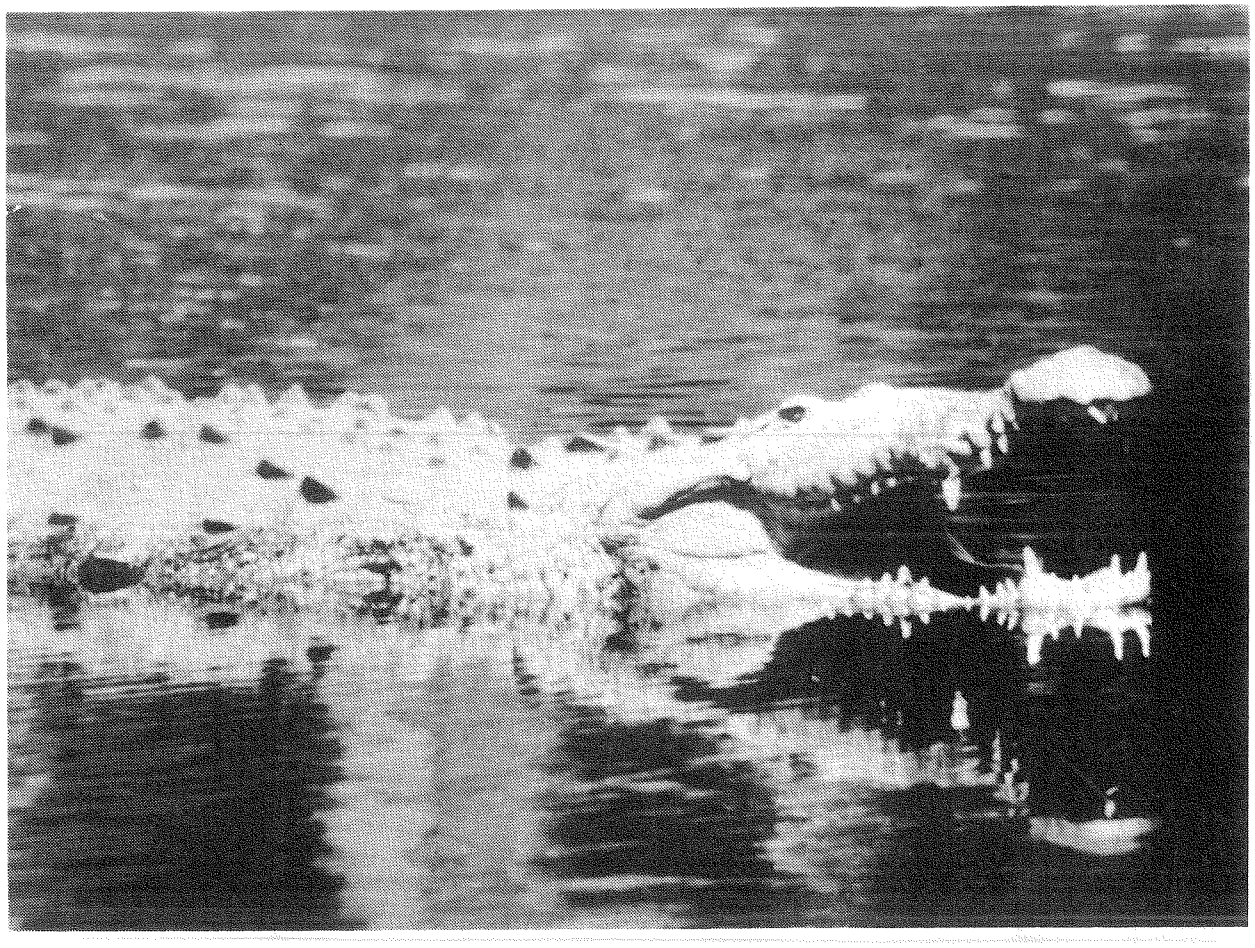
CROCODILE SPECIALIST GROUP

NEWSLETTER

VOLUME 9 No. 3 ■ JULY 1990 - SEPTEMBER 1990



International Union for Conservation of Nature and Natural Resources ■ Species Survival Commission

CROCODILE SPECIALIST GROUP

NEWSLETTER

VOLUME 9 Number 3
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IUCN--The World Conservation Union
Species Survival Commission

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COVER PHOTO:

Crocodylus acutus, adult male approx. 4m at Gator Jungle, Christmas, Florida, U.S.A. J. Thorbjarnarson photo.

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EDITORIAL

The following address was given by Professor Harry Messel, Chairman of the CSG, on 3 August 1990, at a symposium in Tokyo arranged by the Japan Leather-Goods Industries Association. Over 300 traders, tanners, manufacturers and retailers from Japan and Singapore attended. Professor Messel was presented with US $1000 for preparing the lecture. This money will be used to help defray costs of the work of the CSG.

Can Sustained Yield Utilization of Wildlife Help Conservation? The answer is yes! Over the past 20 years one has perceived a slow but important change in the attitude of many of the world's conservation bodies towards the commercial utilization of wildlife. Whereas in the early 1970's commercial utilization was normally strongly opposed by conservationists, today one sees these same bodies encouraging it, for certain species, because of its importance for the conservation of the species and its habitat. The principle of sustained utilization of wildlife was recognized with the adoption of the World Conservation Strategy in 1980. However this is done with a very strict and unequivocal proviso: wildlife can be only be utilized commercially if it can be done on a sustained yield basis which helps the conservation of the species and its habitat. This in turn automatically necessitates systematic and unbiased monitoring of the relevant wildlife populations so that corrective action may be taken if there is any sign of the wild populations being impacted negatively.

Utilization of wildlife is not something new. Without it mankind could not have evolved - without it none of us would be here today.

I will define two terms: *Wildlife* refers to any wild, non-feral species of plant or animal. *Sustained yield utilization* (SYU) refers to exploitation of species in such a way that it contributes to the conservation of the species and its habitat in the wild. The products produced may or may not be traded. If the products are traded, utilization implies financial benefit to individuals, companies or countries.

Since the beginning of mankind, plants and animals have been utilized for food and shelter. How else could mankind have survived and thrived? Wildlife utilization was part of life; it was the very essence of living.

Thousands of years ago, human populations were small, much smaller than the wildlife populations which had evolved before them. Utilization was at a low and sustainable level due to the small human population. There was little thought about SYU until human populations began to expand rapidly and outstrip the wildlife ones.

Our tribal ancestors, however, were able simply to move to another area once their local one was depleted of their basic wildlife necessities. This worked as long as the number of tribes was small, but as these multiplied, territorial fights became a way of life, fights to gain access to the wildlife. This kind of thing still occurs on sections of our planet today.

As mankind evolved and at the same time increased in number, we remained a major user of wildlife but also supplemented this to an increasing degree with farmed plants and animals. In the heavily populated areas of the globe agriculture developed at a rapid rate bringing untold benefits but also, unforeseen and major problems. Even in the early days our tree clearing and farming habits had disastrous results. Recall that much of the present desert in the middle east was once forested and that even today we are turning vast areas of the globe, in Africa, in Asia, in South America, in Australia and even in Canada and the USA, into virtual deserts, a sorry reflection upon mankind's inability to act in a rational fashion.

I have stated many times in the past that man's brain, which places him at the top of the animal kingdom, appears to contain the seeds of his own destruction.

Global Wildlife Commercialization -- Conservation Backlash. As our population increased and then exploded, wildlife began serving a global market and was used at much higher levels than wild species could sustain.

This has meant that the developed nations - all of which had practically "mined" out their wildlife resources - began "mining" the wildlife of the developing nations as well. This was compounded by the developing nations now additionally mining their own wildlife to meet the needs of their rapidly increasing populations. Look at what is happening in Africa, in South America, in Malaysia, in Indonesia, in the Solomon Islands. Rapidly increasing populations with rapidly decreasing wildlife resources and often accompanied by catastrophic loss of habitat.

It is not surprising that after the devastating impact of World War II began to wear off that many people began to realize what was happening and saying, "Hey, wait a minute, what are you developers and wildlife users doing? Many of our species have decreased alarmingly and are endangered. Many have become extinct. Additionally vast areas of wildlife habitat are being lost. We must do something, we must act, we must try to control trade in endangered wildlife and if we can't control it, we must stop it." This was a common attitude and certainly was mine in the early 1970's.

I was at the founding meeting of CITES in Washington, D.C., in early 1973. I well remember the feeling of despondency among many of the founding delegates as to what could be done to control international trade in endangered wildlife. There was very little hard scientific data on the status of the relevant species at that time. All we knew was that many species had become scarce and an important cause was uncontrolled exploitation.

The Crocodile Example. Consider for example the case of crocodilians. After World War II, and especially during the 1950's and 1960's, millions of crocodiles were shot and trapped for their valuable skins. We believed that a number of populations, which were known to be once abundant, had been essentially wiped out, but we didn't have the hard data available to back up this belief. Practically no one was willing to provide funds to develop survey techniques and do surveys on the status of crocodilians that were essential for proper management and SYU programs to be implemented.

In Australia I took the lead in 1970 and began raising the large amount of money required to survey the tidal rivers of Northern Australia and to determine the population status of the crocodiles in them. We spent some A $5,000,000 doing so. In the meantime illegal hunting continued and I was able to convince the Australian Government to impose a total ban on the export of crocodile products in December of 1972. At the same time alligators also received protection in the US but elsewhere in the world the flood of crocodile skins continued.

At that time the trade was not interested in talking about crocodile conservation or providing the funds to determine the status of crocodile populations. In response, conservationists launched a media campaign advising the public not to buy products from endangered species - in this case crocodiles, many of which were being taken illegally. The media campaign was very successful. Perhaps it was too successful.

Our knowledge about crocodilians has increased greatly over the last 17 years. Times have changed and today we can tell people that buying crocodile products derived from sustainable yield programs can in fact help the conservation of crocodiles. How has this come about?

Conservation Through SYU. In recent years, giant strides have been made in crocodilian conservation and management programs in a number of major producing countries such as USA, Papua New Guinea, Zimbabwe, Australia and Venezuela. In addition crocodile farming is being developed extensively; however, farming maintains self sustaining populations under carefully controlled captive conditions and does little for conservation except perhaps decrease pressure on wild populations.

The very important development both for conservation and the trade is *crocodile ranching*, where eggs and young are taken from the wild and reared in captivity to produce products. Crocodile ranching has conservation merit if it is carried out under a carefully managed and monitored SYU program.

The rancher must obtain his supply of eggs or young from the wild. This has a double barrelled conservation advantage. Firstly, it is in the rancher's interest to protect the wild breeding stock and this in turn requires preserving its habitat. The preservation of wetlands for crocodiles allows the conservation of many other species as well. Wild crocodiles also become a valuable resource for rural people - who in the past did not support crocodile conservation.

Having said this I must quickly add that crocodile ranchers are in the business of making money and are not necessarily conservationists. This means that the ranching enterprise must be carefully controlled officially and the wild populations monitored by reputable scientists not involved with ranching. Such is mostly the case in Australia, Zimbabwe, PNG and the US at present. Any signs of a negative effect of ranching on wild populations must lead to immediate corrective action such as a reduction of egg or hatchling harvests and, in the extreme case, closing the farming enterprise. It must be absolutely clear that conservation of the wild population is the foremost priority, not the profit of the trade.

It should be noted that it is still necessary to completely prohibit trade in products of some species to conserve them. For example, rhinoceros horn, sea turtle products, some parrots and mountain gorillas require complete protection at present. This is because their exploitation is not based on SYU and because their traders are not working with conservationists for the benefit of the species. If the trade cooperated and the management of these species could be developed on a sustainable basis it might be possible to trade them in the future, but until that happens conservationists will continue to oppose trade in such species.

In some countries, such as the USA and PNG, the wild populations are reasonably well studied and appear sufficiently robust to withstand a combination of ranching and wild harvest. In PNG only immature crocodiles may be harvested whereas in the USA a strictly controlled harvest of both immature and adult alligators is allowed. In both countries the populations and harvest are very carefully monitored and regulated and no negative impact on the wild population has been seen. Generally speaking it is unwise to allow harvesting of adult female crocodiles and this should be strongly discouraged.

Crocodile ranching on an SYU basis, and to a lesser degree of farming, is resulting in an increase in the availability of classic crocodile skins. For these skins to be absorbed profitably on the world market a change is required in public perception of the conservation merit of purchasing crocodile products. This change can only occur with the cooperation between crocodilian conservationists and the trade. However it should be understood that many conservationists, including Harry Messel, are not in this field for the benefit of the trade. We are in conservation because we believe it is of vital importance to mankind.

Many of us are now willing to support legal, regulated, trade in crocodilians taken in SYU programs providing the trade is willing to support and help adequately fund, crocodilian conservation. I am happily aware that the trade no longer expects a free ride at the expense of crocodiles and conservationists. The increasing active participation of the trade in the Crocodile Specialist Group and in crocodile conservation field projects is evidence of this and should greatly help to stop the remaining large illegal trade, particularly in caiman skins. Soon we may be able to use the motto "Buy a bag and save a croc".

STEERING COMMITTEE

Le plus ça change, Le plus c'est le meme chose. Proceedings of the Third Working Meeting of the CSG (1976) were not published but the following report is extracted from a summary report of the meeting prepared in 1976 for IUCN by Prof. F. Wayne King. Readers will note a remarkable similarity in content to issues addressed by the CSG recently. Some problems, it seems, just will not go away. "Those who fail to understand history are doomed to repeat it."

A RETROSPECTIVE VIEW: THIRD WORKING MEETING OF THE IUCN/SSC CROCODILE SPECIALIST GROUP, CONVENED AT MANINGRIDA, AUSTRALIA, 11-12 MAY 1976.

Participants: F. Wayne King, Howard Campbell, Robert Chabreck, Hugh B. Cott, J.C. Daniel, Rene Honegger, Ted Joanen, John Lever, Federico Medem, Harry Messel, Tony Pooley, and observers Murray Elliot, Richard Gore, Gordon Grigg, Navu Kwapena, Dave Lindner, Bill Magnusson, Victor Onions, Janet Taylor, Grahame Webb and Michael Yerbury.

The Third Working Meeting was attended by 20 members and observers from Australia, Colombia, England, India, Papua New Guinea, South Africa, Switzerland and the U.S.A. The first two days of the meeting were spent

reviewing the status of wild crocodilians. The Group noted with concern the continued decline in most African, Asian and Latin American populations, as a result of continued hide hunting, sale of souvenirs and trinkets and "vermin" eradication. However the Group is happy to report the "Recovered" status of the American alligator as a result of efforts involving several group members. Robert Chabreck, Ted Joanen and Wayne King were active in the fight to protect the alligator with federal and state laws including the U.S. Endangered Species Act. Duke Campbell drafted much of the U.S. federal regulations on hunting, capture and interstate commerce and Ted Joanen is the head of the federal recovery team charged with directing the conservation of alligators.

The Group was also pleased to note the development of a management plan for the *Crocodylus novaeguineae* and *C. porosus* in PNG under the direction of Max Downes. Unfortunately no such management scheme exists in neighboring Irian Jaya where these species are declining.

On the negative side the Group learned that Colombia had authorized the issue of licenses to hunt 290,000 caiman in Colombia during 1976. The Group doubts that there are that many adult caiman remaining in the wild in Colombia. The unrealistically high quota will stimulate the killing of caiman smaller than the legal size and the smuggling of hides from other nations.

The Group was extremely concerned by the low numbers of estuarine crocodiles remaining in Australia. Extrapolation of extensive surveys by the University of Sydney crocodile research team suggests fewer than 5,000 non-hatchling estuarine crocodiles remain in northern Australia. The population was destroyed by hide hunting and the large number of juveniles in the remaining population reflects the low number of valuable adults that have survived. The Group expressed their concern in a letter to the Australian Authorities and congratulated the federal government on its total ban of hide exports.

The Group singled out the critically endangered Gharial and the Orinoco crocodile for special attention. Fewer than 500 Gharial were estimated by surveys conducted by Romulus Whitaker from 1974 to 1976. The largest remaining population is in the Chitwan National Park and the Narayani River, Nepal, and Satkosia Gorge Sanctuary in India. Primary cause of this species decline has been hide hunting, drowning in fishing nets, incidental mortality from illegal dynamite fishing and robbing nests of eggs.

In 1975 Federico Medem surveyed 252,530 km^2 of the Orinoco drainage and recorded only 280 Orinoco crocodiles. This species is one of the most endangered crocodiles.

A day was spent discussing commercial crocodile farms. Crocodiles and sea turtles seem to generate more interest in commercial farms than any other endangered vertebrate, possibly because the market for these reptiles is enormous and there are no other species that can be readily substituted. Another reason might be that the reproductive potential of reptiles that lay 50 or more eggs suggests to the layman that a few breeding pairs will yield many hides. The Group has devoted considerable time to responding to enquiries about crocodile farming, pointing out the difficulties concerned and the lack of data on many aspects of such activities. The Group has now drafted a standard response for these enquiries and more detailed replies will generated if further information is requested.

There have been several unsuccessful attempts by reptile leather tanneries in Europe to operate commercial hide farms in Africa and South America. A few have planned to use exotic (non-native) species, ignoring the potential for introducing an exotic reptile predator and unbalancing natural ecosystems.

UNDP and FAO have also received requests from governments to assist in developing farming programs, marketing plans and schemes to exploit wild crocodilian populations. Unfortunately many of the "experts" engaged to provide this assistance are not experts in the field. The European tanning industry has complained to the CSG that one "expert" advising the government of Sudan on tanning and marketing of hides has no knowledge of reptile leather tanning or crocodile management. The Group is aware of another "expert" who devised the harvest/research scheme that caused the near extermination of crocodile populations in Botswana.

In contrast, what may be the largest crocodile rearing program in the world is under development by CSG member Max Downes in Papua New Guinea (PNG). This program is a comprehensive conservation / exploitation program in which adult crocodiles are protected in the wild to ensure a healthy breeding population and eggs and young are collected

from the wild to be raised in captivity to supply the hide market. Eventually there may be hundreds of individuals, communities and companies involved in rearing crocodiles in PNG. The development costs have been borne by the PNG government but they are now seeking UNDP funding for the program. The UNDP has contacted the CSG Chairman for assistance in evaluating the program and an extensive report has been provided by the CSG. Group members F. Medem and T. Pooley visited the scheme and provided an additional independent evaluation. It is hoped that the PNG program will be a model for crocodile conservation for other developing countries and it is further hoped that FAO and UNDP will continue to consult with the CSG on crocodilian conservation.

Crocodile farmers have claimed that hides from captive stock, with their steady supply, and uniform size and quality, will replace wild hides in the international market. On the other hand, some conservationists fear that the farmed hides will stimulate, but fail to satisfy, increased demands for crocodile products. The Group has reviewed the impact of commercial farming on wild populations of other species to try and resolve this question. No clearly beneficial or clearly harmful examples could be found; the farming of ostriches for their plumes was the closest to being beneficial but this was in great part due to the closure of the market to wild plumes. It is doubtful that ostrich conservation would have benefited from ostrich farming without the wild plume prohibitions. Since CITES has prohibitions on trade of some crocodilians, captive reared hides might eventually replace wild hides if the ratifying nations cooperate and the technical problems of captive management are overcome.

Several days were spent reviewing the latest research results. The positive impact of crocodiles on their environment is now well documented. Positive effects on fish productivity, parasite control and drought resistance in wetlands are well known and need to be called to the attention of nations proposing to exterminate their crocodiles.

The complex social signalling and elaborate maternal behavior of crocodilians have been the subject of several scientific and popular papers and a Time--Life televison documentary was filmed largely at Tony Pooley's crocodile research station in the St. Lucia Game Refuge in Natal, South Africa.

New research techniques including a method to examine gut contents of live crocodiles and a solar powered radio telemetry unit were revealed.

The Group continues its efforts to monitor the hide trade. An estimated 2,000,000 hides are traded annually. A majority of these have their origin in South America. Africa is the second largest source. France Germany and Italy are the largest consumers and England, Japan and the United States also consume large numbers.

Considerable time was spent debating the placement of crocodile species on Appendices I and II of CITES. Part of this discussion was prompted by a letter from the German Reptile Leather Association in which the Group was asked to recommend a series of changes in Appendix listing. In return for these proposed changes the industry offered to impose a voluntary ban on the use of certain size classes of hides and to donate funds for crocodilian conservation and farming research through the Frankfurt Zoological Society. The Group drafted a reply stressing their desire for continued dialog and cooperation but expressing extreme reservations about many of the proposals that were made.

The Group debated problems associated with restocking areas depleted of their wild crocodilians and concluded that this will be impossible in many instances without public education programs and economic incentives to tolerate the presence of crocodiles. Also examined was the disposal of confiscated hides. The majority of members supported the position that confiscated hides should be destroyed to prevent their re-entry into trade. A few members reported that their governments lacked a legal basis to destroy confiscated materials but the hides were being allowed to deteriorate through improper storage.

Action Program. -- The group decided to concentrate on a few important and realizable goals rather than promulgate a program so large that it was impossible to implement. The following action items were approved.

Gharial. -- The CSG requests that IUCN/SSC make representation to His Royal Highness Gyanendra, of Nepal, to protect the gharial population in Chitwan National Park and in the Narayani River. Nepal should be asked to accept the ultimate responsibility for assuring its

survival. India should be encouraged to set aside a portion of the Narayani River continuous with the gharial habitat in Nepal as a reserve. The Group will attempt to find an ecologist to study gharials in the Chitwan and Narayani populations. This scientific presence will further insure the conservation of the species in the subcontinent.

Orinoco crocodile. -- The CSG requests that a letter be sent to the President of Colombia seeking more effective protection for the Orinoco crocodile in that nation, including the establishment of sanctuaries. Protection will also require adequate support for the wildlife officials responsible for enforcement.

A similar letter should be sent to the President of Venezuela seeking the establishment of a sanctuary for the species and acceptance of the responsibility for the species survival. The Group is prepared to offer technical assistance to Venezuela if it is needed. The group requests that IUCN/SSC congratulate Dr. Pedro Trebbau for his initiation of a breeding program for Orinoco crocodiles at the Jardin Zoologico "El Pinar", Caracas. Dr. Trebbau should be encouraged not to disperse the breeding group or its offspring by giving specimens to visiting zoo directors during the upcoming IUDZG meeting in Caracas.

Colombian Caiman. -- The Group requests that IUCN send a letter to the President of Colombia calling for a re-examination of his decree permitting the killing of 290,000 caiman.

Ultimate responsibility. -- The Group hopes governments can be prevailed upon to accept the ultimate responsibility for conservation of crocodilians that occur within their jurisdiction. Particular responsibility for endangered species are suggested as follows:

Chinese alligator (*Alligator sinensis*) -- China. Apaporis river Caiman (*Caiman crocodilus apaporiensis*) -- Colombia. Orinoco crocodile (*Crocodylus intermedius*) -- Venezuela. Philippine crocodile (*Crocodylus mindorensis*) -- Philippines. Cuban crocodile (*Crocodylus rhombifer*) -- Cuba. Gharial (*Gavialis gangeticus*) -- Nepal. False Gavial (*Tomistoma schlegelii*) -- Malaysia or Indonesia.

New sanctuaries. -- It is the intention of the group to encourage the establishment of a number of urgently needed sanctuaries:

1) Narayani River in Nepal and India (as mentioned above) for gharial.
2) Orinoco River sanctuaries in Colombia and Venezuela (as mentioned above) for Orinoco crocodiles.
3) Lago Catemaco, Mexico, for Morelet's crocodile (*Crocodylus moreletii*).
4) Lago Enriquillo, Dominican Republic, for the American crocodile (*Crocodylus acutus*).
5) Black River Morass, Jamaica, for the American crocodile.

In addition, the Group hopes to encourage all crocodile producing nations to establish new sanctuaries for these reptiles and to include the species in protection given by existing parks and reserves.

CITES. -- Because of the recovered status of the American alligator (*Alligator mississippiensis*) the Crocodile Specialist Group suggests that this species be transferred from Appendix I to Appendix II of CITES. If it is appropriate the IUCN in its role of Convention Secretariat should suggest this to the November 1976 Meeting of the ratifying nations.

New Group Members. -- The Group noted with regret that Max Downes was no longer directly involved with crocodile conservation. The Group voted to make up this loss with the addition of John Lever, head of crocodile conservation in Papua New Guinea. Other people recommended for group membership were Romulus Whitaker, founder director of the Madras Snake Park Trust, and Dr. Federico Achaval of Uruguay. The addition of these proposed members awaits the approval of the Chairman of the SSC.

Venue and date of next meeting. -- The Group tentatively selected India for the 1978 meeting pending final arrangements by the Indian members. The Group decided that each member should raise the travel funds they need to attend the meeting.

Crocodile Conservation and UN agencies. -- The CSG is concerned that the United Nations agencies needlessly and unwisely encourage crocodile exploitation as a means of obtaining foreign exchange. The Group is disturbed by their habit of supplying nonexpert advisors on UN crocodile exploitation projects. These

practices are resulting in needless squandering of valuable resources. Nearly one half of the estimated 2,000,000 crocodile skins in international trade each year are unusable due to rot. If the quality of field preservation were improved it would be possible to reduce the number of wild crocodiles killed without reducing the number of useable hides.

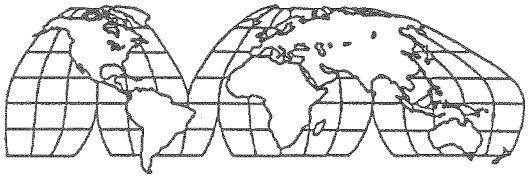
The CSG has learned that FAO has prepared a confidential report on the reptile leather industry, which it is using as a basis for many of its crocodile projects. The Crocodile Specialist Group has been denied access to this report, although one member has viewed it superficially but was not even allowed to write down the correct citation.

The Group urges IUCN to make strong representation to FAO to obtain a copy of this report for review by the CSG. We also suggest IUCN seek discussion with FAO and UNDP to end their hiring of nonexpert advisors on crocodile projects. The Crocodile Specialist Group is willing to assist the UN to locate knowledgeable people as was done for Papua New Guinea. We are frequently told that the UN recognizes the scientific expertise of the IUCN on conservation matters. Apparently that recognition does not extend to matters involving crocodilians. We also wish to remind the SSC that at its General Assembly, IUCN routinely praises FAO, UNDP, UNEP and WHO for their cooperation. If that cooperation does not exist we should reevaluate this procedure.

Crocodile ecologists. -- To increase the number of crocodile biologists available for conservation work, each group member will try to attract one student a year to the field.

Following the meeting Federico Medem, Rene Honegger and Wayne King routed their trips through Germany and were able to meet with representatives of the German Reptile Leather Industry in Frankfurt on 3 May 1976. They set forth their response to the letter sent by the Industry group and presented the CSG's view of the problems resulting from overexploitation of wild crocodile populations. An exchange of views was held on size limits, reduction of the volume of world trade in skins, sharing of data on the status of wild populations and the functioning of the Washington Convention (CITES). Concern was also expressed by the Leather Industry group about the use of nonexpert advisors by FAO, a concern already addressed by the CSG.

AREA REPORTS



AFRICA

Central African Republic:

Bertrand des Clers, International Foundation for the Conservation of Game, 15 Rue de Teheran, 75008 Paris, France, writes:

> A crocodile farm/ranch is being started in the Northern CAR [Central African Republic], with technical advice from Zimbabwe and feasibility study partly financed by the CAR Government/European Development Fund. The farm will be a private venture raising *Crocodylus niloticus* near the border with Chad operated by a safari outfitting company.

Mozambique:

The following account appeared in *Weekly World News, 17 July 1990*: DROWNING MOTHER SAVED BY KILLER CROC. A boatload of tourists watched in wide eyed disbelief as a drowning pregnant woman was rescued and carried to safety by a full grown female crocodile. The crocs gentle act, which defies explanation, was also witnessed by African villagers who fell to their knees in reverence when the 18 foot croc brought the woman to shore. The amazing, lifesaving drama unfolded in the Zambezi river delta when 26 year old Molly Mbuto, a pregnant mother of three, fell into croc infested waters. A large crocodile approached and, sinking beneath her, surfaced with the woman across its back and carried her to shore. American tourist Karen Fowler reported that the croc "...just flicked its tail and the woman rolled onto the grass. Then it just turned and swam slowly away." The woman suffered mild shock from her ordeal but both she and her unborn child were reported to be unharmed.

[Female crocodiles apparently grow larger in Mozambique than elsewhere as the largest size reported for females by Hugh Cott is 3.5 m (about 11.5 feet). Perhaps this individual's unusually large size explains "her" unusual behavior. -- *Eds.*]

South Africa:

NILE CROCODILE FARMERS ASSOCIATION (NCFA) has produced its second newsletter reporting the growing strength of the newly formed organization for South African crocodile farmers. The Newsletter reports on the recent CSG meeting and on crocodile pond design. Some important initiatives the Association is involved with are registration as CITES approved farming operations and down listing South Africa's *C. niloticus* populations from CITES Appendix 1. -- Andrew Ericsen, *NCFA Newsletter editor, Cango Crocodile Ranch and Cheetah Land, P.O. Box 559, Oudtshoorn, 6620 South Africa.*

CROCODILE FARM HANDBOOK FOR THE SADCC COUNTRIES OF SOUTHERN AFRICA. The handbook is co-authored with Dr. L. Guillette, University of Florida, Gainesville, FL 32611, U.S.A., and assembles materials that should greatly benefit crocodile conservation and crocodile businesses in southern Africa.

ASIA

Bangladesh:

STATUS OF CROCODILES IN BANGLADESH. Bangladesh has a network of numerous rivers and a large coastal area. Historically she has supported large populations of crocodiles of three species reported to occur in the country: saltwater crocodile (*Crocodylus porosus*) in the Sundarbans coastal area, and the marsh [= mugger] crocodile (*Crocodylus palustris*) and the Gharial (*Gavialis gangeticus*) in the big rivers.

They were once abundantly found in Bangladesh but now have been wiped out from most of their former range due to massive illegal hunting for the valuable skins. As a result all three species are now critically endangered and on the verge of extinction (Sarker and Sarker

Public viewing bridge and one of ten breeding ponds in Crocworld, Natal, South Africa. A. Drummond photo.

Zambia:

M.P. Simbotwe, ESCC Pty. Ltd., P.O. Box 60127, Livingstone, Zambia, is completing a

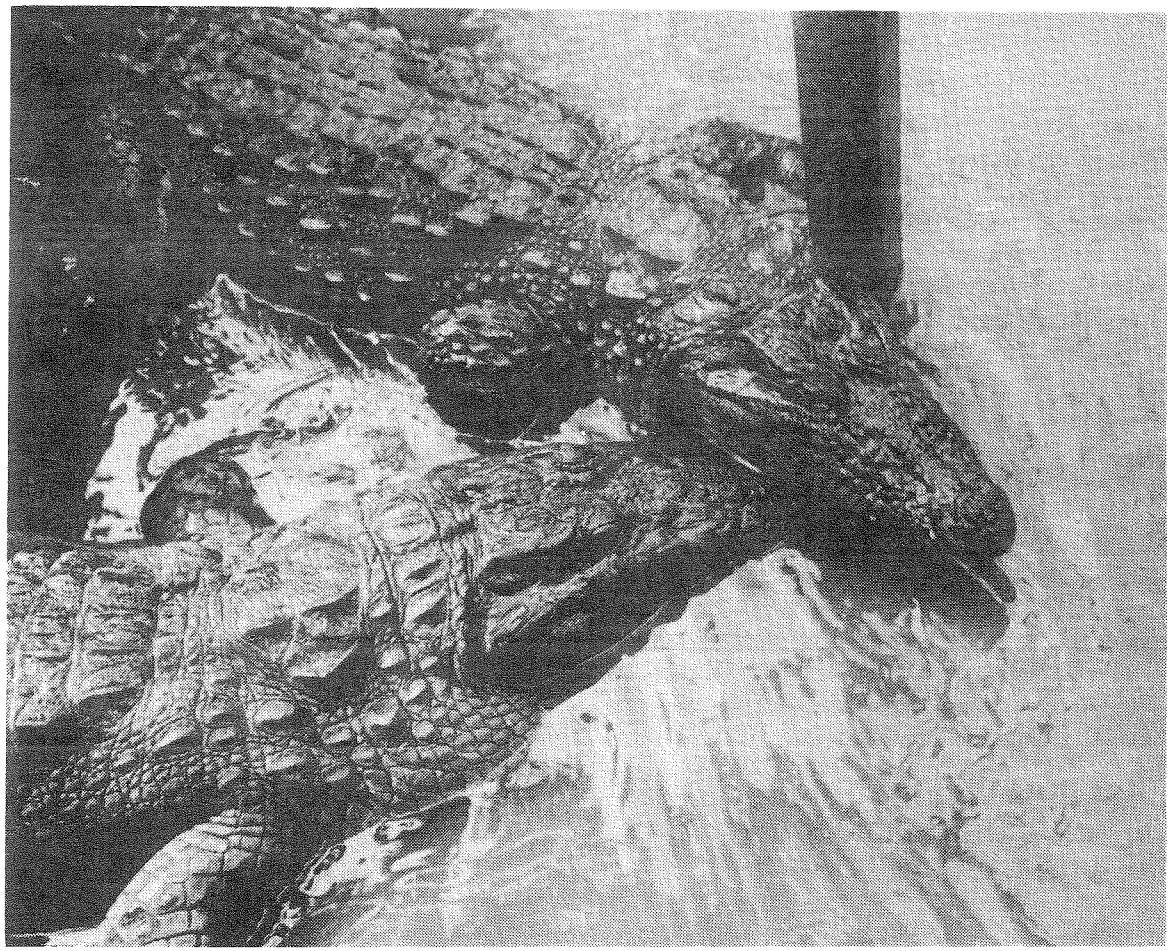
1983). Marsh crocodiles are thought to be extinct in their in their natural habitat (Whitaker and Daniel 1978, Husain and Sarker 1985). Marsh crocodiles are now confined to captive situations like zoos and a pond at Peer Khan Jahan Ali at Bagerhat.

Review of the literature reveals some difference of opinion in regard to the exact population status of crocodile species in Bangladesh and no proper methodology of evaluation has been used. This author has ascertained the status of the species at present by personal visits throughout the country since 1981.

marsh crocodile since 1981 with a view to increasing populations, but additional efforts are needed.

Table 1. Status of the Crocodiles in Bangladesh.

Species	Past Status	Present Status
Crocodylus palustris	Common	Extinct in wild
Crocodylus porosus	Common	Endangered
Gavialis gangeticus	Common	Endangered



Courting mugger crocodiles at Tikarpada, Orissa, India. L.A.K. Singh photo.

The populations of crocodiles both in nature and in captivity were estimated on the basis of information from fishermen, local inhabitants and forest staff and from nest counts, baiting and personal observations.

Unfortunately, little is known about crocodile breeding activities in Bangladesh. I have been investigating breeding biology of the gharial and

Two breeding colonies of gharial were reported on the Padma in Rajshahi during 1982-1985. Of the twelve nests in the colonies, three were studied and 98 of 122 eggs hatched out. Reproduction of the marsh crocodile was studied both in the pond at Bagerhat and in the Dhaka zoo. The number of eggs per clutch was 38, mean hatching success was 61% and survival 8%

at the pond. In the zoo, clutch size was 28 and hatch success and survival were nil.

Table 2. Estimated populations of crocodiles in Bangladesh.

Species	Location	Numbers[a]
C. palustris	Bagerhat	1.1.4[b]
	Dhaka Zoo	2.1.7[c]
C. porosus	Sundarbans	10.22.8.
	Dhaka Zoo	0.0.2
G. gangeticus	Padma, Jamuna, and	
	Brahmaputra	2.12.6
	Rajshahi Zoo	0.0.2
	Dhaka Zoo	0.0.1[d]

[a] Listed in order of males.females.juveniles.
[b] Peer Khan Jahan Ali Pond, Bagerhat.
[c] 7 survivors of 9 hatchlings collected from Bagerhat pond in 1987.
[d] Collected from residential house, Ghaibandah.

Populations both in the wild and in captivity are not increasing because of poor management and immediate attention to this problem is needed.

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Mohamed M. Rahman, *Wildlife Section, Bangladesh Forest Research Institute, G.P.O. Box No 273, Chittagong - 4000, Bangladesh.*

China:

TDSD IN CHINESE ALLIGATOR. Investigations on temperature dependent sex determination are being carried out at the Research Center of Chinese Alligator Reproduction, Wuhu. Samples of 40 eggs were incubated at different temperatures and the resulting numbers of male and female hatchlings scored. Preliminary results indicate mostly males produced at temperatures above 33° C and females at temperatures below 28° C. Survival was poor at temperatures above 36° C and below 27° C. One intersex was produced at 33° -35° C. -- Dr. Chen Bihui, *Dept. Biology, Anhui Normal University, Wuhu, Anhui Province, People's Republic of China.*

India:

NANDANKANAN BIOLOGICAL PARK, ORISSA. During the second and third week of March 1990, three female gharials (nos. 2, 4 & 6) laid eggs (36, 39 & 38 eggs respectively). Six female gharial are kept in an excellent breeding pool with the male gharial "Bajrabahu". Sixty eggs (20 from each nest) were removed for the Project Hatchery incubation and the remainder were left to incubate in the original nests. Eggs of female No. 4 and No. 6 hatched and produced 48 hatchlings total but eggs of female No. 2 did not hatch at the hatchery or the natural nest. This year there was continuous rain during the summer months and air temperature was low (26° to 39°C, average 31°C). The temperature of nests both at the hatchery and the original nests were below optimum and was a factor in low hatch success.

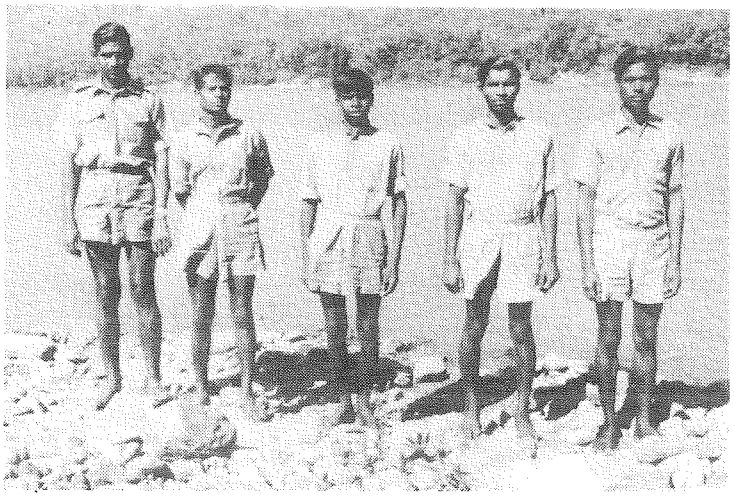
A captive female mugger crocodile at Nandankanan laid 24 eggs on 1 March 1990. All the eggs were removed for incubation in the hatchery but were later found to be infertile. Another female mugger of 1.8 m length died after laying 3 eggs. Thirty three undeveloped eggs in a compact ball were found at post mortem and the death of the animal was due to egg peritonitis and toxemia.

For the second time the female spectacled caiman, *Caiman crocodilus*, laid eggs in its enclosure on 5 June.

The saltwater crocodile egg collection program from forest blocks in the Bhitarkanika National Forest was quite successful. Twelve crocodile nests have been located to date and 25 eggs from six nests have been removed for incubation at the Saltwater Crocodile Research and Conservation Center, Dangmal. This year four released *C. porosus* have laid eggs in the wild and nest guarding activities of the females are under constant observation. Also two females, including the white (Sankhua) female have laid eggs in the breeding enclosure at Dangmal.

At present 442 crocodiles of various ages are being reared in pools at the Crocodile Research center at Dangmal. More than 200 crocodiles of

about 2m length will be released after the rainy season into suitable locations in the Kujang area, which is part of the delta of the Mohandai river. -- Dr. Sudhakar Kar, *Research Officer, c/o the Chief Conservator of Forests (Wildlife), Orissa. 315 Kharavel Nagar, Bhubaneswar -751001, Orissa, India.*



Gharial guards: Local people involved in Orissa crocodile conservation. Rajesh Bedi photo.

Nepal:

UPDATE ON GHARIAL RELEASES. A total of 87 five year old (1.2 - 1.6 m length) gharials were released into the river systems of Nepal in March this year. Twenty-five were released into the Narayani River, 32 into the Kali Ghandaki River and 30 into the Babai River in western Nepal. This was the first release of gharials into the Babai River. The Babai River supports 7 - 10 wild gharials and is the only river in Nepal that is not affected by dams. A survey in January 1990 revealed nine wild gharials (3 males, 6 females) in the Kali River and 31 wild gharials (3 males, 28 females) in the Narayani. The gharial population in the Narayani is concentrated around the Velaunge and Bhosarghat areas where there are deep pools exceeding 7 m and high sand banks suitable for basking and nesting. Of captive raised gharials released into the wild about 40 (18% of those released) survive in the Narayani and some of those first released in 1981 are approaching reproductive age. To date the program has reared about 1000 gharials and 394 have been released. -- Dr. Tirtha M. Maskey, *Dept. of National Parks and Wildlife Conservation, P.O. Box 860, Rabar Mahal, Katmandu, Nepal.*

Pakistan:

Further information on the general situation of crocodiles in Pakistan has been transmitted by Romulus Whitaker, Vice Chairman for Western Asia. These confirm the report published in the last NEWSLETTER.

Aziz Aslam Khan, Director General, Wildlife and Parks, 2 Sanda Road, Lahore, Pakistan, reports that the Government of India has agreed to export a small number of crocodiles to the province of Punjab, Pakistan, for the establishment of a captive breeding station.

From Sind province Abrar Husain Mirza, Conservator of Wildlife, Sind Wildlife Management Board, Strachen Road, Karachi 1, P.O. Box 3722, Pakistan, reports a captive breeding operation is underway and it is intended to raise crocodiles for three years before releasing them to the wild. Data from captive reared crocodiles that have been released into the wild are insufficient to infer the success of the program so far.

Both correspondents confirm that crocodiles persist in a few protected sanctuaries in Sind but appear to be extinct in the wild in Punjab. They are protected throughout Pakistan and the sale of skins is prohibited. No commercial exploitation is planned at this time while attempts are made to rebuild the wild populations.

Singapore:

SINGAPORE WITHDRAWS RESERVATIONS. Dr. Giam Choo Hoo, Deputy Director, Primary Production, Ministry of National Development and CITES Management Authority, Singapore, has informed the CITES Secretariat and the CSG, in a letter dated 30 August 1990, that,

> 1. I am pleased to inform you that with effect from 31 August 90 Singapore will withdraw her reservations on *Crocodylus porosus* and *Crocodylus novaeguineae novaeguineae*. We would appreciate it if you could inform other Management Authorities and interested parties of this.

2. In accordance with resolution Conf. 4.15 we would like to register 4 captive breeding operations for *Crocodylus porosus*. The operations to be registered are as follows:

i) Jurong Crocodile Paradise Pte. Ltd.
ii) Singapore Crocodilarium Pte. Ltd.
iii) Tan Moh Hong Reptile skin and crocodile farm.
iv) Long Kuan Hung Pte. Ltd.

The information required by Notification No. 568 for registration is given in the Annex.

3. Each "product unit" from these operations will be tagged with a nonreuseable plastic tag. Each tag bears the ISO code (SG) for Singapore, the year of issue and a unique number (eg. SG 90 0001) The term "product unit" only refers to whole skins.

4. We would appreciate it if these four operations which meet the requirements of the Convention and the relevant Resolutions be entered into the Register of operations which breed specimens of species included in Appendix I in captivity for commercial purposes.

5. I am pleased that something positive has come out of our discussion in Tokyo, together with Professor Messel."

[The Crocodile Specialist Group warmly applauds Singapore on this very positive contribution to international crocodilian conservation. -- *Eds.*]

AUSTRALIA/OCEANIA

Australia:

IMPORTATION OF CROCODILE PRODUCTS INTO AUSTRALIA. The import and export of parts and products derived from Crocodylia (crocodiles, alligators and caimans) is subject to regulation under the Wildlife Protection (Regulation of Exports and Imports) Act:

Import of skins and other products from crocodiles, alligators and caimans requires the prior grant of an import permit from the Australian National Parks and Wildlife Service. Permits will only be granted for private or commercial purposes where the following conditions have been met:

- For CITES Appendix I listed species, the skins/products must be derived from animals taken under a captive breeding program recognized and approved by CITES. For Appendix II listed species, a valid CITES export (or re-export) permit issued by the Management Authority of the overseas country must clearly display the source of these items as "bred in captivity".

- Valid CITES export permits issued by the Cites Management Authority of the country of the proposed export **must be obtained** prior to the export occurring. For Appendix I species these permits must indicate the relevant farm (a commercial breeding operation notified by the CITES Secretariat).

- Australian importers **must apply in writing** to the Australian National Parks and Wildlife Service, GPO Box 636, Canberra, ACT 2601, Australia, for a permit to import prior to the export of the products from overseas. The ANPS permit **must be issued prior** to the arrival of the products in Australia.

- Failure to obtain the necessary permits may result in the items being seized in Australia. In such cases reconsignment is not permitted and the products would become forfeited to the Commonwealth. -- Robert (Hank) Jenkins, *Australian National Parks and Wildlife Service, Canberra, Australia.*

MORE CROCS EAT FEWER HUMANS. A recent crocodile fatality at Groote Eylandt in the Northern Territory in May is certain to generate calls for culling the estimated 50,000 saltwater crocodiles in the Northern territory said crocodile expert Dr. Grahame Webb. But experts say the recent statistics on crocodile fatalities read comparatively well. Crocodile numbers are estimated to have doubled since they were protected in 1972 while only seven fatalities have been reported since 1985. Dr. Webb said that egg collection and the removal of adults by the Conservation Commission served to partially cull the population while supporting a valuable commercial resource and tourist attraction." It seems senseless to put an optimum

or maximum number on the quantity of crocodiles we can put up with" said Dr. Webb. "If someone told you they had got rid of half or even all the crocodiles in a river, would you still go swimming?" "It seems the death at the weekend was a real case of misadventure. That's the way most of the crocodile fatalities seem to happen." -- Excerpted from *New Zealand Herald, Wednesday, 16 May 1990.*

Papua New Guinea:

The PNG Management program for crocodilians has now been approved by the Australian authorities to allow the import of PNG crocodilian products into Australia. Guidelines for the handling of meat have been set and authorities in PNG are now approving facilities in Lae that meet the Australian standards. Cooperation between PNG and Australian authorities has improved considerably and it is hoped that PNG crocodile products can now be imported into Australia. There is a lot of interest in tanning PNG skins in Australia. As reported in the last CSG NEWSLETTER, PNG has banned exports of crocodile products to Singapore. -- Brian Vernon, *Deputy Vice Chairman, Australia and Oceania, Box 4184, Lae, Papua New Guinea.*

Philippines:

CFI NEWS (Vol. 2 No. 2 September 1989), a quarterly publication of the RP-Japan Crocodile Farming Institute, Department of Environment and Natural Resources reports that CFI has successfully hatched 5 eggs from a clutch of *C. mindorensis* eggs laid in captivity in June 1989. Nine of the 19 fertile eggs were left to hatch naturally. CFI NEWS also reports the capture of 8 wild crocodiles in estuaries near Del Carmen, Siargao Island north of Mindanao. These crocs, which appear to be *C. porosus*, ranged in size from 7.7 feet to 15.1 feet and were removed to the CFI farm on Palawan. The largest animal is thought to be responsible for several human attacks and fatalities in the area.

SOUTH AMERICA

Bolivia:

BOLIVIAN *MELANOSUCHUS* ADVENTURE. John Thorbjarnarson, Florida Museum of Natural History, Gainesville, FL 32601, U.S.A., took some time off from writing up his PhD dissertation to make a short trip to Bolivia to help with the first ever release of black caiman (*Melanosuchus niger*) back into the wild. The project was directed by Andres Szwagrzak, from PRODENA, the Bolivian Wildlife Society, with backing from AGA (Aktionsgemeinschaft Artenschultz e.V.), a German animal protection group. Most of the funds came from Izod Lacoste and from Camel cigarettes. John travelled to Bolivia at the request of Luis Pacheco, a Bolivian student who is finishing up his Licenciatura degree on aspects of the behavior and ecology of captive *Melanosuchus*.

The project was a cooperative venture among PRODENA, AGA, the ranch owners, and the Beni Biological Station (where the animals were released). Originally, all or most of a captive *Melanosuchus* population located on a ranch (El Dorado, in northern La Paz Province) were to be released. The total captive population numbers some 120-150 adults and subadults, however, due to organizational problems only 25 large caiman (plus 11 hatchlings) were captured. Luis Pacheco headed the biological team which helped with the captures, took morphological measurements, and planned the release. Originally funding was to have been provided for surveys of the release sites, but this money was never forthcoming so all 25 caiman (2.5-3 m long) were released (on 4 July) in the Laguna Normandia at the Beni Biological Station (located some 150 km to the southeast of the El Dorado ranch), which had been the site of a two year study of Yacare caiman by Ernesto Ruiz of Spain.

Everything was done in grand style (Hercules transport planes, helicopters) and Lacoste stickers and Camel field equipment and clothing were in evidence everywhere. However, the entire operation was planned more with an eye towards "public relations" than towards effective logistics or even conservation. There were more film teams and journalists around than people willing to work, and there was a distinctive lack of coordination among the participants. The whole operation was promoted (in Germany) by AGA as a last ditch attempt to save the last remaining population of black caiman. Although it was a notable effort to do something positive for black caiman in Bolivia, the planners were a bit out of touch with the reality of conservation in the field and, in John's opinion, the money invested in the whole program would have been

much better spent on surveys for wild populations and better protection (e.g. more guards) at the Beni Biological Station.

Brazil:

CAIMAN RANCHING REGULATIONS. The Brazilian Institute for Environment and Renewable Natural Resources (IBAMA) has issued regulations for the rearing of *Caiman crocodilus yacare* for commercial purposes. The regulations include restriction of the proportion of wild eggs that may be taken to stock ranches, a requirement for animals to be maintained for at least six months before entering commercial trade and a requirement for 10% of the resulting hatchlings to be used for an IBAMA repopulation program. Detailed definitions, procedures and permitting requirements are given in the resolution No 126 of 13 February 1990. -- Juan Villalba Macias, *CSG Vice Chairman for Latin America, Carlos Roxlo 1496/301, Montevideo, Uruguay.*

Colombia:

The Colombian Magazine NUEVA FRONTERA, 122 , June 1990 is entirely devoted to articles on captive breeding under the heading, "La Zoocria: Alternativa para el desarollo" (Captive breeding: Alternatives for development). Articles on "Cultivation of species in captivity", "Characteristics of raising crocodylia" and "What is Renewable?" show the focus of this issue and the intense interest on this topic in Colombia. Articles discuss captive raising of crocodilians, capybara, fish and bullfrogs. The magazine is available from the publishers: NUEVA FRONTERA, Apartado Aereo 3137, Bogota, Colombia.

Ecuador:

STUDY OF THE BLACK CAIMAN POPULATION AT ZANCUDO COCHA, ORIENTE, ECUADOR. Dr. John C. Jahoda, Department of Biological Sciences, Bridgewater State College, Bridgewater, MA 02338, U.S.A., continues his field studies of black caiman, *Melanosuchus niger* in Ecuador. Nightly surveys conducted at the lake during January revealed 42 black caiman and 2 common caimans. Total population size in the lake is estimated by mark and recapture techniques to be between 64 and 178 black caiman. The population in Zancudo Cocha continues to be in good shape, largely because of the remote location and difficulty of access of the lake. However, increasing evidence of human activities was noted and this population does not presently have any formal protection. A full report of the 1990 expedition results can be obtained from Dr. Jahoda.

Honduras:

Adolfo S. Midence, Agropecuario de Colon, Apartado Postal No. 6, Tegucigalpa, DC, Honduras, writes that a breeding facility for *Crocodylus acutus* was established in the area of Trujillo, Departamento de Colón, Honduras. Stock for the farm was collected from the wild and some success at captive breeding has been realized. Presently they are holding 64 adult females and 10 males in a natural lagoon restrained by a cyclone fence six feet high enclosing about one and a half hectares and they are raising about 900 juvenile crocodiles ranging from 2 to 7 feet in length. Approximately 560 eggs were produced in 1990.

Paraguay:

PRESIDENTIAL DECREE BANS EXOTIC CROCODILE IMPORTS. During the 10th Working Meeting of the CSG in Gainesville, Florida, participants from several Latin American countries expressed their concerns about the introduction of Nile crocodiles to Brazil and signed a declaration asking governments of the region to prohibit further introductions of this species. On the 19 of June 1990 President Rodriguez of Paraguay signed presidential decree No. 6418 prohibiting the importation of Nile crocodiles and restricting import of other non-native crocodile species into Paraguay. Taking note of the declaration by the Latin American crocodile specialists, the decree specifically prohibits the importation of *Crocodylus niloticus* into Paraguay; authorizes the eradication of exotic species or their return to their country of origin and prohibits the importation of other non-native crocodilian species without a study of the reasons for import and authorization of the Ministry of Agriculture. The Ministry is given authority to issue permits for importation for cultural or scientific reasons. The preamble to the decree states the reason for the prohibition is the need to protect the rich

indigenous fauna from the possible negative biological impacts of non-native crocodiles that might escape to the wild. -- Juan Villalba Macias, *Vice Chairman, CSG, Latin America, Carlos Roxlo 1496/301, Montevideo, Uruguay, and* Lucy Aquino Shuster, *Museo Nacional de Historia Natural de Paraguay, Ministeria de Agricultura y Ganaderia, Sucursal 19, Ciudad Universitaria, San Lorenzo, Paraguay.*

CAIMAN PROJECT ON HOLD. The second phase of the project on Yacare caiman is on hold until some questions concerning recent events are answered. Scientists from Paraguay and the U.S. were preparing to implement the second phase of the project when the Paraguayan Ministry of Agriculture and Livestock (MAG) sold some skins confiscated in 1989, to a local trader. Although Paraguayan decree allows the selling of confiscated skins, MAG had agreed with CITES and TRAFFIC not to continue this practice. The trader assured MAG that the skins were for domestic use only. The quantity was originally reported to be 35,236 [author did not specify hides, flanks or pieces. -- *Eds.*], however, no "official" inventory was taken and no documentation exists.

Early this year the trader repeatedly petitioned CITES-Paraguay for permits to exports these skins. No permits were ever signed and the owner of the skins has refused to give the Paraguayan CITES scientific representative permission to view the skins, raising the question, "do these skins exist?"

Juan Villalba-Macias visited Asunción between 3 - 7 August 1990, as a representative of both the CITES Secretariat and TRAFFIC. During a press conference Sr. Villalba directed questions concerning these skins to the Paraguayan Government that to date have not been answered to the satisfaction of CITES. Therefore, CITES has sanctioned Paraguay and withdrawn support for any programs in Paraguay, including the caiman project, until this situation is clarified.

The conservation and scientific organizations in Paraguay would like to thank both Sr. Villalba and Dr. Obdulio Menghi of CITES for their strong participation and support on this issue during the last few months. Because of Sr. Villalba's visit, this issue and others concerning Paraguayan wildlife are finally receiving the attention they deserve. We would like to invite Juan to return to Asunción as soon and as often as possible. -- Lucy Aquino-Shuster, *Museo Nacional de Historia Natural de Paraguay, Ministeria de Agricultura y Ganaderia, Sucursal 19, Ciudad Universitaria, San Lorenzo, Paraguay.*

Suriname:

CROCODILIANS AND POLLUTION. Due to guerrilla activities most parts of Suriname are unsafe nowadays. The only river that is relatively safe is the Para river. Here I study the habitat selection of *Caiman crocodilus* and *Paleosuchus palpebrosus*. A most interesting development is the discovery of polluted swamps and lakes in the area. Pollution is caused by the bauxite industry. We have investigated a swamp polluted by caustic soda. The pH of the water is around 10 (highly alkaline) which has caused the death of most of the vegetation so that the swamp looks more like a lake. In contrast to the water in the Para river (pH 4), primary production and oxygen content is high in the swamp. Fish remain abundant and both species of crocodilian occur in numbers comparable to the river. One difference is that we didn't see juveniles in the swamp while they are abundant on the floating meadows of the river.

In the near future we hope to visit some extremely acid lakes with pH of 2 and a lake with increased salinity. This will give us the opportunity to study the tolerance of both species of caimans to several environmental factors in unintended large scale experiments. -- Paul E. Ouboter, *Department of Zoology, Anton de Kom University of Suriname. P.O.B. 9212, Paramaribo, Suriname.*

Venezuela:

AN UPDATE ON THE RECOVERY PROGRAM FOR THE ORINOCO CROCODILE. The goals of the Orinoco Crocodile Recovery Program are:

a) An evaluation of the status of the wild populations.
b) The construction of captive rearing facilities.
c) The capture of juveniles from wild populations.
d) The creation of refuges for the Orinoco Crocodile.
e) The reintroduction of the Orinoco Crocodile into the refuges.
f) The monitoring of the released crocodiles.

The search for wild populations of the Orinoco crocodile was begun in the 1970's. The first results were published by Godshalk and Sosa (1978), with additional information being provided by subsequent surveys of Ayarzagüena (1987), Franz et al. (1985), Ramo and Busto (1986) and Thorbjarnarson (1988). These data indicate that there still exists at least two important populations in the Capanaparo and Cojedes Rivers, each with more than 200 non-hatchling crocodiles, as well as a series of much smaller populations. Some of these populations have still not been censused and others still are suspected to exist in the Venezuelan Llanos.

The Capanaparo and Cojedes populations are very different, with the former being scattered over more than 200 km of river, and the latter being concentrated in about 10 km. The Capanaparo River is relatively untouched, whereas the Cojedes River is contaminated by chemicals and other waste by the runoff from large agricultural development projects upstream. Breeding occurs in both populations. However, the Capanaparo populations suffer from egg and juvenile collection by the local people and in the Cojedes population the majority of the juveniles disperse to adjacent sub-optimal areas. Both populations are in a slow state of decline.

Captive rearing facilities for the Orinoco Crocodiles were begun during the 1970's on the "El Frio" Biological Station and the Masaguaral ranch, and subsequently at the Llanos University (UNELLEZ). The aim of each of these was to maintain a small breeding stock of adult crocodiles with a view to producing young for the recovery of the species. However, to date the results have been disheartening. Some of the problems involved have been discused by Gorzula (1987).

On the basis of the recent censuses it was considered feasible to stock captive rearing facilities annually with juveniles collected from the wild populations, and thus give these crocodiles a "head start" when released. In 1987, at a meeting of the Venezuelan Crocodile Specialist Group, it was decided that the Cojedes population would be appropriate for this project, but that the Capanaparo population should be excluded and subject of a separate program aimed at eliminating egg and hatchling collection by local inhabitants.

A concept was developed whereby batches of juvenile Orinoco crocodiles would be collected in the Cojedes River, raised in captive rearing facilities to sizes of 1.2 m or more, and released into protected areas decreed by the Ministry of the Environment (MARNR) (Ayarzagüena, 1988a). A report (Ayarzagüena 1988b) was presented to MARNR on the Caño Guaritico as a first step in the creation of refuges. As a result more than 40 km. of the Caño Guaritico was designated as a wildlife refuge by the President of Venezuela (Decree 2,702, 30 March 1989).

In 1987, 99 eggs and 27 hatchling Orinoco crocodiles were collected from the Cojedes population and 28 juveniles were collected in 1989. No eggs or hatchlings were collected in 1988. These crocodiles are being reared at the "El Frio" Biological Station and at UNELLEZ, and will be released in 1991. This year an additional 76 juvenile crocodiles have been collected for release in 1992. Twenty four juveniles were released into Caño Guaritico Wildlife Refuge during 1989 and 1990. The Fundacion La Salle and the Spanish Agency for International Cooperation (AECI) invited government agencies (MARNR, PROFAUNA, the Governor of Apure State and the National Guard) and NGOs (UNELLEZ, FUDENA, "El

Jose Ayarzagüena with the skulls of two Orinoco crocodiles that were killed by local people during the 1990 dry season. S. Gorzula photo.

Frio" Biological Station and Masaguaral ranch) to a ceremony releasing the crocodiles in April 1990. The recovery program for the Orinoco Crocodile plans to release some 300 individuals into the Caño Guaritico over the next three years.

Due to canalization work over the last three years the Cojedes population is now divided into three sections. The Sacare/Eneal section contains about 20 non-hatchlings, the Caño de Agua section between 200 to 400 non-hatchlings and the Caño Amarillo section about 100 non-hatchlings. Juvenile collections have been made in the Caño de Agua section that produces at least 30 nests annually and results in a minimum of 300 hatchlings. This year, however, nesting and hatching success were very reduced. A marked dry season, combined with the management of the Majaguas reservoir, dried out the river. Many of the large crocodiles did not have enough water to submerge themselves completely, and some were found in this situation and shot by local people (figure 1). These occurrences are probably not all that important, but they are worrying.

During the collecting period (May 25 to May 29) fewer hatchlings and juveniles (of less than 1.5 m) were seen than on previous years, but they may have already dispersed due to the early rains in April and the opening of the Majaguas Reservoir sluice gates. This latter event flooded many of the nests. A technical report is being prepared for MARNR in order to avoid future catastrophic flooding by the reservoir during the crocodile nesting period. The report also contains suggestions for mitigating the effect of maintenance dredges that are working upstream. These dredges are producing the most negative impact on the Cojedes population, but manual labor could be substituted for a cost of between Bs.400,000 and 500,000 (U.S. $ 10,000) per year. This budget includes a small wildlife protection unit. The author is grateful to Dr. Stefan Gorzula for translating the manuscript.

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Dr. Jose Ayarzagüena, *Fundacion La Salle, Apt. 1930, Caracas, Venezuela.*

NORTH AMERICA

United States:

MYSTERY CROCS UNMASKED: PLANNED PARENTHOOD FOR PHILIPPINE CROCS. Several years ago, Gator Jungle in Plant City, Florida, acquired a stock of Morelet's crocodiles *Crocodylus moreletii* for exhibition. Included with this purchase were two animals that were

obviously of a different species of unknown identity. Subsequent authorities viewed these animals in their compound and guessed that they were either New Guinea crocodiles (*Crocodylus novaeguineae*) or Philippine crocodiles (*C. mindorensis*), but no definitive consensus could be reached. On 25 January 1990 we captured these animals for examination to try to resolve their identity.

New Guinea and Philippine crocodiles are morphologically similar in appearance, but taxonomically distinct. Although the modal values for some aspects of squamation for these two species may differ, the range of values shows considerable overlap. Hence, one must employ skull characters as well to make a positive species identification [see Copeia 1989(1):71-80]. A Philippine crocodile, when compared to a New Guinea crocodile of equal head length, has a much more robust skull characterized by a shorter, broader snout with a wider interorbital region and longer cranial roof. Additionally, the mandibles are also noticeably more robust with wider dentaries and a much broader mandibular symphysis. If the identification is in doubt, a quick examination of the lower jaw should prove helpful. The ratio measurement of the relative width of the mandibular symphysis (RWSS = maximal width across mandibular symphysis / maximal length of mandibular symphysis) is nearly invariably greater than 1 for *C. mindorensis* (mean for 6 animals = 1.15) and less than 1 for *C. novaeguineae* (means for 145 males = 0.77, for 74 females = 0.73, and for 82 unknown gender animals = 0.72).

By using the combination of squamation and skull characters, we identified both of the Plant City mystery crocs as adult female *C. mindorensis* (snout-vent/total lengths = 103/197 cm and 115/211 cm, respectively). To our knowledge, these are the only adult females of this species in the U.S.A., aside from a pair on loan from Silliman University in the Philippines to the Gladys Porter Zoo, in Brownsville, Texas (see CSG NEWSLETTER, October-December 1989, 8:30). We were previously aware of an adult Philippine crocodile owned by the Saint Augustine Alligator Farm (SAAF) that was housed in their Ocala facility. However, the gender of this animal was unknown to us and SAAF. Through the cooperation of SAAF, their animal was captured for examination on 23 March 1990. The species identity was confirmed and, fortuitously, this animal proved to be an adult male *C. mindorensis* (SVL/TOT = 125/219 cm). Following this, arrangements were made between Gator Jungle and SAAF to transport one of the female Philippine crocs from Plant City to Ocala on 6 April for introduction to their male animal in the hope that they would be compatible and form a successful breeding pair. The Philippine crocodile is an endangered species and efforts at captive propagation form an integral part of the conservation strategy for this species. Unfortunately, captive breeding has had very limited success to date. We hope to reverse this trend and shall report on progress at a future date.

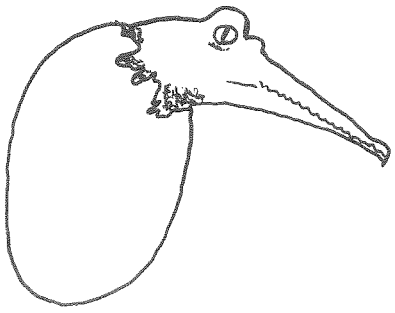
We thank Mark Wise for allowing us to examine the SAAF animal in Ocala and also thank Terry Heaton-Jones, Ralph Kramer, and Greg Lepera for assisting in the capture of the animal at Ocala. -- Philip M. Hall, *Department of Wildlife and Range Sciences, 118 Newins-Ziegler Hall, University of Florida, Gainesville, FL 32611*, U.S.A., *and* Tracy N. Howell, *5145 Harvey Tew Road, Plant City, FL 33565, U.S.A.*

FOOD PREFERENCES. Recent studies on the feeding behavior of American alligator have been completed at the Rockefeller Wildlife Refuge, Louisiana. The responses of alligators to air and water borne chemicals from food indicate possible food-chemical preferences. Chemicals have been isolated from Nutria meat that elicit a specific response of open mouth foraging. The identity of these chemicals will be described at a future CSG meeting. -- Marilyn Banta and Paul Weldon, *Department of Biology, Texas A & M University, College Station, Texas 77843, U.S.A.*

CHICKEN ANYONE? Tyson Foods is working with both the American Alligator Farmers Association and the Florida Alligator Farmers Association in trying to develop a raw poultry based feed that is economical to farmers, but promotes good skeletal and muscle growth in alligators. Different poultry products have been tried. A combination of products appears to be performing. High protein, calcium and phosphorous are the highlight of the poultry based feed. -- Ross Formica, *Tyson Foods, P.O. Box 4130 Station B. Fort Smith, Arkansas 72914, U.S.A.*

SEX DETERMINATION CONTROLLED WITH HORMONES. Dr. David Crews and colleagues of the University of Texas at Austin have perfected a technique for ensuring that reptile eggs produce female hatchlings independent of the temperature of incubation. By placing small amounts of commercially available female hormones on the incubating egg at a critical stage of development, the hatchling develops into a functional female. The technique has been demonstrated in geckoes, in fresh water turtles and in alligators with a hatchling success of up to 97%. Dr. Crew's team is confident that it works on all reptiles that show temperature dependent sex determination. The process has been patented by Reproductive Sciences Inc., a Texas company created by Dr. Crews to develop practical applications of the technique for conservation and for commercial use. The technique has obvious wide application for controlling sex in captive propagation of rare species and in commercial ranches and farms, without using expensive incubators. The technique is also a valuable tool for the further elucidation of the complexities of temperature dependent sex determination. Reproductive Sciences Inc. is applying for small business grants to allow them to test the method in large scale applications and share the technology with the conservation community.

Reproductive Sciences Inc. is examining the potential for applying their patented method in existing captive propagation facilities at no charge to conservation projects and at reasonable licensing fees for commercial use. Individuals interested in obtaining further information on this possibility should contact: Dr. David Crews, President, *Reproductive Sciences Inc., 16010 Awalt Drive, Austin, Texas 78734, U.S.A.*



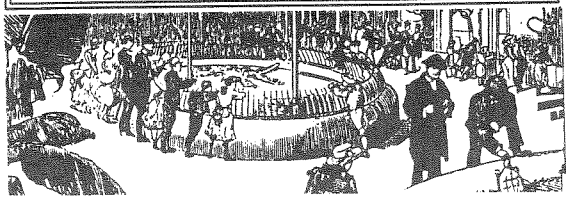
Mummy, is it safe to come out? L.A.K. Singh 1976.

OKEFENOKEE BURNS IN DROUGHT. During the summer of 1990 water in the 200,000 hectare Okefenokee Swamp National Wildlife Refuge, Georgia, fell to record low levels. An 8 km long sill impedes the Suwannee River flowing south out of the swamp and normally impounds a body of water 8 km long and 10 km wide. However, this June this body of water was greatly reduced. Alligators moved to the sill from other areas of the swamp and fed on concentrations of fish. In a 1500m section of the sill impoundment I counted 350 alligators 1.5 m to 3.5 m length. In marsh areas of the Okefenokee peat beds were exposed and alligators retreated to water in holes and caves in the peat. Some marsh lakes still contain water and attracted high concentrations of fish and alligators but the alligators had to crawl rather than swim in the shallow water. On 1 June, in 9 ha Buzzard Roost Lake, I counted 100 alligators 2 to 3 m length in water less than 0.5 m deep. With surface waters exceeding 40°C in some shallow water, small alligators crawled out of the water and stabilized their body temperature by entering dry solution holes in sand and peat.

As the water levels continued to fall, marsh plants became desiccated and their litter accumulated on the crusty surface of the peat. In July, lightening struck trees and started fires. An 800 ha fire burned trees on Mitchell Island and began spreading over the dry marsh in Grand Prairie. Because of concerns that the fire would spread to private tree farms outside the refuge boundaries, refuge personnel decided to extinguish the blaze. This was difficult because nearby water sources were depleted.

Wildfire in Okefenokee represents a dilemma for refuge managers. Fire is necessary to prevent the succession of swamp to forest but uncontrolled fires can cause the loss of human life and private property outside the refuge. In 1953, the water in Okefenokee dropped to the previous low record and uncontrolled fires burned over most of the refuge. Following this fire the sill was constructed to keep the water level higher in the swamp during drought periods. -- R. Howard Hunt, *Herpetology Dept. Zoo Atlanta, 800 Cherokee Ave. SE., Atlanta Georgia 30315, U.S.A.*

ZOOS

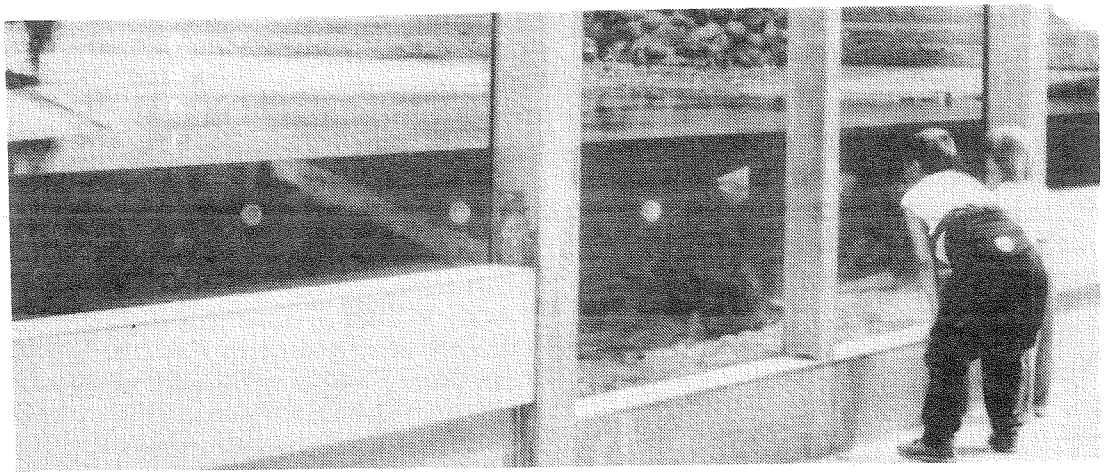


The numbers of animals in zoo collections are listed in the order of males, females, and juveniles or unsexed individuals, and separated by periods or commas: One male, two females, and three juveniles is coded as 1.2.3 or 1,2,3.

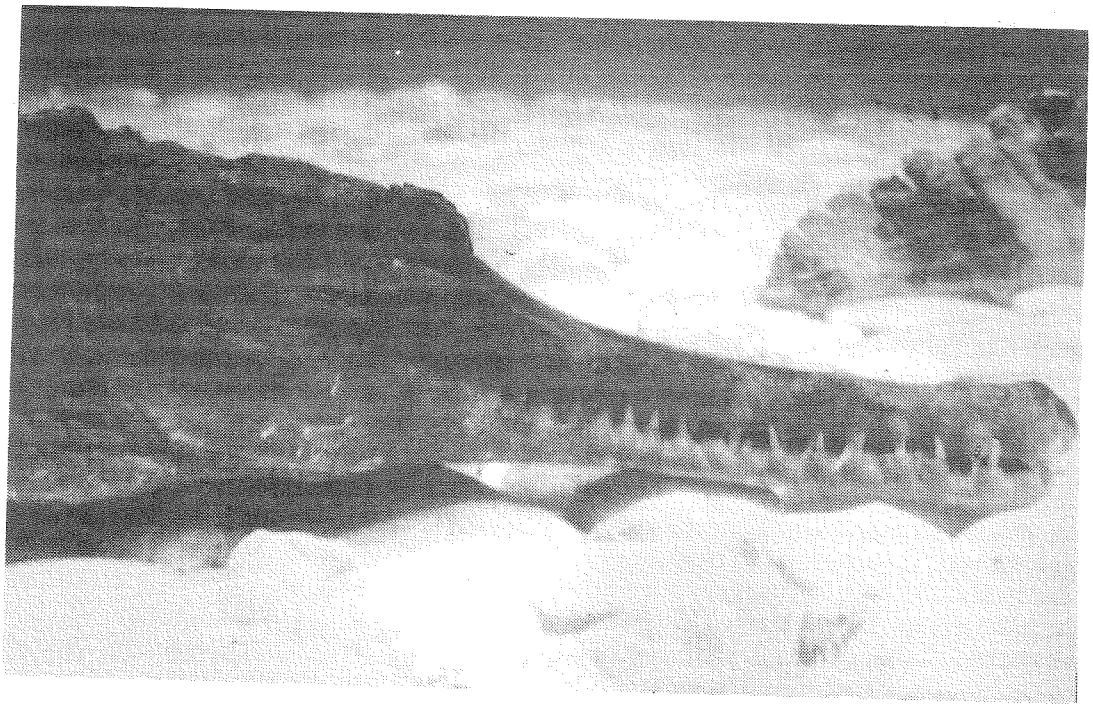
NEW Tomistoma EXHIBIT AT ZOO "SEETEUFEL", SWITZERLAND. Zoo "Seeteufel", a private zoo located at CH-2557 Studen-Biel, owns a total of nine (probably 1,8) *Tomistoma schlegelii*. A first group of five specimens was purchased in 1964 and the remaining animals arrived in 1972. Today the largest animal of the first group has a total length of 340 cm and its weight is approximately 230 kgs. The corresponding figures for the second group are 230 cm and ca. 70 kgs.

In order to comply with the provisions of the Swiss Animal Welfare Ordinance which defines minimum space for requirements for *Alligator, Crocodylus, Gavialis* and *Tomistoma* specimens as 4 m^2 of land and 4 m^2 / 2 m^3 of water, the zoo had to rebuild its facilities prior to 31 December 1991. In June 1990 the five larger specimens were moved into a new exhibit with a land surface of 36 m^2, a water surface of 40 m^2 and an average water depth of 1 m. The water in the pool is illuminated by underwater lamps and is constantly filtered and turns over four times a day. The exhibit is glass fronted. The four glass panes are 46 mm thick and have a total length of 10 m. They give visitors the opportunity to watch the animals under water. The remaining animals were moved to the exhibit where the larger specimens were formerly kept and this enclosure was enlarged. It now offers 17.5 m^2 of land and 17.5 m^2 of water with an average water depth of 50 cm. -- Peter Dollinger, *Swiss Federal Veterinary Office, CH-3097 Liebefeld- Berne, Switzerland.*

BREEDING OF *OSTEOLAEMUS TETRASPIS* AT WALTER ZOO, SWITZERLAND. Walter Zoo, a private zoo at CH - 9202 Gossau, owns a trio of *Osteolaemus tetraspis*. In 1988, after the construction of a greenhouse with a 120 m^2 enclosure for housing the zoo's alligators, the group was built up from one male already in possession of the zoo and two females obtained from a private person, and placed in the former alligator exhibit. This enclosure has a total land/water surface of 11.5 m^2. During summer the animals also have access to an outdoor enclosure. In 1989 one of the females produced 18 eggs from which 15 young hatched on 26 August 1989. From a second clutch of 8 eggs from the same female, 7 hatchlings were obtained in January 1990. The second female laid 11 eggs in 1990 that are expected to hatch in August or September.



The new Tomistoma exhibit at Zoo "SEETEUFEL", the 46mm glass front allows easy viewing of the animals underwater. P. Dollinger photo.



One of nine *Tomistoma schlegelii* held at Zoo "SEETEUFEL" in Switzerland. P. Dollinger photo.

The keeping of crocodilians by private persons is subject to licensing in Switzerland and applicants must fulfill the same requirements as public zoos. As a result the local market for crocodiles is rather limited. Therefore, the Walter Zoo is prepared to give its *Osteolaemus* offspring at favorable conditions to zoos. Interested institutions are invited to write to: Walter Zoo, Attn. E. Federer, Neuchlen, CH-9202, Gossau SG, Switzerland. -- Peter Dollinger, *Swiss Federal Veterinary Office, CH-3097 Liebefeld-Berne, Switzerland.*

MIAMI METROZOO. On 11 June 1990, 24 *Crocodylus cataphractus* eggs were laid by a female who is estimated to be 56 years of age. She was imported in the mid 1930's and held by the U.S. National Zoo until December 1982 when she was transferred to Miami Metrozoo. Of the 24 eggs, 8 are fertile. This is the oldest crocodilian known to have produced fertile eggs in North America. Also on 12 June 1990, 17 more *C. cataphractus* eggs were laid by a different female. All 17 are fertile. Metrozoo is the only zoo to breed *C. cataphractus* outside Africa. This second clutch of eggs is significant in that it is only the second pair in the U.S. to reproduce, providing for the first time the ability to pair unrelated animals for interested institutions. -- F. William Zeigler, *Metrozoo, 12400 SW 152 St., Miami, Florida 33177, U.S.A.*

AAZPA/CAG. Members of the American Association of Zoological Parks and Aquariums, Crocodilian Advisory Group met on 25 April while in Gainesville for the CSG 10th Working Meeting. Discussions covered the problems of surplus captive crocodilians, studbooks, black caiman breeding, Chinese alligator breeding and a captive crocodilian census. Discussion of new activities concerned a developing project on Morelet's crocodile in Belize and the need for a consortium effort to increase breeding of *Tomistoma* in U.S. facilities.

Studbooks have been approved by AAZPA/WCMC for Cuban crocodile, Morelet's crocodile, Siamese crocodile and Tomistoma and approval is expected shortly for the Dwarf caiman. Data is also available in studbook format on Gharials and the African slender snouted crocodile.

A full account of the meeting and the advisory group members list is available directly from: John Behler, *New York Zoological Society, 185th St. and Southern Blvd., Bronx, New York 10460, U.S.A.*

TRADE

The following prices (in U.S. dollars) paid to hunters, farmers or other producers were reported to the editor since the last issue of the NEWSLETTER appeared. This information is provided as a service to our readers to allow an overview of the world market for crocodilian skins and products. The CSG cannot guarantee the accuracy of the reports submitted to us and makes no endorsement or advertisement of particular sales or prices.

Alligator mississippiensis in Georgia, U.S.A.: June 1990 - Wild alligators (nuisance trapping program) hides = $52.00 per foot length, avg. length of 55 hides 7' 9"; meat approx = $5.00 per pound; live alligators to farms = $45-$50 per foot length.

Alligator mississippiensis in Florida, U.S.A.: August 1990 - wet salted belly hides from farm raised alligators = $7.61 per cm width (across the board all sizes and widths), avg. width 35 cm; Sept. 1990 - wet salted belly hides from farm raised alligators = $6.29 per cm width, avg. width 31.0 cm.

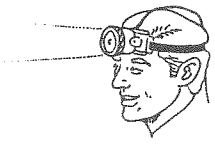
Crocodylus niloticus in Zimbabwe: June 1990 - Hides $7.50 per cm width; October - December 1990, First grade skins, 20 - 24 cm = $5.50 per cm width; 25 - 29 cm = $6.50 per cm width; 30 - 34 cm = $7.50 per cm width; 35 - 39 cm = $9.00 per cm width; 40+ cm = $11.00 per cm width. Dressed tail meat with bone = $9.00 per kg.

Crocodylus niloticus in Cape Province, South Africa: crocodile tail meat = $13.46 per kg; crocodile body meat = $3.85 per kg.

Crocodylus porosus in Queensland, Australia: July 1990, Belly skins, 34 - 36cm width = $12.00 per cm width

Crocodylus johnstoni in Queensland, Australia: July 1990, Belly skins, 24 - 26 cm width = $7.00 per cm width.

PERSONALS



Dennis David, Deputy Vice Chairman for North America, and spouse Ilonka, interrupted a busy alligator nesting season this July to successfully bring daughter Kayla into the world. Warm congratulations to all three Davids.

It must be contagious! CSG has just learned that Vice Chairman for Africa, Jon Hutton is the proud father of a daughter born 24 August. Again CSG offers best wishes and congratulations. Two intriguing possibilities arise. One is that all the bellowing and roaring at CSG Steering Committee meetings somehow enhances the potency of committee members. The other is that our Steering Committee are incubating their offspring at lower temperatures to produce all these females. Further studies are in progress.

Dr. Jose L. Diaz, Director of the RP-Japan Crocodile Farming Institute, Puerto Princessa City, Palawan, Philippines, has moved to the main Office of the Department of Environment and Natural Resources, and Desditchado S. Villasario is the new Officer in Charge at the farm. Dr. Diaz will assume an assignment in the Foreign Assisted and Special Projects Office. *CFI News Vol. 2(1), September 1989.*

Angus Drummond of Crocworld, P.O. Renishaw, Natal, South Africa, reports that the recent CSG meeting was much enjoyed by their farm manager Jo Lello. Hide production at Crocworld is expected to be around 1500 and continues to increase.

Franklin Percival joined Manley Fuller, President of the Florida Wildlife Federation and artist Gregg Murray in several TV newscasts on

alligator biology and the Federation's fundraising project "Art for Alligators." Gregg displayed his alligator art at the Florida Museum of Natural History through April. Ken Rice manned an exhibit on alligator research for the unit at the Sunbelt Agricultural Exposition last October and teamed up with Greg Masson to give another exhibit at the Florida Museum of Natural History in April. -- *Cooperative Fish and Wildlife Report, Spring 1990 School of Forest Resources and Conservation, University of Florida, Gainesville, FL 32601, U.S.A.*

Rohtash C. Gupta, Reader and Principal Investigator, Kurukshetra University, Kurukshetra-132 119, India, writes to introduce himself and report that he has been engaged in research on the Indian marsh mugger at Bhor Sainda Crocodile Sanctuary in Haryana State. Although unable to attend the 10th Working Meeting, Dr. Gupta is eager to remain in contact with the group and receive information on crocodilians.

Peter Bayliss, c/o Depto. de Ecologia, INPA CP-478, 69011, Manaus, Brazil, informs us that he is will now be working on crocodilians in Brazil for Dr. Bill Magnusson at INPA, Manaus. He hopes to pursue studies on the black caiman for the next couple of years.

M.P. Simbotwe, Director, ESCC Pty. Ltd. P.O. Box 60127, Livingstone, Zambia, has left Botswana after terminating his association with the Department of Wildlife and National Parks there. He is now running Environmental Sciences Consultancy specializing in wildlife utilization and crocodile businesses. He is currently seeking funding for studies of the Nile crocodile in Zambia in support of a ranching and management plan for the CITES program similar to the one he did for Botswana.

Yoshio Kaneko, formerly with the CITES Secretariat in Switzerland, has now returned to Japan after his excellent service at CITES. He has taken up the position of Programme Coordinator of the Nagao Natural Environment Foundation, Hongo 3-39-12, Bunkyou, Tokyo 113, Japan. He hopes to remain in contact and active in crocodilian conservation activities while developing the program of NEF.

REQUESTS

Carmen S. L. Melo, Research Head, RP-Japan Crocodile Farming Institute, P.O. Box 101, Irawan, Puerto Princessa City 5300, Palawan, Philippines, requests that:

> Since we are just starting our crocodile research we are in need of references vital to our undertakings. We would like to ask your help in providing us with the exact addresses for publishers of books, journals and other related literature about crocodiles.

Tony Pooley, P.O. Box 295, Scottburgh, 4180 Natal, South Africa, writes,

> I have been researching the incidence of Nile crocodile (*Crocodylus niloticus*) attacks on humans over a number of years for a book to be published on this subject. Before completing this manuscript I am appealing for additional information, in particular, eyewitness accounts or details on attacks such as locality, date, sex, age, race and actions of the victim when attacked, the nature of injuries inflicted, how the victim managed to escape death, or if the attack proved fatal, whether the body was recovered, etc.
>
> Of particular value would be photographs or colour transparencies of wounds, or corpses, and details of medical treatment to wounds of survivors. Obviously all information of relevance will be acknowledged and included in the text.
>
> Please write to me at the above address.

Clyde Hunt, Hunt's Alligator Breeding Ranch, RR. 1, Box 25H, Bushnell, Florida 33513, U.S.A., writes,

> We have an as yet unexplained phenomenon. Our new round grow

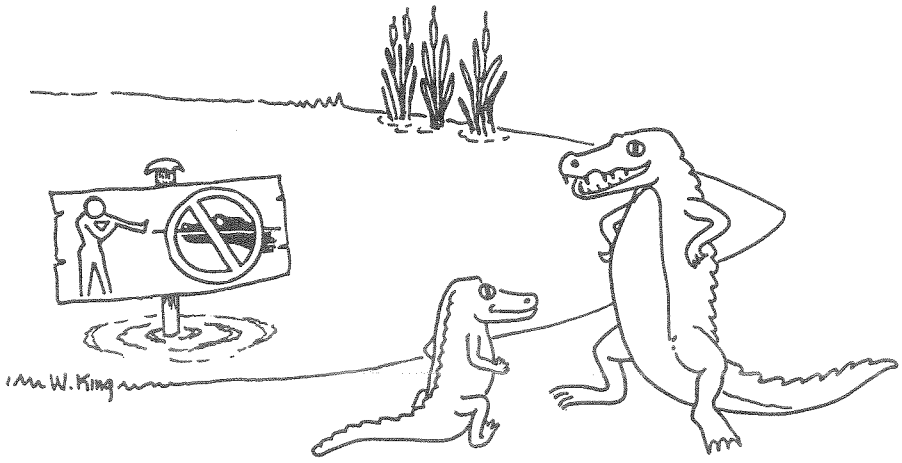
out houses are nearing completion and the new dry pelletized feed is doing an excellent job so far.However, we collected our first clutch of eggs on 13 June 1990 that were unbanded and they began hatching out 31 July, that is only 49 days later?? Can anybody shed any light on what happened?

PUBLICATIONS

EYELIDS OF MORNING, by Alistair Graham and Peter Beard, an intriguing and whimsical account of "The mingled destinies of crocodiles and men" has been reprinted and is available from *Chronical Books, 275 5th Street, San Francisico, California 94103, USA. Phone toll free (800) 722 6657 or fax (415) 777 8887.* Price of the book is $24.95 plus shipping for the lavishly illustrated 9" X 12" paperback. Overseas customers should write or call for information on their local distributor.

PROCEEDINGS OF THE 10TH WORKING MEETING OF THE CROCODILE SPECIALIST GROUP have gone to press and will be available 1 October. PROCEEDINGS will be distributed from this office until 31 January 1991 after which date all orders will be handled by the IUCN Publications Unit, 219c Huntington Road, Cambridge CB3 0DL, U.K. Advance orders for the two volume set may be sent to J.P. Ross, *CSG Executive Officer, Florida Museum of Natural History, Gainesville, FL 32611, U.S.A.* Unfortunately the high cost of production forces us to break with previous practice and free copies will be distributed only to Patrons at the US $1,000 level and above. Cost of the PROCEEDINGS is U.S. $25 for the two volumes plus postage. Orders to this office should be accompanied by payment in U.S. currency by check, money order or bank draft payable to Crocodile Specialist Group.

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.



Yes son, you no sooner finish a couple of those two legged snacks and it isn't safe to swim here anymore.

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, Vadanemmeli Village, Mahabalipuram Road, Perur PO, Tamil Nadu, 603 104 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 Roxlo 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, 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, Dept. Cell & 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 FG 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: (81) (3) 824 1571 Fax: (81) (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. Deputy Chairman: Grenville Lucas, The Herbarium, Royal Botanic Garden, Kew, Richmond, Surrey TW9 3AB, United Kingdom. Tel: (44) (1) 940 1171 Fax: (44) (1) 948 0819.

CITES Observer: Dr. Obdulio Menghi, Scientific Coordinator, CITES Secretariat, Case postale 78, CH-1000 Lausanne 9, Switzerland. Tel: (41) (21) 200 081 Fax: (41) (21) 200 084.