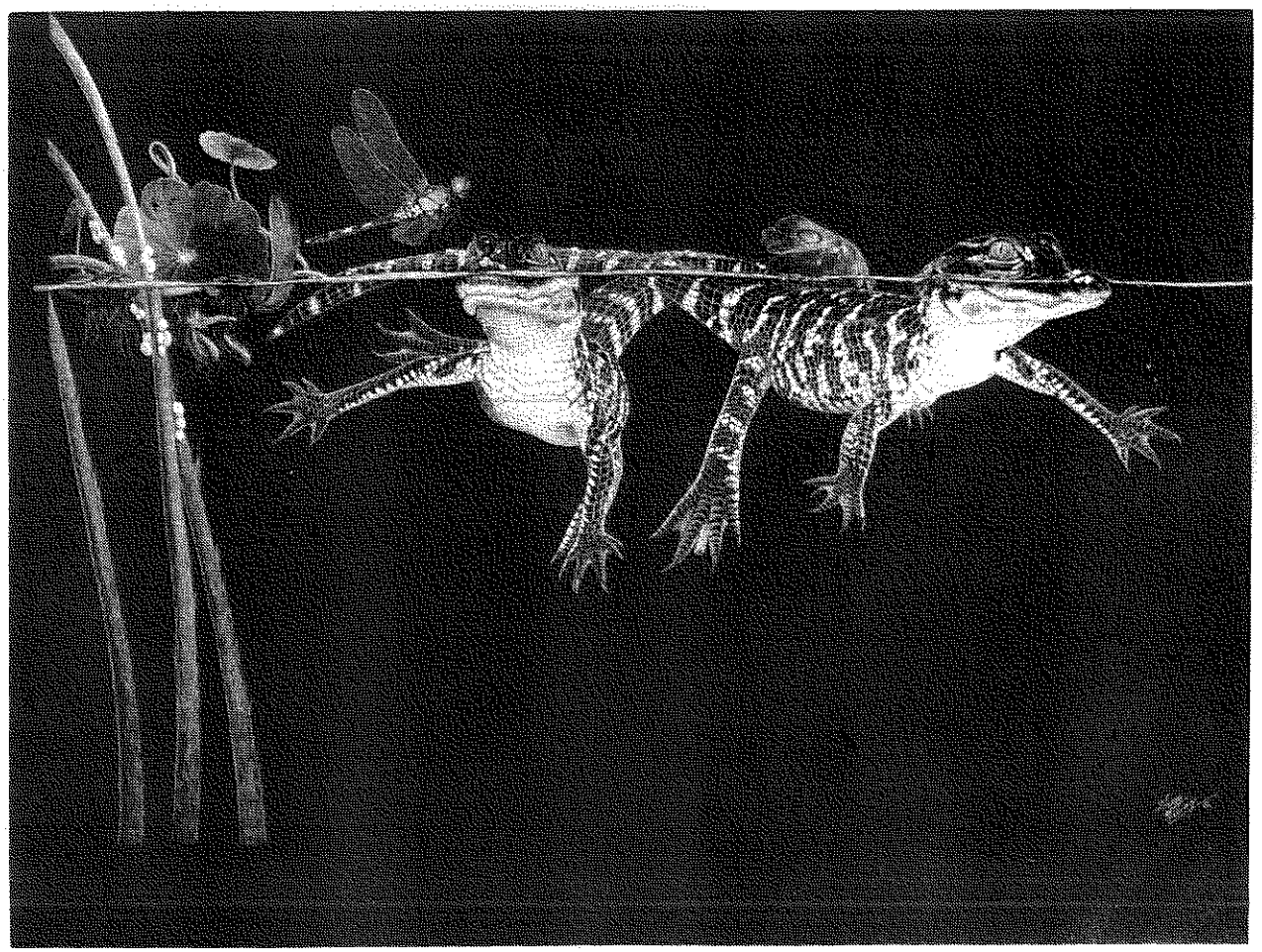
CROCODILE SPECIALIST GROUP

NEWSLETTER

VOLUME 8 ▪ JULY 1989 - SEPTEMBER 1989



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

CROCODILE SPECIALIST GROUP

NEWSLETTER

VOLUME 8
JULY 1989 - SEPTEMBER 1989

International Union for
Conservation of Nature and
Natural Resources

Species Survival Commission

Prof. Harry Messel, Chairman
IUCN Crocodile Specialist Group
School of Physics
University of Sydney
Sydney NSW 2006
Australia

EDITORIAL OFFICE:
Prof. F. Wayne King, Deputy Chairman
Florida Museum of Natural History
Gainesville, Florida 32611, U.S.A.

CONTRIBUTING EDITOR:
Peter Brazaitis

COVER PHOTO: "First Year", a limited edition scratchboard etching of young Florida alligators, *Alligator mississippiensis*, by Gregg Murray (see United States: 'Art for Alligator' article on page 8).

EDITORIAL

Funding is desperately needed for crocodilian conservation. There simply is not enough money to carry out all the population and habitat surveys, longterm monitoring efforts, and ecological studies, or for the development and implementation of management programs (including extension services to crocodilian farmers) that are needed in Africa, Asia, Australia/Oceania, and in North, Central, and South America. Now more than ever, governments and industry have recognized the need and are making annual contributions toward the cost of these field programs. The money is made available because the contributors believe the results from the fieldstudies will yield more hides directly to the trade. Though funding is better than it has ever been before, it still is inadequate to pay for all the projects that are pending. However, funding for the basic programs upon which the field efforts depend is even more scarce.

For example, the CSG regularly is called upon by governments, intergovernmental agencies, and private concerns to review myriad crocodilian conservation and farming programs; to provide consultation, advice, and direction. It costs money to photocopy and circulate these proposals to CSG members who can deliver constructive comments on them, and then compile the individual replies into a group response and mail that back to the people who asked for the review. While the CSG reviews are valuable enough that governments, agencies, and the industry request them, to date they have not been sufficiently valuable for the requesters to underwrite the associated costs of photocopying, postage, and telephone use, much less pay for the professional consultation.

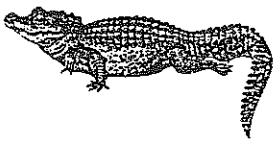
Similarly, trained personnel to undertake the various population surveys and other field projects are in demand, but not always available. Experienced personnel already are committed to existing programs. How then can they be expected to assume responsibilities for new programs in other countries or involving other species of crocodilians? Additional personnel are needed, but there is precious little money available to train new people at the college level, particularly people from tropical countries. If new personnel are not trained, the entire program will slowly grind to a halt. At the 1980

CSG meeting in Gainesville, Florida, the members set as one of their top priorities the training of students who could carry out the increasing number of crocodilian conservation projects. That decision was reaffirmed at later meetings, but there remains precious little money for graduate training.

At the 1986 CSG meeting in Quito, Ecuador, the group members recognized the need to increase communications between, and service to, the members and interested parties. At the 1988 meeting in Lae, Papua New Guinea, that need was addressed by establishing a Steering Committee to advise on the work of the group between the biennial Working Meetings. Plans call for the Steering Committee members to meet once, and preferably twice, a year, and to keep in touch between meetings by telephone, fax, and mail. The Committee held its first meeting in Gainesville, Florida, U.S.A., in late February 1989. Though support was obtained to meet the travel and per diem expenses of the Australia/Oceania regional representative, the lack of similar funds for the representatives from Asia and from Central and South America precluded their participation in the meeting. Without such support, the Committee will not be able to serve the CSG members and crocodilian-related interests.

Even production and mailing of this NEWSLETTER costs money, as does publication and mailing of the PROCEEDINGS. Approximately 380 copies of the NEWSLETTER and 150 of the PROCEEDINGS are mailed with each issue.

To date, support for these basic operations have been borne by the chairman's home institution and two or three supporters. The time has come to accept the reality that CSG operations are not free. If they are needed, then they are worthy of support. The CSG is only as effective as its ability to meet its commitments. Without outside support, it will have to curtail many of the services it presently provides. -- *Prof. F. Wayne King.*



SUPPORTERS

We wish to acknowledge the following contributors to the program of the CSG in 1989:

Jacques Lewkowicz, Société Nouvelle France Croco, Paris, France, supported the survey work of the deputy chairman in Central and South America.

Sharon R.F. King, Gainesville, Florida, U.S.A., supported the operation of the deputy chairman's office.

Mainland Holdings Ltd., Lae, Papua New Guinea, supported production of an Action Plan for Crocodile Conservation, and general operation of the CSG program.

F. Wayne King, Gainesville, Florida, U.S.A., supported operation of the deputy chairman's office.

Yoichi Takehara, Horuichi Trading Co., Tokyo, Japan, supported operation of the CSG program.

Harry Freeman, Hartleys Creek Crocodile Farm, Queensland, Australia, supported publication of the CSG NEWSLETTER.

AREA REPORTS

AFRICA

Angola:

Nkosi Luta Kinfengo, Departmento da Fauna e Areas Protegidas, Luanda, writes that he is the Southern African Development Coordination Conference (SADCC) contact person for inland fisheries and wildlife. He is involved with developing project proposals for Angola wildlife, including crocodiles.

Botswana:

The crocodile project continues to gather information on 1) population size estimates, 2) population size structures, 3) habitat associations, nesting sites, 4) total number of nests per breeding season, and 5) nesting patterns of the Nile crocodile country-wide. Farm statistics focuses on wild and farm harvested eggs, i.e., clutch sizes, conditions of incubation, percent hatchability, farm loses and morphometric information on animals collected

from the wild to form breeding stock. One more farm has opened on the Tuli Block and utilizes the Limpopo river crocodile population. The fourth is to open business soon. Progress has been remarkable and we would like to share our experiences with the others. Various papers have been prepared for publication concerning the biology of the Nile crocodile in Botswana. The following publications are available:

Simbotwe, M.P. 1989. The role of crocodilians in game utilization schemes in the SADCC region of Africa. A Current Bibliography of African Affairs, vol. 21(2):163-178.

Simbotwe, M.P. 1988. Crocodile research and management. KCS Newsletter, vol. 21:8-9, Gaborone.

Simbotwe, M.P. 1988. Preparing a future for the crocodile in southern Africa. UNEP News Africa, Oct./Dec., pp. 7, Nairobi.

Malumo Philip Simbotwe, *Department of Wildlife and National Parks, Box 131, Gaborone, Botswana.*

Congo:

Agnagna Marcellin, Chief of the Fauna Management Service, reports that a study of habitat partitioning between the three species of crocodiles in the Congo, *Crocodylus cataphractus, C. niloticus,* and *Osteolaemus tetraspis* is underway. He also states that he is involved in a crocodile breeding project, and a study of the biology of *Osteolaemus.* Agnagna also is inventorying forest elephants.

Ethiopia:

Tadesse Hailu is Wildlife Farms Coordinator for the crocodile farm at Arba Minch, Gamo Goffa region, and an ostrich farm at Hora Kalobaing. The croc farm has completed its fourth year of successful operation, and presently holds over 10,000 Nile crocodiles, from one month to 4 years old.

Melvin Bolton, Yeppoon, Queensland, Australia, surveyed the Arba Minch crocodile farm for FAO and UNDP in 1983, 1984, and 1986. In response to the statement by Ms. Almaz Beyero (CSG NEWSLETTER vol. 8, April-June 1989, page 8) that farm was covered with many wild mammals and birds, Melvin states that,

> I think I should point out that the wildlife referred to by Ms. Almaz occurs (with some amendments to the species list) in a nearby National Park and should not be thought of as potential crocodile food. There have been too many misconceptions in regard to this ranching proposal!
>
> The original proposal was for a small facility to be built using imported materials. This could then have been expanded to utilize waste from the freshwater fishery. In the event, a much larger facility was built at the outset, using local materials, and the anticipated food supply was not made available. Food supply therefore remains a major problem.

Bolton's 1987 DP/ETH/84/009 report to FAO/UNDP, Crocodile Farming Ethiopia: Progress in Development of Arba Minch Crocodile Farm and Outstanding Issues requiring further External Assistance, indicates problems with the water supply, drain pipes, and food supply. Hopefully these have now been corrected.

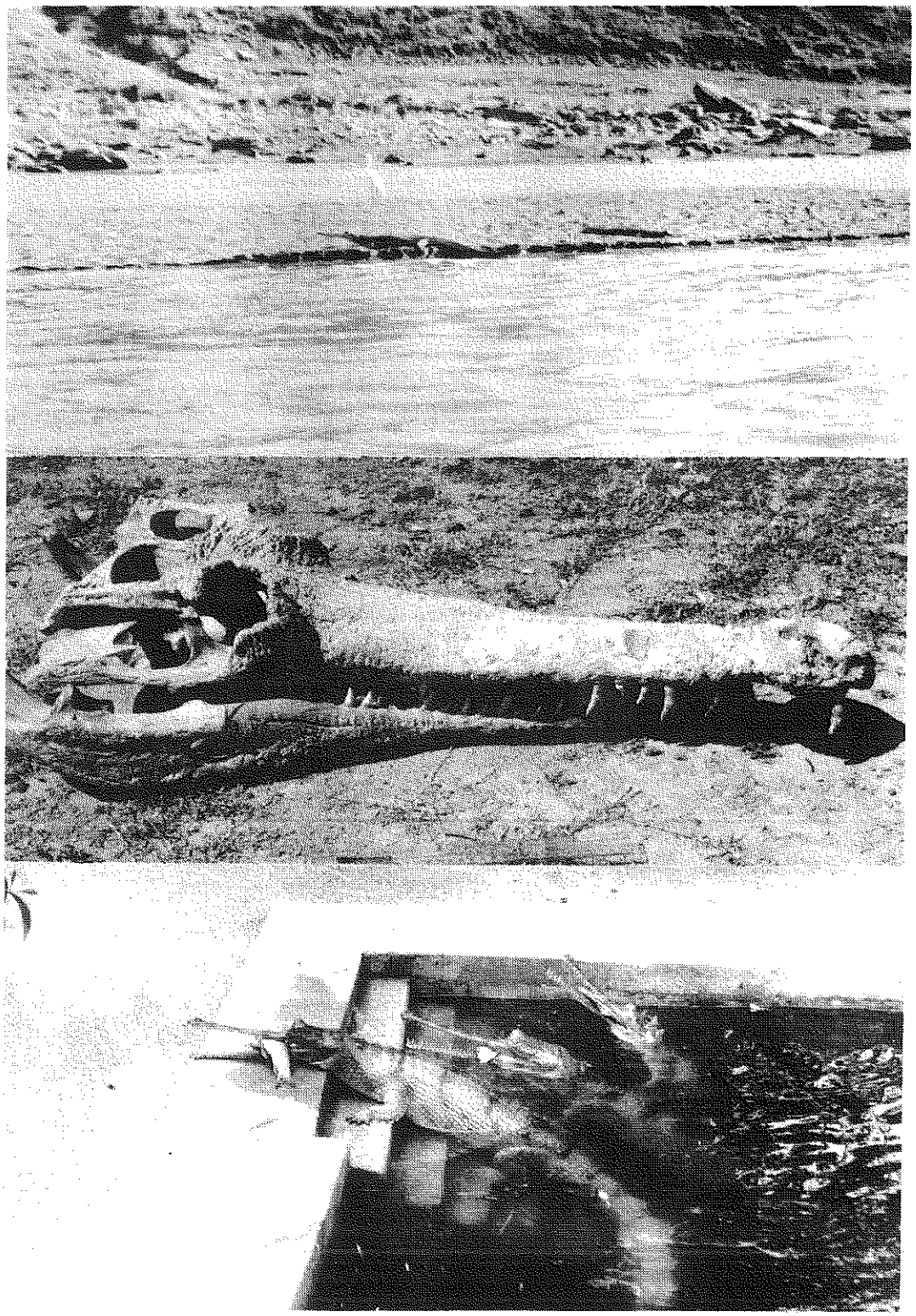
Most significantly, Bolton's report states that,

> It is evident that, with nest protection, the wild crocodile resource can sustain a yield of hatchlings well in excess of that which could be reared at Arba Minch - even if offal collection were successfully organized.

ASIA

India:

Research studies on the nesting ecology of gharial in the National Chambal Sanctuary were completed during 1989. Monitoring of the managed gharial population in a 400 km stretch of the Chambal River inside the National Chambal Sanctuary is being continued. A total of 15 gharial hatchlings (6 months of age) from the Deori Gharial Rearing Centre were released in the Chambal River during December 1988. Monitoring of these hatchlings revealed that some of the hatchlings (7) had migrated downstream for more than 5 km in a two months period. During February 1989, a total of 5 captive reared gharial (1.2 m) at DGRC have



Top to bottom: Gharial basking in the Chambal River, India. Gharial skull from the Chambal River, India. Young gharial at the Deori Gharial Rearing Centre, National Chambal Sanctuary. R.J. Rao photos.

been released in the Chambal River. The captive rearing programme for reptiles at DGRC is being continued, new enclosures were constructed where mugger and six species of freshwater turtles are being reared. -- R.J. Rao, *Deori Gharial Rearing Centre, National Chambal Sanctuary, Morena, Madhya Pradesh, and Assistant Professor, School of Studies in Zoology, Jiwaji University, Gwalior, Madhya Pradesh, India.*

Lala A.K. Singh, Similipal Tiger Reserve, is more busy with mammal work than with crocodiles. He has just completed an analysis of 9-years sighting data on mammals in the reserve. The first portion of this on elephant is finished, and he has just finished an elephant management program for Orissa for the decade, 1990-2000. Lala has implemented procedures for estimating populations of some major mammals in Similipal, and has improved the 17-year old technique used to census tigers. He has developed techniques for distinguishing between the tracks of tiger cubs and adult leopard.

Despite all the mammal work, Lala has not lost his interest in crocodilians and reports that the Crocodile Research Centre at Hyderabad has been closed down since July 1988 and the Government of India no longer has a special body to monitor the crocodile program. During March 1988, Lala, B.C. Choudhury, and Sudhakar Kar, wrote an Action Plan for crocodiles in the 1990s and submitted to the government.

The chief wildlife warden in Orissa has proposed a release of mugger crocodiles in the Balimela reservoir, Koraput District, and an experimental release of gharial in the Mahanadi River near Dibrigarh Sanctuary and the Hirakud Reservoir. Presently at Ramatirtha there is a stock of 2 male and 4 female adult muggers; 19 subadults from a 1986 hatching; 32 from a 1987 hatchling; 51 juveniles from 1988, and 51 from 1989. The last release of 25 muggers into the Khairi River at Similipal on 24 April has been very successful. The crocodiles have remained within 4 km of the release site despite a high flood and continuing monsoon rains. The muggers in Similipal appear to have a good future. Hatchlings have been reported in 1988 and again this year.

With only 32 km of the river lying inside its boundaries, the Satkoshia Gorge Sanctuary has not been as successful for protecting and rehabilitating gharials as originally hoped. However, the sanctuary has developed into a good mugger sanctuary. Muggers have bred in the Satkoshia this year according to S.K. Mishra, District Forest Officer (Wildlife).

Nepal:

CSG member, Tirtha Maskey, reveals that the gharial breeding and reintroduction project in Nepal is continuing. Eggs were collected from six gharial nests along the Narayani River in April 1989 and incubated under natural conditions. Fifty-seven percent of the 247 eggs hatched, yielding 141 hatchlings to the program. During the coming year, longterm monitoring of the gharial hatchlings will continue, and gharial will be reintroduced into the Karnali and Babai rivers in western Nepal.

Pakistan:

Crocodiles and gavials were plentiful in the 1930s in the Province of Sind. The old records and pictures all bear testimony to the fact that once the lakes and swamps in the Province of Sind were teeming with these reptiles. As a result of harnessing the river Indus and construction of dams and barrages for irrigation purposes, many of these swamps and lakes dried up, thereby reducing the habitat of crocodiles and gavials. The demand from the leather industry made the situation even worse. Looking to the endangered status of these reptiles, the government decided to start a captive breeding programme for crocodiles. The protective measures were also intensified with good results. The Government of Sind has declared an area of about 50,000 acres, where about 30 lakes and swamps are available, as a Sanctuary under the Law for Crocodiles.

The second part of the project is to breed the crocodiles and gavials in captivity and re-introduce them in the places they formerly occurred. -- Khan Muhammad Khan, *Conservator of Wildlife, Sind Wildlife Management Board, Karachi, Pakistan.*

Wild populations of marsh crocodiles [*Crocodylus palustris*] in Pakistan are found in the provinces of Sind and Baluchistan. In both these provinces, crocodiles remained under

tremendous hunting pressure for the last few decades. Where as some populations in Sind are now safe, the majority of those in Baluchistan are threatened with local extinction. Although hide traders are highly blamed for exploiting crocodiles, recent surveys in Baluchistan indicated that most of them are being killed by local villagers for no obvious economic gains. These are just killed, either by fun seekers or those who are scared of them. Fishermen have already cleared several sites of crocodiles just to enhance their fish catch while local farmers have turned against them because of the possible predation of crocodiles on their livestock.

River Hingol is a very important habitat of crocodiles. The river got almost dry during the 1986-87 drought, exposing crocodiles to fun seekers. Many got slaughtered. It may take years for the native crocodiles to regain their previous status.

It appears hard to stop the local extinction of crocodiles in Baluchistan unless the NGOs join hands with the local wildlife department and start a conservation campaign in the area to preserve whatever is left, in the form of scattered individuals. We shouldn't wait till crocodiles go forever from this important region. -- Ashiq Ahmad Khan, *Wildlife Management Specialist, Pakistan Forest Institute, Peshawar, Pakistan.*

Abdul Latif Rao, Conservator of Wildlife, National Council for Conservation of Wildlife, Islamabad, reports that the Government of India has agreed to the sale and export of 200 young mugger crocodiles to Pakistan. The crocodiles will come from India's crocodile rearing program and will be used to stock sanctuaries in Pakistan. [We congratulate Pakistan and India for their joint efforts in behalf of crocodile conservation. Such intergovernmental cooperation for wildlife conservation is long overdue. -- *Editors*.]

AUSTRALIA/OCEANIA

Australia:

A total of 200 *Crocodylus johnstoni* were successfully transported from Darwin in the Northern Territory to Hartleys Creek Crocodile Farm in Cairns, North Queensland. The 200 female freshwater crocodiles (average length 1.2 m) were purchased from Janamba Crocodile Farm. The crocodiles were snout tied and placed in a specially modified truck for the 3,000 km journey back to Hartleys Creek Crocodile Farm. The truck was divided into 8 separate compartments which held 25 crocodiles each. Foam rubber and straw were placed on the floor to absorb road shock on the journey. Not one crocodile was lost in transit. The crocodiles fed on the second night after installation in their new home and have not looked back. -- Harry Freeman, *Hartleys Creek Crocodile Farm, Cairns, Queensland, Australia.*

John Bache, Crocodile Farms Pty. Ltd., Northern Territory, reports that commercial crocodile farmers in Queensland and the Northern Territory have established the Crocodile Farmers Association of Australia. John is Chairman, and Hilton Graham, Letaba Crocodile Farm, is Secretary/Treasurer. Correspondence should be addressed to: Crocodile Farmers Association of Australia, P.O. Box 38503, Winnellie, Darwin NT 0821, Australia.

The annual salty egg harvests in the Northern Territory are still being carried out as a research exercise. No impact on the wild population has been detected. We continue to research nesting, egg incubation, hatching growth and survival, and efficient monitoring. Production on the three farms is being monitored and significant improvements are being made each year. The salty population continues to expand at 5-6% per year. -- Grahame Webb, *G. Webb Pty. Ltd., P.O. Box 38151, Winnellie, NT 0821, Australia.*

Solomon Islands:

Prof. Harry Messel, CSG Chairman, and Prof. F. Wayne King have returned from the Solomon Islands where they spent two months surveying the populations of *Crocodylus porosus* for the government and the CITES Secretariat. The team traveled more than 1,600 miles (2,500 km) through the islands to survey the best crocodile habitat. The results will be reported formally to the government of the Solomon Islands by the CITES Secretariat and will be presented at the 10th Working Meeting of the CSG in Gainesville, Florida, U.S.A., in April 1990.

EUROPE

United Kingdom:

Life at the University of Manchester has been extremely busy, but we have been continuing our crocodile and alligator research, particularly into the mechanisms of temperature dependent sex determination, as well as running a large research programme on palate development and cleft palate.

In a ROYAL SOCIETY manuscript we have documented a number of effects of incubation temperature on subsequent development in alligators. The temperature of egg incubation affects not just the sex of the animal, but its potential adult growth rate, its embryonic growth rate, its pigmentation pattern (embryos incubated at 33°C have two extra stripes, compared to those incubated at 30°C), and the temperature at which it prefers to thermoregulate as an adult. All of these appear to be regulated by the embryonic hypothalmus.

We also have put together a new theory concerning the mechanism of temperature dependent sex determination, and a re-interpretation of the shift experiments. These are detailed in a ROYAL SOCIETY manuscript, and also in a forthcoming paper in the AMERICAN ZOOLOGIST.

Since then, we have gone ahead and made a total alligator genomic library. This has been screened with the Page ZFY probe. On the basis of this, we have isolated, cloned and sequenced three of the genes in the alligator sex determination cascade. Further genes are being isolated at the present time. This work has been written up and submitted to NATURE. There is a very high degree of homology (92%) between the genes causing sex determination in alligators, and those causing sex determination in man. It appears that one of the mechanisms which may regulate whether you develop into a male or female, is dosage of the ZFY gene product. With temperature dependent sex determination, the dosage is regulated by temperature - by simple physical principles, i.e., gene transcription, translation and activity of the protein are optimum at 33°C, but suboptimum at 30°C. Embryos require a certain quantum of this ZFY product by a particular stage in development. If they get it, they become males, if they don't, they become females. Therefore all alligators at 33°C become males because they get the requisite amount of the protein, at 30°C all become females, because none of them achieve this. At temperatures in between, one is measuring the variation in individual embryos in terms of the dose of the molecule required, and the time it is required during incubation.

Under genetic sexual determination, the dosage of ZFY is regulated by chromosomal mechanisms, either by the number of copies of the gene on the X or Y chromosome, or by placement of one of the genes in the region of X interaction.

This work is of fundamental importance for understanding the molecular mechanisms of sex determination in a wide variety of vertebrates, not just crocodiles and alligators. Alligators are a beautiful experimental system in which to study these effects. We also have research programmes investigating these mechanisms in chickens, turkeys, and other commercially important birds. There, there is really great application of the results because chicken farming is incredibly inefficient - the males are fairly useless for egg laying species and the females are equally useless in species grown up for meat. We have programmes underway to develop transgenic birds with temperature dependent sex determination, using data from the molecular analysis of alligators.

This work was the subject of an extensive BBC scientific documentary entitled "What makes you sexy", exploring the molecular basis of sex determination in alligators. I have a video copy of this documentary. I also put together a semi-popular article for the NEW SCIENTIST, which outlines these findings in broad scientific terms.

We have also been busy analyzing the morphometrics of embryonic growth and development in alligators at 30°C and 33°C. We have conducted a similar analysis on *Crocodylus porosus* and *Crocodylus johnstoni* embryos, using material I measured when I visited Grahame Webb a number of years ago. On the basis of this, we have put together a comparative morphometric growth and development paper, comparing alligators and the two Australian crocodiles. These have some very interesting findings. Alligators are not premature crocodiles. There are fundamental differences in the growth patterns of alligator and crocodile embryos from very early in incubation. This manuscript has been accepted in the JOURNAL

OF ZOOLOGY, and will be published shortly.

In collaboration with Ray Noble at the West of Scotland Agricultural College, we have conducted very detailed analyses of the lipid contents of alligator yolks and embryos throughout incubation. There are some very interesting changes in lipids, some of which are similar to birds, but many of which are different. Four manuscripts describing the lipid composition of yolk and embryos are currently submitted for publication. These data will have some relevance to those farming crocodiles and alligators, as they give insights into dietary requirements for egg laying females, as well as nutritional requirements for the embryo.

On the basis of the pigmentation pattern differences between embryos incubated at 30°C and 33°C, we have been able to gain some insight into the mechanisms of pigmentation patterns during embryogenesis in alligators. We have further modelled these biological data mathematically to come up with a theory (using reaction-diffusion, kinetics) of how pigmentation patterns may be set up in the developing embryo. This work has been done collaboratively with Professor Jim Murray, FRS, of the Centre of Mathematical Biology, University of Oxford. It is an extremely interesting mathematical/developmental analysis. A manuscript describing these pigmentation pattern differences, and their mathematical modelling will appear in the PROCEEDINGS OF THE ROYAL SOCIETY OF LONDON.

Finally, in September of this year, there was the World Congress of Herpetology in Kent, together with the World Poultry Association meeting in Ayr. We took advantage of these two major meetings in Britain to organise a satellite meeting in early September to thoroughly analyse, compare and contrast the physical effects upon incubation and development in birds and reptiles. Now that a mass of reptile data has accumulated, no one has thoroughly compared and analysed these processes in birds and reptiles. The proceedings of the meeting will be edited into a definitive reference book to be published by Cambridge University Press edited by Charles Deeming and me.

In parallel with all this, we have also been conducting extensive studies of palate development, particularly analyzing molecular and cellular mechanisms during embryogenesis. Most of my palate work is now in the mouse, chickens and marsupials, with rather little in alligators. However, two major manuscripts describing tooth development in the lower jaws of alligators appeared in the JOURNAL OF ZOOLOGY and a further 100 page manuscript telling you everything you ever wanted to know about upper jaw development in alligator embryos will appear in the AMERICAN JOURNAL OF ANATOMY.

In the mouse system, we have already identified three candidate genes for cleft palate susceptibility, and are now making major inroads in human dental genetics. -- Professor Mark W.J. Ferguson, *Department of Cell and Structural Biology, School of Biological Sciences, University of Manchester, Coupland III Building, Manchester M13 9PL, United Kingdom.*

NORTH AMERICA

United States:

'Art for Alligators' is a fundraising program initiated by the Florida Wildlife Federation, the University of Florida School of Forest Resources and Conservation (SFRC), and the Florida Cooperative Fish and Wildlife Research Unit. Gregg Murray, a well-known wildlife artist has produced a full-color scratchboard etching of young alligators entitled, "First Year" (see front cover), reproductions of which are now on sale. A total of 950 signed, one-time limited edition, 15" x 21" color prints, and 10,000 posters, will be sold to raise money for scholarships, fellowships, and alligator research in the SFRC. Cost, including handling, of the unframed limited edition prints is U.S. $105.00 each, while framed prints cost U.S. $217.50 each, and posters cost U.S. $17.50 each. Payment can be made by check, credit card, or money order. For credit card orders, be sure to include both the card number and expiration date. To order, or for further information, contact: Alligator Research Print Fund, P.O. Box 1702-186, Gainesville, FL 32602-1702, U.S.A.

The Nuisance Alligator Trapper Program started this year in Georgia, and we have been harvesting some alligators for their hides and also selling some alligators alive to alligator farmers for breeding stock.

Hides have been bringing $45.00 per foot and live gators have been selling for $25.00 to $40.00 per foot, depending on size and sex.

Most of the trappers that I have talked with are not selling meat because they do not have an approved butchering facility that will meet the State qualifications. Hopefully, by next summer all of the trappers will have approved facilities. -- William B. McLean, *815 South Main, Moultrie, Georgia 31768, U.S.A.*

Steve Ruckel, Georgia Department of Natural Resources, Albany, reports that as of 30 June 1989, nuisance alligator agent-trappers in Georgia had captured 178 alligators since the harvest program began in March 1989. A total of 55 of these were sold alive to licensed Georgia alligator farmers, and the remainder were killed and processed.

SOUTH AMERICA

Argentina:

In northeastern Argentina, near Loreto, northern Corrientes Province, there is a 10,000 hectare cattle ranch, 'Estancia San Juan Poriahu', where all wildlife is conserved. Since approximately 80% of the ranch is composed of swamps, lagoons, and marshes, crocodilians find it one of the best natural habitats in Corrientes Province. The importance of this place is best understood if we take into account that caiman hunting for the leather industry occurs illegally throughout all of northern Argentina. Unfortunately, this ranch is not entirely free of hunting pressure since in its remote corners it is possible to find illegal hunting camps with up to 70 carcasses, with skulls and legs attached, but without flanks in bigger animals and without vent and tail in younger ones. Up to 95% of these carcasses are from *C. yacare.*

The two species occurring on the ranch are *Caiman latirostris* and *Caiman yacare*. *Caiman latirostris* is more difficult to see, not because it is more rare, but because it prefers heavily vegetated swamps and little lagoons of less than 50 m diameter. The total population, not counting hatchlings and juveniles, may be between 500 and 800 subadult and adult specimens. *Caiman yacare*, with a thousand or more individuals is easy to see because of its tameness and its preference for open lagoons and inner channels of the swamps, and coastal marshes. Since the highest concentration of lagoons occurs near the headquarters of the ranch, this protects an important breeding group of around 200 animals. In any event, caimans are not as persecuted as in other range countries.

Marcos García Rams, one of the owners of Estancia San Juan Poriahu, is very receptive to having researchers conduct short term studies there. Due to the tameness of the caimans, which results from their being hand fed fish, the ranch is ideal for behavioral observations. Since hatchlings of *latirostris* and the nest and hatchlings of *yacare* have been found in the last few years, it is clear that both species are breeding on the ranch. Moreover, juveniles and subadults are an important component of the total population. -- Tomás Waller, *Peña 2432 7° Piso, 1125 Capital Federal, Argentina.*

Caiman yacare basking in lagoon on Estancia San Juan Poriahu. Photo Tomás Waller.

Tame *Caiman yacare* being hand fed dead piraña, *Serrasalmus spilopleura.* Tomás Waller photo.

Juan Villalba-Macias, CSG member and director of TRAFFIC Sudamérica, held a press conference in Buenos Aires in April to announce that during the previous three years large numbers of caiman sides had been illegally exported from Argentina. Apparently, S. y F. Tracter e Hijos, a tanner in Cañada de Gomez, received permission to export 19,624 caiman flanks. However, starting in January 1986 and continuing through November 1988, more than 265,000 'pieces' of hides were exported. The continued export of that many cuttings from the original 19,624 hides began to worry officials. By checking with the purchasing companies in Europe and Japan, it was learned that the shipments contained not pieces but whole hides and flanks. TRAFFIC Sudamérica displayed copies of the export documents issued by officials in Argentina. The total value of the exports is estimated to have been U.S. $16,000,000. After a week of criticism in the national press, the director of the national wildlife agency in Argentina resigned.

Claudia and Angel Alberto Yanosky, Colonia Pte., Formosa, report that they are attempting to breed *Caiman crocodilus yacare* and *Caiman latirostris* in captivity. They already have been successful in breeding the tegu lizard, *Tupinambis teguixin*, at El Bagual, and are currently raising 70 hatchling lizards in special chambers.

Angel also has circulated a questionnaire throughout much of South America seeking information on the historical and current distribution of *Caiman latirostris*. To date replies have been received from people in Argentina, Brazil, Colombia, Peru, Paraguay, Uruguay, and Venezuela.

During August and September 1988, Angel participated in an alligator training program conducted by Ted Joanen at the Rockefeller Wildlife Refuge in Louisiana, U.S.A.

Brazil:

THE FIRST MEETING FOR CAIMAN CONSERVATION IN THE PANTANAL WAS HELD IN CAMPO GRANDE, BRAZIL, FROM 27 TO 29 MARCH 1989. The commercial hunting of all wildlife has been banned in Brazil since 1967. There is considerable interest in the development of caiman management programs in Brazil and all of Latin America, witnessed by the fact that no fewer than five countries in Central and South America are presently undergoing CITES surveys of their crocodilian resource.

In response to the interest in Brazil, World Wildlife Fund co-sponsored a workshop in Campo Grande, 27-30 March, to bring together scientists, landowners, and government officials to identify and discuss issues related to development of a management program for *Caiman crocodilus yacare* in the vast Pantanal region. Several CSG members and correspondents, including Zilca Campos, Ginette Hemley, Bill Magnusson, Peter Crawshaw, and I attended the meeting.

Long hours of fruitful discussion and debate

were held during the meeting which resulted in recommendations focusing on four major areas: 1) various avenues to control illegal hunting of caiman; 2) identification of research topics thought to be critical in supporting a sound caiman management program; 3) evaluation of caiman ranching as a potential program element; and 4) establishment of an infrastructure of state and federal agencies to administer the implementation of a management program.

Although statistics on illegal trade are difficult to confirm, it is generally recognized that as many as one million illegal yacare skins may come out of the Pantanal annually. Actions which were recommended to stop this tremendous drain of the resource from the Pantanal included: a) establishment of relations with enforcement agencies and the military in the neighboring countries of Argentina, Bolivia, Paraguay, and Uruguay to aid in patrolling borders and intercepting illegal trade; b) request that the Brazilian delegation to the next CITES meeting solicit support to place pressure on importing countries to more vigorously control illegal imports; c) initiate a tagging system for all skins legally produced under any future management program; d) generate revenue to support enforcement (and research efforts) through the sale of confiscated skins presently stored; e) and the establishment of earmarked tag and license fees under any future management program.

The long-term ban on the utilization of any wildlife in Brazil has contributed little in the way of support for wildlife research. Therefore, information regarding the status or ecology of caiman in the Pantanal is somewhat limited. Research topics which will provide a sound biological basis for implementing a caiman management program in the Pantanal were identified. Recommendations to seek funding and support for studies into the status of yacare in various habitat types, effective inventory and monitoring techniques, sustainable harvest strategies for ranching as well as wild harvests, and social and economic benefactors of potential harvests were an encouraging technical benefit of the meeting. Proposals for research in these areas already are emanating from Brazil.

Because of the present prohibition against hunting, and what seems is a desire to domesticate and 'raise' animals in any agriculturally oriented culture, interest in captive propagation and rearing of caiman is popular among landowners. A group of approximately 90 landowners has been formed, with a stated interest in conservation of the Pantanal and the establishment of caiman rearing operations. Although caiman farming and/or ranching is only one potential element of a caiman management program, the interest in captive rearing has served as the catalyst for a grass roots movement among major landowners in the Pantanal supporting the establishment of a caiman management program. This organized group may well serve as a formidable ally in working with state and federal agencies to implement a management program. The landowner groups are encouraging caiman ranching as one alternative to be considered in a management program. Additionally, there is a willingness among landowners to support further research into evaluating the economic feasibility of caiman ranching as well as improved captive husbandry and management techniques. Experimental egg collections on two ranches reveal relatively plentiful and easily accessible nests and apparent hatch rates in excess of 95%.

Possibly the most difficult obstacle in establishing a caiman program in Brazil is the lack of a wildlife agency infrastructure. As a consequence of the long-term ban on hunting of wildlife in Brazil, there are no traditional governmental agencies that would clearly be responsible for accepting the task of developing and implementing a caiman management program. The National Institute for the Environment and Renewable Natural Resources in Brazil (IBMARNR) and the State Secretariat for the Environment in the states of Mato Grosso and Mato Grosso du Sol were recommended as the lead federal and state agencies to coordinate development of a management program. An advisory committee made up of representatives from the above agencies as well as state and federal universities, landowner organizations and the national agricultural research station was suggested to establish program priorities and administer funds through the establishment of a private foundation.

The advisory group and governmental agencies face the complex task of drawing on the result of this initial meeting and developing a management program proposal which details the type of program they will implement.

The vast wildlife resource of the Pantanal certainly offers tremendous potential as well as

an equally burdensome number of issues to address in the development of a management program. If the momentum of the first meeting for caiman conservation in the Pantanal continues, we will likely see more on their progress at the next April 1990 CSG Working Meeting in Gainesville. -- Dennis David, *Florida Game and Fresh Water Fish Commission Research Laboratory, 4005 S. Main Street, Gainesville, Florida 32611, U.S.A.*

I have been using implantable transmitters supplied by Clarence Abercrombie in *Paleosuchus trigonatus* over the last year. I made a ±3 cm lateral incision through the skin and muscle and pushed the radio between the body wall and peritoneum until it was lying just above the bony belly plates. In dense rainforest I could locate the animals at 80-100 m, which is about what you can with a similar sized transmitter with an external antenna. The wound left no scar and a transmitter removed after one year was firmly held by connective tissue where it was placed. I used implantables because *P. trigonatus* is small and habitually enters tight burrows and tangled root masses. However, I now think it likely that implantables should be the radio of choice for many crocodilians, especially juveniles, in a variety of habitats where easy access or the possibility of aerial survey makes the slight loss of distance over which the radio can be received acceptable. -- William E. Magnusson, *Depto. de Ecologia, INPA, CP 478, 69011, Manaus AM, Brazil.*

In August and September, crocodile biologists, conservationists, and farmers all over the world wrote to the Brazilian government protesting the importation of Nile crocodiles, *Crocodylus niloticus*, from Zimbabwe for stocking a farm in southern Brazil. Almost certainly some will escape from the farm and establish a feral population which then will compete with native crocodilians and threaten local people and livestock. Brazil has already been stigmatized by the inadvertent release of African bees, and their subsequent spread throughout South and Central America. The Nile crocodiles may prove to be an even bigger ecological and economic disaster. There is little justification in looking for an exotic crocodilian species with which to stock the farm. Black caiman, *Melanosuchus niger*, yields an extremely valuable belly hide and is endemic to the Amazon drainage. It also is a critically endangered species which could benefit from captive propagation efforts. Hopefully, the crocodiles will be returned to Zimbabwe rather than released to the Brazilian farm.

Peru:

The Tumbes river in northern Peru is the southern-most locality in the natural distribution of *Crocodylus acutus*. Development of shrimp farms in the Tumbes estuary has resulted in loss of crocodile habitat in the river. Nevertheless, the crocodiles somehow hold on. A former field assistant to Ana María Trelancia in Tumbes sent her photographs of a young *C. acutus* that was given to him by a neighbor in October 1987. He released the animal back into the Tumbes. He also reports that he spotted 10 crocodiles basking in the sun along the margins of the river very close to the main square in Tumbes city.

Young American crocodile, *Crocodylus acutus*, being released back into the Tumbes River, Peru.

Venezuela:

Alejandro Carrillo García, a lawyer finishing his PhD studies on ecological and wildlife laws and regulations at the Universidad Santa María, Caracas, reports that a 2nd Annual Workshop was convened from 21 to 23 July to discuss methods of improving the baba, *Caiman crocodilus*, harvest program. Several panels discussed baba production, commerce in hides and meat, and possible farming and ranching of baba. The meeting was attended by ranchowner producers, tanners, biologists, and government wildlife officials. The Minister of Natural Resources (MARNR) attended and exhorted everybody to support and promote the baba program.

ZOOS

Barcelona Zoo, Spain, has 22 unsexed juvenile *Caiman crocodilus yacare* and 13 unsexed juvenile *Osteolaemus tetraspis* from their captive breeding program. For information on the availability of these surplus specimens contact: M. Ruiz, 08003 Barcelona, Spain, tel. (34) (3) 309 2500.

Buenos Aires Zoo, Argentina, again bred *Caiman latirostris* in 1988-1989.

Cologne Zoological Garden, Federal Republic of Germany, hatched 9 *Paleosuchus palpebrosus* and 3 *Crocodylus niloticus* from their captive breeding program in 1988.

Dubai Zoo, United Arab Emirates, has four 2-year old and one 5-year old Nile crocodiles for sale or exchange. Contact: Moh. A. Reza Khan, Dubai Zoo, P.O. Box 67, Dubai, United Arab Emirates.

Ellen Trout Zoo, Lufkin, Texas, U.S.A., has bred Siamese crocodiles and Morelet's crocodiles. The three eggs in the first clutch ever laid by the Morelet's croc female are being incubated.

Jihlava Zoological Garden, Czechoslovakia, has bred *Osteolaemus tetraspis* three times.

TRADE

The following 1989 prices, in U.S. dollars, were reported to the editor:

Alligator mississippiensis in Florida, U.S.A.: fresh boneless meat from wild alligators = $5.00 to $7.00 per lb.; 30 Sept. 1988 - wet salted belly hides from wild alligators = $43.00 to $47.00 per foot of length; whole dead wild alligators = $35.00 to $45.00 per foot of length paid by processors who do their own flaying; 15 March 1989 - wet salted belly hides from wild alligators = $47.00 to $50.00 per foot of length.

Alligator mississippiensis in Georgia, U.S.A.: April to June 1989 - wet salted belly hides from wild alligators = $44.00 to $46.00 per foot of length; fresh meat = $5.00 to $6.00 per pound.

Alligator mississippiensis in South Carolina, U.S.A.: 1988 - wet salted belly hides from wild alligators = $45.00 to $46.00 per foot of length; fresh meat from wild alligators = $5.00 to $7.00 per lb.

Caiman crocodilus in Venezuela: end of May 1989 - dry salted chalecos = $17.00 per square foot, and up to $83.00 apiece for 'supers' (= 3 square feet or more); salt-cured meat = $0.70 to $1.33 per kg.

Crocodylus johnsoni in Queensland, Australia: May 1989 - wet salted belly hides = $5.21 to $5.50 per cm width; fresh meat wholesale = $15.00 per kg.

Crocodylus niloticus in Botswana: August 1989 - no hides are sold at the moment; fresh meat = $12.00 per kg.

Crocodylus niloticus in Transvaal, South Africa: 1988 - wet salted belly hides = $5.50 per cm belly width; fresh meat = $7.20 per kg.

Crocodylus niloticus in Zimbabwe: March 1989 - wet salted belly hides = $6.25 per cm width; fresh meat = $6.00 per kg.

Crocodylus porosus in Queensland, Australia: May 1989 - wet salted belly hides = $8.50 per cm width; fresh meat wholesale = $15.00 per kg.

Crocodylus porosus in Northern Territory, Australia: June 1989 - wet salted belly hides = $9.00 to $9.50 per cm width; fresh meat = $15.00 per kg for whole carcasses.

PERSONALS

George R. Campbell indicates that he is chairing the Southwest Florida Regional Alligator Association in Ft. Myers, Florida, U.S.A.

Luis Fernando Pacheco Acosta, Universidad Mayor de San Andres, La Paz, is studying the ecology of *Melanosuchus niger* on Estancia El Dorado in Bolivia, under the direction of Dr. Mario Baudoin, Director of the Institute of Ecology at the university. Part of the study involves reintroducing the species into the Beni Biological Reserve, operated by the Bolivian Academy of Sciences and the Institute of Ecology. During mid-1989, Luis attended the wildlife conservation and management training program at the U.S. National Zoological Park, Smithsonian Institution, Washington, D.C., U.S.A., and visited with crocodilian researchers and program managers in Gainesville, Florida, U.S.A.

In addition to his new duties as Executive Manager of the Crocodile Farmers Association of Zimbabwe, Jon Hutton has been keeping busy surveying the crocodile populations of Kenya, Tanzania, Moçambique, and other east African nations on behalf of the CITES Secretariat. Olivier Behra, National Museum d'Histoire Natural, Paris, and Jon jointly surveyed the crocodiles of Madagascar.

E. V. Cock, Harare, Zimbabwe, maintains his interest in research on reptiles and wildlife in general, though he is no longer actively involved. He states that he keeps in touch with things through Chris Foggin, the Crocodile Farmers Association of Zimbabwe, and the NEWSLETTER.

Paul Craig has left Ilimo Crocodile Farm in Boroko, Papua New Guinea and returned to the U.K. Geoff Tuke replaced him as general manager of Ilimo Poultry Products Pty. Ltd.

Mohamed Ali Reza Khan, CSG member from Bangladesh, has left his position with the Al Ain Zoo and Aquarium. He presently is in charge of the Dubai Zoo, United Arab Emirates.

Heinz Wermuth indicates that during the past year various things have conspired to keep him out of his office. He reports that if and when he manages to catch up a bit this year,

> I will succeed to root like a pig through the sedimentations of my office, I shall try to continue.

[Anyone who has faced the daunting task of digging through accumulated correspondence after a prolonged absence from the office, can sympathize with Heinz. We wish Heinz the best and look forward to hearing from him in the coming months when he gets back to things crocodilian. -- *Editors*.]

Keith Cook, Cairns, Australia, reports that he is operating a skin buying and processing business in Queensland. In the past he has worked on alligator farms in the U.S.A., and crocodile farms in Africa, Australia, and Papua New Guinea.

Goran E.D. Blomberg, East Lansing, Michigan, U.S.A., is associate managing editor of THE JACK-PINE WARBLER, the scientific journal of the Michigan Audubon Society. He has ten or more papers (mostly book reviews) in press, and hopes to get his doctoral dissertation finished soon.

Chris Traher has left his position with Croc World, Natal, South Africa, to accept a post with Rhodes University where he will be involved in a program of croc research.

Harry Andrews has been working at the Madras Crocodile Bank Trust (MCBT), Vadanemmeli Village, Tamil Nadu, India, for the past seven years. Prior to that he worked at the Madras Snake Park. He has been project director for J.W. Lang's research on the of mugger crocodiles at the MCBT funded by the U.S. National Science Foundation, National Geographic Society, and the Smithsonian Institution. Harry also has assisted in sea turtle

conservation and croc breeding projects, and with the snake venom centre.

Ian Games, Dept. Biological Sciences, University of Zimbabwe, Mount Pleasant, Harare, writes that he is completing his PhD thesis on numbers, growth, age, condition, feeding and digestion of *C. niloticus* on the Zambesi River in Zimbabwe and Moçambique. Ian also has been assisting CSG members Roberto Zohlo and Jon Hutton collect and analyze data on crocodile cropping from the Cahora Bassa Dam and Zambesi River in Moçambique. Moçambique has an annual export quota of 1,000 skins from the wild. The quota was filled in 1987 and 785 animals were taken in 1988. Cropping continues in 1989. Data are collected on population numbers, nesting, reproductive status, feeding and growth. The data will be used in the report to the CITES Secretariat and in Ian's thesis. In addition, Ian states,

> I have a computerized reference database which is available, in its entirety, to any interested parties. Jon Hutton and I have been using it for about two years and have found it extremely useful. It has been constructed using dBase III Plus on an IBM compatible computer. It can be searched by author, year, title, journal, and keyword, or any combination of the above. It currently holds 2,000 references pertaining to crocodilia and other related subjects (i.e., reptilia, methodology, reviews). I include detailed notes on how to manipulate and extend it in dBase III (which is compatible with dBase IV) and how to export it to word-processors for inclusion in documents and papers. It presently covers two 3½" (720k) diskettes or four 5¼" (360k) diskettes. Offers would be appreciated as it represents many, many hours of tedious work.

Congratulations to CSG member, Ana Maria Trelancia and her husband, Luis, who announced the successful eclosion of a hatchling caimanero, Emilio José, on 5 August 1989.

Mark A. Staton reports that he recently finished his PhD and short-term postdoctoral program at the University of Georgia, U.S.A., where he studied various aspects of American alligator nutrition. He now is on the staff of Mainland Holdings Crocodile Farm Pty. Ltd., Lae, Papua New Guinea, and is responsible for the farm's rapidly increasing research on crocodile feeding and housing requirements.

Cheers to Stefan and Josephine Gorzula, who at the height of the Caracas food riots on 2 March 1989, decided to break curfew and dash off to the hospital, where Michael James Gorzula was born.

REQUESTS

Randal Berry, Ellen Trout Zoo, P.O. Drawer 190, Lufkin, Texas 75901, U.S.A., requests information on compatibility of various crocodilian species in a single enclosure. He particularly wants data on any problems associated with maintaining *Alligator mississippiensis* and *Crocodylus siamensis* in the same exhibit.

BOOK REVIEW

WILDLIFE MANAGEMENT: CROCODILES AND ALLIGATORS. Edited by G. J. W. Webb, S. C. Manolis and P. J. Whitehead. Surrey Beatty & Sons Pty Limited. Chipping Norton, N.S.W., Australia. 1987. xiv, 552pp. $65.00 (cloth).

The 23 extant species of crocodilians present unique and interesting problems for the field of wildlife management. Prior to the early 1960's, little was known about the biology of these animals. Crocodilians typically are large, and potentially dangerous, aquatic predators that inhabit tropical and subtropical wetland habitats throughout the world. Local peoples usually look upon crocodilians with great apprehension, if not open hostility. However, though the potential for conflict with man is high, crocodilian hides are in great demand and can be an important source of income for many rural peoples. Crocodilians are also unique survivors of a past era when reptiles dominated the world and many aspects of their

physiology, morphology, behavior and ecology are of great potential interest to scientists and layman alike.

Over the last century, the human view of crocodilians has changed dramatically. At first they were viewed as potential threats to man and livestock and efforts were made to eradicate them. Later they were exploited for short-term economic gain by the reptile leather industry. Massive efforts were devoted to the large scale commercial hunting of crocodilians. When one population was driven to the edge of extinction the industry would exploit another. The intensive exploitation caused a rapid decline in crocodilians worldwide, and beginning in the 1960's an acute awareness of the problem emerged. Initial conservation efforts in many countries aimed at stopping the commercial hunting. Laws were passed to protect the animals and their habitats. These efforts met with varying degrees of success, being by and large successful in the more developed countries with sufficient economic and institutional resources (e.g. the alligator in the United States), but less so in most less developed countries.

Finally, in the late 1960's and early 1970's new types of crocodilian management schemes began to emerge. These were aimed at conserving these reptiles and their habitat via the sustained commercial utilization of the species. Most programs began in countries where native crocodilian species were recovering, or were not eminently threatened with extinction, and sought to achieve conservation by making crocodilians an economic asset and by exploiting populations on a scientifically sound basis. In the last 10 years many governments have expressed interest in developing economically based conservation programs for their populations of crocodilians. This growing interest in crocodilian conservation has also been accompanied by a marked increase in research into many aspects of the biology of these species. A rather extensive literature on crocodilian management and research techniques now exists, but much of this information is scattered throughout the scientific literature and no one source has been available to offer guidelines for developing research or management programs.

WILDLIFE MANAGEMENT: CROCODILES AND ALLIGATORS is the first publication that has attempted to summarized much of what is known about the management of crocodilian populations. It is the product of a 1985 conference convened in Darwin, Australia, by the Conservation Commission of the Northern Territory. The book attempts to provide a comprehensive overview not only of crocodilian management programs, but also of important management-related aspects of the species' biochemistry, physiology, behavior and ecology. In this effort it largely succeeds and the result is a lavishly produced and illustrated volume that offers a wealth of information, both for the crocodilian veteran as well as the newcomer.

The book contains 51 chapters written by experienced research and management personnel from around the world. Much of the material presented in the volume is drawn from work that has been done in the 4 countries with the longest tradition of crocodilian management: Australia, Papua New Guinea, the United States and Zimbabwe. The volume is organized into 10 sections. Parts I, III, and V are short sections, each containing 2 chapters which provide an introduction to the order Crocodylia (part I), address crocodilian management and indigenous peoples (part III), and aspects of public education (part V). The largest single section is part II, which contains 11 chapters that summarize crocodilian management programs in 6 different countries (the 4 principal countries mentioned above as well as India and Venezuela), and also presents an overview of crocodilian management with respect to CITES (the Convention on Trade in Endangered Species of Wild Flora and Fauna) and the World Conservation Strategy. In many respects this section represents the heart of the book, and it includes a number of excellent chapters that outline the historical development and operation of the world's premier crocodilan management programs.

The book's other sections present information on techniques for studying wild crocodilians, capture and immobilization methods, crocodilian behavior, thermoregulation, and captive rearing, and the identification, preparation and marketing of skins. Recently, the ecology of crocodilian eggs and embryos has been a particularly active area of research and an entire section (10 chapters) is devoted to this topic. Some of this recent work has demonstrated the embryonic period to be one of the most important times in a crocodilian's life and is the time when sex and many aspects of the animal's future fitness are determined.

At the beginning of each section the editors

have provided a brief preface that introduces the topic and places the information presented in the chapters within an overall context. Most authors have done outstanding jobs summarizing the subject matter. The topic coverage includes most important aspects of crocodilian management and research. However, a few topics have been neglected. The inclusion of a chapter with CITES statistics on worldwide crocodilian trade would have been very useful in examining current trade in hides and live animals. Also, for many who are just now considering the farming or ranching of crocodilians a summary chapter with basic approaches to captive rearing techniques would have made the volume more complete.

Nevertheless, WILDLIFE MANAGEMENT: CROCODILES AND ALLIGATORS is an impressive volume. It has done a magnificent job in summarizing much of what has been done in the past in the name of crocodilian management, and in many ways sets the stage for future work. It should serve as a standard text in crocodilian biology and conservation. -- John B. Thorbjarnarson, *Florida Museum of Natural History, University of Florida, Gainesville, Florida 32611, U.S.A.*

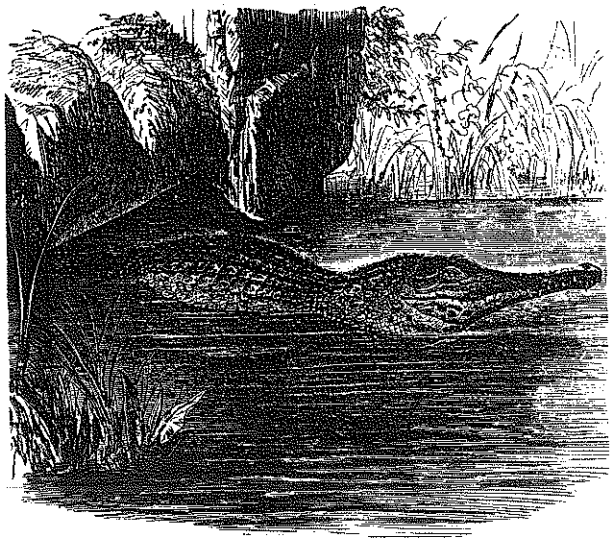
IN THE NEXT ISSUE

■ **CSG REORGANIZATION.** The operation of the CSG and the CSG membership are about to change as a result of decisions taken at the CSG Steering Committee meeting at IUCN headquarters in the World Conservation Center in Gland, Switzerland, 8 October 1989. The changes will be explained in the minutes of that meeting which will be published in full in the next issue of the CSG NEWSLETTER.

■ **CITES 1989.** The next issue also will contain a summary of the decisions involving crocodiles made at the 7th Meeting of the Conference of the Parties to CITES in Lausanne, Switzerland, 9 to 20 October.

■ **PATRONS.** Under a new program explained in the next issue, supporters of the CSG program are being designated 'Patrons.'

■ **10th WORKING MEETING.** More information on the largest ever crocodilian meeting.



Crocodylus cataphractus

THE 10th WORKING MEETING OF THE IUCN/SSC CROCODILE SPECIALIST GROUP

23 to 27 April 1990, Gainesville, Florida, U.S.A.

The 10th Working Meeting of the Crocodile Specialist Group is open to anyone interested in crocodilian biology, conservation, management, and sustained utilization, including ranching and farming. If that encompasses your interests, plan to attend. More than 250 participants are expected, making this the largest 'crocodilian meeting' ever convened.

The meeting will include technical reports on the status of crocodilian populations throughout the world; descriptions of current programs for returning these populations to former abundance or for their sustained utilization; descriptions of the latest developments in farming and ranching husbandry; the newest designs for captive propagation facilities; trends in international trade in crocodilian hides and meat; and the ruses presently being used to trade illegal hides on the international market.

The meeting will feature four specialized workshops on:

- International Trade in Crocodilian Products - chaired by Ginette Hemley. A review of international trade and trends.
- Crocodilian farming - chaired by Jon Hutton. The workshop will produce a major paper on crocodilian farming methods; the latest information on crocodilian husbandry, diets, egg collection and incubation, rearing of young, and breeding facilities. It is planned that the paper be included in a booklet containing an international atlas of existing farms and ranches that is being prepared by Richard Luxmoore and colleagues in the World Conservation Monitoring Centre, Cambridge, U.K.
- Model Crocodilian Management Program - chaired by Dennis David. The workshop will produce an exemplary management program for crocodilians that incorporates both the biological needs of the species and proven methods of regulating exploitation, hunting, ranching, and marketing. Such a management program could serve as a model to be used by the many nations wanting information on crocodilian management.
- Action Plan for Crocodilian Conservation - chaired by John Thorbjarnarson. The workshop will review the threats to crocodilian conservation country by country, cross referenced by species and biogeographic region. In addition, the workshop will produce a priority list of what action needs to be taken to assure the conservation of the various populations.

Participants will take part in airboat surveys of American alligators on Orange Lake, Florida, U.S.A. There will be post-meeting fieldtrips to alligator farms in Florida and to the Everglades National Park.

The 10th Working Meeting of the Crocodile Specialist Group will be cosponsored by the Florida Game and Fresh Water Fish Commission; the American Alligator Farmers Association; the Florida Alligator Farmers Association; and other agencies and organizations.

Help us finalize the meeting program by immediately completing and returning the enclosed pre-registration form to:

Prof. F. Wayne King
Florida Museum of Natural History
Gainesville, FL 32611, U.S.A.
tel: (904) 392 1721
fax: (904) 392 9367

PLAN NOW TO ATTEND!

10th Working Meeting
of the
IUCN/SSC Crocodile Specialist Group

23-27 April 1990
Gainesville, Florida, U.S.A.

Pre-Registration Form

Name: _____

Address: _____

_____

_____

_____

☐ I plan to attend the meeting, but will not give a paper.

☐ I wish to present the following paper(s):

_____

_____

_____

I will need the following audiovisual equipment:

☐ carousel projector for 35mm slides

☐ overhead projector for acetate sheets

☐ VCR video cassette player (NTS format only)

☐ I would like to exhibit the following material(s):

_____

☐ I am interested in participating in a post-meeting fieldtrip leaving from Gainesville to visit Florida alligator farms and ending up at the Orlando International Airport.

☐ I am interested in participating in a post-meeting fieldtrip leaving from Gainesville to visit Florida alligator farms, the Everglades National Park, and ending up at the Miami International Airport.

_____

★ Please complete this form and return it immediately to:

Prof. F. Wayne King
Florida Museum of Natural History
Gainesville, FL 32611, U.S.A.
tel: (904) 392 1721
fax: (904) 392 9367

10th Working Meeting
of the
IUCN/SSC Crocodile Specialist Group

23-27 April 1990
Holiday Inn West
Gainesville, Florida, U.S.A.

Meeting Information

The CSG's 10th Working Meeting will be held at the:

Holiday Inn-West Banquet & Conference Center
Interstate Highway 75 and State Road 26
Gainesville, Florida 32605, U.S.A.

A block of rooms has been set aside for the CSG which must be booked direct by each participant. Any unfilled rooms will be released on 9 April 1990, two weeks before the start of the meeting. You must book your rooms before that date. Confirmed reservations require payment of a one-night deposit in U.S. dollars. Payment can be made by check, money order, or credit card. Reservations can be made by completing the enclosed form and returning it together with payment to Holiday Inn West at the address above, or can be made by telephone or fax and your credit card.

Type of rooms and rates (in U.S. dollars) are:

Single occupancy / two double beds or one kingsize bed = $43.00
Double occupancy / two double beds = $49.00
Double occupancy / one kingsize bed = $49.00

All participants in the meeting must book their own rooms directly with the hotel. Payment must be in U.S. dollars, U.S. dollars travellers checks or money orders, or by major credit card. Foreign currency cannot be exchanged at the hotel.

The weather in Gainesville in April is pleasant. Temperatures should be around 20°C to 25°C (70°F to 77°F) during the day and slightly cooler at night. Rain showers are possible, but should be infrequent. Dress comfortably and informally. Shorts and sandals are fine for men during the day, but long pants and shoes are usual at night.

Gainesville is the home of the University of Florida; Florida Museum of Natural History; Florida Game and Fresh Water Fish Commission Research Laboratory; Payne's Prairie State Preserve; Bivens Arm Nature Park; Morningside Nature Center; San Felasco State Preserve; Kanapaha Botanical Gardens; Hippodrome State Theater; and Harn Art Museum. In addition, numerous other state parks, state geological and historic sites, and national forests are within an hour's drive of Gainesville. Disney World and Kennedy Space Center are approximately 2½ hours away by car. A major shopping mall and a large shopping center are within walking distance of the conference hotel.

Daily flights connect Gainesville Regional Airport (GNV) with Atlanta International Airport (ATL), Miami International Airport (MIA), Orlando International Airport (MCO), and Tampa International Airport (TPA). Gainesville also is served by Greyhound/Trailways bus lines.

Gainesville is about a six hour drive by automobile north of Miami on the Florida Turnpike or I-95 (Interstate Highway 95) and I-75; 2½ hours north of Orlando on the Florida Turnpike and I-75; and 3½ hours north of Tampa on I-75.

10th Working Meeting
of the
IUCN/SSC Crocodile Specialist Group

23-27 April 1990
Holiday Inn West
Gainesville, Florida, U.S.A.

Hotel Booking Form

Your name: _____

Mailing Address: _____

_____

_____

☐ I wish a single room with double/kingsize bed (U.S.$43.00/night).

☐ I wish a room with two double beds (U.S. $49.00/night). I wish to share my room with _____(name of other registrant).

☐ I wish a double room with one kingsize bed (U.S. $49.00/night).

Total Amount Enclosed or Charged $_____._____ in U.S. dollars.

☐ Check Money order Visa Master Card American Express

Credit Card Number _____ Expiration Date _____

I will arrive in Gainesville on ____ April 1990, at ____ o'clock, and will depart the hotel on ____ April.

I expect to arrive on _____ airline, flight _____.

Other comments: _____

_____

★ Please complete and return, together with deposit, to:

Holiday Inn-West
7417 NW 8th Ave.
Gainesville, Florida 32605, U.S.A.

Attention: Sales Department

tel: (904) 332 7500
fax: (904) 332 0487
international reservations: (800) HOLIDAY / (800) 465 4329
toll free U.S.A. reservations: (800) 426 4287