

NEWSLETTER

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International Union for the Conservation
of Nature and Natural Resources

F. Wayne King, Chairman

Survival Service Commission
Crocodile Specialist Group

Editors: Peter Brazaitis
Myrna E. Watanabe

EDITORS' COMMENTS

First of all, the editors, on behalf of the CSG chairman, those of you who sent greetings for all, and ourselves wish to convey to each of you very warmest Christmas greetings and best wishes for a happy New Year.

To
Peter, Myrna and the CSG group

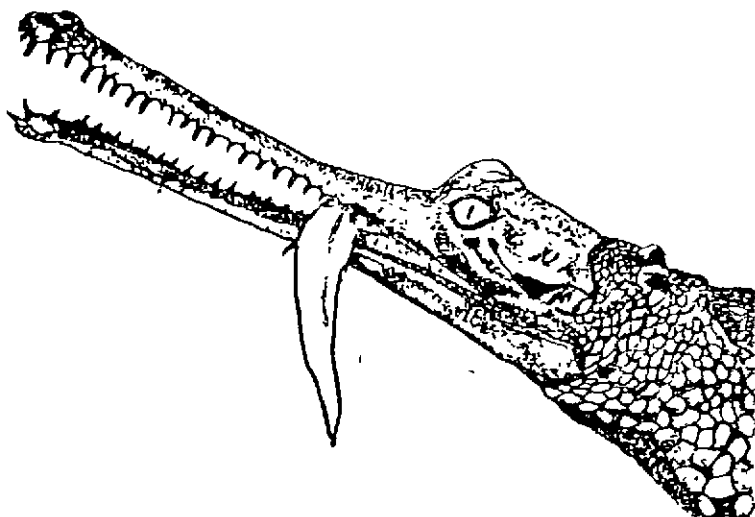
WITH BEST WISHES
A HAPPY NEW YEAR

DR. L. A. K. SINGH

Camp.- National Chambal Sanctuary

Post Box 11

MORENA-476001 (M. P.) India



Since our last edition in July of 1983, a number of important meetings have taken place concerning major field studies of crocodilians most utilized in trade. CSG members received letters from the CSG chairman requesting their input.

A preliminary meeting was held in Washington D.C. on 28 July 1983, at the invitation of the U.S. Fish and Wildlife Service, to discuss a comprehensive proposal to do a central South American study of endemic crocodilians in Bolivia, Brazil and Paraguay. The initial two year plus study, projected at a cost of about \$200,000, will be directed by the CSG chairman, while all funding and study reports will be coordinated by the office of the CITES Secretariat. The study should commence in mid-1984. Details are discussed in the section on South America.

The CSG chairman also initiated an offer of assistance by the CSG to the European Economic Community, to do a comprehensive survey of the crocodile populations of southern Africa. He asked the EEC to consider underwriting the work.

A plan to translocate a population of about 15 sub-adult Crocodylus acutus which

Editors' Comments - cont'd.

are threatened by the construction of new port facilities by the EXXON Corp. in Colombia at Bahia de Portete, was brought to the attention of the CSG by Fred Medem. EXXON is willing to offer some form of assistance, and CSG members were asked for their advice.

A call for papers went out to CSG members, for presentation at the 7th Working Meeting of the Crocodile Specialist Group. The Meeting will be in Caracas, Venezuela October 21-28, 1984, and will be hosted by FUDENA and the government of Venezuela. The CSG meeting will be held in conjunction with a proposed Latin American crocodilian workshop on conservation and utilization. The tentative plan is to spend three days in Caracas and four days in the field. When plans are finalized they will be announced by the CSG chairman. Cecilia de Blohm, Director of FUDENA, is handling the Venezuelan arrangements.

The editors would like to thank all of you who sent in communications for this issue of the newsletter. We initially thought we were not going to have enough information for a mailing, but we soon realized we were mistaken as the correspondence slowly arrived by the pound. We are most gratified by the many expressions we received to indicate your need for the newsletter and that we were in many ways fulfilling that need. Please continue to take the time to keep us informed of the many crocodilian related activities you are aware of. Don't ever assume we already know some bit of information that you think is common knowledge. Often, because we do filter information from CSG members, consultants, and correspondents from around the world, we are in a position to pass on valuable information and insights to others, both through the newsletter and by personal correspondence.

If your information is sensitive, please advise us so we may treat it appropriately. Some of you wrote in and asked that we cite the sources of our information. We do, except if we are expressly requested not to do so. Please tell us in your communications if the information you give is for general distribution in the newsletter or not.

We have had a number of requests for back issues of the CSG newsletter. Unfortunately, we do not have any issues prior to Volume 2 on hand. If some are available from private files, we would appreciate receiving copies. We can have them duplicated and fill those requests.

We received a number of most welcome suggestions for a CSG logo, with several drawings and some pictures. The Chinese alligator and offspring seemed to receive wide approval. We decided that as so many ideas had so much merit, we would incorporate all of them in the newsletter at one time or another. Send us more drawings and photos. We can only use original work, not excerpts from publications because of copyright laws.

Lastly, after considerable consultation with a number of senior CSG members (whose responses ranged from constructive criticism to concern for our states of mental health) your CSG Newsletter editors met with representatives of their respective families and the state judiciary on 27 January 1984 and were married. The best reasons we could give for such a brash move are that we now jointly own the new microcomputer upon which this newsletter is being written, and Myrna's need for Peter's comprehensive

Editors' Comments - cont'd.

medical insurance plan.

AREA REPORTS

AFRICA

From Rene Honegger we received a copy of Panorama magazine (Nr. 138 :24-27) with an article entitled "Aus dem leben eines krokodilexperten". The article features Tony Pooley, Elsa, and of course Tony's Nile crocodiles and the croc center at St. Lucia. It's the kind of good press crocodilian conservation needs. The photos, both color and black and white, are quite good.

Rene also sent a report of a second visit to Togo, between 9 March and 9 April 1983, by a tourist with herpetological interests. The whole region was very dry. A pool in the vicinity of Kini Kope, northwest of Tsevie, which held all three native croc species in 1978, was devoid of animals in 1983. Two young Crocodylus niloticus were dug out of the ground nearby, and two juveniles and an adult were reported from a village waterhole. In Lome, an animal dealer by the name of M. Fouchard, maintained a stock of some 40 juvenile C. niloticus, (two juvenile), a 180 cm long Osteolaemus, and two C. cataphractus. Skins and goods made from python, monitor lizard, C. niloticus and O. tetraspis were for sale everywhere, along with carvings from ivory and hippo tusks. Dealers assured tourists that all products were legally taken and the goods may be imported into their own countries without fear of seizure.

Rene received a letter from I. Roger Bills of Circuit Molding Ltd. whose company wishes to establish a crocodile farm for skins and tourism in Zambia in order to gain more foreign exchange. They would like to start with C. niloticus, C. cataphractus, and Osteolaemus tetraspis (Eds. note- for skins???). They later would like to obtain specimens of rare species such as Gavialis, Tomistoma, Alligator sinensis, Caiman sps., Paleosuchus, and Melanosuchus.

Goran Blomberg sent us the sketch which appears on the closing page of this issue. Goran reported that the simulation of the Okavango crocodile population is being tested for sensitivity to altered data for parameters such as age-specific percentages of nesting females, changed initial ages of cannibalistic behavior and egg laying, and eventually for sensitivity to different age spans subject to hunting. He hopes to return to Botswana for more field data.

Trevor Bond of the Sabie Crocodile Ranch, and Peter Arnold of the Cango Crocodile Ranch, both South Africa, announced the formation of the South African Farmers' Association. They cited the great enthusiasm South African farmers have, and look forward to developing commercial crocodile farming in a number of areas. They estimate that S.A. farmers will be well into the commercial market in about six years. Congratulations to Trevor Bond! Sabie is the first Lowveld farm to breed and hatch C. niloticus. Trevor included some pictures taken in 1982, of a quite pleased David Blake, who has been advising the operation, removing some eggs from a nest for incubation.

Trevor Bond has taken up the responsibility of compiling a library for the S.A.

Africa - cont'd.



Farmers' Association. Any donations of papers and books would be greatly appreciated, and put to good use. Trevor would also like information on observations on the relationship between pupil contraction or dilation relative to the temperature a crocodile is subjected to. Write Sabie Crocodile Ranch, c/o Swo Bond's Balkan Restaurant, Van Erkomdeurloop/Arcade Pretoriusstr., 217 Pretorius Str., Pretoria, R.S.A.

(We look forward to receiving the S.A. Farmers' Association Newsletter, and wish this enterprising organization great success. S.A. farmers are handicapped by the shortage of adult breeding stock. Young potential breeding animals are purchased at considerable cost from farms in Zimbabwe, and recently Binga Products (pvt) Ltd. of Zimbabwe applied to export adult C. niloticus captured in Malawi (600 to 800 adults are cropped annually by the Wildlife Management Authority of Malawi.) to Natal, South Africa. This editor had the pleasure of visiting Sabie during the last CSG meeting, and was most impressed with the fine care, conditions, and good management practices employed at the farm. South Africa is a yet untapped market for quality crocodilian products. All of the products this editor saw for sale in tourist shops in quality hotels were labeled crocodile but were in reality rather poor quality Caiman crocodilus from South America. Trevor confirmed the same in his letter.-P.B.)

ASIA

China:

Chen Bihui, scientific advisor to the Chinese Alligator Breeding Center (formerly the Xiadu Tree Farm Alligator Farm), reported that 300 young alligators hatched at the Anhui Province farm in 1983. By last December, the largest hatchlings already weighed 70 g and the entire group was doing very well. The number of females breeding was low due to high population density. Chen expects this problem to be ameliorated in 1984 with the completion of a naturalistic enclosure surrounded by 5000 m of fence. He expects that by 1985 the conditions at the farm will allow for maximal breeding success. Chen has recently been taking temperature readings in dens during winter.

Huang Chu-chien has been working with Shi Yingxian of Institute of Developmental Biology, Chinese Academy of Sciences, Beijing, using serum protein electrophoresis to study the relationship between the two members of the genus Alligator. They have produced two scientific papers on this work: "The comparative study of karyotypes of Alligator sinensis and mississippiensis," and "The comparative study of albumin, hemoglobin, and LDH of Alligator sinensis and mississippiensis." Their work has been publicized in the Beijing Science and Technology Newspaper and the English-language government newspaper, China Daily.

A report received via Huang Chu-chien described work being carried out by the Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences. In 1979, under the direction of Mr. Ceng Linyu of the Biology Department of Lanzhou University, a systematic study was begun on the morphology and anatomy of the Chinese alligator, including comparisons with the American alligator. The work is expected to be completed this year and a document with more than 300 illustrations will be produced.

Huang Chu-chien sent us a full report on breeding of Chinese alligators at the Shanghai Zoo. We are planning to have it translated and to send it out for publication.

There are more than 30 commercial crocodilian farms in Taiwan raising as few as 30 animals to as many as 200, according to a September, 1983 report in the Times Weekly, a U.S.-based Chinese language newspaper. But the largest crocodilian farm in Taiwan is the Matou Prefecture Farm, owned by Ch'iu Hsi-ho and his wife, which the Times Weekly reported has 8,400 crocodiles. The farm was begun with several South American specimens, most of which died during the farm's first year of operation. From photographs accompanying the article, it appeared that the bulk of the animals were Caiman crocodilus ssp. Ch'iu also has Tomistoma schlegeli, an African crocodile, and probably other species. You may recall that in Vol. 2 No. 2 we presented a report from Karlheinz Fuchs on the Taiwan operation. He reported that the primary species raised was Caiman c. crocodilus.

In 1983, out of 2,600 eggs artificially incubated at the farm, 2,289 young hatched. The animals are being raised for meat and hides. The Ch'ius expect to market the animals when the crocodilians reach three years of age.

Interestingly, an article about the same farm in the October, 1983 issue of the

Asia - cont'd.

Taiwanese Government publication, Free China Review, contained information that conflicted with that in the Times Weekly story. It gave different statistics on the numbers of animals maintained at the farm: 14,000 animals, 11,000 of which were hatchlings. Ch'iu claimed a 40 percent hatching success rate for artificially incubated eggs, while in the Times Weekly a 95 percent hatching success rate was reported. In neither article was the primary species raised noted, nor did they discuss from where the basic breeding stock was obtained, although the Times Weekly named an import-export firm working on behalf of Mr. Ch'iu.

(Note: We have heard of shipments of large numbers of live hatchling Caiman crocodilus fuscus, exported from Colombia through the U.S. en route to Taiwan in 1983. Eds.)

India:

Dr. Sudhakar Kar, Saltwater Crocodile Research and Conservation Unit, Orissa, reported that 50 juvenile (approx. 1.50 m long) C. porosus were released into the creek systems of the Bhitarkanika Wildlife Sanctuary in one month, in April 1983. This brings the total released to date to 250, with a few more to be released this winter.

The research unit appears to be progressing well. With 155 new hatchlings, the number of C. porosus at the unit has increased from 550 to 705. In addition, a 10 ft (3.0 m) long male was acquired from as a potential mate for a female which had not produced fertile eggs in the past seven years. Sudhakar reported the female is quite pleased with his choice of her mate, and fertile eggs are expected next season.

(Please see the "personal" section of this newsletter for a report of even greater accomplishments at the research unit. Eds.)

From Dr. Lala A.K. Singh, National Chambal Gharial Sanctuary, Madhya Pradesh, India, we received word that as of May, 1983, the name of the Central Crocodile Breeding and Management Training Institute of the Government of India (Department of Environment) has been changed to the Crocodile Research Centre of the Wildlife Institute of India. The function will remain the same: specialized courses to in-service foresters, research and consultancy.

Dr. Singh was in the Sanctuary in June, doing radio-telemetry studies to identify preferred habitat and monitor movement patterns of released captive reared gharials, and homing patterns of wild gharials. He reported the danger which is always present from out-laws who have taken refuge in the sanctuary. They were sleeping one night and were visited at 4:30 am by a group of six people who said they were police. Fortunately nothing happened, for they later learned the men were not police at all. (Dr. Singh also mentioned that his bills for "Agarbati" or scented sticks, which his wife Pushpa lights to protect him and ensure his safe return, have risen considerably since he began visiting the Chambal. We urge him not to make light of such honorable traditions, if one considers the logic of spending long nights away from home, sleeping uncomfortably, enduring insects, venomous snakes, heat and cold, and evading cutthroats while in pursuit of crocodiles. There have been, we're sure, occasions when all of us have wished someone were lighting "sticks" for us at home. Pushpa - you go right ahead

Asia - cont'd.

and light sticks, and please remember the rest of us, too! - Eds.)

Rom Whitaker reported that the first Crocodylus porosus to be hatched as the result of captive breeding in India emerged in August 1983. Seventeen young out of 41 eggs hatched, including one light colored individual. Rom also reported that Caiman crocodilus reared from hatchling size produced 42 young from four nests. Rom is acquiring as many species of crocodilians as he can for study and propagation, including a number of Crocodylus siamensis acquired from the New York Zoological Park and the Metro Zoo in Florida, U.S.A. Good luck, Rom!

Abdul Latif Rao, National Council for Conservation of Wildlife, Government of Pakistan, Islamabad, told us that the project "restoration of Gavial and Marsh crocodiles in their former ranges in Punjab, Pakistan," has been developed and funding has been secured. The project includes the training of a wildlife officer in a foreign country, such as India or P.N.G. for 6 months, procurement of 200 pairs of young and 10 pairs of adult C. palustris and Gavialis from outside Pakistan, captive breeding in suitable lakes under management supervision, practical training for workers, and a program of re-introduction. Requests for training and stock have gone out to India. Help from any agency or government would be greatly appreciated. (The Eds. are forwarding Abdul's letter to several agencies which may be of help. Anyone who may be of assistance may write to Dr. Rao through the Ministry of Food, Agriculture, and Cooperatives, Government of Pakistan, 4-g, No.51, F-6/4, Islamabad.)

AUSTRALIA

Alistair Graham of the Janamba Croc Farm sent us the following note: "Have established (in 1982) a crocodile farm for the commercial production of hides. Only C. johnstoni are used with initial production based on wild harvest pending self-sufficiency on domestic production. The first season has gone well with some 3,000 animals nearing a year old, and a start made with the stocking of adults. C. johnstoni rapidly learn to eat dead food and are generally easily managed except that they are exceptionally timid and seem to need extensive cover in their pens."

Vic Onions wrote that Applied Ecology Pty Ltd is now called the Edward River Crocodile Farm Pty Ltd and maintains an office in Cairns, Queensland. The farm is doing well although there was, for a time, some doubt over the continuation of Government funding. According to Vic, the Government has decided to continue "support for the farm as an Aboriginal enterprise..." In 1983, 760 Crocodylus porosus were hatched.

Harry Messel told us that Laurie Taplin is in Maningrida assisting him on a three-year study of C. porosus. Harry said he could predict what will happen with porosus populations, and that he would be writing his final paper on that particular subject.

Australia - cont'd.

We recently received a beautiful, illustrated flyer on the "Crocodiles in Kakadu National Park N.T." The photos are superb!

CARIBBEAN

Puerto Rico:

A population of Caiman crocodilus estimated to number between 30-50 individuals, has been located in the Tortuguero Lagoon, a freshwater lagoon on Puerto Rico's northcentral coast. This was reported to us by Peter Ortiz of the Commonwealth of Puerto Rico, Department of Natural Resources, San Juan.

CENTRAL AMERICA

Costa Rica:

Manley K. Fuller III of the Carolina Wetlands Project reported at the 1983 meeting of the American Society of Ichthyologists and Herpetologists on population surveys of Caiman crocodilus and Crocodylus acutus in Costa Rica. The caiman were found in small streams and swamps located in the area of the Tortuguero River. The acutus were found in the Tempisque River. He concluded, "Both species appear widely distributed in the Costa Rican lowlands and may occupy the same drainage systems... These initial observations suggest that in the lower Tempisque River and the smaller tributary streams of the Tortuguero River habitats are largely segregated between Caiman crocodilus and Crocodylus acutus."

Earl Junier Wade of the Ministério de Agricultura y Ganaderia, San Jose, visited New York last July. He is studying the possibilities of farming and restocking Caiman crocodilus fuscus and plans to raise breeding stock of C. acutus.

Honduras:

The Government of Honduras has accepted bids on a contract to do a feasibility study for setting up farms for Crocodylus acutus and Caiman c. fuscus. Bidders included French, American, and German firms. (There are so many U.S. and other troops in Honduras that it was said that one particularly grizzled old C. acutus was saluted twice and promoted to officer in charge of amphibious forces. It wasn't until he showed up at the mess hall that someone figured out he wasn't an officer dressed in camouflage- Eds. again.)

NEAR EAST

Israel:

Guy Ben-Moshe of the Hammat Gader Alligator Park wrote the following: "This year we had a more successful breeding season than our first year, and we have 180 thriving hatchlings from the '83 season. Nests of first time layers averaged a 30 percent

Near East - cont'd.

hatchout, and from second time layers we saw a 70 percent hatchout, so that we anticipate even better success in the future.

"Since our Alligator Park opened its gates to the public in September, 1981 we have had more than a million visitors, and our tourist complex of Hot Springs, gators and antiquities is now the second most visited tourist site in Israel."

NORTH AMERICA

Legislative changes and proposed changes are the major news out of Washington. The Texas populations of Alligator mississippiensis have been reclassified to "Threatened by Similarity of Appearance." Texas has just submitted a draft of its alligator management plan to the U.S. Fish and Wildlife Service. The plan is now being circulated for comments. Until the plan is approved, export of hides will not be able to begin. The Atlanta Regional Office of the U.S. Fish and Wildlife Service submitted a proposal for reclassification of the Florida alligator populations from "Threatened" to "Threatened by Similarity of Appearance." The proposal has been returned by the Washington Office to the region for rewriting. It is expected that this change will take effect.

There are rumors that both South Carolina and Georgia will be petitioning the U.S. Fish and Wildlife Service for reclassification of their American alligator populations.

The U.S. Fish and Wildlife Service has been petitioned by attorneys for the leather industry to reclassify Caiman c. yacare. The industry is working on the basis that the subspecies was improperly placed on the Endangered Species List in the first place. There is a general consensus that little reliable scientific data exist for pulling the Yacare caiman off the list. The industry also requested that an import quota of Yacare hides be allowed into the United States while studies take place in central South America to determine the status of populations. There are no provisions in the Endangered Species Act to allow this. (Somehow, there seems to be something wrong in the logic of asking to be able to kill large numbers of a recognized endangered species while you're trying to determine the status of it in the first place! Eds.)

C. Kenneth Dodd, Jr. of Office of Endangered Species, U.S. Fish and Wildlife Service wrote: "The U.S. Congress has approved \$5 million for the purchase of Crocodile Lake National Wildlife Refuge in Florida. Since this was agreed upon by both Houses of Congress, there should be no further obstacles for obtaining these much needed funds... According to figures compiled in February (1983), this should allow the purchase of nearly 2000 acres of important habitat for the American crocodile.

"The FWS is presently reviewing the status of the Nile crocodile in Zimbabwe as a result of its recent downgrading from CITES Appendix I to II. It is likely that the U.S. will propose reclassification under provisions of the Endangered Species Act of 1973, as amended, of this population from its present Endangered status to Threatened by Similarity of Appearance. This would allow for importation of crocodiles, their parts and products, from Zimbabwe if they originated from farmed stock."

North America - cont'd.

Lou Densmore (Llewellyn D. Densmore III to those who don't know him.) currently Division of Biological Sciences, University of Michigan, Ann Arbor, submitted the following report, "Molecular Studies on the Systematics and Evolution of the Crocodilians," on behalf of himself and Herb Dessauer of Louisiana State University Medical Center:

"The high degree of convergent evolution that has occurred in characters traditionally considered important in assessing relationships among the Crocodilia and the lack of critical fossils in several of the families (especially the Crocodylidae and Gavialidae) have made attempts to understand the systematics and evolutionary history of the living members of the order difficult. We have compared homologous proteins from all 21 crocodilian species using a number of biochemical and immunological techniques to determine relationships among the extant crocodilians and to infer something of their phylogeny. The source of proteins compared was blood collected from captive animals at zoos, wildlife refuges and private collections across the United States and Canada. The generosity of the curators and keepers of such facilities was invaluable in allowing us to complete this study. The techniques that we employed were immunodiffusion on trefoil plates (for albumins and transferrins), hemoglobin fingerprinting and starch gel electrophoresis of 17 red cell and plasma proteins. All of the resulting data sets were concordant in the patterns of relationships and the relative degrees of divergence between taxa that were suggested.

"Three distinct and probably ancient lineages are present within the living Crocodilia: 1) a loosely associated Alligator-Lineage containing the three widely divergent species groups Alligator (the American and Chinese alligators), Paleosuchus (Cuvier's and Schneider's smooth-fronted caimans) and Caiman (the true caimans) plus its close relative Melanosuchus (the black caiman); 2) a Crocodile-Lineage consisting of Osteolaemus (the dwarf African crocodiles) and their relatives in the genus Crocodylus (the true crocodiles); and 3) the Gavial-Lineage made up to the two closely related genera Gavialis (the true gavials) and Tomistoma (the false gavials).

"For the most part, these findings are in good agreement with many of the conclusions suggested by morphological and paleontological studies, the most radical departure being the close association of the two gavials. The false gavial (Tomistoma) has long been considered to be an "aberrant-looking" crocodile, while the highly specialized true gavial (Gavialis) has been judged by most crocodilian systematists to be distantly related to other living forms. Another interesting finding was the extreme lack of protein divergence which characterized the 11 circumtropical species of the genus Crocodylus. No biochemical or immunological technique could effectively separate these species from one another, suggesting either an almost unbelievable degree of molecular convergence or a recent divergence of these forms. We are not invoking a vicariance model to explain the present distribution of the genus, but are suggesting a transoceanic migration of salt-tolerant forms. This latter hypothesis is corroborated by the recent discovery of functional salt-secreting glands in the tongues of true crocodiles by Laurie Taplin and Gordon Grigg in Australia. We are currently collaborating with Taplin on a paper characterizing our independent observations, and one of us (LDD) is beginning to investigate the Crocodylus problem using a more sensitive molecular probe, mitochondrial DNA, to try and assess relationships within the genus."

North America - cont'd.

Ted Joanen submitted the following brief report on the State of Louisiana's 1983 alligator harvest program:

"Louisiana's statewide season extended from September 10 to October 9, during 1983. Some 17,000 tags were issued by department biologists to slightly over 1,000 licensed hunters. Approximately four million acres of alligator habitat were hunted.

"Harvest quotas (# tags issued) were based on annual population surveys conducted prior to the harvest season. Louisiana hunters killed 16,000+ alligators ranging in size from 4 ft to 13 ft (1.2-4.0 m) in length for a 94 percent hunter success. Average size of the skins taken was in the 6-7 ft (1.8-2.1 m) size class. Louisiana skin dealers paid from \$10-\$15 per linear foot with an average price of \$12.50. French tanners purchased 58 percent of the skins with the remainder (42 percent) going to the Japanese."

Ted reported that the unseasonably cold winter has resulted in the deaths of many alligators.

I. Lehr Brisbin of the Savannah River Ecology Laboratory visited with us last fall and told us that his alligator bibliography was nearly completed. He expected it to contain between 2,000-2,300 titles on A. mississippiensis. Regarding the work on alligators being carried out at the Ecology Lab, he stated that it was "now under the direction of Dr. Larry Vangilder. Larry's work continues to document that alligators in both reservoir and swamp habitat leave den sites and seek shallow water refuges during periods of extremely cold winter weather, as documented in an earlier study. Reproduction seems now to be increasing in the population inhabiting the Par Pond Reactor cooling reservoir."

We had the pleasure of seeing one of our old friends, Don Ashley, several weeks ago. He was disturbed about our innuendo in Vol. 2 (2) that the American Alligator Association had fallen apart due to unspecified difficulties between the membership and himself. Don swore to us that the Association would be coming back bigger and better than before, and that he would prepare a report for the next CSG newsletter. Stay tuned for more developments.

OCEANIA

Papua New Guinea:

We have excerpted the following from a letter recently received from Martin Hollands of the Crocodile Project, Boroko, NCD:

"Here in PNG things seem to be coming together at last... Many changes are underway which I believe will give us a good management structure for a non-detrimental, and highly profitable, industry. I will give you a quick run through the main areas:

Oceania, - cont'd.

"1. Monitoring. The program for the Sepik side is going well. Although obviously premature, the three years' data on C. novaeguineae are very encouraging. There was an increase of 25 percent on our nest surveys for 81-82, and a further 12 percent increase for 82-83. There was a pleasing number of young females starting to breed. It was really good to see increases in this heavily hunted area -- but where hunters are harvesting according to our recommendations. The saltie data for the same period will be available after the March surveys. A full report on both will be ready for the next CSG meeting. Jack Cox's, "FAO Field Document" on the nesting ecology of crocodiles in PNG is nearly ready for printing.

"Prof. Messel kindly paid for one of our biologists, Kayama Simba, to work with their survey team for a few weeks. Kayama found this trip of great benefit, and learned a lot, and is now establishing a program on the same lines for the mangrove/nipa delta area in the Gulf of Papua.

"Surveys on a small swamp close to Port Moresby (about three miles from the Central Government Offices) are also proving interesting. Despite being extremely heavily fished there were at least 12 active nests there this year, yet an average night's "spotting" (before hatching) yields 2-3 animals.

"2. Law Enforcement. After two years constantly pushing, my section has finally been granted permission to be given legal powers to carry out inspections. We now inspect all export consignments prior to export, and carry out spot checks as well. One prosecution is underway, and I think enforcement -- our main problem for the last two years -- is now fairly well covered.

"3. Management. As I said in Zimbabwe, we are trying to get the industry to help fund monitoring/enforcement costs. The way we are doing this is by establishing a "Crocodile Management Board" with Government, Provincial Government, and industry representation. I also feel that the wider base of experience will be beneficial in decision making. In the interim period we have formed an "Advisory Board," with the same structure to advise on matters, and to help draft new legislation. The Chairman of the Board is Mr. Graham Goudie, General Manager of Mainland Holdings, and a member of the CSG. Any worries that industry involvement is going to be detrimental to the conservation of the species are very much unfounded; the people involved are interested in the longterm future of the industry and appreciate the need for monitoring, and effective law enforcement, and want to make sure they are carried out.

"4. Industry. The very low skin prices have obviously had a serious effect and couldn't really have come at a worse time. The farms were just coming into production and really needed a good return, yet found selling difficult. I was worried when analyzing the figures for the first half of the year as exports were well up, and I was worried that producers were responding to low prices by hunting more. However, it now seems that it just took a long time for price information to get through to the villages, and the total year's exports (17,032 freshwater and 3,465 saltwater) are well down on 1982, despite more farmed skins. Although farms are now making a significant contribution to exports we are still a long way off the time when they are the main producers.

"We have also managed to get an encouraging spirit of cooperation going between

Oceania' - cont'd.

the industry and government, and between different sectors of the industry. This will be essential for things to really come together here."

Philippines:

The Silliman University Crocodile Programme, under the direction of Prof. Angel Alcala, has received an extension of its grant from World Wildlife Fund through August, 1984. Andy Ross tells us that the funding will be used to build an additional breeding pen for Crocodylus porosus mindorensis. All of us wish to extend our congratulations to Prof. Alcala, who, by the way, was at the Herpetology Section of the California Academy of Sciences, San Francisco, as late as last fall. During the last two years, 15 surviving young of C. porosus mindorensis were produced at the University's crocodile farm. They expect to release some young at a sanctuary near Busuanga Island this year.

SOUTH AMERICA

On 28 and 29 July, 1983, an international meeting was called by the U.S. Fish and Wildlife Service in Washington to discuss a far reaching study proposal to investigate the taxonomic status, populational levels, and trade in Caiman crocodilus in central South America. The meeting was by invitation and was attended by representatives of the governments of Bolivia, Paraguay, and Brazil, the U. S. Fish and Wildlife Service, U. S. State Department, World Wildlife Fund, the CITES Secretariat to South America, Dr. F. Wayne King and Peter Brazaitis of the CSG, and representatives of the Reptile Leather Tanners and Trade Association. Dr. Roy McDiarmid (USFWS-Research) presented a preliminary study proposal for consideration.

The need for such a study was brought into focus several years ago when hides of caiman were imported into the United States bearing documentation indicating they were Caiman crocodilus crocodilus originating from Paraguay or Bolivia. The species does not exist in Paraguay nor is there any scientific evidence to support its presence in Bolivia. Researchers and the governments of Brazil and Paraguay reported extensive poaching and violations of national laws prohibiting the commercial exploitation of wildlife. Other reports gave conflicting indications of populational levels that were either stable, abundant or rapidly declining. Equally confusing was the fact that the actual species most utilized was Caiman c. yacare, listed as a U.S. Endangered Species and totally prohibited from trade, but listed by CITES as Appendix II. Although four races of Caiman crocodilus are generally accepted by biologists, some German herpetologists and the German reptile leather tanners' association have published literature which indicates six or more races exist. The scientific basis for such conclusions is presently unclear.

The resulting confusion led the U.S. Fish and Wildlife Service to place a total ban on the import of all crocodilian hides and products originating from Bolivia or Paraguay. Trade, both legal and illegal, continues to the present time. Economic depression, lack of personnel, and lack of expertise have prevented the implementation of effective hunting controls by most countries. Only Paraguay has initiated biological studies to assess their diminishing populations and devise management

South America - cont'd.

programs.

The present study calls for the complete cooperation of the governments and interests involved. A two year, two part study was proposed. Part I deals with the taxonomic status and distribution of caiman in central South America. Part II includes detailed surveys of specific sites to determine the caiman populations and evaluate the impact of commercial utilization on the species. Trade recommendations and management techniques will be suggested to the governments involved. The cost of the study was estimated at approximately \$108,000 per year. Study teams will include scientists from the United States, a counterpart scientist from the South American country under study, technicians, local field assistants and support staff. Three teams will work separately in Bolivia, Brazil, and Paraguay. Dr. F. Wayne King, CSG Chairman, was named to head the study.

All funding for the project will be directed by and through the CITES Secretariat's representative to South America, Sr. O. Menghi, who will also issue periodic progress reports. Present sources of funding include the World Wildlife Fund, U.S. Fish and Wildlife Service, the Reptile Leather Tanners Association, and possibly several U.S. State Department programs now offering aid to developing countries. Industry members also offered the use of personal vehicles, equipment and facilities in the field.

Starting date for the first part of the study is projected for some time in 1984, the beginning of the next dry season in Bolivia and the Pantanal.

Paul Gertler, chairman of the meeting on behalf of the U.S. Fish and Wildlife Service, closed the meeting by expressing the mutual satisfaction and agreement expressed by all the participants. A colossal step towards sound international wildlife management has been taken.- Peter Brazaitis

Brazil:

George Rebelo and Jose Carlos S. Duarte of Depto. Parques Nacionais e Reservas Equivalentes - IBDF, Brasilia filed the following report — Survey of Caiman Skins Confiscated in Brazil:

"We made a postal survey of the offices of the Instituto Brasileiro de Desenvolvimento Florestal (IBDF) holding confiscated caiman skins. We received replies from 14 states and territories which represent about 44 percent of the country and include all geopolitical and morphoclimatic regions. Of 31,165 reptile skins held in 13 storages, 8,622 were from crocodilians. Four species of crocodilians were reported but 99.8 percent of the hides were from Caiman crocodilus. This result concurs with CITES data which indicate that around 90 percent of crocodilian skins exported to the U.S. from Bolivia and Paraguay are from C. crocodilus. CITES data also indicate that C. crocodilus is involved in about 80 percent of the world trade in crocodilian skins. The two more valuable species, Melanosuchus niger and Caiman latirostris were represented by less than 15 skins each, indicating the grave threat to their survival. Caiman c. crocodilus remains abundant and appears to be relatively resistant to hunting. However, if the intensity of hunting increases the situation could change for

South America - cont'd.

the worse as has been reported for Bolivian and Colombian populations. C. c. yacare is probably more threatened, as poaching has resulted in a visible reduction in the natural populations."

George has been transferred to CECAN, an experimental breeding center for Amazonian wildlife. He is hoping to breed caiman there, along with the standard Amazonian mammals. Prior to being posted to Manaus, he worked with Daniel Louzada on nesting, hatchling habitat preference, and dispersal of Paleosuchus palpebrosus. George also worked at Rio Trombetas Biological Reserve with Luis Fernando Padua counting caiman. This time, they were unable to find black caiman. George further reported that the Federal Government of Brazil organized an operation to control illegal hunting of caiman in the Pantanal. After two months of operation during the dry season, they confiscated the annual take of caiman skins from the South Pantanal. They used 500 soldiers and military support and, with only one casualty, captured 230 men, 270 guns, 29 small airplanes, 19 vehicles, and 3 kg of cocaine. The entire operation cost the equivalent of U.S.\$170,000.

Both George and Bill Magnusson expect to participate in the Bolivia-Brazil-Paraguay-U.S. caiman study.

Bill Magnusson was unable to obtain funding for surveys of Melanosuchus; he therefore is concentrating on Paleosuchus. Bill relayed information collected by Marcio Ayres on prices for crocodilians in the Rio Japura region. "A Caiman skin sells for 150 cruzeiros (21 cents U.S. at official rate or 13 cents at the true exchange rate). Caiman meat sells for 250 cruzeiros (36 cents official/ 21 cents black market) per kilo (presumably dried). The meat is sold in Para. He didn't know where the skins went. There is no price given for Melanosuchus. The locals consider it commercially extinct. As there is no price offered, it is to be assumed that when a Melanosuchus is killed the hunter receives only the Caiman price!"

Peter Crawshaw, who has currently forsaken crocodilian research for a study of jaguars, forwarded an article to us that recently appeared in Ciencia Ilustrada on the plight of C. c. yacare in the Pantanal.

Ecuador:

The September 20, 1983 issue of The New York Times ran a story about Dr. Eduardo Asanza C. who is studying caiman in the Upper Amazon Basin. According to the article, he is making population counts, collecting data via capture-marking-recapture techniques, observing maternal and nesting behavior, etc. The story claimed that he found nest temperature affected sex ratios of young: in low temperatures there are more males, in high temperatures, more females. We found this interesting, as it conflicted with data on American alligator as reported by Ferguson and Joanen. Dr. Asanza still hasn't answered our letter of inquiry to him. Does anyone know if the information given in the Times was correct? Does anyone hear from Dr. Asanza? We would like to print information about this in future issues.

South America - cont'd.

Venezuela:

Your editors are able to give you a first-hand report from Venezuela, as we spent 10 days there visiting with Tomas Blohm in September. The highlight of the visit, which, it has turned out, was a miniature dry run for the field trips to be scheduled for this year's CSG Meeting, was a trip to Bahia de Turiamo, approximately 75 km west of Caracas. There we were taken by Andres Eloy Seijas of Servicio Nacional de Fauna Silvestre, MARNR, to the mangrove swamp salinas behind the bay. Andres Eloy has been carrying out night counts of Crocodylus acutus there whenever he can. He had previously seen about 13 animals, ranging in size from 1.5 m to about 2.1 m. That night we hit the jackpot! Andres Eloy and Tomas found a newly hatched nest on a cliff, approximately 10 m above the water. We captured 26 of 28 visible hatchlings in the water just below the nest. Andres Eloy weighed, measured, and marked them for recapture studies. Although assigned to work with many different noncrocodilian species, Andres Eloy studies crocodiles any chance he gets. Two years ago he attended the training course given for South American scientists at the Rockefeller Wildlife Refuge in Louisiana. Andres Eloy's superior, Douglas Figueroa, is very interested in crocodilian conservation and has been most diligent in supporting studies of the Venezuelan species.

We found several Caiman crocodilus nests at Hata Masaguaral, Tomas' ranch. A female was guarding one of the nests. Nest temperatures averaged 31 degrees C.

Stefan Gorzula of Puerto Ordaz, Estado Bolivar, showed up in New York this past fall. Before he got here, he filed this report: "On the 13 May, 1983 I found a population of crocodilians in the Rio Yuruani (04°55'N, 51°25'W) at an altitude of 940 meters above sea level. Of four crocodilians seen along some 4 km of riverbank, one was identified as Paleosuchus trigonatus, and the other three dove before they could be identified. I was surprised to find any crocodilians at this altitude, because the climate is in this part of Venezuela somewhat subtropical. The following day a skin of Paleosuchus trigonatus was found in a Pemón Indian house."

TRADE

1982 Commercial Imports of Caimans into the United States - prepared by Jeri Lynn Chandler, Traffic (U.S.A.).

In 1982, the U.S. imported 7,779 live specimens, 14,000 (+ 50 sq ft, 1200 m, and 2,583 cm) raw skins, and 113,650 finished products derived from Latin American caimans (see below). These figures represent a decrease in trade from 1981 when the U.S. imported 15,531 live caimans, 105,428 raw skins, and 138,705 products [Roeper, N. and Hemley, G., 1982. Crocodile and Alligator Trade by the United States, 1981. Traffic (U.S.A.), Washington, D.C.]. Over 85% of the items imported in 1982 were declared as that of the spectacled caiman, Caiman c. crocodilus. Brown caiman, C. c. fuscus; Yacare caiman, C. c. yacare; C. crocodilus species and Paleosuchus species accounted for the remainder of the imports.

Trade - cont'd.

Almost 90% of the caiman imports in 1982 had been re-exported through intermediate countries, primarily France and Italy. Overall, the countries most commonly declared as the sources of caimans were Colombia (64%), Brazil (9%), French Guiana (7%), Panama (5%), El Salvador (3%), and Peru (3%); four percent of the imports were declared of unknown origin. Items declared as originating in Guyana, Surinam, Paraguay, Bolivia, Argentina, and Venezuela were also imported. [The Editors would like to thank Jeri for preparing this report for the CSG Newsletter, and want to commend Traffic (U.S.A.) and its staff for providing this monitoring service which is so badly needed and of major importance.]

Tom Milliken, Director, Traffic (Japan), reported in a recent letter to Traffic (U.S.A.) that the Japanese government has been uncooperative in sharing details of caiman trade with Traffic. Tom states there are no trained customs authorities who can identify trade in wildlife. CITES identification manuals have not been distributed to port officials, and there are no plans to do so.

A recent price list from an animal dealer in Ft. Meyers, Florida, advertised an albino Caiman c. crocodilus for US \$10,000!!!! The common form was priced at US \$30 each for 60 cm long animals. (Keep on looking Bill Magnusson; there's hope yet to fund your black caiman study! Eds.)

We've been watching the market here in New York and in Washington, D.C. over the past several months. Just before the Christmas buying season we saw a slight upsurge in crocodilian products, as expected. Most of the items we saw in shops were caiman flank and caiman scrap products, usually in the form of shoes, belts, and some handbags, often made in Italy. However, these items were highly priced, and appeared to be just part of completing a line of goods rather than being promoted or sold as important items. Some genuine crocodilian products, which are always to be found in quality department stores, were not in evidence in significantly great numbers.

Snake and lizard skin handbags and shoes were featured instead, and imports of these items soared. Some manufacturers told us they were being deprived of snake and lizard skin by French and Italian suppliers if they did not accept caiman flanks as well. Manufacturers cited the high cost of tanned flanks (US \$30 - 40 per foot), problems with seizures by Fish and Wildlife officials because importers had no control over what species suppliers sent — and they often included endangered species, and the lack of consumer interest. One manufacturer now puts a notice on all orders that payment will be made only upon clearance by U.S. Fish and Wildlife Service, rather than upon the usual "when shipped."

As for prices we have heard that were paid for raw skins in U.S. dollars: 13 cents for caiman skins of any kind in Brazil (compare that to the \$30 + per foot for flanks when it is estimated that it costs about \$8 to tan the skin), (Louisiana farmers would like to see trade restrictions placed on caiman skins imported into the U.S. because they feel it competes with alligator skin on the market.); \$6.25 to \$7.00 per belly inch for PNG skins (Martin Hollands was trying to put together a meeting of farmers, producers, etc. in Paris in Sept. 1983, and said the farms had come close to folding.); 1983 harvests in Louisiana brought approximately \$12.50 per foot for American alligator skins; and U.S.\$3.30/cm belly width for farm-raised skins in South Africa.

Trade - cont'd.

The CSG Editors and Chairman recently attended the sale of hides taken in the State of Florida in 1983. Sealed bids were accepted, and opened before the public, by Florida Fish and Game officials. About 1,700 American alligator skins were offered for sale. Buyers had the opportunity to inspect the skins previously, and could offer as many bids as they wished up to a specified time and date. The highest bid was offered by a U.S. tannery, at \$15.12 per foot, considered too much by most observers. The next highest bids were in the range of \$13.25 per foot, and the leading French company offered \$12.00 per foot. (It was reported they had also paid about \$10.00 per foot in mid 1983 for Florida hides which are considered not as good a quality as Louisiana skins.) Two Japanese companies bid about \$10.00 per foot. Products made from American alligator hides sell at comparable prices to products made from Nile crocodile and PNG freshwater crocodile.

Japanese tanners are becoming more and more competitive in the U.S. hide buying market. About 60% of the hides they buy are consumed in Japan, and the rest are exported as hides or products. Japan is continuing to seek new U.S. markets, and will be an important influence on prices in the future. One company is reported to buy 3000 caiman skins from Colombia and Paraguay per month, 4000 sea turtle from Mexico per month, and 3000-4000 snake skins per month from Singapore.

The announcement that, as of the beginning of 1984, member nations of the European Common Market will have to abide by the CITES agreement of face penalties, has led to the "dumping" of caiman hides and products on the market. This is probably the reason we have seen a recent increase of caiman imports, rather than any increase in demand. Certainly there has been no show of interest in the fashion journals or advertisements.

India, the supplier of a large percentage of snake skins to the market, has recently placed the whip snake and the common cobra on their list of protected species. The U.S. and CITES have been requested to honor these restrictions, placing them on Appendix III.

The bottom line is that the whole reptile skin trade, including crocodilians, is undergoing change. More and more emphasis is being placed on legal harvests, farms, and managed and controlled wild populations to supply the world demand. I think that for now, farming operations face lean times while they still have to compete with cheaper illegal or poached hides. But slowly the industry is changing to work with and take advantage of legitimate sources of skins. Industry is now beginning to fund research, management, and conservation of crocodilian resources. The illegal dealer is still doing business the old way, but under increasing pressure. There is a whole new generation of honest, concerned businessmen with their lives invested in legitimate operations, who are the industry of tomorrow, complete with computers and sophisticated technology. Conservationists, too, are changing, and are beginning to recognize that the best protected species are those that are a valuable economic resource to their endemic country. -P. Brazaitis

This is the first in a new section on trade which we would like to continue. We tend to ask members of the industry, farmers, manufacturers, and retailers to contribute. We would also like to hear your suggestions, and if you believe such a contribution is of value to you. - Eds.

ZOOS

MIKE DAVENPORT'S COLUMN

Crocodilian Hatchings in U.S.

The following are crocodilian hatchings which occurred in U.S. Zoological Parks and related institutions between 1 January and 15 October 1983. This information was gathered by canvassing these institutions by telephone.

	<u># Hatched</u>
<u>Alligator mississippiensis</u>	
Alexandria Zoological Park Alexandria, Louisiana	2
Busch Gardens Tampa, Florida	53
California Alligator Farm Buena Park, California	40
<u>Crocodylus moreletii</u>	
Atlanta Zoological Park Atlanta, Georgia	Approx, 40 from 75 eggs (two clutches)
Silver Springs Attraction Silver Springs, Florida	2 (1 did not survive)
<u>Crocodylus niloticus</u>	
Busch Gardens Tampa, Florida	18 (3 did not survive)
Jacksonville Zoological Park Jacksonville, Florida	6 from 18 eggs (1 did not survive)
<u>Crocodylus palustris</u>	
California Alligator Farm Buena Park, California	2 from 4 eggs (1 did not survive)
<u>Crocodylus rhombifer</u>	
New York Zoological Park Bronx, New York	1 from 17 eggs
<u>Crocodylus siamensis</u>	
Metrozoo-Miami Miami, Florida	17 from 32 eggs (2 clutches)

Zoos - cont'd.

Sedgewick County Zoological Park Wichita, Kansas	# Hatched 10 from 22 eggs (1 did not survive)
<u>Osteolaemus tetraspis</u>	
Fort Worth Zoological Park Fort Worth, Texas	1 from 23 eggs
Philadelphia Zoological Garden Philadelphia, Pennsylvania	4 from 15 eggs

The Atlanta Zoological Park reported only an approximate number of C. moreletii hatchlings because females are allowed to excavate nests and assist in hatching, thus making it extremely difficult to get exact counts. The low hatching success rates with some species (C. moreletii at Silver Springs Attraction, O. tetraspis at Ft. Worth Zoological Park and Philadelphia Zoological Garden) were due in part to the incubation of some eggs in nests constructed by females. Mike Davenport, National Zoological Park, Washington, D.C. 20008

Reports From Other Zoos:

We received a letter from Lic. Esteban D. Astort who is head of the Herpetology Section of the Jardin Zoologico de Buenos Aires, Argentina. The zoo maintains two Alligator mississippiensis, six Caiman latirostris chacoensis juveniles, and three Caiman crocodilus yacare juveniles. Sr. Astort wrote, "The caimans are in an oval area of some 200 m². The depth is 0.70 m and contains an island with varied vegetation (40 m²). There are submerged tree trunks in various places. The caimans cohabit with various species of Pleurodires and Cryptodires."

"In the case of A. mississippiensis, the Zoo has had for some 18 years a male of 3.05 m in length (about 20-23 years old) which lived with another male (2.89 m) until two years ago. During that summer (December), the smaller one suffered serious wounds in the head and tail due to the fights with the other. The animal died a short time afterward due to septicemia. I was possibly to blame by giving live food and creating a strong territorial behavior, extremely magnified in the enclosure. But, then this had been going on for a few years (reproductive territory?)."

"During this past June, we received a 9 year old female (2.20 m) from a breeding farm in Florida to serve as a possible mate with our male... I was forced to locate her in an enclosure which has been maintained in spring-like conditions as the one's from where she came from, to avoid any stress due to climate changes. I did not place the female in the oval enclosure since ... the necessary microclimate was not optimal. We are building a "hibernarium" for caimans which is connected to the enclosure for next winter (June-August '84). That the male survived 18 years in our local winter does not signify that all specimens of the same species would adapt to an alteration of conditions which are not very optimal."

Zoos - cont'd.

"...the female is well in her temporary enclosure and in approximately two weeks we shall transfer her to the pool so that visual contact can be established with the male and we may observe the behavior of both and perhaps we can join them physically to achieve reproduction. (I realize that this male has never been with a female and may not accept her or vice versa.)

"If you have any information on work dealing with metabolism, adaptation, reproduction, feeding, habitat and biology of Alligator, I would be tremendously indebted to you if you could send it to me. Until now I have not published anything on crocs, but I hope to do so on those that live in Argentina (on the shore of the Parana River, especially C. latirostris chacoensis and C. crocodilus yacare)." Translated by Carlos Estol.

Peter Crawshaw reported that the Sao Paulo Zoo in Brazil has five Paleosuchus palpebrosus -- four males and one female ranging in size from 1.0-1.3 m. They also have one Caiman latirostris.

We received a copy of a paper published in Natureza em Revista, 1981 No. 8 by Francisco Luis Widholzer, Betina Borne, and Terezinha Tesche: Manhas e artimanhas do jacare-de-papo-amarelo. The paper is based on observations on behavior of Caiman latirostris made at the Parque Zoologico da Fundacao Zoobotanica do Rio Grande do Sul.

The Aquarium of the Musee des Arts Africains et Oceans, Paris has bred Crocodylus niloticus.

A translated synopsis of a paper, "Breeding Paleosuchus palpebrosus in captivity" (Haltung und Zucht des Brauen-Glattstirnkaimans) by Hansjorg Luthi, which appeared in Herpetofauna 5 (1983) was provided by Rene Honegger:

"Male (ca. 100 cm), female (ca. 90 cm) kept in aquaterrarium (400 x 120 x 60 cm, of which 1/4 land)

"Food: once a week, mice, beef liver or beef heart, no fish taken.

"Temperature: air 26-28°C/ water 25-27°C, water filtered (1500 l/hr).

"Light: 8 x 40 Watt tubes, during 12 hrs/day.

"Breeding: During October 1981 male started calling (like thunder); Protovit and vit. E-Ephynal added to food. Calling increased until December. Male and female renounced feeding during December and January (as usually observed earlier). Temperature lowered about 10°C; lights on only during 6 hrs/day.

"Female increased in size; did not start feeding as male did in February.

"On May 15, 1982, a box of sand was introduced on the land part of the cage. On

Zoos - cont'd.

May 19, the female was observed digging in it with a foreleg. As soon as hay was offered to the caimans, both started building a nest on top of the sand; the female used its jaws, the male the tail to transport the hay.

"The female used the time between June 10 and July 2 to build the nest; one time watering the hay through the cloaca.

"Egg-laying took place on July 3, 1982 (between 1600-2300 hrs); (to avoid disturbance from an observer, night-day was shifted on July 2). All nine eggs were rearranged by female, which took the eggs with its jaws to place them in the nest. [Editor's note: !!!] Nest was closed by female and surface flattened with belly.

"Eight eggs were taken and placed in a home-made incubator, on sand and sawdust. T = 29°C, rel. humid. 90%. During egg-moving, the female attacked vigorously. Nest guarding continued until early October. Eggs measured about 6-7 cm. (In a later breeding exact data will be gathered.)

"Hatching started on October 15, when the eggshells became brittle. No acoustic communication was heard from the eggs. One egg was placed in the empty nest (one egg opened earlier, but little development was found). Nest again guarded by female, which then assisted young to hatch and took it to the water where it climbed on the male's head. The male reacted immediately to the sounds of the young, attacking everything but the young caiman. The female did not show any reaction."

Rene Honegger also sent us the following: "According to newspaper reports, the Stuttgart Zoo 'Wilhelma' has succeeded for the third time in breeding Caiman crocodilus. Five hatchlings were reported from a pair which has been with the zoo since 1976. They hatched about the end of September/beginning of October.

"The Jackson Zoological Park, Jackson, Mississippi 39209, is offering 1,3 West African dwarf crocodiles at U.S.\$150 each. (Fall surplus list, 1983.)"

The Cologne Zoo has again bred Crocodylus niloticus. If anyone would like the surplus animals, please contact Harald Jes at the Cologne Zoo or René Honegger at Zoo Zurich for more information.

Terry Bond of the Sabi Crocodile Farm, Republic of South Africa, received a letter from Mario Casimiro, General Manager of "Reserva el Rincon," a Safari Park in Madrid, Spain, requesting male and female crocodiles. He would like at least two pairs, greater than 10 feet (3.0 m) in length.

REQUESTS

The Department of Herpetology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20008, has requested that we inform our readers that they have obtained a salvage permit for crocodilian material. They would appreciate it if

Requests - cont'd.

anyone who has any crocodilians that have died, been found dead, etc. would consider making arrangements to deposit the specimens with the Smithsonian. Your editors would like to make it clear that we are not necessarily endorsing this practice, as the definition of the term "salvage" could also include animals that were poached or otherwise obtained illegally. It is difficult to establish that the specimen was indeed found dead. There is considerable opportunity for abuse.

Stefan Gorzula would like to begin an exchange of ideas and opinions within the columns of the Newsletter on standardization of terminology used to express densities of crocodilians per unit of area. He referred people to his 1978 paper in *Oecologia* (Berl.) 35: 21-34 where he gave densities of caiman in shallow lagoon systems as caiman/m² of permanent or temporary lagoons, and in large lakes and reservoirs as caiman/km of shoreline. In narrow rivers and streams, he suggested that animals should be counted as # crocs./km of stream, while in wide rivers, where populations of both banks are separate, they should be counted as crocs./km of shoreline. He also pointed out that Bill Magnusson's point [J. Herpetol. 17: 86-88 (1983)] that total number estimates are not valid without knowing size class, is important and one should note whether or not hatchlings were included in the count. Stefan further suggested that the effect of habitat fragmentation on population densities should not be overlooked. He asked, "Would a series of 20 half hectare ponds hold more crocs than a single 10 hectare lagoon in a given area?"

We will be happy to run your comments and observations on this and other topics in an opinion and commentary column.

Your editors have a request. In conversations with colleagues we have been told that few people read book reviews. We would like to know if you would prefer to have a column listing books and articles received with no reviews, or if you would like the book review column to continue. There is a space for answering this question on the tearsheet.

BOOK REVIEWS

Das Krokodil/Der Kaiman in Vorstellung und Darstellung sudamerikanischer Indianer by Klaus R. Zeller. Publ. Klaus Renner Verlag, Hohenschaftlarn. (Publication date and page numbers not given.)

This publication, written in German, contains a wealth of data on the ethno-sociological relationship of humans and crocodilians. Unfortunately, the zoological nomenclature is not according to that latest revisions. But this is an important publication to prove that crocodiles are important beasts!- Rene Honegger, Zoo Zurich, Zurichbergstrasse 221, CH-8044 Zurich, Switzerland.

Captive Crocodile Health Problems by Elliott R. Jacobson. Field Document No. 11, India: Crocodile Breeding and Management Project, FAO, Dehra Dun, 1982. 23 pp.

In our age of modern technology, human medicine is changing from an art to a

Book Reviews - cont'd.

science, but veterinary medicine still operates in the realm of the magical. Dr. Jacobson's report cannot convince us otherwise. It is based on a trip in August and September 1982 to India, in his own words, "to examine in various parts of the country, captive breeding complexes and management procedures ... and make detailed recommendations aimed at an improvement in husbandry methods and the reduction of disease and mortality."

The report seems to be purely and simply a report on what Dr. Jacobson saw and was told, with a short list of recommendations, most of which only an individual with much experience rearing crocodilians would be qualified to give. He didn't seem to be giving much advice on actual veterinary medical practice. At one rearing center Dr. Jacobson reported animals being treated for a non-specific mycotic infection with broad spectrum antibiotic ointment containing steroids. Nowhere does Dr. Jacobson note that mycoses do not respond to broad spectrum antibiotics, and must be treated with anti-fungal agents, nor does he note that steroids are contraindicated in treatment of infectious diseases.

The Appendix listing diseases of crocodilians is woefully incomplete. Jacobson mentions one report of a death of Alligator mississippiensis due to Aeromonas. In fact, there was a project of several years' duration at the Savannah River Ecology Laboratory specifically focussed on Aeromonas infection in alligators. Reports on this work were given at symposia and are available through SREL. Nowhere does the author mention granulomas induced by construction sand, a very important problem in areas where animals are maintained in concrete pools where the concrete was mixed with construction sand. Visceral gout in crocodilians is often a catchall phrase used to cover a multitude of otherwise inexplicable diseases.

I had hoped that this tract would contain information that would be of much help in improving crocodilian husbandry and management practices utilizing the latest in veterinary medical knowledge and technique. It does not.- M. Watanabe

PAPERS RECEIVED

Arnhauser, Christoph and Vincent Ziswiler. 1983. Lokomotionsstudie und Funktionsanalyse der epanxonischen Muskulatur beim Nilkrokodil Crocodylus niloticus (Crocodylia). Revue suisse Zool. 90: 789-798.

Watanabe, Peter and Myrna E. Watanabe. 1983. Ultrasound scanning of Siamese crocodile eggs: Hello, are you in there? J. Herpetol. 17: 286-287.

Stard, H.R. and B.C. Choudhury. Date? Long distance movement by a saltwater crocodile (Crocodylus porosus). Br. J. Herpetol. 6: 87.

Stard, H.R. and L.A.K. Singh, eds. 1982. An Annotated Bibliography on Indian crocodilians. India: Crocodile Breeding and Management Project, Field Document No. 9, 30, Rome. 54pp.

Papers Received - cont'd.

Camacho B., Milton G. 1981. Aprovechamiento y conocimiento de *Crocodylus acutus* 1807 (Largato) y *Caiman crocodilus fuscus* (Cope 1868) (Cuaajipal) en Nicaragua. Instituto Nicaraguense de Recursos Naturales y Del Ambiente, Managua. 42+pp.

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PERSONALS

A recent issue of the Bulletin of the Florida State Museum was dedicated to the memory of the late CSG Chairman, Dr. Howard W. "Duke" Campbell.

Peter Crawshaw expects to be attending graduate school in the U.S. in September.

C. Kenneth Dodd, Jr. visited Australia last summer. He's collecting croc stamps. His latest find is a Pakistani stamp with the mugger crocodile on it.

Stefan Gorzula and his wife, Glenda Medina, announce the birth of a daughter, Stefania (named after the hyloid frog, Stefania) on March 6, 1983. "We gave birth using up (a technique used by many "primitive" peoples, but recently modernized by a bunch doctor) ... very biological and recommended by us to our colleagues!"

Personals - cont'd.

Gordon Grigg is on the organizing committee for the 1984 Australasian Herpetological Conference to be held August 28-31, 1984 in Sydney.

Martin Hollands' wife Sue recently gave birth to a son. Martin tells us he is "delighted with parenthood."

Dr. Sudhakar Kar reported the birth of a son in August, 1982. "At present, I am somehow assisting my wife, Anuradha, in taking care of our son (first), Papuni, in addition to my research and husbandry work. When Papuni was only 29-days old, I left for Australia on UNDP Fellowship Training Program to study crocodiles with Prof. Messel."

Ms. Heidemarie Lux wishes to obtain a position in commercial crocodile farming and/or research. She may be contacted at: Hausweg 72, 6103 Griesheim, Federal Republic of Germany.

Your editors had the pleasure of seeing Fred Medem in Washington, D.C. last November. Fred has recently recovered from a serious bout of pneumonia during his stay in Texas, and is now finding it necessary to breathe using oxygen tanks. He was to go into the hospital in Colombia on February 10 for cataract surgery. He hopes this will improve his vision. Despite his infirmities, his intellect and spirit are fine. He signed his latest letter to us, "From the old and decrepit croc." But old and decrepit crocs still swim! We're sure the rest of the CSG members will join us in sending Fred our best wishes for a speedy recovery.

In his December letter to us, Lala Singh reported "Growth rate of my yearling son (1 yr. 7 mos.), Anshuman, is slower than gharial -- he is 81 cm, 11 kg."

In December we received the following in a letter from Dr. Luis Varona, dated 7 November: "Two months ago on September 7, I suffered an 'isquemia cerebral,' that is, a plug in a cerebral blood vessel. I lost a sense of equilibrium. When I stand up, I have a tendency to fall to the right. I have anesthesia in the right portion of the head and the left side of the trunk, including the arm and leg. My voice is very weak also. I was in the hospital two months ago but now I am in my home. I stay in a chair or in bed. The doc said that I have to be very patient. But I am not. Just can't..." We're sure Dr. Varona would like to hear from CSG members and correspondents. Please write to him at Norte 29, Nuevo Vedado, La Habana 6, Cuba.

Your editors apologize to you for the lack of accent marks on non-English words and names. Our printer has the characters. We just can't figure out how to program them into the computer. Hopefully, the problem will be solved shortly.

We hope you have enjoyed this edition of the CSG Newsletter, and that it has been useful. Please let us know, and by all means, please contribute.

Peter Brazaitis and Myrna Watanabe

TEARSHEET

Please return to: Peter Brazaitis/Myrna Watanabe
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