare'*, the relative status of *siamensis* and the *mindorensis–novaeguineae* group, the possibility of additional subspecies of *Caiman* and the separation of *Osteolaemus* into two species.

There is no point in the conservation community attempting to restrict the scientific efforts of taxonomists, equally no one is served if new species are rendered extinct by uncontrolled exploitation shortly after they are described. A solution might be for both interests to maintain open communication and flexibility. There is an obligation on the part of CITES and conservation interests to accept the best current definition of species diversity, and to recognize that it will change from time to time. There is an equal responsibility for taxonomists to recognize that their efforts do not occur in isolation, but have the potential to profoundly affect the conservation of crocodilians.

A key component in this interaction is that the taxonomy is of the highest quality. The erection of new species based on single, perhaps aberrant, specimens of obscure origin is unjustified. New taxa should only be described on the basis of adequate series and should include details of range and distribution. The utilization of biochemical and karyotypic characteristics, in addition to both external and skeletal morphology should be routine. The editors and reviewers of taxonomic papers have a special responsibility to ensure that species descriptions and changes meet the highest modern standards.

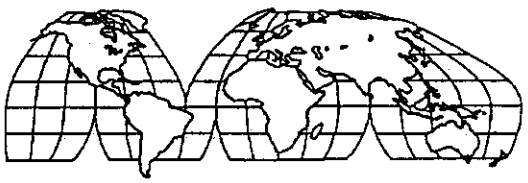
For their part the conservation community has an obligation to remain aware of developments in the taxonomic field and be prepared to rapidly adjust regulatory mechanisms to reflect current taxonomy. Ideally taxonomists and conservationists could work together to ensure that new taxa receive appropriate protection immediately, or very shortly following their official publication. - J.P. Ross, *Ed.*

STEERING COMMITTEE

STEERING COMMITTEE MEETING. The Steering Committee of the Crocodile Specialist Group

will convene at Santa Marta, Colombia, on Saturday 10 November 1990, and Sunday 11 November, immediately prior to the 1st Regional Working Meeting. The provisional agenda includes detailed discussion of the Group's position on proposals submitted for the 1992 CITES meeting regarding crocodilians. Of particular note are the proposals concerning Indonesia, Thailand and the universal marking of crocodile skins. The meeting will be, as always, open to observation by CSG members and other interested parties. Minutes of the meeting and resulting resolutions and decisions will be published in the next NEWSLETTER. -- James Perran Ross, *Executive Officer CSG, Gainesville, FL 32611, USA.*

AREA REPORTS



AFRICA

Vice Chairman's report.

The African region has been fortunate in receiving financial support from several quarters. WWF-USA is supporting a project entitled 'TECHNICAL ASSISTANCE FOR CONSERVATION AND TRADE CONTROL PROGRAMS FOR THE NILE CROCODILE IN EAST AND SOUTHERN AFRICA' which has provided modest but important funding for the Vice Chairman's travel. The People's Trust for Endangered Species is supporting a project entitled 'THE REINTRODUCTION OF CAPTIVE RAISED JUVENILE NILE CROCODILES TO LAKE KARIBA, ZIMBABWE AND THE MONITORING OF THEIR SURVIVAL' which will be undertaken as a doctoral study by Richard Fergusson. The study, which will use radiotelemetry, is essential to evaluate ranching schemes that compensate for their take of wild eggs by releasing juveniles. Finally, the Crocodile Farmers Association of Zimbabwe has contributed $10,000 Zimbabwe to support the Vice Chairman's office and travel.

Most regional work has been conducted under the WWF grant beginning with a letter to each country in the region soliciting invitations for the Vice Chairman to visit and advise. Botswana, Ethiopia, Kenya, Malawi Tanzania and Uganda responded. While no official response was received from Mozambique, Zambia and Sudan, subsequent enquiries have been made from those countries through individual farmers and traders, or in the case of Mozambique, through CITES.

All the responding countries except Ethiopia were visited by April 1991 and a brief summary of results follows:

Botswana. Three days were spent in Gabarone assisting the Department of Wildlife to draw up their crocodile management plan and discussing their Annual CITES Report.

Ethiopia. A planned visit to Ethiopia was cancelled due to the deteriorating security situation at that time. Ethiopia has one ranch but exports skins under a quota (CITES Conf. 5.21). They expressed a wish to submit a ranching proposal and comments were sent to the Wildlife Manager in Addis Ababa. A proposal was submitted to CITES before the 330 day deadline but the supporting statement has still to follow.

Kenya. Kenya has submitted a ranching proposal and supporting statement to CITES following an extremely successful workshop run by the Vice Chairman for the Kenya Wildlife Service. Dr. Richard Leaky opened the 2 day meeting which was attended by 20 people including farmers, wildlife officials and Dr. G. Howard of the regional IUCN office and Dr. N. Leader-Williams of African Wildlife Federation (AWF) who has recently begun a wildlife utilization project in Tanzania.

Malawi. Malawi has a ranching proposal and two crocodile farms, one in well established production. Malawi also exports a limited number of wild hides. The two farms were visited and a report submitted to the Wildlife Department. General advice was given to the Management Authority emphasizing annual reporting. A new law and management plan is being prepared to bring crocodiles under the complete control of the Wildlife Dept. and ending the division of responsibility between wildlife and fisheries. Two wildlife officers will visit Zimbabwe in August to examine crocodile management.

Mozambique. There are now four ranches in Mozambique and about 15,000 eggs were collected in 1990/91. Only one farm has

extensive rearing facilities and the intention had been for all the farms to export about 8,000 hatchlings to South Africa. With the recent decline in the skin market, offers were not forthcoming. A proposal to catch and export adult females in violation of CITES regulation alarmed the CSG and CITES Secretariat asked the Vice Chairman to help explain the regulations to the Management Authority.

Sudan. Sudan is reported to have a stockpile of some 7,000 skins but no longer has an export quota. The Vice Chairman assisted in drafting a letter from the Management Authority to CITES requesting a postal procedure to obtain a quota and an invitation to visit Sudan is expected.

Tanzania. After a series of visits by the Vice Chairman there are now three ranches under construction although not all are set for success. Assistance with the drafting of a ranching proposal for CITES and a crocodile workshop is planned with AWF for August.

Uganda. Uganda is drawing up documents to join CITES and wishes to submit a crocodile quota proposal. The Vice Chairman was requested to assist with a workshop in September with surveys and drafting of management plans and CITES submissions. -- Dr. Jon Hutton, *Vice Chairman for Africa, 16 Cambridge Ave., Highlands, Harare, Zimbabwe.*

Burundi:

YES, THERE ARE CROCS IN BURUNDI. During a survey of Duikers in Burundi, Mr. V. J. Wilson of Zimbabwe reported seeing crocodiles in the Rusizi River at the headwaters of Lake Tanganyika, near Bufumbura, the capital. He reports that on 8th July 1990 he saw six crocs of 2-2.5 m and three of at least 4 m, basking on islands in the Rusizi estuary only a few hundred meters from the Lake. He also saw 'lots' of eyes at night. This is the first well documented report that crocodiles remain common in some of the rivers draining into northern Lake Tanganyika. -- Dr. Jon Hutton, *Vice Chairman for Africa, 16 Cambridge Ave., Highlands, Harare, Zimbabwe.*

Congo:

BUSHMEAT SURVEY. In a study of the bushmeat market at Pointe-Noire, Congo, V.J. Wilson reported that 21 *Osteolaemus tetraspis* were seen on 14 October 1990, many still alive and two females with eggs. On the following day 27 *Osteolaemus* were observed. At a second market in Tiete, *5 Osteolaemus* were seen on 22 October 1990. He summarizes the market for *Osteolaemus* meat as follows:

> "Large numbers of this species of crocodile were killed and eaten by people in the Pointe Noire area each year. Many dead and also live specimens were found for sale at the Grand Market and the Tiete bush-meat markets in Pointe Noire. Crocodile meat is a great delicacy and the local people prefer the fresh meat to that of smoked meat. As a result the crocodiles are caught alive in the swamps and rivers near Pointe Noire and in the Mayombe forest and transported alive to markets. There they are kept alive as long as possible and only killed when the butcher has a customer. A whole small dwarf crocodile was valued at about 7,500 CFA (US $30.00) each. However, most people purchased slices of the crocodile as opposed to whole animals."

-- Dr. Jon Hutton, *Vice Chairman for Africa, 16 Cambridge Ave., Highlands, Harare, Zimbabwe.*

Mozambique:

NILE CROCODILES ON BAZARUTO ISLAND. In the CSG NEWSLETTER 9(4), Dr. Jon Hutton mentioned the unique population of crocodiles inhabiting two islands in the Bazaruto Archipelago, off the Mozambique coast, and expressed concern that this population would be diluted by escapees from the two commercial farms on the islands. He mentioned the importance of collecting tissue samples before this happens. I drew this to the attention of Mr. Paul Dutton, who is working in the archipelago for WWF, implementing a master plan for the conservation of natural resources, with crocodile conservation part of the overall plan. The larger of the two crocodile farms, Crocodilos de Moçambique, based on Bazaruto Island, has agreed to cooperate with Mr. Dutton within the framework of the master plan for crocodiles.

In the past, local people have collected all the eggs they locate for food and also ate crocodile meat. Paul Dutton has now persuaded the local

people living near the freshwater lakes inhabited by crocodiles not to eat the eggs this season. They have been issued with numbered stakes bearing the WWF panda logo to mark the nests that they locate, thus staking their claim. The farm will take up the eggs and reward the "owner" with cash and a fifty kg bag of maizemeal for each nest. This scheme is reported to have been agreed to enthusiastically by the local people.

Hatchlings from eggs collected last season by the farm were marked by toe clipping and individuals from eight different clutches and four different lakes have been reared separately with the intention of submitting them for tissue analysis to establish whether or not they are different from mainland crocodiles. Accidental contamination of the local population by Crocodilos de Moçambique is unlikely under present management and no deliberate contamination will occur.

A superficial preliminary survey of crocodile populations in the lakes on Bazaruto Island has been carried out and more intensive spotlight surveys are planned. Depending on the survey results a decision will be made on whether or not to release hatchlings back to the lakes. Nesting data from last season indicates at least 32 breeding females occur on Bazaruto Island. These crocodiles exhibit interesting behavior. They do not return to their nests after laying until the hatchlings commence calling. This makes locating nests difficult unless someone is present at laying, or tracks are found before they are obliterated. The crocodiles are very bold in the water and will follow a person walking along the shore. One of the lakes, Mbiti, is avoided by local people for this reason and no cultivation is done at the water's edge. Fatal attacks on people have occurred in the past, and goats sleeping on the dunes near the lakes at night are sometimes taken by crocodiles.

With the cooperation that now exists between all parties involved, the survival of the Bazaruto crocodile populations appears to be reasonably secure for the immediate future. -- Peter Taylor, *P.O. Box 191, Harare, Zimbabwe.*

Nigeria:

CROCODILE REHABILITATION PROJECT. There are three extant species of crocodile in Nigeria; the Nile crocodile, the west African dwarf crocodile and the long-snouted crocodile. Nile crocodiles range from the coastal lagoons through the big inland water bodies and extend as far as Lake Chad in the Sahelian northeast corner of Nigeria. Their populations are in decline everywhere, except in a few places where cultural practices confer protection on them. This decline in Nigeria, is due to use for food and for leather. Nile crocodiles are rarely offered for sale any more, a possible indication of their declining abundance. The species is fairly well represented in Nigerian zoos.

The dwarf crocodile (*Osteolaemus tetraspis*) is probably the most abundant crocodile in Nigeria. Its current distribution seems to be restricted to the Niger and Benue rivers and it is most abundant in the rainforest belt and associated water bodies. The species is the main crocodile in commerce in Nigeria today. Although the value of its leather is reported as low, virtually all crocodile leather work in Nigeria derives from this species. It is well represented in Nigerian zoos.

The long-snouted crocodile (*Crocodylus cataphractus*) is the rarest and most endangered crocodile species in Nigeria. In captivity it is represented by single individuals in two zoos. Its population in the wild, if it still exists, is very precarious. There is an urgent need to organize proper searches and to initiate rescue work for this crocodile.

In 1982, the Federal Department of Forestry, within the Ministry of Agriculture and Natural Resources, embarked upon a crocodile rehabilitation project. The project consists of rearing crocodiles in captivity as its main thrust and river surveys were also done though resources were not always available for this purpose. To date only Nile crocodiles have successfully bred in captivity with eggs being laid in 1988, 1989 and 1990. Hatchlings were obtained from the 1989 and 90 eggs. The Dwarf crocodiles in the project have not bred and no long snouted crocodiles are kept in the project.

Trade in crocodiles still occurs openly but international trade has been forbidden by Decree No. 11, 1985, to comply with CITES requirements. A few Nigerians keep crocodiles as pets at home but very few have an interest in farming. A few foreigners seem to be engaged in farming as a pretext for smuggling skins as they request export licenses but have failed to show any farm. Seizures of crocodile skins originating in Nigeria may occur in Europe or America,

most of these have been illegally exported. -- M. P. O. Dore, *Assistant Director, Federal Department of Forestry, P.M.B. 1223, Benin City, Bendel State, Nigeria.*

South Africa:

CROCODILE ATTACKS IN LAKE ST. LUCIA. Considering the number of adult crocodiles in the Lake St. Lucia system (a minimum of 833 adults for 1990), and the human pressure, the number of crocodile attacks recorded is extremely low. Pooley gives a figure of 16 up to 1984 with the first recorded attack on a missionary. The Reverend Lindfield was taken while wading across Brodie's crossing in 1902.

Crocodiles have an instinctive fear of humans and tend to shy away from areas of human activity. While crocodiles can learn to become man eaters, most attacks are either opportunistic, made in desperation, or in self defense. Two recent attacks fall into that later categories.

The first of these was on a European tourist who, with a number of friends, was playing around in shallow water near the mouth of the estuary despite warning notices and being warned verbally by game guards. He was seized by the left arm by a large crocodile (about 4 m). He was able to rise to his feet and beat the crocodile about the head with his right arm and fortunately the crocodile gave up the attack. The tourist was lucky to escape with 67 stitches in his arm. This crocodile was caught and found to be in very poor condition as a result of having lost half its tail, probably due to a collision with a motor boat. This crocodile was probably hampered by its recent loss of tail and attacked in desperation for food.

The other attack was on a canoe in a wilderness area of the Lake. There were two canoes and no sign was seen of crocodiles until the first canoe was attacked twice by a very large crocodile. The incident took place in shallow water and in the ensuing panic both canoes were swamped and the occupants waded ashore without further incident. Later all their equipment was recovered by Natal Parks Board officers without any sign of the crocodile. In this case the crocodile was probably lying quietly on the bottom and was struck by the canoe. It then spun around and bit the front section of the canoe twice, folding the fiberglass side over the leg of one of the occupants who received minor injuries to his calf. This attack can only be put in the category of defensive behavior.

Human nature being what it is there are bound to be future attacks but one should not blame the crocodile, it is only behaving instinctively. -- David K. Blake, *Natal Parks Board, St. Lucia Crocodile Center, Natal 3936, South Africa.*

CROCODILE FARMING IN NATAL. One of the roles of the Natal Parks Board, through the St. Lucia Crocodile Center, is to oversee the crocodile farming industry in Natal. The first farm (Stewarts Farm) was started in June 1981. Today there are eight farms extending over 500 km from Hluhluwe in the north to Ramsgate in the south. Five of these farms are open to the public and the other three are purely commercial. This does not include the St. Lucia Crocodile Center which is an interpretation center.

The main restriction to starting crocodile farming in Natal has been obtaining stock. Initially the farms relied on stock imported from Zimbabwe and Botswana. These sources are no longer available and more recently stock has been obtained from other farms in South Africa, either as surplus or as farms close down. One farm is holding adults for another farm whose climate is not suited to crocodile breeding and will share any hatchlings obtained. Stock is also obtained from the St. Lucia Crocodile Center in the form of problem animals and from hatchlings produced by crocodiles held for interpretation purposes.

Recently some hatchlings have been obtained by the Center from nests in the region of the St. Lucia Estuary that have been identified as having no chance of survival. These hatchlings are sold to farmers on the condition that they are retained for future breeding to comply with CITES requirements. The farmers have formed a loose association that meets with members of the Natal Parks Board once a year. While crocodile farming in Natal is still developing it has the potential to be a very viable venture in the future. -- David K. Blake, *Natal Parks Board, St. Lucia Crocodile Center, Natal 3936, South Africa.*

INVITATION TO SOUTH AFRICA. The Nile Crocodile Farmers Association wishes to extend an invitation to participants at the 11th Working

Meeting of the CSG to visit South Africa following the Working Meeting in Zimbabwe. The Association intends to arrange tours of facilities in South Africa. This invitation has been coordinated with the convenors of the Zimbabwe meeting to be a complementary activity and details will be developed over the next few months. People interested in this opportunity should contact : -- Mr. Howard Kelly, *President NCFA, P.O Box 245, Ramsgate 4285, South Africa.*

FIRST SOUTH AFRICAN CROCODILE SYMPOSIUM. On 21 June 1991 the Crocodilian Study Group of Southern Africa, in conjunction with the Department of Animal Science, University of Pretoria, staged the First Symposium on Crocodile Production in the Republic of South Africa.

One hundred and fifty seven participants attended the symposium at the University. The delegates included farmers affiliated with the Transvaal Crocodile Breeders Association, The Nile Crocodile Farmers Association, producers from Botswana, Brazil, Mozambique, Zambia, Zimbabwe, all regions of RSA, and academics, accountants, businessmen, conservationists, insurance brokers, herpetologists, journalists, paleontologists, students, and veterinarians interested in crocodiles.

A wide spectrum of topics were addressed by invited speakers who included; Dr. Chris Foggin - DISEASE AFFECTING FARMED CROCODILES; Dr. Richard Luxmoore - CITES AND ITS IMPLICATIONS FOR THE INDUSTRY; Dave Blake - STATUS OF *CROCODYLUS NILOTICUS.* ; Prof. Leon Brummer - A FINANCIAL MODEL FOR CROCODILE FARMING; Quinton Coetzee - CROCODILES, A TOURIST ATTRACTION; Dr. Niels Jacobsen - CROCODILES AND THE LAW; Johan Marais - THE STATUS OF CROCODILE FARMING & CROCODILE HUSBANDRY; Prof. Gerrie Smith - NUTRITION OF CROCODILES & FACILITIES AND TECHNOLOGY FOR CROCODILE PRODUCTION; Dr. Mark Verseput - COLLECTING SPECIMENS FOR VETERINARY DIAGNOSIS; and papers submitted by Kevin van Jaarsveldt - THE SKIN TRADE, and Tony Pooley - AN UPDATE ON LITERATURE, who could not attend. The papers will be published as a handbook on crocodile farming in South Africa which will be available soon from the Crocodilian Study Group. The coordinators of the symposium wish to thank all speakers, delegates, and others who supported the effort, especially our producers who made valuable information available. To obtain the handbook please contact: The Coordinators, Crocodilian Study Group of Southern Africa, Dept. of Animal Science, University of Pretoria, 0002 Republic of South Africa. -- Johan Marais, *Manyane Game Lodge and Crocodile Farm, P.O. Box 3, Buhrmannsdrif, 2867, Republic of South Africa.*

GATOR BANK AT CROCWORLD. Crocworld in Scottburg, South Africa, is privileged to have a pair of American alligators on display. These individuals were born in the USA in 1952 and in 1953 they were acquired by the Zurich Zoo, Switzerland. When that zoo closed its reptile display in 1985, Tony Pooley was able to get the animals to sunny South Africa.

During the recent summer months the female alligator stopped eating and did not take food for 12 weeks. We decided to give her a thorough examination, vitamin injection, and treatment for infection and parasites. Unfortunately she died from complications with the immobilizer used.

While doing the post mortem we were surprised to find, not stones as we expected, but handfulls of coins in her stomach. The total was 931 coins weighing 2.1 kg. Most of the coins were Swiss, followed by French and German. Other coins included Danish, Canadian, British, Italian, Spanish, Yugoslavian and even some from the USA. The coins dated from 1940's to early 1980's.

We can only conclude that these coins were tossed into its mouth while it was gaping in the zoo. Did the visitors think the alligator was a piggy bank - or should we call it a *GATOR BANK*? [Crocodiles at the Bronx Zoo, New York, USA, have been observed to pick coins off the bottom of their pool by swirling the water with their head and catching the coins lifted by the eddies -- *Eds.*]

The coins did not appear to be the cause of her not eating and the pathologists found no trace of heavy metals in organs or blood. We suspect the male alligator also has coins in his stomach.

BREEDING AND REARING RESULTS. The breeding stock of Nile crocodiles at Crocworld is wild caught adults from the Okavango swamps in Botswana that we have held for five or six years. The sex ratio of breeding adults is 1 male: 5-7

females and the breeding pens are run as a tourist operation open to public view. We receive 60,000 - 80,000 visitors per year. Breeding results in 1989/90: Of 85 adult females, 55 laid a total of 2,854 eggs. 2,024 (71.4%) hatched and we ended up with 1,975 healthy hatchlings. In 1990/91 of 77 adult females, 69 laid a total of 3,417 eggs, 2,746 (80.6%) hatched and produced 2,700 healthy hatchlings. 172 hatchlings died in their first 12 months (8.75%) and 68 of these died from stress and suffocation in pile ups when we were performing unusual tasks that are not normally carried out. Only 16 died between 5 and 12 months age. In our rearing stock, which are kept in open air ponds, not a controlled environment, 23 died out of 1506 crocs of 12 -24 months age (1.5%) and 11 died out of 1392 crocs of 24 - 36 month age (0.8%). -- J.V. Lello, *Farm Manager, Crocworld, P.O. Renishaw, 4181, South Africa.*

Tanzania:

CROCODILE RANCHING IN TANZANIA. The move to develop crocodile ranches in Tanzania saw a burst of activity in the last quarter of 1990 and early this year. The Tanzanian Department of Wildlife suggested that allocation of the 1991 wild skin quota would only go to those individuals or companies with an operating crocodile ranch in 1991. As a result motivation was high in this period. Three projects were initiated under a consultancy with Daren Bruessow and Jon Hutton and varying degrees of success were achieved. Hambo Crocodile Village is the most ambitious of the three ranches. Located 20 km north of Dar es Salaam, it now holds 577 hatchlings. Of these 220 were hatched from 300 eggs collected in the Rufiji basin and the balance, 375 were survivors from 405 hatchlings collected in the wild. Mortality in the project has been moderate to high with a 27% death rate in hatchlings from eggs and 12% loss of the wild collected stock. Hambo Crocodile Village is designed to cater for a 3000 hatchling intake each year. The first phase is nearing completion with central complex of cold storage, feed preparation, workshop, and office, functioning and the first bank of ponds for 1000 animals occupied.

Teule Arts Crocodile Ranch in Ifakara, 450 km south west of Dar es Salaam, was to cater for 2,000 hatchlings a year. Construction proceeded well until December 1990 when all development was halted due to financial considerations and there appears to be no move to complete the project. There is no report of any crocodiles held.

Tumaine Crafts Crocodile Ranch, a 1,500 hatchling / year project, is located 5 km from Teule project. Approximately 280 hatchlings were moved onto the ranch from the incubator in June 1991. No additional information is available. Two additional projects are reported to exist, one near the Rufiji delta and the second in the Lake Rukwa region but there is no report of developments in these projects.

The fall in skin prices has not deterred the two established ranches to any degree but has discouraged newcomers to the industry. The future of crocodile ranching in Tanzania is presently resting on the shoulders of the Wildlife Department. A management document has been drafted with policies that will be significant in determining the success of Tanzania's aspiring crocodile ranches. -- Daren M. Bruessow, *Wildlife Africa Ltd., P.O. Box 1867, Dar Es Salaam, Tanzania.*

ASIA

India:

MUGGER RESEARCH AT RAMATIRTHA. The mugger research and conservation projects at Ramatirtha (Orissa) were started in 1979 as part of the country wide crocodile management program in India. Major topics of study and activity since 1988 have been as follows:

Improving the performance of captive breeding using vitamin E treatment.

Improving the survival of hatchlings. Comparisons have been made of the survival and growth of hatchlings in rearing pens and in semi-wild conditions with the parents. Hatching time control and provision of food supplements have been investigated.

Studies of behavior relevant to management in the wild. Studies were conducted of partitioning of resources such as basking and nesting sites, water bodies and contact with the other sex.

Understanding of general biology including the incidence of congenital deformities and the occurrence of twinning.

The project has also handled nuisance crocodiles, designing a trap to recapture a 2.1 m

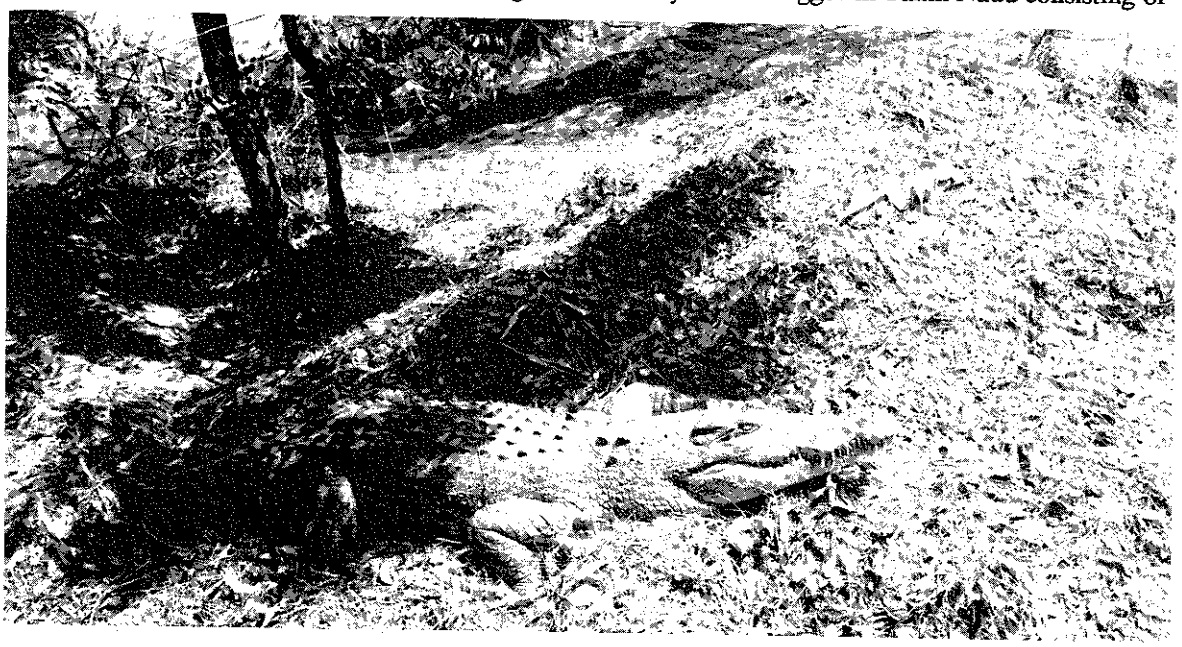
mugger that escaped into the adjoining river. During its 12 years of operation the project has produced 864 eggs from 1984 to 1991 resulting in 466 hatchlings (51.6%). Ramatirtha has provided 194 muggers for restocking in Similipal Tiger Reserve and an additional 106 were obtained from rearing projects at Nandankanan and Tamilnadu with a survival figure of 81.1% for muggers restocked. -- Dr. Lala A.K. Singh, *Similipal Tiger Reserve, Khairi-Jashipur, Orissa 757091, India.*

MADRAS CROCODILE BANK. This has been another very good year. The highlight of our breeding season was that one of the *Crocodylus siamensis* bred at the New York Zoological Society, USA, in 1983, and sent to us by John Behler, nested this year. This female came to us at 6 months age and was 35 mm total length. This year she laid a clutch of 26 eggs of which 50% were determined to be infertile by candling. We expect our other female to nest next year. We have 2 males that are a year older than the females.

This year three *C. moreletii* nested. Clutches ranged from 25-37, viability rate determined by candling was 98%. Hatch rate was 85% and there were some early embryonic deaths. We have 10 of these crocodiles from Zoo Atlanta thanks to Howard Hunt. Our *Caiman crocodilus crocodilus* are breeding well. We had 4 year olds nesting this year, producing 8 nests and a total of 24 nests for the species. C. *porosus* and *G. gangeticus* also nested this year with one gharial laying a 100% viable clutch of 26 eggs from which 96% hatched.

On the Mugger front this year we had 309 nests and 6,012 eggs with a hatch rate of 85%. A few months back Dr. Lala A.K. Singh and Dr. Sudhakar Kar spent a month assessing *C. palustris* numbers in captivity at the different centers in Tamil Nadu and looked at some habitat for further re-stocking possibilities. Jeff Lang visited again in May and hopefully will be back in December for a 4-5 month stay.

One of our research staff will conduct a status survey of the mugger in Tamil Nadu consisting of a 4 month survey of habitats and populations in the State. Similar surveys were last done by Rom Whitaker in 1974. In February 1992 a long term study on muggers in the wild will be started. -- Harry Andrews, *Deputy Director, Madras Crocodile Bank, Post Bag No. 4, Mamallapuram 603 104, TN, India.*



Female *Crocodylus porosus* guarding nest at Madras Crocodile Bank, India. H. Andrews photo.

Indonesia:

CROCODILE MANAGEMENT REVIEWED. At the invitation of the Indonesian Government Dr. Grahame Webb, CSG Vice Chairman for the

region, and Dr. Robert Jenkins of Australian National Parks and Wildlife Service, visited Indonesia, 17 February to 2 March 1990 to review current crocodile management practices and provide advice on a strategy for achieving sustainable use of the wild crocodile resource. They visited five tanneries and 18 farms located throughout Indonesia and containing 54,500 crocodiles of four species. One of the central aims of the review was to identify management problems and suggest solutions that could be incorporated into a proposal for consideration by CITES. In their detailed report, Webb and Jenkins stress that in addition to meeting CITES requirements, management for conservation of crocodilians in Indonesia must be practical and tailored to the diverse cultural and socioeconomic characteristics that prevail there. They point out the severe geographic, logistic, biological and economic constraints that apply in Indonesia. The archipelago comprises more than 17,000 islands spanning 5,000 km east-west and 2,000 km north-south. Indonesia in inhabited by approximately 176 million people with an annual growth of 2.2%. The logistics of surveying the full extent of wetlands in Indonesia and their crocodile populations are so daunting as to be considered impractical, if not impossible.

After reviewing the wild crocodile resources in Indonesia the report identifies current management problems that include the separation of control, monitoring and enforcement functions, and difficulties caused by the present size limit, which is not consistent with size limits in neighboring Papua New Guinea and relies on an unrealistic restriction on capture technique. The great difficulty of effectively monitoring crocodile populations due to the complex and heavily vegetated terrain. Problems were also identified in the management of farmed crocodiles including difficulties in providing adequate feed and related husbandry problems, and the conflicting incentives and returns on captive raised and wild hunted skins that encourage producers to market wild skins.

Webb and Jenkins conclude that crocodile management must be developed on different lines in Irian Jaya from the remainder of the country. In Irian Jaya extensive habitat, large crocodile populations and existing investments and infrastructure could be modified to effectively manage crocodiles on a sustainable basis using a combination of wild harvest and ranching similar to the New Guinea Model. Elsewhere in Indonesia they propose that the different conditions justify total protection of wild adult stocks with the option of controlled ranching of eggs and hatchlings. They offer detailed proposals to achieve these goals including extensive re-organization of management and organization and extremely detailed licensing and reporting systems to control production and trade of skins. A key recommendation is the formation of a Crocodile Conservation Task Force incorporating elements of the existing PHPA program and skilled staff of the FAO project to oversee and coordinate crocodile management and conservation. These recommendations will be incorporated into a proposal for CITES for Appendix II listing for *Crocodylus porosus* in Indonesia. -- summarized from *MANAGEMENT OF CROCODILIANS IN INDONESIA, A review with recommendations. Grahame J.W. Webb and Robert W.G. Jenkins, April 1991.*

ILLEGAL CROCODILE SKINS SEIZED IN JAYAPURA. On 30 May 1990 officials of Natural Resources Conservation, working with Police and Harbor authorities, seized 77 crocodile skins that were being illegally removed from Irian Jaya without proper documentation. The skins were also of illegal sizes under Indonesia's crocodile management regulations. The skins were packed in three large suitcases and a sack and the excessive weight of these parcels led authorities to examine and then seize the shipment. Police are said to have arrested five people including the owner of the skins who had arranged for their illegal shipment.

Heads of the Regional Police office and the Natural Resource Conservation body (KSDA) in Jayapura agree that this shipment violates the recently adopted Regulation No. 5, 1990 and that criminal prosecutions will follow. The seized skins, worth approximately 30 million Rupiah (US $15,000) are being held as evidence by the police. Regulation No. 5, 1990 carries maximum fines of Rp 100 million (US $50,000) and five years imprisonment. Col. Dr. M.B. Hutagalung, Head of the Regional Police office said, "This regulation should be effective to protect our flora and fauna from the conduct of irresponsible people." -- *from* SURA PEMBARUAN (Jayapura Newspaper) 1 June 1991 & KOMPAS SELASA (Newspaper) 4 June 1991.

Vietnam:

CROCODILE INFORMATION SLOWLY REVEALED. The situation of native crocodiles in Vietnam, including rumors of the transfer of Cuban crocodiles to Vietnam, has been very obscure. Recently, during a review of crocodile management in Cuba, information was provided to Miguel Rodriguez and Perran Ross verifying that in 1985, 107 *Crocodylus rhombifer* were sent from Cuba to Vietnam as part of a diplomatic exchange of gifts. Six of the *rhombifer* were breeding adults of which 2 died in transit, and 99 of 101 subadults and juveniles survived. All these animals were reported to be captive bred at the crocodile farm at Laguna Tesoro in the Zapata swamp, Cuba.

Richard Luxmoore of WCMC has also made enquiries in Vietnam and received the following information from the Forest Protection Department:

> "At present Vietnam has no full scale crocodile breeding farms. Some small pilot crocodile breeding farms are controlled by local authorities, zoos and private owners. There about 40 to 50 crocodiles in each farm. The small native crocodiles are captured along the rivers in Platean areas and the south east parts of Vietnam. Native crocodiles and their skins, captured or exported, are forbidden based on Regulation No. 276 Q.D. 2 June 1989 signed by the Minister of Forestry.
>
> There are about 100 crocodiles (*rhombifer*) from the Caribbean in 5 or 6 crocodile breeding forest sanctuaries. Their offspring seem to be developing well. Step by step we are trying our best to collect all information from the crocodile sanctuaries. We hope that we shall be able to give you our initial information in the short coming future."

Richard is continuing his enquiries to establish which native species are involved, and what the intentions with regard to skin production and export are. He has advised the Forest Protection Department about the potential problems with the exotic *C. rhombifer* should they escape. We hope this is the beginning of continuing communication with Vietnam. -- Dr. Richard Luxmoore, *World Conservation Monitoring Center, 219c Huntington Rd. Cambridge, UK*; Mr. Miguel A. Rodriguez M., *Monterrey Forestal Crocodile Farm, Zambarano, Colombia*; Nguyen Mau Tai, *Director Forest Protection Department, Ministry of Forestry, Vietnam*.

AUSTRALIA/OCEANIA

AUSTRALIA:

CROCODILE STRESS IN N.T. A Professor of Intensive Care from Royal Adelaide Hospital, will be using his sophisticated resuscitation equipment on some most unusual patients this week - the saltwater crocodiles of the Top End. Professor Bill Runciman joins a scientific team led by Adelaide University's Senior lecturer in Zoology, Dr. Roger Seymour, on a research project being conducted in conjunction with the Conservation Commission. The team also includes Monash University's Reader in Zoology, Dr. John Baldwin, Top End crocodile researcher Dr. Grahame Webb and his staff, and Commission scientists and rangers.

The project aims to find a way to make capture less stressful for the hundreds of crocodiles removed by Commission wildlife rangers each year from Top End waterways. "Normally, and not unexpectedly, the crocs put up a violent struggle during capture, and become stressed to a stage where they may not be able to breathe properly," Dr. Seymour said. "The Commission has an obligation, through its crocodile management program, to re-locate potential problem crocodiles. There have been instances in the past where larger crocs have died in the capture process because of this stress factor. We want to make sure there is a resuscitation plan in case things go wrong."

The research experiments are due to begin in Darwin in September on several crocodiles of various sizes temporarily taken from the wild. The crocs will be tested with special equipment set up to determine such things as blood gases and the concentration of respiratory gases in their bodies. Resuscitation equipment will be used on selected animals to determine the response.

"This could prove a somewhat daunting exercise in itself, because muscle relaxants will

not be able to be used, as the drugs could affect the outcome of the tests," Dr. Seymour said. "We hope to get some valuable data from the project, which could enhance the Commission's crocodile management program and make life easier for the crocs when they do get caught." -- Conservation Commission of the Northern Territory, *submitted by* Michael J. Hannon, *GPO Box 4694, Darwin, NT 0801, Australia.*

CROCODILE AFFAIRS OF THE HEART. Stephan Nilsson, Suzanne Holmgren, Michael Axelsson and Regina Frische from the University of Goteborg, Sweden, are visiting Gordon Grigg's laboratory at the University of Queensland for some further work on the intricacies of cardiovascular physiology of the crocodilian heart. The research is focussing on the role of the left systemic arch and the anastomosis between the left and right arches, dorsal to the lungs, during diving. The team is also working on cardiovascular questions about Queensland lungfish. -- Professor Gordon Grigg, *Department of Zoology, University of Queensland, Qld. 4072, Australia.*

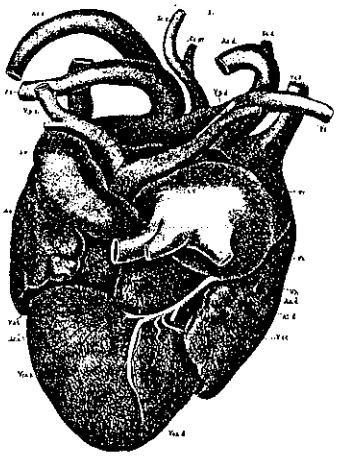


FIG. 58. HEART OF A. LUCIUS. (Dorsal View.) (From Bronn, after Fritsch.)

CENTRAL AMERICA AND CARIBBEAN

Belize:

BELIZE SURVEY. A crocodile survey was carried out by Paul Ouboter in and around the Shipstern Nature Reserve, Coozal District, Belize. Both *C. acutus* and *C. moreletii* were observed. At least *C. moreletii* proved to be breeding. One possible *C. acutus* nest was found on the shores of an inland lagoon. Great difficulty was experienced in distinguishing between, especially young, *acutus* and *moreletii*. Numbers of crocodiles were low on all investigated locations. Illegal hunting and overfishing are possibly the most important contributing factors to this. A full report will be produced by Mr. Ouboter. -- Jan Meerman, *Manager, Shipstern Nature Reserve, P.O. Box 1694, Belize City, Belize.*

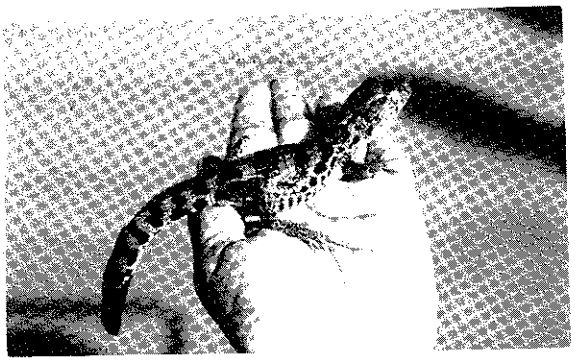
Trinidad and Tobago:

FIRST CAPTIVE BREEDING OF TOBAGO CAIMAN. Professor Federico Medem visited Trinidad in 1972 and with my brother, Julius O. Boos, made a trip to Tobago to collect and examine "alligators" that had been recorded by Woodcock in 1867 but not officially listed until 1969 by Mertens.

The specimens, collected at Hillsborough Dam in the mountains of central Tobago, sparked Medem's interest. The breeding population of caimans in this body of water seemed below the normal adult size for *Caiman crocodilus*. Medem later stated that the Tobago population "possiblemente representa un nueva subespecie", and in correspondence with the author in 1983 he again stated that "I am almost sure that the caimans from Tobago represent a new subspecies, possibly due to island dwarfism." He encouraged me to look deeper into the Tobago caimans and suggested that several caimans of both species be captured and established as a controlled breeding unit.

Four years later his suggestion bore fruit. An expedition mounted by the Zoological Society of Trinidad and Tobago with members of the staff of the Emperor Valley Zoo and a member of the Council, went to Tobago in 1988 and in September Hans Boos, John Seyjagat, Nicholas Leith and Geoffrey Gomes, captured three adults (one male, two females) and two juvenile caiman in the Hillsborough Dam.

The juveniles have not survived but the trio of stunted adults settled down well at the zoo and the females first appeared gravid in July 1990, although no mating had been observed. The pond where they are kept measures 6.5 x 6 x 1 meters with a semicircular area of land 6.5 m diameter.



Caiman hatched at the Emperor Valley Zoo, November 1990. H. Boos photo.

Chopped bush and grasses were supplied for nest construction. However on August 17 1990 and again on August 22, first 21 and then 24 eggs were seen discarded in the meter deep water of the pond. These were hurriedly retrieved and placed into an incubator. The incubator was constructed from a glass aquarium with a substrate of peat moss and heat lamp suspended above the open top that maintained temperatures between 31° and 33°C. Average egg measurements for the 17 August clutch were 55-59 g weight and 53-63 x 29-30 mm diameter and for the 22 August clutch 63-73 g weight and 58-69 x 30-31 mm diameter. We had almost given up hope when on November 18th, head keeper Nirmal Biptah's efforts were rewarded by the hatching of two young caiman from the first clutch (9 eggs were spoiled and 10 were fertile but dead). Between November 26 and December 2, 1990, nine eggs hatched from the second clutch (8 eggs spoiled, 7 fertile but dead). Total incubation time was 96-102 days. Of the eleven hatchlings, six have survived to date and they averaged 24.3 cm total length and 40.2 g weight. Measurements of the adults will be maintained in the future and the young will be carefully monitored to chart their progress as well as those hatched hopefully in years to come. -- Hans E. A. Boos, *Curator, Emperor Valley Zoo, Port of Spain, Trinidad.*

EUROPE

France:

PARIS LEATHER SHOW REPORT. Roger Ruvell reported on his impressions during his first visit to the show, which ran September 21-24 in Paris: It was difficult sometimes to separate fact from fiction, but it is very clear that the whole leather market was depressed, not just crocodilians. Some hides were still selling well, notably *siamensis* and *porosus*, and some hardly at all, like alligator. Most crocodile hide buyers said business was down about 40% below 1990 but expected a recovery by the first quarter (optimists) or fourth quarter (pessimists) of 1992. The major tanners are thought to have bought heavily in 1990 on fears that hide prices would continue to rise. Instead worldwide recession and the Gulf War triggered a serious drop in luxury goods sales and a reverse domino effect down the chain from tanners to producers. The present buyers market allows tanners to insist on grade ratios of 80% 1's, 20% 2's and no 3's for lots under 40 cm and no worse than 70%/20%/10% for larger skins.

Florida alligator hides came in for a hammering. I heard claims that Florida gators must be a different subspecies with less pleasing scale patterns, this despite the fact that about 25% of Florida hides come from Louisiana breeding stock or hatchlings. Assertions were made that Florida skins have more fat, more scars, worse abrasion and osteoderms. Whether these allegations are true or not (I think not); the buyers and tanners believe them and Florida producers have a long counter propaganda campaign ahead.

Some interesting technical advances were displayed. Rohm Tech Inc. claims to have developed an 85% vegetal tanning process that will greatly reduce costs of removing chrome from tanning waste water. After 15 years development the process produces finished hides at least equal to the best traditional chrome tanning. Ludwig Dose, of Dose Maschinebau, has developed computerized chemical formula control that produces outstanding consistent color matching. A turn-key tannery capable of finishing 150,000 hides annually is available for under $ 1 million US, including training personnel. This tannery operates with a staff of three and the computerized control means the master tanner does not need the extensive lifetime experience to produce consistent color matching. Dieter Majunke, a leading German tanner, works with Dose equipment and has consistently produced color matches for 60% of his production.

Up market leather products displayed included a Harley Davidson motorcycle with

matte finish tan sauvage crocodile trim and a lovely young lady wearing a dramatic motorcycle kidney belt in matching hornback. There were a large number of hornback products displayed but hide processing regulations in the USA preclude this cut, for the most part, in alligator. Caiman flanks were everywhere.

Faces seen at the show included Jon Hutton; Don Ashley; Chris Plott of American Tanning and Leather, whose booth became a rendezvous for US alligator farmers; Gerard Hemery of Louisiana Tannery, Inc.; Dr. Paul Cardheilac attempting to straighten out French buyers on their misconceptions about Florida hides; Zack Casey trying hard to sell alligator hides; and Shlomi Ranot, looking serious as usual. Alligator farmers Wayne Sagrera, Scott Anderson, Mike Fonseca, Craig Lycan, and I, were there wondering where our businesses are heading and Maurice Abelanski, an old Nile croc hunter friend from the bad old, pre-convention days in West Africa. Informative and generous with their time were reptile buyers and tanners Jaques Lewkowicz (Paris); Yoichi Takahara (Tokyo); Alain Maison (Paris); John Thurlow (London); Patrice Mathieu, Herve Loubert, & Yves Coularn, (France); and Sergio Trachter and his brother Alex of Buenos Aires and Texas, respectively. Giovanna Bertelli and Dr. J. Kaplan extended gracious invitations to remain in touch and visit tanneries.

The Paris Leather Show was most instructive and not to be missed. A final thought from this alligator farmer: Crocodile farmers of the world, unite! You have nothing to loose but your hides. Where is the International Crocodilian Farmers Association now that we need you? -- Roger Ruvell, *Geneva Farms Inc. P.O. Box 1119, Geneva, FL 32732, USA.*

SOUTH AMERICA

Argentina:

PROYECTO YACARE. Since September 1990 Patricio Micucci has been working with Tomás Waller and Catalina Teixido in Proyecto Yacare in northeastern Argentina (CSG NEWSLETTER 9(4)). The program developed by the CITES Management Authority, under the auspices of the CITES Secretariat is financed by the Fundacion para la Conservacion de las Especies y el Medio Ambiente (FUCEMA) and the Chamber of Reptile Tanneries of Argentina. We have produced this analysis from records of interdicted merchandise.

- At least 20,000 hides were illegally harvested in recent years in northern Argentina and 95.5% originated in Corrientes Province. This could be explained by the highly suitable habitat in this province of "Esteros" (tropical swamps), "Bañados" (marshes), and "Lagunas" (lagoons) totalling 25,000 km ^{2}.
- Around 66% of the total harvest is *Caiman crocodilus yacare* while the remainder is *Caiman latirostris*, indicating that in spite of international bans on *C. latirostris* (CITES Appendix I) a strong demand still exists for it.
- For yacare about 51% of the hides harvested are of animals that had at least one reproduction (larger than 1.45 m). A monthly analysis shows an interesting oscillation for the proportion of yacare greater than 1.45 m that could be explained by the time involved in recolonizing hunting areas and consequently harvesting of younger animals in these periods.
- For *C. latirostris* about 57% of the hides belong to mature animals, taking into account that maturation occurs at about 1.3 m.
- The average number of hides per shipment is a better representation of population abundance since each shipment corresponds to a direct hunting event. On the other hand the monthly average of shipments reflects the demand for skins as the product of several hunting episodes are accumulated in order to meet market requirements.
- For the last two years caiman hide has not had a good price in the Argentinean market and so today the animals are not severely hunted.

It is important to emphasize that due to excessive harvest during the 60's there was a significant decrease in the original caiman population, at least in Corrientes province. In spite of this the population has supported, during the last 10 years, a naturally sustained low quota. The population data gathered during the 1991/91 surveys shows a significant recovery trend in practically all sample sites for both species. We expect that through the continuation of the present "honorary agreement" between the CITES Management Authority and the tanneries that the populations of both species will near their original levels soon. -- Patricio A. Micucci, *Field Investigator, Proyecto Yacares, DNFS-FUCEMA-CITES, Paraguay 2499 7° B, 1121 Buenos Aires, Argentina.*

Brazil:

BRAZIL BACKS CAIMAN FARMS. The Brazilian environmental agency, IBAMA, is supporting the growth of reptile farming. Currently Brazil supplies 60% of the world's annual consumption of two million caiman skins. Most are caught illegally in the wild.

IBAMA has undertaken a rigorous crackdown on the trade and annually burns tons of seized skins. But now they maintain that suppression is not enough and they have issued guidelines on conditions for raising the most popular species, *Caiman crocodilus yacare*.

The organization has already actively cooperated in the foundation of farms with expert advice from the USA. As part of the deal, farmers must return 10% of hatchlings each year to the wild to repair the damage done by skin smugglers.

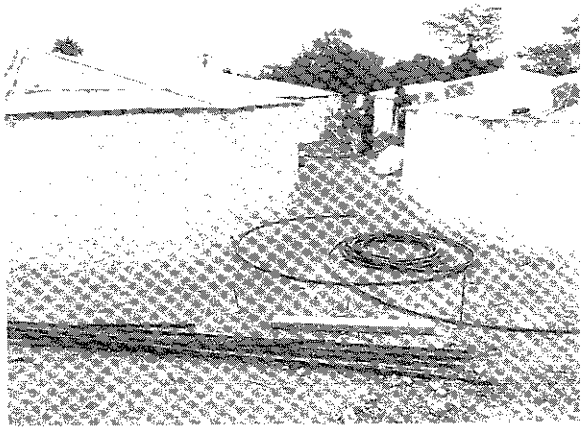
Research in Brazil has shown that farm grown caimans yield leather and meat of superior quality and quantity to those caught in the wild. Importantly, a controlled diet also prevents the formation of bony "buttons" in the belly and tail, allowing the entire hide to be used for leather.

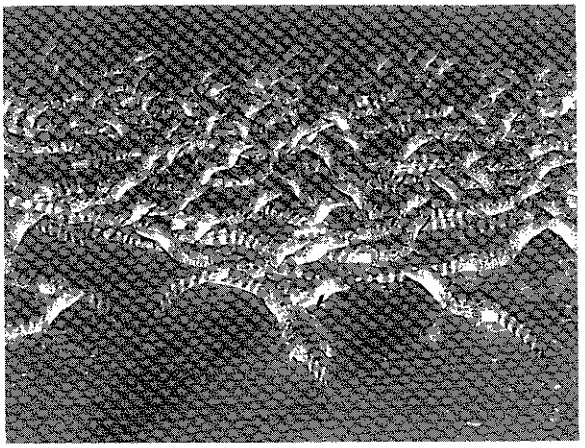
One of the first licensed farms has already shipped 300 hides to Japan, the worlds biggest exotic leather buyer. Each was marked with an indelible stamp, identifying it as Brazilian farm grown and legal. The farm expects to be producing up to 1,500 hides year. *From* LEATHER September 1991.-- Kadir Donmez, *University of Cincinnati, LIA Laboratory, Cincinatti, Ohio 45221-0014, USA.*

SURROUNDED BY 'ALLIGATORS'. Inhabitants of the Amazonian town of Nhamunda, surrounded by an estimated two million 'alligators' *(Caiman yacare)*, have been ordered to stop killing the animals. The Brazilian environmental agency IBAMA accuses the fishermen of setting their sights on the lucrative skin trade where each skin can sell for £60 (US $ 120) to the shoe and handbag industry. But the fishermen reject this and say they usually throw away the skin of any caiman killed, unaware of the high prices they could fetch in Tokyo, Paris or New York. We kill them because they destroy our fishing nets which are our basic tools for making a living, they say. The yacare is a protected species but peoples' lives and their livelihoods are threatened by a population explosion of these beasts. The local Governor has called for a hunting season to allow controlled culling of the yacare and several illegal hunting expeditions are reported recently. *From* DAILY TELEGRAPH, London, 16 August 1991. -- Dr. Stephan Gorzula, *14 Ferry Road, Millport, Isle of Cumbrae, Scotland KA28 ODZ, UK.*

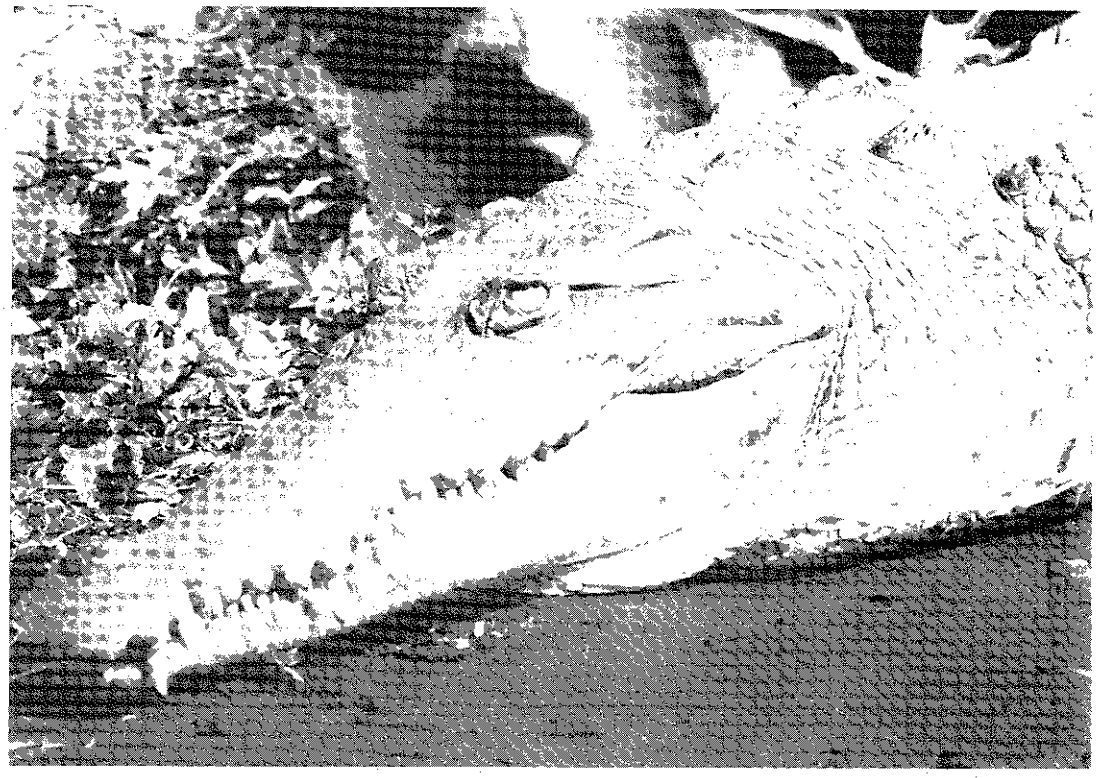
Venezuela:

Another 25 Orinoco crocodiles were released at Hato el Frio in the Caño Guaritico Wildlife Refuge on 1 September. All were reared at Hato Masaguaral and were between 70 and 190 cm total length. Alfredo Arteaga of Fudena and I censused part of the release site and recaptured four previously released crocodiles for measurement.





New construction and *Caiman crocodilus* hatchlings at the Arismendi farm, Venezuela. A Ashkenazi photo.



Crocodylus acutus from Laka Izabal, Guatemala. Col. Julio Caballeros Sigme photo.

All had grown but were thinner than when released. We also conducted a night survey of Caño Guaritico but the water was high and very little was seen except one large (4 m) crocodile. We were accompanied by a film team who will make a documentary for public education.

Maria Muñoz is continuing her radio telemetry study at the other release site at Rio Capanaparo. Surprisingly most of the crocodiles have moved upstream, some as far as 15 km in the first months after release. One of the eight radio equipped crocs was killed by an Indian fishing with bow and arrow at night but the others are doing well. We have constructed a small house to serve as a biological station next to the park guard, Miro Benitez' house. We have been conducting a small mark and recapture study of *Paleosuchus palpebrosus* living in a 'Moriche' (*Mauritia flexuosa*) palm swamp near the Capanaparo and our first recaptures of marked yearlings indicates growth of about 25 cm total length a year. This species seems to be distributed throughout the Llanos wherever there are Moriche palm lined streams.

With Tomas Blohm, we continue to improve the Hato Masaguaral rearing center. We have moved 4 adult *C. intermedius* to a new breeding enclosure, lowering the overall density, which we hope will result in better breeding success next year. -- John Thorbjarnarson, *Apartado 39, Calabozo 2312-A, Guarico, Venezuela.*

NORTH AMERICA

United States:

GEORGIA TRAPPERS. The Georgia nuisance alligator trappers had a hide sale in June, the first of the season. The sale was well attended with ten Georgia trappers, one farmer and an alligator trapper from Alabama. One hundred and thirty five hides were sold at an average price of $34.00 per foot length. After the sale and lunch the group met and took the first steps toward forming the Georgia Alligator Trappers Association, with the ten trappers present signing up as members. At their meeting in October by-laws were adopted and Bill McLean was elected President; Jack Douglas, Vice President; Charles Holland Secretary and Tommy Ethridge, Treasurer. The new association has 11 members. -- Bill McLean, *Rt. 4, Box 405, Moultrie , GA 31768, USA.*

INFORMATION AND EDUCATION AT AIRPORTS. Mike Jennings of U.S. Fish and Wildlife Service, was at Stapleton International Airport, Denver Co, USA, and saw an exhibit that provides information about commerce in restricted species products. The glass enclosed display focused on the traveller's responsibility to avoid items made from ivory, sea turtles, cats and crocodilians. This was somewhat misleading as products from Appendix II crocodilians were not clearly identified as legal sources. Numerous confiscated products were shown with accompanying text explaining the biological consequences and legal ramifications of purchasing such items while overseas. Local and state authorities as well as World Wildlife Fund, U.S. Fish and Wildlife Service and U.S. Customs were responsible for the display. This type of education is a great way to use confiscated items and to inform people most likely to contribute to the decline of CITES restricted species. -- Mike Jennings, *U.S. Fish and Wildlife Service, 4512 McMurray Avenue, Fort Collins, CO 80525-3400, USA.*

GATOR NABS WOMAN'S ARM. A 7 foot alligator tore off the lower arm of an 80 year old woman as she collected water from a canal outside her Everglades home. Clara McKay was listed in serious condition although she was conscious and talking to friends after arriving at the hospital. McKay, who has no running water at her home, was taking water from the canal by her house when she was attacked. Police said she called authorities herself, telling them an alligator had bitten her arm off. " She's a tough lady," said fire Chief Vince Doerr. The alligator was shot and killed by Florida Game and Freshwater Fish Commission officers after a 4 hour search. They said they could see the alligator, with the arm in its mouth, on the bottom of the canal. The severed limb was recovered but could not be surgically re-attached. In Florida there have been only five deaths and 138 injuries caused by alligators in 43 years since 1948. -- *From* THE GAINESVILLE SUN, 8 September 1991.

PAR POND ALLIGATOR STUDIES. Two researchers with long experience with alligators are returning to the scene of earlier studies at the Par Pond reservoir of the U.S Department of Energy's Savannah River Site, near Aiken, South Carolina. Here they will evaluate the effects of a recent reservoir drawdown on alligators. The drawdown, prompted by a need for inspection of and repair of the earthern dam, is designed to lower the water level by approximately 20 ft.

Tom Murphy of South Carolina's Non Game and Endangered Species Program began his masters thesis research on Par Pond in the mid 1970's with the University of Georgia's Savannah River Ecology Laboratory (SREL). Murphy has continued his research on alligators and other endangered species and has acquired international prominence for his work with bald eagles and sea turtles. Laura Brandt, an associate in wildlife ecology at the University of Florida, also studied the Par Pond alligators for her masters thesis with SREL in the 1980's. She now maintains an active program of research and consulting on alligator management and wetlands resource management in Florida.

The data collected by Murphy, Brandt, resident scientists from SREL and other collaborators provide a substantial data base describing the attributes of the Par Pond alligator population before the drawdown. The Par Pond alligator population is possibly the best known and most extensively studies reservoir population of crocodilians in the world.

In recent years a number of the world's threatened and endangered crocodilians have become associated with man made reservoirs. Studies by Murphy and Brandt during the present drawdown will provide the first opportunity to evaluate the responses of alligators to drawdowns, which are likely to become necessary for other impoundments as their dam structures age and need inspection and repair.

These studies are under the direction of I. Lehr Brisbin, a senior ecologist on the SREL staff. Brisbin initiated the studies at Par Pond with Murphy in the early 1970's to evaluate responses of alligators to heated water effluents from nuclear reactors at Savannah River. At that time studies showed a disproportionate number of large adults and relatively low levels of reproduction. Introduction of reactor effluents to Par pond ceased in the late 1980's and Brandt documented increasing rates of reproduction and higher numbers of immature animals in the population. It is not clear whether the cessation of heated effluent, or the continuing processes of trophic succession in the reservoir, or both, were responsible. The new studies on the effect of

reservoir drawdown will allow another chapter to be added to the ongoing story of what is now a more than two decade study of this population. -- I. Lehr Brisbin, Jr. *Research Professor, Savannah River Ecology Laboratory, Drawer E., Aiken, SC. 29802, USA.*

ZOOS

ST. AUGUSTINE ALLIGATOR FARM CLOSES OCALA FACILITY. St. Augustine Alligator Farm has announced it will close it's Ocala Crocodilian Center in Anthony, Florida, near Ocala. Some of the extensive collection of crocodilians will be transferred to St. Augustine and the remainder is being distributed to other institutions. Announcements have been circulated to zoos and individuals offering selected stock for sale or donation. The Ocala facility was originally established to house Nautilus equipment tycoon, Arthur Jones, private collection of crocodilians. The Jones collection, which includes some notable breeding groups of several rare species, was acquired by St. Augustine in 1988. Director Mark A. Wise has re-assured the CSG that the important components of the collection for conservation purposes, will be maintained either by St. Augustine, or by other institutions. Enquiries concerning the Ocala collection may be addressed to -- Mark A. Wise, *St. Augustine Alligator Farm, P.O. Box 9005, St. Augustine, FL 32085, USA.*

GHARIAL IN UNITED STATES COLLECTIONS. The gharial (*Gavialis gangeticus*) is the only member of the family Gavialidae. Currently there are five U.S. collections maintaining gharial. Zoo Atlanta, New York Zoological Society, San Diego Zoo, St. Augustine Alligator Farm, and National Zoo in Washington, DC, together house twenty specimens (7.13.0).

Zoo Atlanta has a male and two females. The male was hatched in captivity in February 1978 from eggs collected in Nepal and has been at Atlanta since September 1985. It was acquired from Atagawa Alligator and Tropical Garden in Japan. The older female was purchased from Hermosa Beach Reptiles in September 1965 for $250. The younger female has been at Atlanta Zoo since 1981. She was a juvenile at the Reptile Institute at Silver Springs, FL., USA, in the Ross Allen days.

NYZS exhibits five gharial (2.3.0) at their Jungle World complex at the Bronx Zoo. New York originally imported eight specimens in February 1985 from the Kukrail Crocodile Rehabilitation Center in Lucknow, India, that were hatched from wild collected eggs in June 1981. One female died in 1990 and a pair were transferred to St. Augustine later that year.

St. Augustine Alligator Farm exhibits six gharial. A pair on exhibit in St. Augustine and a male and three females were at their Ocala Crocodilian Center in Florida. St. Augustine acquired these specimens in 1988 as part of the collection purchased from Arthur Jones, who had imported them in early 1988 from captive hatched eggs in Nepal. Of six specimens imported by Jones only four remain with St. Augustine as a pair were purchased by San Diego Zoo in 1990. The smallest pair of Jones's Nepal gharial are at St. Augustine and two Nepal females and the largest pair from the Bronx Zoo are at Ocala.

The National Zoological Park in Washington, DC currently exhibits four gharial (1.3.0). These were a gift to the United States from the Government of Nepal received in June 1982.

None of the gharial in the United States are currently reproducing. The largest specimens are in the Atlanta, New York and Ocala collections, and courtship behavior has been observed at both St. Augustine and Ocala. -- Mark A. Wise, *AAZPA- Crocodilian Advisory Group, Gharial North American Registry, P.O. Box 9005, St. Augustine, FL 32085, USA.*

GLADYS PORTER ZOO. On August 26 1991 four Philippine crocodiles (*Crocodylus mindorensis*) hatched at Gladys Porter Zoo. The zoo had previously hatched 7 Philippine crocodiles in September 1989. Most of the 1989 clutch appear to be males and so we incubated the eggs this year at 30.0° C in an attempt to produce females this year. Success of this attempt will be reported upon when we can sex the hatchlings. -- Colette Hairston, *Curator of Reptiles, Gladys Porter Zoo, 500 Ringold Street, Brownsville, TX 78520, USA.*

BUENOS AIRES ZOO. The Buenos Aires Zoo started a captive breeding program for the Broad-nosed caiman, *Caiman latirostris*, in 1986 and for three years we have achieved breeding success. Clutches were obtained in 1986 (14 hatchlings), 1990 (10 hatchlings) and 1991 (10 hatchlings). By June of 1991 the hatchlings from this most recent clutch were averaging 32.5 cm length. The hatchlings are maintained in a controlled environmental chamber for the first year, after which they are moved to outdoor enclosures. Five of our one year old hatchlings of Broad-nosed caiman (which are 84 cm long!) have been sent to the Montevideo Zoo in Uruguay with two juvenile Nile crocodiles that the Buenos Aires Zoo obtained from South Africa the previous year. -- Lic. Carmen Pia Urruzuno & Lic. Nadia Boscarol, *Oro 2705 -5°F- (1425), Capital Federal, Republica Argentina.*

TRADE

The following prices in US dollars were reported to the editors. The CSG cannot guarantee the accuracy of these reports and makes no endorsement or advertisement of sales or prices.

Alligator Mississippiensis in Louisiana, USA: September 1991- wild salted belly skins = $25.00 per foot length; alligator meat = $5.00 per pound.

Alligator Mississippiensis in Georgia, USA: June 1991- wild salted belly skins = $34.00 per foot length; September 1991- wild salted belly skins, 7' - 10', 1st grade = $45.00 per foot length; October 1991- wild salted belly skins, 7'+, 1st grade = $35.00 per foot length.

Alligator Mississippiensis in Florida USA: September 1991- wild salted belly skins = $36.00 per foot length. In South Africa: September 1991- imported tail meat (filleted) = $7.86 per kg.

Caiman crocodilus in Venezuela: August 1991- crusted skins = $46.00 each, caiman meat = $5.00 per pound.

Crocodylus niloticus in South Africa: September 1991- wet salted belly skins 35 cm - 40 cm width - A grade = $5.75 per cm width; back skins = $21.00 each. Natal: body meat = $4.28 per kg; ribs = $2.86 per kg; tail (unfilleted) = $5.00 per kg. Cape Province: body meat = $5.71 per kg; ribs = $6.43 per kg; tail meat (filleted) = $12.50 - $13.21 per kg. Transvaal: tail (unfilleted) = $7.14 per kg.

PUBLICATIONS

FAUNA OCH FLORA, Nummer 1, 1991, publication of the Royal Natural History Museum, Stockholm, Sweden, carries reviews of Charles A. Ross, Crocodiles and Alligators 1989, Golden Press, Australia: 240 pp.; Grahame Webb & Charlie Manolis, Crocodiles of Australia, 1989, Reed Books Pty. Ltd. Australia :140 pp. & Grahame Webb, Charlie Manolis and Peter Whitehead, Wildlife Management- Crocodiles and Alligators, Surrey Beatty & Sons, Australia: 552 pp. -- Tony Hakansson, *Skogsbacken 10, 17241 Sundbyberg 01, Sweden.*

ZOOS PRINT. News of Zoos and captive breeding centers in India and elsewhere in the East. June 1991, volume VI, number 6, special issue on Ectotherms. Dr. L.A.K. Singh editor. This special edition contains articles on crocodilians as well as chelonians and fishes. ZOOS PRINT is a monthly publication of Zoo Outreach Organization, Box 1683, Peelamedu, Coimatore, TN 641 004, India.

1991 LITERATURE. Readers are reminded that an annual review of literature will be published in the newsletter early next year. This list is provided by Mr. Terry Sexton, Editor of Wildlife Review. Unusual items that are unlikely to be recorded on standard abstracting services should be sent to the CSG for forwarding to Mr. Sexton and inclusion in the list. -- James Perran Ross, *Executive Officer, CSG, Florida Museum of Natural History, Gainesville, FL 32611, USA.*

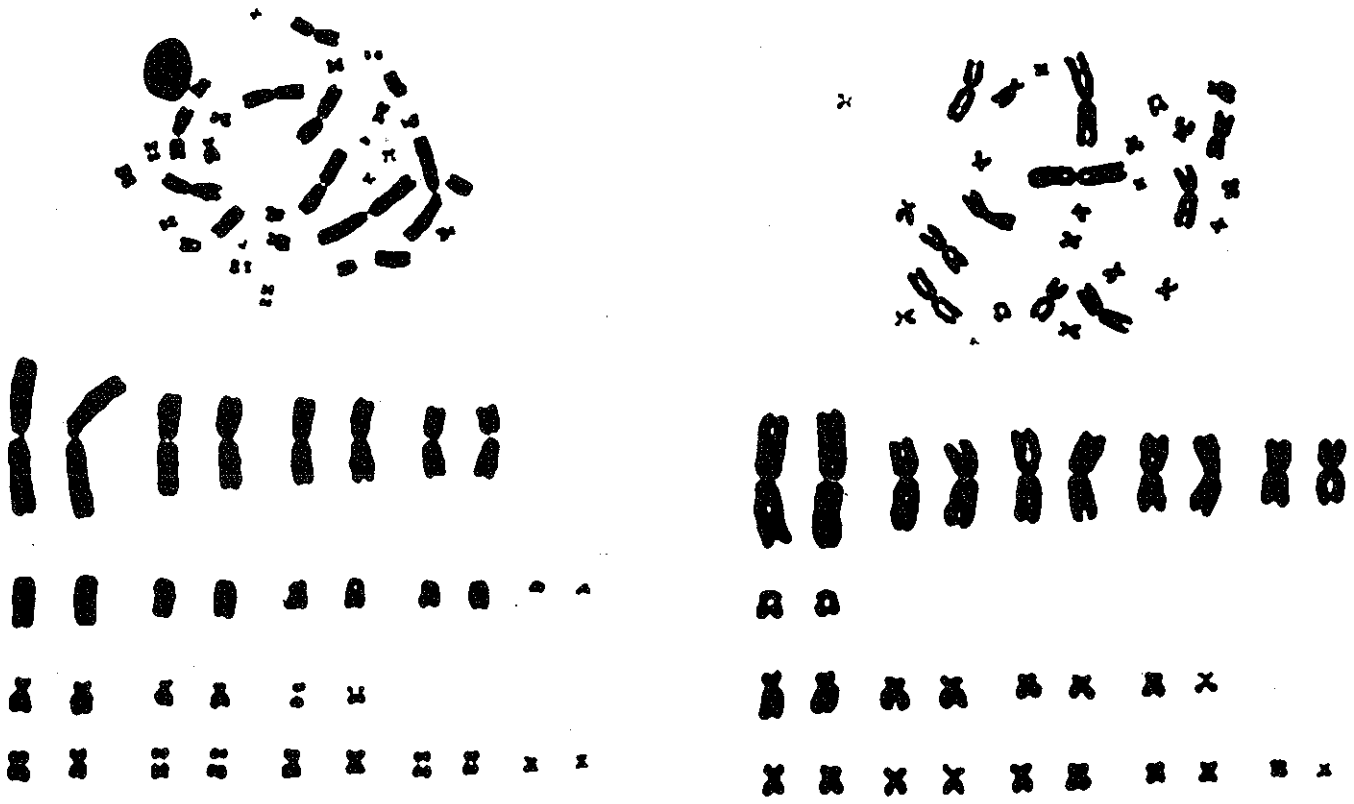
SCIENCE

CROCODILE CHROMOSOMES. Dr. Panya Youngprapakorn of the Samutprakan Crocodile Farm and Zoo, with Dr. Vivat Chavananikul, Veterinary Faculty, Chulalongkorn University, Thailand, have been studying chromosomes of crocodiles at the farm and have determined that the chromosomes of *Crocodylus porosus* are 2N = 34 (figure 1) and those of *Crocodylus siamensis* are 2N = 30 (figure 2).

In this study we found a difference from the study of Cohen and Gans 1970 (CYTOGENETICS 9:81-105) who reported that *C. siamensis* has 2N = 34. We intend to continue this study by examining hybrid crocodiles and other species as well. [*Eds*. people wishing to review this result, the methods, sample sizes etc, should contact Dr. Youngprapakorn directly.] -- Panya Youngprapakorn, *Samutprakan Crocodile Farm and Zoo, 555 Taiban Road, Thailand.*

Figure 1. The chromosomes of *Crocodylus porosus* (2N = 34)

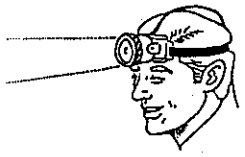
Figure 2. The chromosomes of *Crocodylus siamensis* (2N = 30)



Salt-water crocodile 2N = 34
Crocodylus porosus

Siamese crocodile 2N = 30
Crocodylus siamensis

PERSONALS



Professor Johan Marais, Manyane Game Lodge and Crocodile Farm, P.O. Box 3, Buhrmannsdrif, 2867, Republic of South Africa, [Note new address] has been appointed Managing Director of the Manyane operation but will continue active work on crocodiles. The farm has 160 breeding female *C. niloticus*. Johan will still be coordinator of the Crocodilian Study Group of Southern Africa and is chairman of a subcommittee on animal ethics. He is working hard to complete the Handbook of Crocodile Farming in South Africa that is the result of their recent symposium.

Jose L. Diaz, Integrated Protected Areas System, Protected Areas and Wildlife Bureau, Department of Environment and Natural Resources, C/O #105 Timog Ave., Diliman, Q.C., Philippines, moved from RP-Japan Crocodile Farming Institute (CFI) in 1989. He is now involved in design of a World Bank system to establish wildlife sanctuaries to protect endangered species. He continues to work on crocodile surveys with the Asian Wetlands Bureau and act as an advisor to CFI.

John Thorbjarnarson, Apartado 39, Calabozo 2312-A, Guarico, Venezuela, married Ximena Valderrama of Washington, D.C. in October. Their friends and colleagues in the crocodile world watched with affection as these two have cautiously circled each other for the last couple of years and we are delighted they are taking this step together. Our warmest best wishes for the future.

Dr. Rohtash C. Gupta, Dept. of Zoology, Kurukshetra University, Kurukshetra - 132 119, India, is initiating studies at the Bhor Sainda Crocodile Sanctuary in Haryana State, sanctioned by the Department of Environment. The project will undertake pilot studies on crocodiles to address an apparent decrease in reproduction at this site.

Randal Berry, P.O. Box 250098, Little Rock, Arkansas 72225, USA [Note new address], is now working at the Little Rock Zoological Gardens. He sent in an article reporting the presence of alligators at Moores Bayou, AR, suggesting a northward extension of the range in this area. Two fishermen reported catching a small alligator on rod and line while fishing for bass.

Alistair Graham, Australian National Parks and Wildlife Service, P.O. Box 1260, Darwin, NT 0818, Australia, has a new address and is working with NPWS in Darwin. He reports to us with great dismay that a recent re-publishing of EYELIDS OF THE MORNING, of which he is co-author, was published without his knowledge or consent. He finds himself in the absurd position of hoping no one will purchase his book because the money will only end up in someone else's pocket.

Harvey Cooper-Preston, P.O. Berrimah, N.T. 0828, Australia, is finally submitting her PhD thesis entitled "Geographic variation in the population dynamics of *Crocodylus johnstoni* (Krefft) in three rivers in the Northern Territory, Australia" to the University of New England, NSW, Australia. Dr. Ruth Bellairs will be visiting Harvey in August to examine gastrulation in *C. johnsoni*.

Dr. Felix Alfredo Martinez, Sargento Cabral 2139 (3.400), Corrientes, Capital, Argentina, reports that ranches for *Caiman yacare* are in a primary phase of development in Corrientes Province involving the elaboration of installations. Therefore there is little data on the development of breeding stock.

CORRECTIONS

MORE ON FLAXEDIL. Professor J.P. Loveridge, Professor of Zoology, University of Zimbabwe, P.O. Box MP 167, Mount Pleasant, Harare, Zimbabwe, wrote confirming the concerns about accidental injection of Flaxedil or Gallamine, and Neostigmine, expressed in the NEWSLETTER (Vols 10 (1) & 10 (2)) and drew readers attention to correspondence in Veterinary

Record 1976, Vol 98: 371-373 detailing the accidental death of a vet who injected himself with etophine. He further refers to his paper with David Blake in WILDLIFE MANAGEMENT - CROCODILES AND ALLIGATORS, 1989. G. Webb, C. Manolis and P. Whitehead (eds.) :259-267. Emergency treatments for Flaxedil and Neostigmine are summarized. The editors re-iterate that these drugs are dangerous and that users should be fully familiar with proper procedures to follow in the event of accidental injection of a person.

MEETINGS

11TH WORKING MEETING OF THE CROCODILE SPECIALIST GROUP, VICTORIA FALLS, ZIMBABWE. 2 - 8 August 1992. Nearly 250 preliminary registrations have been received and a package of information and detailed booking questionnaire is being sent to all registrants. Early return of this information is necessary to allow confirmation of hotel bookings and meeting space. Send your responses **NOW** to:

Caroline Peel, Spencers Creek Crocodile Farm, P.O. Box 18, Victoria Falls, Zimbabwe, Fax 263 13 4417.

The previously planned charter flight from Harare to Victoria Falls has turned out to be more expensive to participants and has been cancelled. Participants should now plan their own onward flight Harare - Victoria Falls on 1 August as part of their itinerary.

If you have not already registered, to receive detailed information about travel, hotel reservations, registration, and program, return a preregistration form or if you lack a form just fax your name, address and fax/phone information to Caroline Peel. Early registration is imperative to secure accommodations.

REDUCED RATE TRAVEL TO CSG MEETINGS. The CSG is negotiating to arrange special group rate air travel for people traveling from the USA to Zimbabwe. The best price we have found to date is $2,800 (NY -Harare). It appears that staying for 14 days or longer will substantially lower fares and we are continuing negotiations in search of a better group rate. We will announce a firm package in December in the meantime contact the Gainesville office for updates.

REGIONAL MEETING OF THE CSG, SANTA MARTA, COLOMBIA. 11 - 14 NOVEMBER 1991. Final preparations for this meeting are underway. Participants who have not yet submitted registration materials may register at the San Mar Hotel and Convention Center on Monday 11 November 1991. Enquiries concerning Hotel reservations may be directed to ABAVIA, Attn. Mr. Horacio Ferrans A.. Apartado Aereo 2560, Barranquilla, Colombia, Tel. (57) 58 457270, Fax (57) 58 457259.

Crocodylus porosus hatched at Crocodile Farming Institute, Palawan, Philippines. I. Sarsagat photo.

EDITORIAL POLICY - The newsletter must contain interesting and timely, not outdated, information. All news on crocodilian conservation, research, management, captive propagation, trade, laws and regulations is welcome. Photographs and other graphic materials are particularly welcome. If you wonder why news from your area is not reported, it is because you have not sent it in. Whenever possible, the information will be published as submitted over the author's name and mailing address. Even if the editor has to extract information bit by bit from correspondence or other works, the revised news items will be attributed to the source. The information in the newsletter should be accurate, but time constraints prevent independent verification of every item. If inaccuracies do appear in the newsletter, please call them to the attention of the editors so corrections can be published in later issues. The opinions expressed herein are those of the individuals identified and, unless specifically indicated as such, are not the opinions of the CSG, the SSC, or the IUCN-World Conservation Union.

11TH WORKING MEETING OF THE CROCODILE SPECIALIST GROUP, AT VICTORIA FALLS, ZIMBABWE, 2 - 7 AUGUST 1992.

ABSTRACT/APPLICATION TO PRESENT - 15 MINUTE TALK / POSTER / EITHER
(indicate one)

(Please Type)
Title:

Authors name(s) and mailing address(es):
(All correspondence will be sent to the first author listed.)

Abstract:
(Brief description of topic and content)

Copy this page or detach and use. Do not exceed this one page. Please complete and return to - Dr. J. P. Ross, Executive Officer, CSG, Florida Museum of Natural History, Gainesville, FL 32611, USA. Fax 1 904 392 9367.

CALL FOR PAPERS

PAPERS ARE INVITED FOR PRESENTATION AT THE 11TH WORKING MEETING OF THE CROCODILE SPECIALIST GROUP, AT VICTORIA FALLS, ZIMBABWE, 2 - 7 AUGUST 1992.

A preliminary schedule of the meeting is presented below. Papers are invited on topics pertaining to the conservation, research, management, husbandry, and sustainable use of crocodilians and related topics. Papers are particularly invited upon the following topics: status of critically endangered species, new techniques for conservation, reports on successful management programs, new information and breakthroughs in crocodilian research. Papers are strongly encouraged from researchers in developing countries, young researchers, and nonacademic researchers. While the standards for presentations are expected to be uniformly high, some editorial assistance will be available and a portion of the program has been reserved for these papers.

Three formats of presentation are available; Invited Keynote lectures, 15 minute talks and posters.

INVITED KEYNOTE LECTURES on broad topics of universal interest will be of one hour's duration, including time for questions and discussion. They are intended to be integrative, innovative and of superior quality. The schedule committee, in consultation with the CSG Steering Committee, will invite individuals to give keynote lectures.

TALKS. Talks will be restricted to 15 minutes maximum (including time for questions) and time limits will be strictly enforced. Facilities for display of color slides, overhead transparencies, and video will be available. Talks should be presented in English and it is not certain if translation facilities will be available. There are 64 slots of 15 minutes duration for talks.

POSTERS are passive displays of text, data and pictures that can be affixed to a vertical surface (display board/ notice board) of approximately 1.5 m x 1.0 m. An area with suitable surfaces will be available for display of poster presentations which can remain assembled and visible for extended time periods. Authors of posters will be asked to remain in attendance near their display to answer questions for periods of one hour.

TO APPLY TO PRESENT A PAPER: Send an abstract of your presentation to:
Dr. J. P. Ross, Executive Officer CSG, Florida Museum of Natural History, Gainesville, FL 32611, USA.

Abstracts should be clearly printed on a single sheet of 8½" x 11" or A4 paper and must include **your name**, your **address for mailing**, the proposed **title** of your presentation, an indication that your presentation will be " **15 minute talk**" a "**Poster**" or "**Either**". The remainder of the single page should contain a brief summary of your presentation. Do not exceed one page. Papers with more than one author must indicate a single author to whom all correspondence will be directed. Abstracts must be received by 15 February 1992. It is not necessary to provide detailed data in your abstract and we will permit some reasonable flexibility between what you propose and what you actually present.

The schedule committee, with the CSG Steering Committee, will review the abstracts received. Presentations will be accepted and assigned to talk sessions or poster presentation based on the content and the relevance to the CSG topics that we wish to cover. Because of the limited time available it may be necessary to assign some authors who request talks to the poster sessions.

Authors will be advised of the acceptance and placement of their papers by 30 March 1992. Authors whose abstracts are accepted will be asked to bring publication quality text and figures to the meeting to be included in the Proceedings. Detailed instructions for the presentation of posters and written papers will be distributed with letters advising of acceptance. As a general guide, previous CSG guidelines and common practice in scientific journals may be followed.

11TH WORKING MEETING OF THE CROCODILE SPECIALIST GROUP, AT VICTORIA FALLS, ZIMBABWE, 2 - 7 AUGUST 1992.

Preliminary schedule *

Friday, 31 July — Arrival Harare, assembly and overnight.

Saturday, 1 August — Flight to Victoria Falls, check in to Hotels.

Sunday, 2 August — Registration.

Monday, 3 August [Registration continues]

8.00 am	Opening of the 11th Working Meeting.
8.45 - 9.45	Keynote lecture: "Crocodilian conservation strategy: Africa"
10.30 - 12.30	Presentations Session 1 (15 mins each): "African regional reports"
2.30 - 4.30	Presentations Session 2: "Other regional reports"

Tuesday, 4 August

8.30 am	Announcements.
8.45	Keynote lecture: "Population biology and conservation"
10.30 -12.30	Presentations session 3: "Endangered species status"
2.30 - 4.30	Presentations session 4: "Other species status"
4.30 - 6.30	Poster session

Wednesday, 5 August Field Trips 8.30 am - 6.30 pm

Thursday, 4 August

8.30 am	Announcements.
8.45	Keynote lecture: "Science ; Physiology and conservation"
10.30 -12.30	Presentation session 5: "Research results"
2.30 - 4.30	Presentation session 6: "Husbandry and Veterinary care"
4.30 - 6.30	Poster session

Friday, 7 August

8.30am	Announcements.
8.45 - 10.00	Keynote lecture: "Commercial factors and conservation"
10.30 - 12.30	Presentation session 7: "Trade issues"
2.30 - 4.30	Presentation Session 8: "Sustainable use management"
4.30 - 5.30	Plenary session, resolutions and closing remarks.
7.30	The Big Braai

Saturday, 9 August -- Field Trips

Sunday, 10 August -- Departure to Harare and/or other trips.

* Subject to adjustment depending on the presentation abstracts received.

Steering Committee of the Crocodile Specialist Group

For further information on the CSG and its programs, on crocodile conservation, biology, management, farming, ranching, or trade, contact the appropriate officer on the Steering Committee:

Chairman: Prof. Harry Messel, School of Physics, University of Sydney, NSW 2006, Australia. Tel: (61) (2) 692 3383 Fax: (61) (2) 660 2903. Deputy Chairman: Prof. F. Wayne King, Florida Museum of Natural History, Gainesville, FL 32611, U.S.A. Tel: (1) (904) 392 1721 Fax: (1) (904) 392 9367.

Africa: Vice Chairman: Dr. Jon Hutton, 16 Cambridge Ave., Highlands, Harare, Zimbabwe. Tel: (263) (4) 739 163 Fax: (263) (4) 708 554. Deputy Vice Chairman: Olivier Behra, Project TCP/MAG/8954, c/o FAO Rep, BP 3971, Antananarivo, Madagascar. Tel: (261)(2) 28831 WWF Fax: (261)(2) 33986.

Eastern Asia, Australia and Oceania: Vice Chairman: Dr. Grahame J.W. Webb, P.O. Box 38151, Winnellie, NT 5789, Australia. Tel: (61) (89) 221 355 Fax: (61) (89) 470 678. Deputy Vice Chairman: Brian Vernon, Mainland Holdings Pty. Ltd., P.O. Box 196, Lae, Papua New Guinea. Tel: (675) 42 6503 Fax: (675) 42 6172.

Western Asia: Vice Chairman: Romulus Whitaker, Madras Crocodile Bank, Post Bag No. 4, Mamallapuram 603 104 Tamil Nadu, India. Deputy Vice Chairman: Dr. Lala A.K. Singh, Project Tiger, Similipal Tiger Reserve, Khairi-Jashipur, Orissa, India 757091.

Europe: Vice Chairman: Dr. Dietrich Jelden, Ernahrung und A, Postfach 18 02 03, 6000 Frankfurt am Main 1, Federal Republic of Germany Tel: (49) (69) 156 4930 Fax: (49) (69) 156 4445.

Latin America and the Caribbean: Vice Chairman: Juan Villalba-Macias, TRAFFIC (Sudamerica), Carlos Rolo 1496/301, Montevideo, Uruguay. Tel: (598) (2) 493 384 Fax: (598) (2) 237 070. Deputy Vice Chairman: Andres Eloy Seijas, UNELLEZ, Mesa de Cavaca, Guanare, Portuguesa, Venezuela. Tel: (58) (57) 68006 ext. 271.

North America: Vice Chairman: Ted Joanen, Louisiana Wildlife and Fisheries Commission, Rt. 1, Box 20-B, Grand Chenier, LA 70643, U.S.A. Tel: (1) (318) 538 2165 Fax: (1) (318) 491 2595. Deputy Vice Chairman: Dennis David, Florida Game & Fresh Water Fish Commission Research Lab, 4005 S. Main Street, Gainesville, FL 32611, U.S.A. Tel: (1) (904) 336 2230 Fax: (1) (904) 376 5359.

Science: Vice Chairman: Prof. Mark W. J. Ferguson, Department of Cellular and Structural Biology, Coupland III Building, University of Manchester, Manchester M13 9PL, United Kingdom. Tel: (44) (61) 275 6775. Fax: (44) (61) 275 6776. Deputy Vice Chairman: Dr. Valentine A. Lance, San Diego Zoo, P.O. Box 551, San Diego, CA 92112, U.S.A. Tel: (1) (619) 557 3944 Fax: (1) (619) 231 0249.

Trade: Vice Chairman: Kevin van Jaarsveldt, P.O. Box 129, Chiredzi, Zimbabwe. Tel: (263) (4) 708 836 Fax: (263) (31) 2782. Deputy Vice Chairman: Philippe Roggwiller, Tanneries des Cuirs d'Indochine et de Madagascar 59 Rue du Faubourg. St. Martin, 75010 Paris, France. Tel: (33) (1) 4203 2680 Fax: (33) (1) 4238 3855. Deputy Vice Chairman: Toshio Yamanaka, President, Yamatoshi Hikaku Co. Ltd., 12-50, Ueno-Kouen, Taito-Ku, Tokyo 110, JAPAN. Tel: (813) (3) 824 1571 Fax: (813) (3) 823 1972.

Trade Monitoring: Vice Chairman: Ginette Hemley, TRAFFIC USA, 1250 24th Street NW, Washington, D.C. 20037, U.S.A. Tel: (1) (202) 293 4800 Fax: (1) (202) 775 8287. Deputy Vice Chairman: Richard Luxmoore, World Conservation Monitoring Centre, 219C Huntington Road, Cambridge CB3 0DL, U.K. Tel: (44) (223) 277 314 Fax: (44) (223) 277 136.

IUCN Species Survival Commission: Chairman: Dr. George Rabb, Chicago Zoological Society, Golf Road, Brookfield, IL 60513, U.S.A. Tel: (1) (708) 485 0263 Fax: (1) (708) 485 3532.

CITES Observers: Dr. Obdulio Menghi, Scientific Coordinator & Jacques Berney, Deputy Secretary General, CITES Secretariat, Case Postale 78, CH-1000 Lausanne 9, Switzerland. Tel: (41) (21) 200 081 Fax: (41) (21) 200 084.