

CROCODILE SPECIALIST GROUP

NEWSLETTER

VOLUME 7 ■ JANUARY 1988 - DECEMBER 1988



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

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Conservation of Nature and
Natural Resources

Species Survival Commission

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COVER PHOTO: Hatchling dwarf caimans,
Paleosuchus palpebrosus. New York Zoological
Society photo.

EDITORS' COMMENTS

With 1988 at its end, we are sending you the record of correspondence we received in the past year. The trend has been toward the establishment of more crocodile farms and the loosening of international controls on trade in some crocodilian species from some areas.

Although early in the year the U.S. market for crocodile skin products appeared to have dried up, the social climate here, which includes conspicuous consumption and ostentation by the very rich, a low value of the dollar internationally, and consequent influx of tourists into the U.S., has led to a market for very high priced, but not necessarily high quality, products (see the TRADE section).

The NEWSLETTER's new format received quite a few positive comments and only one or two negative ones. We appreciate hearing from you, even if you only wish to comment on the NEWSLETTER.

We received a number of suggestions from our readers on ways to improve the NEWSLETTER. Some we already are incorporating, such as publishing short research reports that would otherwise not be published. Other suggestions will not be incorporated at this time, but certainly give all of us with the CSG ideas for future services. For example, although we agree that putting in addresses of authors of publications would be a useful improvement, the NEWSLETTER is not constituted as a bibliographic source. That would expand the size of the publication, making printing and mailing costs much higher. Already our mailing list contains at least twice as many names and addresses than the actual numbers of people who are active in the field, so there is little justification for this added expense. Certainly a bibliographic service could be a function of the CSG. This should be taken up with the CSG Chairman by those readers who would like to see such an extensive bibliographic service (also, see the note on CROCLIT in the REQUESTS section). For now, in most cases, addresses may be obtained from the CSG Chairman.

Several of our readers suggested we list all articles on crocodilians from publications we receive that may have most or all of each volume or issue devoted to crocodilians. Again, although we did this to some extent in this issue of the

NEWSLETTER, we will not be doing so in the future. One publication that has excellent notes on crocodilians is Hamadryad, which is published by the Madras Crocodile Bank. (See the NOTES section for Rom Whitaker's address.) Subscriptions are very inexpensive and the money assists Rom and Zai Whitaker with their work. Anyone interested in a subscription should contact Rom.

Getting back to the large size of the mailing list, it seems to grow and grow at a rapid pace. This would all be well and good if the NEWSLETTER were a money-making, or even a self-sustaining, venture, but it is not. In fact, many of the tearsheets we receive have on them statements like, "I'm not in the field but I enjoy your publication." We went through over 400 copies of our last NEWSLETTER in three separate printings! We must cull the mailing list. In fact, if we wish to qualify for less expensive U.S.A. postal rates, the NEWSLETTER must be a controlled circulation publication. This means that, even though the NEWSLETTER is sent at no charge, all recipients must qualify to receive it. All CSG members, and anyone else who has a letter of appointment from the SSC Chairman for a position with the CSG, qualify to receive the NEWSLETTER. In order to continue receipt, you must complete the tearsheet, indicate how you qualify, and return it to us. For those of you who will be cut from the mailing list, the publication is available at natural history museums in many areas (e.g., British Museum (Natural History), American Museum of Natural History, Australian Museum, Bombay Natural History Society, Field Museum of Natural History, Florida Natural History Museum, U.S. National Museum of Natural History (Smithsonian Institution)). If you would like to know who in your area is receiving the NEWSLETTER so that you may have access to it, write to the CSG Chairman.

We wish all of you a healthy and productive 1989!

SUPPORTERS

Building on the decisions taken by the CSG members at the 8th and 9th Working Meetings of the CSG in Ecuador and Papua New Guinea, respectively, to seek support for the operation of the CSG (as opposed to support for specific field

projects) we wish formally to acknowledge the assistance the CSG received in 1988:

The University Foundation for Physics, University of Sydney, Australia, supported publication of the PROCEEDINGS OF THE 8TH WORKING MEETING and the SPECIAL PROCEEDINGS.

The Nixon Griffis Wildlife Conservation Fund of the University of Florida Foundation, Gainesville, Florida, supported operation of the CSG chairman's office and program, and publication of the PROCEEDINGS OF THE 8TH WORKING MEETING and the SPECIAL PROCEEDINGS.

Rafael and Lucy Leon, Key Biscayne, Florida, USA, provided travel assistance for delegates from tropical nations and graduate students to attend the 9th Working Meeting of the CSG in Papua New Guinea, and supported operation of the CSG chairman's office.

Jacques Lewkowicz, Société Nouvelle France Croco, Paris, France, supported publication of the PROCEEDINGS OF THE 8TH WORKING MEETING, and translation into Spanish of articles on crocodilian farming for publication and distribution in Central and South America.

Mainland Holdings Ltd., Lae, Papua New Guinea, underwrote much of the cost of the 9th Working Meeting of the CSG in Papua New Guinea, provided on-site support in the form of both funding and personnel for the meeting, and underwrote the travel costs and other expenses for many delegates attending that meeting.

AREA REPORTS

AFRICA

Botswana:

Dr. Malumo Philip Simbotwe of the Department of Wildlife and National Parks in Gaborone reports that the two farms in Botswana continue to grow and will start producing skins in 1989. Two other farms will open soon. To enhance sustainable conservation, he is carrying out a crocodile census and monitoring program that covers the whole

country. Mr. Alistair Graham and Dr. Simbotwe are presently writing a paper for Biological Conservation on all that is known about Botswana's endemic crocodiles. Malumo is quite taken by the great Okavango swamp and all of its wildlife.

Central Africa Republic:

Olivier Behra of the Museum National d'Histoire Naturelle, Paris, France, did a preliminary survey of crocodiles in central Africa and Madagascar, including Cameroon, Congo, and the Central African Republic.

Floris Deodatus, P.N.U.D. project, Bangui, reports that since 1 July 1988, he is in the C.A.R. to start a crocodile conservation and management project for the FAO. He reports that good crocodile records are absent, and during the last decade crocodiles in that country have been seriously depleted through poaching. Only three were seen in the south during a CITES survey last April. Lack of finances, qualified personnel, and proper management makes the introduction and execution of a good crocodile conservation plan very difficult. There is no experience in crocodile farming in the country. The first phase of the project will involve a feasibility study to provide information for investors. The next phase will be to compile data for the collection of eggs to fulfill the CITES quota request. Parallel training of local farmers will then take place.

Kenya:

Ariel Zilber and Kobi Kagen of the Mamba Crocodile Farm Ltd., Mombasa, tells us that the farm is located on the Kenya coast in Mombasa, near the Bamburi Nature Trail. The farm was established in 1984 and is owned by CLAL Israel Crocodile Farm. The farm has over 8,000 crocodiles; 73 are fully grown breeding females and 30 are mature males. Thirty-one nests produced 950 hatchlings in 1988, which grew at a rate of 4.8 inches per month. The farm is also run as a ranch with the authority of the Kenyan government. Hunting has been banned since 1977, resulting in a great increase in the crocodile population and danger to local villages near the river bank. Crocodiles are reported to take a human life every other day. They continue to

increase the breeding stock of crocodiles by taking animals from the river and by the collection of some eggs, which have a 70% hatching success. After running the farm for 4 years, they have the capability to export 2,000 skins a year and utilize the meat locally. They are doing scientific research under Ariel on the effect of stocking densities on growth rates of *Crocodylus niloticus*, as well as on rearing crocodiles in dark and semi-lighted ponds.

Zimbabwe:

Dr. E.V. Cock, Harare, tells us that crocodile populations are continuing to increase and are getting to be a problem in Lake Kariba.

ASIA

Burma:

We have no current news about Burma. In fact, we are not even sure that any of the people in Burma to whom we send the NEWSLETTER ever receive our publication or exist at the addresses they supplied. Nevertheless, we received copies of the November 1987 and February 1988 issues of the Ex-CBI Roundup, a newsletter for U. S. military veterans who served in China, Burma and India during World War II. They contained articles repeating the fictionalized account of the night of 19 February 1945, on Ramree Island in the Bay of Bengal, when crocodiles were reported to have eaten and/or killed many of the 1000 Japanese troops reported to have been trapped in the swamp. Between gunfire, drowning and the crocodile rampage, only 20 men are supposed to have survived the night. This account has been discredited by war records and the officers who were there, but the story is too fantastic to die away.

China:

Prof. Huang Chu-chien of Institute of Zoology, and Prof. Shih Ying-hsien of the Institute of Developmental Biology, both of Academia Sinica, Beijing, hosted Satoshi Kimura and Sadao Tambe of the Atagawa Crocodile Farm and John Behler of the New York Zoological Park in May. The group was not allowed to visit the Anhui Research Centre of

Chinese Alligator Reproduction in Xuancheng because it was temporarily closed due to irregularities in the Centre's dealings with export of animals (see NEWSLETTER, Vol. 6 for a description of these irregularities.). Prof. Shih, who visited New York this summer, assured Myrna that the problems at the farm have been corrected and the staff is very honest and competent. The farm has since reopened.

Prof. Huang related the following information about the Changxing County Chinese Alligator Farm in Zhejiang Province. The farm was established in 1982. It currently has a total of 72 alligators, including 15 hatched in 1988, 21 hatched in 1987, 14 hatched in 1986, 12 hatched in 1985, 6 hatched in 1984, plus four breeding adults. The farm, which was set up by local peasants, is supported by the government. People at the farm are concerned that funds available to them are not sufficient to continue to manage the operation.

Prof. Huang wrote that his future work will be done in close coordination with the Ministry of Agriculture, under the Chinese Aquatic Wild Animal Protection Project. He would like to collaborate with his foreign colleagues.

Prof. Shih Ying-hsien reported that she and her co-workers will be studying the "DNA of various species of alligators and crocodiles."

A delegation from the Anhui Centre and its parent groups, the Department of Forestry of Anhui Province and the Ministry of Forestry, visited the U.S. in the spring of 1988. They visited Ted Joanen and Larry McNease at Rockefeller Refuge in Louisiana; the staff of the St. Marks National Wildlife Refuge in Tallahassee, Florida; and the CSG chairman at the Florida Museum of Natural History and the alligator research and management program staff of the Florida Game and Fresh Water Fish Commission in Gainesville.

Included in the delegation was our longtime friend and correspondent, Chen Bihui, who, after the trip, reported on some work he has been doing on the lingual gland of the Chinese alligator. He found that animals whose stomachs were irrigated with an NaCl solution produced chloride ion from the lingual gland, while those that were irrigated with distilled water did not produce the chloride ion. He suggested that the Chinese alligator's lingual gland functions as a salt gland.

India:

Dr. Lala A. K. Singh has moved to the Similipal Tiger Reserve in Orissa. His responsibilities, aside from developing a research and training program for the Tiger Reserve, are to:

...look after the work of the Gharial Project at Satkoshia Gorge Sanctuary and advise on the mugger project at Ramatirtha, which is under the management of the Similipal Tiger Reserve. The project at Ramatirtha was started in 1979. Captive breeding commenced in 1984. The offspring from the project are restocked in the river system inside Similipal Tiger Reserve. On the 5th December 1987, 39 juveniles were released in R. Budhabalanga. The total release in Similipal to date (Dec. 1987) is 159. The captive stock at Ramatirtha is 83, and includes 6 adults (2+4). In River Mahanadi, a census of gharial and wading birds is now (Dec. 1987) in progress. By the end of October (1987) a total of 529 gharials had been released in the river.

Lala reported the following in January of this year (1988):

A crucial meeting of the Technical Committee on Crocodilian Management (of the Government of India) was held recently (19-27 Jan.). The committee consists of six members including four wildlife State-Heads, an FAO expert and myself as the Convenor. Mr. V. B. Singh (Ret'd. Chief Wildlife Warden of Uttar Pradesh, now Wildlife Advisor to the Uttar Pradesh Government) is the chairman of the six member committee. A large number of recommendations are now getting final shape for communication to the Government of India. We plan to elevate a few of our 13 existing crocodilian sanctuaries to National Crocodilian Reserves. The location for pilot closed-circuit mugger farming have been finalized. We now stop collection of eggs for *palustris* and *porosus*. The stocks are piling up due to operations of previous years and captive breeding. Identified natural areas have responded well to release programs. Reports of nuisance *C. porosus* are worrying everybody -- particularly the reports from

Andamans. In February (1988) I should be there studying the situation to draw some management programs on a long-term basis. There are various other recommendations.

Lala has since sent along tables listing 29 captive rearing/breeding programs and 34 sanctuaries and other areas offering protection to crocodilians, and the breeding successes in these areas.

In April, Lala (who, along with Huang Chuchien, is one of our best correspondents) sent the following table and some additional information:

<u>Releases during</u> <u>1987 and 1988</u>	<u>Total released</u> <u>in this location</u> <u>to date</u>
Gharial (R. Mahanadi): 125	531
Mugger (Similipal): 52	171
Mugger (R. Mahanadi): 0	112

They plan to release gharial "in Brahmani River where the species is to be reintroduced. Re: mugger research at Ramatirtha (Similipal) - a mini-project on territorial basking in relation to breeding behavior through studies on a captive group of 2M:4F."

Rom Whitaker, Director of the Madras Crocodile Bank, wrote to us in March that up to that date he had 96 mugger nests and his caiman and *C. porosus* had not yet laid eggs. He also wrote:

We are deeply engaged in producing a film for the Children's Film Society of India about a little village boy who makes friends with a crocodile in a jungle pool. The film should be complete by October and, hopefully, the overseas audience will get to see it. ... our Curator, Harry Andrews, will be attending the Summer Course at Jersey this year followed by a stint with Ted Joanen and his team at the Rockefeller Refuge.

Indonesia:

Scott Frazier, the Monitoring Officer of the FAO Crocodile Project, sent along photographs (see facing page) of what may have been a record-sized *Crocodylus novaeguineae* that they

found, dead, on the Mamberamo River in Irian Jaya. The animal was a male with a total length of 3.47 m. It apparently was killed by hunters.

Mr. Syafii Manan, Director of Nature Conservation of the Ministry of Forestry, Bogor, Java, wrote, "Our office as CITES management now is cooperating with FAO crocodile industry development project in Irian Jaya."

Malaysia:

Rob Stuebing of Jabatan Biologi, UKM - Sabah, sent us this report:

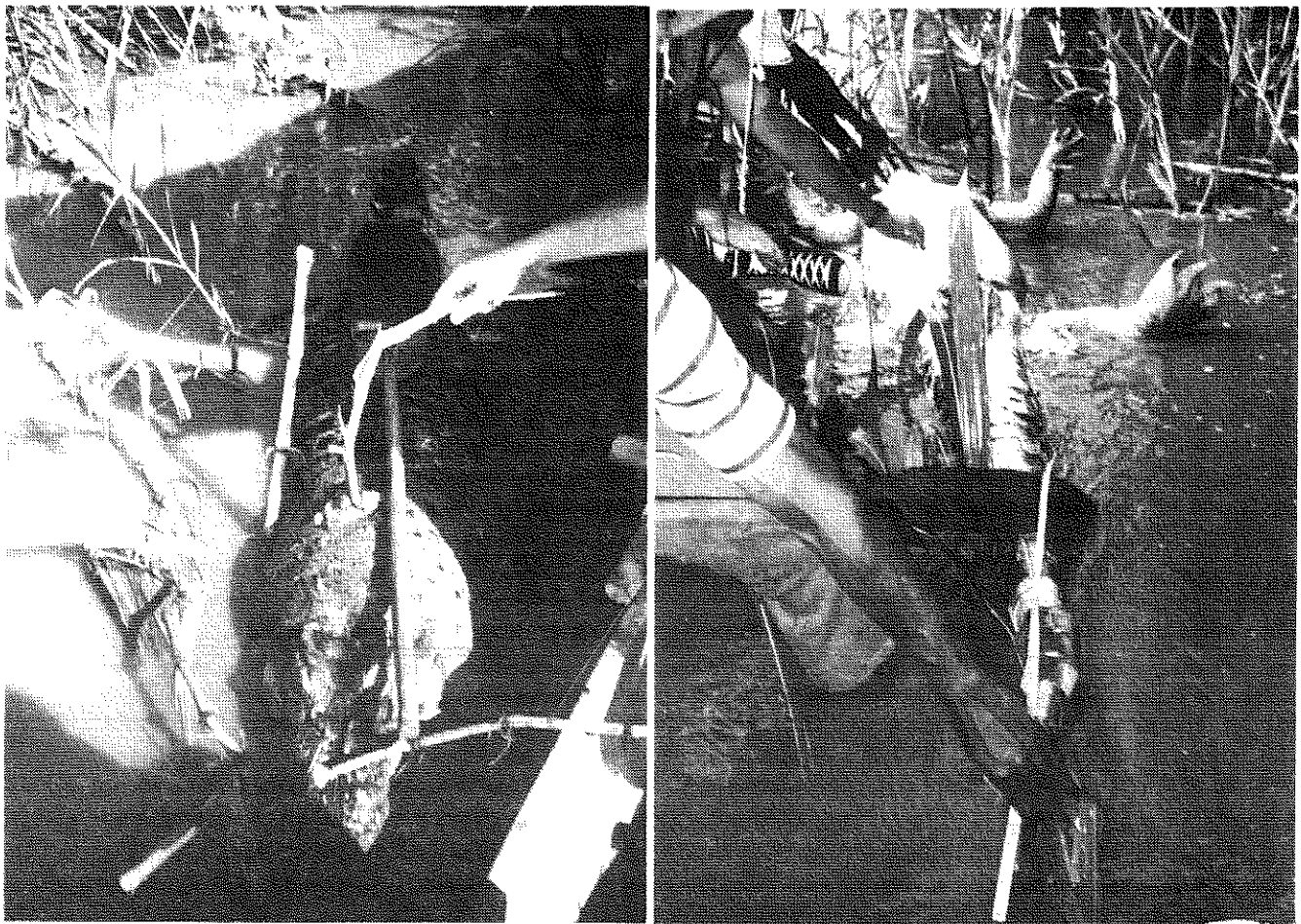
There is good news and bad news, so to speak. The bad news is that although *C. porosus* is officially a protected species in Sabah, hunting (poaching) continues unabated. The good news is that currently the crocs appear able to withstand widespread poaching and remain numerous. We have just (June 1988) completed one year of surveys along a 37 km stretch of the Klias River in western Sabah. The area is part of a previously degazetted (1984) national park, and remains largely undisturbed by man. Severe fires over several years (1983, 1987) destroyed much of the swamp forest surrounding the river, but a fringe of forest remains along the river banks. Wildlife abounds, including substantial numbers of *Nasalis larvatus*, the proboscis monkey.

Twelve spotlight surveys over 10 months beginning in July '87 produced from 6-20 *C. porosus* sightings per night, and by February '88 we calculated that a population of approximately 90 crocodiles must be present within the 37 km study area.

We had an opportunity to check our results when in April we received firsthand reports that 48 crocodiles had been taken by poachers in March from our study area. Our contact in Kota Klias had been able to verify the total. On April 17, we conducted another night survey of the same area, in exactly the same way as previously, and counted a total of 15 crocs.

Needless to say, we were surprised to find that the observed numbers had remained virtually the same.

This is the same river which was mentioned in a World Wildlife Fund report



The record 3.47 m (= 11.39 feet) *Crocodylus novaeguineae* found dead Irian Jaya's Mamberamo river. Scott Frazier photo.

in 1984 (IUCN/WWF Project No. 3127) as having only 0.05 crocs per km. In that same report, *C. porosus* was said to be "severely depleted" in Sabah.

The bottom line is that if ecosystems remain undisturbed, saltwater crocs are very resilient.

Singapore:

A letter from Mr. Richard Tan Chye Hock, Assistant General Manager of the Jurong Crocodile Paradise Pte. Ltd., 5001 Beach Rd., #02-23, Golden Mile Complex, Singapore 0719, was received by Dr. King in January, 1988. In it, Mr. Tan stated the following:

Personally, we have proved to some critics in Singapore that it is possible to

breed crocodiles in Singapore and we have hatched some 2,000 hatchlings.

Though our interest in its commercial elements cannot be denied, the positive experiences in farming and breeding have further reinforced our conviction to adopt crocodile farming and conservation seriously in order to ensure the continuity of this remarkable reptile.

Regarding our Research and Development Laboratory, we have made arrangements with Dr. P. Gopalakrishnakone of the National University of Singapore Department of Anatomy of 10, Kent Ridge Crescent, Singapore 0511, and will be working out the Laboratory equipping and research studies with him when we draw closer to the

completion of our new Jurong Crocodile Paradise.

Tagging is currently applied to skins only, and we wish advice on tagging live crocodiles in order to improve management. It would be easier if the information regarding its sex, year of birth, date acquired, date caught, F1 or F2 stocks, serial number, ISO code, weight, and girth size at tagging dates are recorded in the tag as it will enable us to improve our farming methods. We would appreciate any comments on the above tag information and any other vital statistical data which we may have omitted.

NOTE: Jurong Crocodile Paradise later decided to use monel tags, bearing only the animal's serial number, placed through the first and second single caudal crest scutes.

AUSTRALIA/OCEANIA

Australia:

CSG Deputy Chairman Harry Messel informs us that the tidal systems of Port Musgrave in Cape York Peninsula, northern Queensland, were completed in August 1987 and some excellent results were obtained. There is little doubt that Port Musgrave has prime habitat for *Crocodylus porosus*. The population there is recovering in spite of the continued heavy losses of larger animals through drowning in barramundi fishing nets. A paper has been published on the results. Those surveys completed the University of Sydney's 17-year crocodile research program in northern Australia. Prof. Messel is very pleased with the results. These have mostly appeared in the 20 monographs published by Pergamon Press. Much, however needs to be done, but there is now growing number of younger researchers interested in researching crocodiles. That is an encouraging sign for crocodile conservation in northern Australia, and should be encouraged.

Our work has shown that the Alligator Region River systems in Kakadu National Park form the most extensive and best type I river systems in Australia for *C. porosus*. Now that barramundi net fishing is being phased out of the systems, the time is right for a systematic long term (50 to 100 years)

crocodile study program to be instituted. This project would be beyond any one individual and would have to be government supported. We surveyed the systems in the regions in 1977, 1978, 1979, and 1984 and there is thus a good baseline data base to carry on from. About six weeks of surveys would be required each year. Here is a marvelous opportunity for the government to provide leadership in Kakadu National Park.

Grahame Webb, Winnellie, N.T., informs us that all three N.T. farms are now exporting skins and the monitoring program for skins and flesh are working well. All major research programs are centered on nesting, raising hatchlings, effects of incubation temperature on eggs, and monitoring wild populations. All goes well.

Harvey Cooper Preston, Berrimah, N.T., is currently working on nuchal plates and femur bones of *Crocodylus johnstoni*. She says she is recovering nicely from leg operations resulting from a crocodile bite nearly a year ago, and should be back at work soon.

Philippines:

Mr. Supremo Tito L. Osario, RP-Japan Crocodile Farming Institute, Puerto Princess City, Palawan, reports that the first issue of the CFI NEWS (the publication of the Institute) came out in April 1988, with Mr. Osario as Editor-in-Chief. (We would like to receive copies of the publication if at all possible - eds).

CENTRAL AMERICA

Honduras:

CSG Chairman Wayne King reports that the Ministry of Renewable Natural Resources and the CITES Secretariat are starting a survey of Honduras crocodilians under the direction of CSG member Mario Espinal and Carlos Cerrato of the Nacional University of Costa Rica. The survey will get underway in February 1989 and will yield data necessary for establishing a conservation and management program for *Caiman c. fuscus* (= *Caiman c. chiapasius*). The

conservation program, including a long term monitoring scheme, may be developed by Tommy Hines (Natural Resources Planning Services, Florida) with funding from U.S. AID.

Apart from caimans, Honduras also is the center of captive propagation efforts for the American crocodile, *Crocodylus acutus*. Adolfo Midence has already established a farm for *Crocodylus acutus* immediately east of Trujillo on the north coast of Honduras, and a second farm is being established by Eric Fernandez near San Pedro Sula. In their second year of captive breeding, the animals produced 17 nests and 540 eggs. The eggs were artificially incubated and produced 385 hatchlings for a hatching success of 71%. Similar CITES programs are being planned in Colombia, Panama, and Peru.

NORTH AMERICA

Mexico:

Marco Lazcano is researching *Crocodylus moreletii* in the Sian Kaan Reserve in the Yucatan peninsula.

United States:

Kenneth Geiger of Swampy Acres Alligator Farm, Sebring, Florida, tells us that they were successful in raising hatchling American alligators from hatchlings to 36 inches in 6 months by controlling heat conditions, dietary supplements, and reducing stress. (Are you sure your formula does not contain some pixie dust, Ken? When can we get reservations? - eds.)

The American Alligator Farmers Association is a professional membership organization founded in Florida in 1986. It serves the alligator industry through research and extension, and representation to government regulatory agencies. The association actively supports conservation of alligator populations in the wild. Currently, 36 Florida alligator farmers are members. A new chapter has been formed by four farmers in Georgia. In addition, buyers, tanners, and manufacturers are associate members of the AAFA. Quarterly meetings are held. In April, the meeting was held at Shlomi

Ranot's Gator Jungle in Christmas, Florida, where he demonstrated processing procedures. Helico Co. also gave a program on solar systems.

Roland Coulson was honored at a three day symposium on crocodilian biology, in conjunction with the annual meeting of the American Society of Zoologists in New Orleans in December 1987.

Steven W. Ruckel, biologist in charge of the Georgia alligator program sent us a Georgia alligator fact sheet. To summarize: The population of American alligators is estimated to be about 100,000 animals, largely located south of the Columbus/Macon/Augusta line. There is an estimated 2 million acres of habitat and surveys have been conducted annually since 1973. While gator populations have been increasing, there have been no reports of attacks on humans. While hunting is not permitted at the present time, the Georgia law was amended to provide a legal basis for instituting a harvest should it become appropriate. A proposal is under consideration to allow the hunting of nuisance alligators by qualified persons under contract to the Department of Natural Resources, if there is a threat to people or livestock. Biologists believe there may be a time when the harvesting of animals is possible in certain localities under strict control.

The state of Florida has been the scene of several highly publicized alligator attacks. Actually, one newspaper reported there had been only 7 deaths attributed to alligators in the last 40 years, and that 46 professional state trappers had killed 3,853 alligators in 1987 that were considered to be menacing people or livestock. Trappers then sell the skin, which brought over \$46 a linear foot last year, and the meat. In Englewood, a 4-year old girl was killed in June as she walked along a pond at 6:30 PM. A 12-year old girl in Port Charlotte was caught by a 3.5 ft. long alligator that seized her leg as she was swimming. The alligator released her.

On another note, the first full scale alligator harvest in 26 years was authorized in Florida on 30 September 1988. Officials expected more than 3500 alligators would be killed. The state population is estimated to be about a million animals.

SOUTH AMERICA

Argentina:

Tomas Waller, Federal Capital, is a new addition to the mailing list and is working on crocodilian conservation problems in French Guiana. (Welcome! - eds.)

Brazil:

Peter Brazaitis together with Carlos Yamashita and George Rebelo completed Phase I of the CITES Central South American Caiman Study (Brazil) in November 1987. While the work focused on the region south of the northern border of Bolivia, the team members continued working with available funds and began surveys in Amazonia and northeastern Brazil. George Rebelo suffered a shoulder injury from which he recovered after some surgery. The team covered over 5,500 km and surveyed all of the major rivers in the region. Over 2,000 blood, tissue, and skin samples were taken for biochemical systematics studies which are being done at the present time in New York. This year the work continues north into Amazonia. Species distributions are being confirmed while sites for in-depth population studies are being targeted. Their report will be available in the near future for those that are interested, as it has just been officially released to the Brazilian government from the Office of the CITES Secretariat.

Bill Magnusson reports from Manaus that a pair of *Paleosuchus trigonatus* he has had for 5 years in captivity had laid eggs and hatched 2 young out of 11 eggs. No visible nest was built. He says he will teach them the nesting end of it next year! Bill also feels that the classic skin trade is stable for now but that the caiman skin trade is very unpredictable but promising.

Zilca Campos of EMBRAPA, Corumba, is now doing caiman studies for her master's degree under Bill at INPA in Manaus. Zilca is a fine biologist who worked with the CITES Brazil team in the Pantanal last year.

George Rebelo, INPA, Manaus, spent January and February 1988 working in the

Pantanal with Guilherme Borges and Amacheto Aituls on the nesting of *Caiman c. yacare*. Thirty four nests were located. Based on talks with farmers and cowboys, George feels that hunting is being reduced in the Pantanal. The Forestry Guards are largely responsible. Hunting parties from Bolivia and Paraguay appear less active.

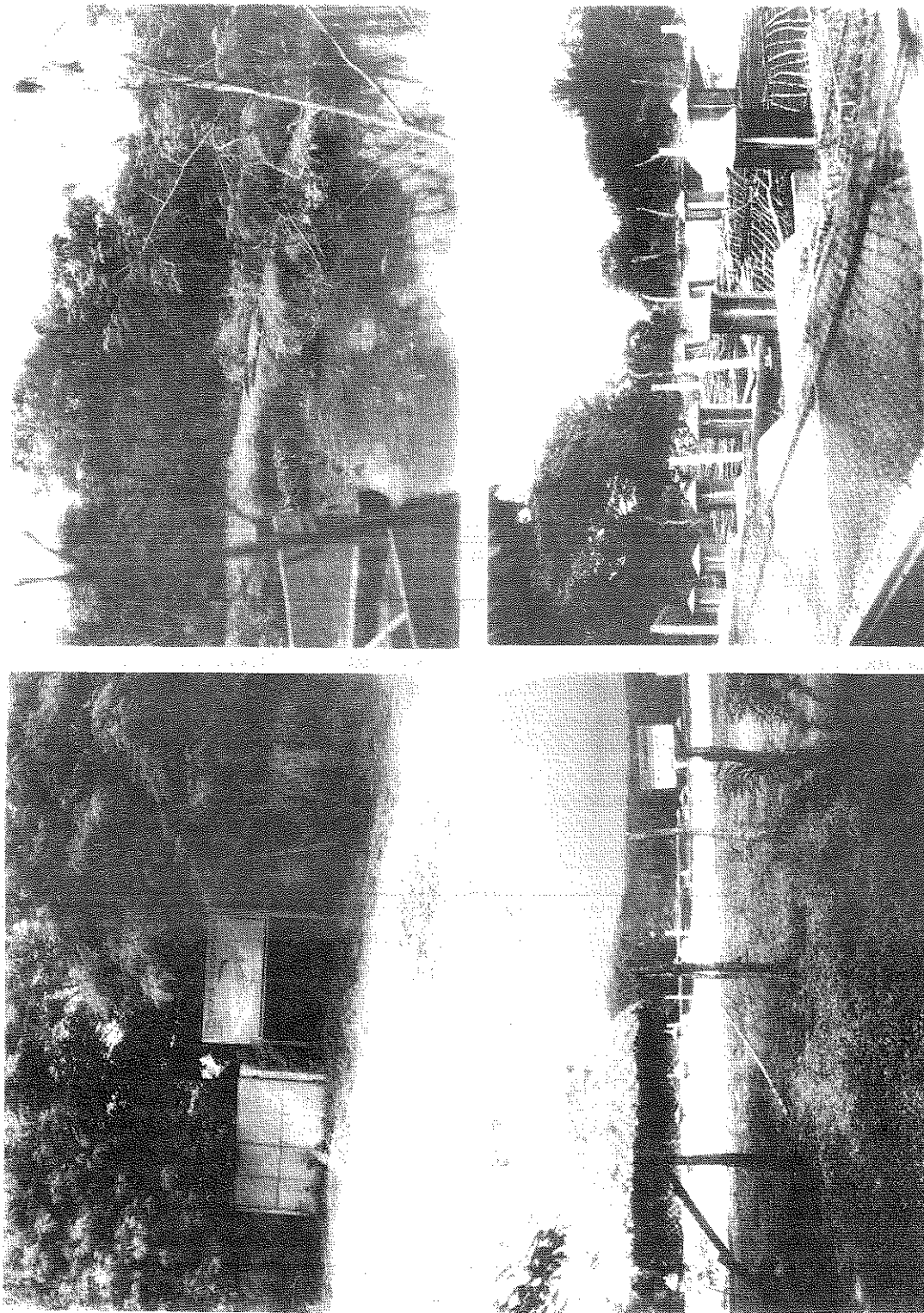
Colombia:

Welcome to CSG Member Miguel A. Rodriguez Melo, Director of Biological Research, Monterrey Forestal Project, Zambrano - who is working on neonates and juveniles of *Caiman c. fuscus*. He also files this report on the *Caiman crocodilus fuscus* and *Crocodylus acutus* pilot farm experience in northern Colombia.

Zambrano is a small town located in the lowland areas of the Magdalena river, 170 km from the northern Caribbean coast of Colombia. Nearby, two forest product companies, Pizano S.A. and Monterrey Forestal Ltda., have been establishing and managing commercial plantations of native trees for the last seven years. Additionally, an experimental crocodile farm has been developed on a pilot scale for the local species *Caiman c. fuscus*, 'babilla' or 'brown caiman,' and *Crocodylus acutus*, 'American crocodile' or 'needle caiman.' The objective is to obtain enough biological and economic information to determine the potential that these species have for production of meat and hide.

According to Colombian laws, farming operations are based on the rearing of hatchlings obtained exclusively by reproduction in captivity from stock legally taken from the wild for that purpose. A research program was initiated in 1983 to establish operational parameters for the farm.

The first step was to develop a diet that was nutritionally sound and economically feasible. Summarizing the results obtained after four years of research; initially 18 to 20 months were required to raise a *Caiman crocodilus fuscus* to commercial size while currently only 8 months are required. The work on growth was complemented by observations on growth rates of the species in the wild (see article listed in the PUBLICATIONS RECEIVED section).



Entrance to the Monterrey Forestal's crocodilian breeding enclosures in Zambrano, Colombia (upper left). Breeding pond for *Crocodylus acutus* (upper right). Rearing pens for farm produced *Caiman crocodilus fuscus* (lower left) have wire covers to keep out birds of prey and fluorescent light traps to attract insects for food at night (lower right). Miguel A. Rodriguez M. photo.

Concerning reproduction in captivity, we can report that two consecutively filial populations of brown caiman have been obtained, and that the research will establish the number and optimum proportion of breeding animals and the kind of enclosures that will yield the number of hatchlings per year that are needed to make the farm operation economically feasible. We are also developing a project on female endocrine physiology, behavior and management of dominant males, and the relationship between the reproductive index of different captive groups and the wild populations. Results after two breeding seasons show that *Caiman c. fuscus*, under proper management, has high potential to maintain a population for a farming operation basically based on the reproduction of captive breeding stock in contrast to other big crocodilian species.

The Zambrano farm also has a brood pair of *Crocodylus acutus* that in 1987 produced the first filial group of 9 animals which has permitted us to evaluate the management methods to raise the American crocodile. In addition to this group of animals, we have two other females that will be ready for reproduction in early 1989. Our purpose is to initially develop a reproduction and conservation plan for *Crocodylus acutus*, a species almost eliminated in the wild 30 years ago, and, subsequently, to develop a commercial plan for hides and meat.

Ecuador:

John C. Jahoda of the Department of Biological Sciences, Bridgewater State College, Bridgewater, Massachusetts, reports on his field work on caiman and black caiman in Zancundo Cocha, Ecuador. He reports a *Caiman crocodilus* of very large size and having skull proportions not unlike some of those of Colombia. A population of over 100 *Melanosuchus niger* were studied.

Guyana:

Rabindra Singh of the Environmental Research and Information Unit of the Institute of Applied Science and Technology, Georgetown, files this report on the licensed export of caiman

skins from Guyana for the years 1982 to, and including, 1987. The ban on exports in Guyana was lifted effective 1 October 1987. (Given the actual numbers of skins that are invoiced from Guyana in international trade, it suggests that many skins may be illegally exported without license - eds.)

In March 1989, Phil Hall, University of Florida, Gainesville, will travel to Guyana as part of the CITES / Ministry of Agriculture crocodilian survey project. The survey should take 90 to 150 days to complete. When the survey is finished, Phil hopes to remain in Guyana to continue studies on black caiman.

Peru:

Linwood Pendleton, Princeton University, Princeton, N.J., continues to study the partitioning and co-existence of caiman and black caiman in Manu National Park.

Surinam:

Dr. Marinus S. Hoogmoed of the Rijksmuseum van Natuurlijke Historie, the Netherlands reports that his doctoral student, Paul E. Ouboter, is working in Surinam on the differences between niches of *Caiman* and *Paleosuchus* between now and 1991. He also says that trade in skins has diminished in the Netherlands. Paul Ouboter, at the National Zoological Collection of Surinam, Paramaribo, says his study on the status and ecology of *Caiman* and *Paleosuchus trigonatus* in Surinam is continuing.

Venezuela:

Tomas Blohm reports great breeding success at Hato Masaguaral in Venezuela involving the *Crocodylus intermedius* breeding program. The old male (not Tomas - eds.) is 3.77m long and is a beast! They have hatched over 90 animals and in addition report the hatching of two *Crocodylus acutus* from their pair of 35-year old animals. Studies on the caiman population there also continue at a quick pace under John Thorbjarnarson (he is off to another year in the Llanos), Gustavo Hernandez, Ildemaro Gonzalez, and Maria Munoz. John has 40 caiman wearing designer radio transmitters.

MIDDLE EAST

Israel:

Dr. Ilan Karplus, Fish and Aquaculture Research Station, Dor Mobile Post, Hof Hacarmel, informs us that he is working on the social behavior of *Crocodylus niloticus* at the Gan-Shmul crocodile farm. He intends to work in collaboration with Emanuel Solnik and other members of the kibutz and later with graduate students, focusing on communication, agnostic, and reproductive behaviors. Ilan is most enthusiastic and wishes to communicate with anyone in the scientific community working with crocs.

Our old friend Yehuda Werner writes from the Hebrew University in Jerusalem that he will write an article for the NEWSLETTER on the identity of the extinct Israeli crocodile.

ARTICLES

COMMENTS ON THE LIVE-TRAPPING OF WARY CROCODILIANS - Philip M. Hall, Department of Wildlife and Range Sciences, 118 Newins-Ziegler Hall, University of Florida, Gainesville, FL 32611-0304, USA.

Recently, F.J. Mazzotti and L.A. Brandt (1988). A method of live-trapping wary crocodiles. *Herp. Rev.* 19(2):40-41. presented an innovative trap design for the live capture of wary crocodilians that offers the appealing advantages of being baitless, inexpensive (<\$10), plus extremely lightweight (<1 kg) and portable. I experimented with this design in 1987 to trap female American alligators (*Alligator mississippiensis*) at their nest sites in northcentral Florida, and here offer comments on its use and improvement.

First, the fiberglass flag poles should be taped with duct tape at intervals of 15-20 cm rather than about 30 cm as originally illustrated in order to minimize the possibility of breakage of one or the other poles when activated. Second, I found that taping the wire set snare in position was less efficient than using a hatchet to notch the top of the stake in which a snare could be securely positioned without tape. Third, an important practice used by Mazzotti and Brandt,

but not mentioned in their article, is that the wire snares be lubricated prior to initial use by coating with a Teflon based product such as Tri-flow (Thompson and Formby, Inc., Memphis, TN 38117) and then also sprayed liberally with WD-40 (WD-40 Co., San Diego, CA 92110) to retard rusting. These products should be applied periodically after several captures to ensure their effectiveness. Last, for anchoring the snare rope, I prefer the use of eye-ring iron stakes (such as used for securing mobile homes) screwed into the ground, rather than tying to natural vegetation. I used 1.2 m (4 ft) length rods which held animals up to 3.4 m overnight. However, I believe that a 0.9 m (3 ft) length rod would suffice for capture purposes. Trapping success seemed to improve if two or three traps were set on different approaches to the nest. Snare lines at such sites were tied to a single iron rod, taking care to ensure that the lines were long enough to allow a captured animal access to water.

I believe that further experimentation with the Mazzotti-Brandt trap will show that it can be adapted for use as a baited set for capture purposes other than at nest sites (e.g., nuisance animal control). Most important, though, is that determined researchers are now afforded a feasible method of obtaining hitherto difficult and rarely acquired accurate data on nesting female crocodilians. I strongly encourage others to experiment with this method and I welcome correspondence on their experiences.

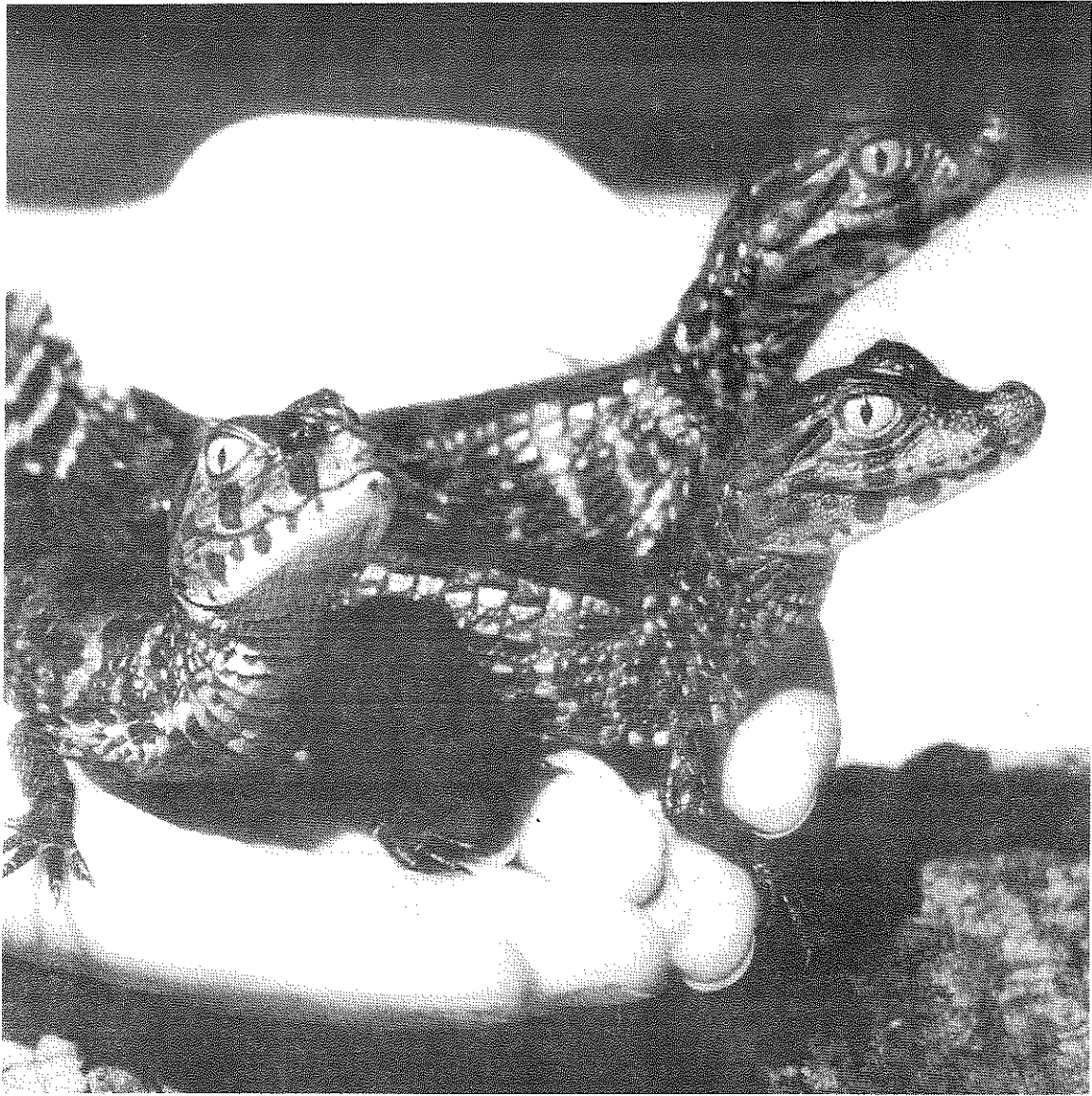
ZOOS

From Rene Honegger the following zoo reports are filed:

Emmen/The Netherlands - One pair of adult *Crocodylus cataphractus* bred in 1987 and produced 7 hatchlings. The animals also bred in 1988.

Copenhagen Zoo - June 1988, announced the hatching of 4 *Osteolaemus tetraspis*, African dwarf crocodiles. Nest material was collected in January into which 20 eggs were laid. Half were removed and incubated.

Barcelona Zoo - reported that 4 *Osteolaemus tetraspis*, African dwarf crocodiles, and 14 *Caiman crocodilus* were hatched in 1987. The



Broad-snouted caiman, *Caiman latirostris*, hatchlings from the Bronx Zoo. New York Zoological Society photo.

dwarf crocodiles were the first to be bred in a European zoo.

St. Augustine Alligator Farm announces the acquisition of what is probably one of the largest crocodilian collections in the United States, the Arthur Jones collection in Anthony, Florida. About 2000 specimens of reptiles are involved, including 17 species. It boasts one of the largest *Crocodylus porosus* in captivity at over 17 feet in length. Mark Wise, the manager of the St.

Augustine Alligator Farm already has developed a fine collection of breeding crocodilians and has been collaborating with researchers and zoos throughout the United States by making facilities available for study. Cooperative breeding programs include a Chinese alligator program which produced 17 young out of 19 eggs in 1988. Other hatchlings included *Crocodylus siamensis* and *Crocodylus moreletii*. Mark wishes to stress their continued commitment to crocodilian conservation and research through captive management and husbandry. The St. Augustine

Alligator Farm recently received accreditation from the American Association of Zoological Parks and Aquariums. The collection will be available to researchers and students. (Well done Mark, and the very best wishes! - eds.)

Hawkhead International Inc., 200 Industrial Loop, Orange Park, FL 32073, USA, produces egg incubators and hatchers. They have a model they are marketing to the alligator farmers in the U.S.

John Behler of the New York Zoological Park is pleased to announce the hatching of five dwarf caiman, *Paleosuchus palpebrosus*, on 1 and 2 September 1988. John collected the sire, a 2-year old, in 1977 near Paramaribo, Surinam. Two females from the same area were acquired from Joep Moonen, former director of the Paramaribo Zoo, in 1985. One of these females nested on 4 June 1988 and the eggs were incubated at about 32° C., at a vermiculite to water ratio of 1:1 for 89 - 90 days. To date, seven crocodilian species have been bred at the zoo, *Alligator sinensis*, *Caiman c. yacare*, *Caiman latirostris*, *Tomistoma schlegelii*, *Crocodylus rhombifer*, *Crocodylus siamensis*, and *Paleosuchus palpebrosus*. Eight *Caiman latirostris* were also hatched in 1988.

We have had numerous requests for back issues of the NEWSLETTER. Rom Whitaker of the Madras Crocodile Bank, Vadanemmeli Perur Post, Mahabalipuram Road, Madras 603 103, India has the following volumes available:

- Nos. 2, 4-8 (by Tony Pooley)
- Nos. 8-11 (by James Powell)
- No. 12 (by Duke Campbell)
- Nos. 13-18 (up to June, 1980 by Rom and Zai Whitaker)
- Vols. 2(2), 3(1 & 2), 4-6.

Rom will send copies upon payment of xeroxing and postage expenses. He expects that it will cost approximately \$7/20 pages Air Mail and \$4/20 pages Surface Mail. Contact Rom for more information.

NOTES

Yehudah L. Werner of the Hebrew University of Jerusalem, sent this most interesting suggestion:

It is conventional to provide information on croc breeding in terms of numbers hatched and sometimes total clutch size (= number of eggs). However, there is considerable biological interest in the inter-relations of the following data: mother size (preferably, ra = rostrum-anus or snout-vent length), tail length, and mass (weight), or else at least total length; number of eggs laid, averaged or typical size of egg (in mass, volume or dimensions); hatchling size (as for maternal size); and maybe mother's age. I urge people who have such data to include them when reporting reproduction. Moreover if anybody can cope with following the individual sizes of hatchlings, and relating them to egg sizes, this would be interesting. The "rules of the game" in crocs could then eventually be compared to those in birds on the one hand and lizards on the other hand.

TRADE

As a service to hide and meat producers, the CSG Chairman has decided the NEWSLETTER should list prices recently paid for hides and meat. This will allow readers to compare the prices they received with those paid in other parts of the world. While we endeavor to report accurately, we cannot verify the prices in every case and only list what has been reported to us. We invite readers to send let us know the prices recently paid for hides and meat in your country. The following 1988 prices, in U.S. dollars, were reported to Prof. Wayne King:

- Alligator mississippiensis* U.S.A.: raw salted belly
hides = \$38.00 to \$47.00 / linear foot (= \$5.85-\$7.23 / cm of width); fresh frozen
meat = \$5.00 to \$7.00 / pound.
- Caiman crocodilus* in Guyana: raw salted belly
hides and flanks = \$5.00 to \$10.00 each.
- Caiman crocodilus* in Venezuela: raw salted
flanks = \$15.00 to \$25.00 / square foot.
- Crocodylus porosus* in Queensland, Australia:
raw salted belly hides = \$8.50 / cm (width);
fresh frozen meat = \$20.00 to \$25.00 / kg.

Crocodylus porosus and *Crocodylus novaeguineae*
in Papua New Guinea: raw salted belly
hides = \$9.38 / cm (width).

The year has been an interesting one for the trade in crocodilian products as well as for this observer. European tanners tell of a lack of skins and economic difficulties because of the very high price of the raw materials, which translates into high priced goods at the retail level.

Import figures compiled by TRAFFIC U.S.A. (Ginette Hemley, pers. comm.) suggest that the level of imports has not declined appreciably in the past few years, based on U.S. Fish and Wildlife Service (FWS) records of import declarations. However, we are told that initial problems with the FWS system may have resulted in only a part of the mid-1980 imports getting into the computer. On the surface, late 1988 imports seem to be strong, especially in anticipation of the Christmas season.

We are seeing imports of caiman products, targeted at the mid-line consumer, increasing rapidly. Their focus seems to be to take advantage of the recently generated fashion promotions for crocodilian accessories and provide the market with a less expensive, yet attractive product that will sell to a consumer who balks at paying the price of the Italian designers. Largely from Singapore, these products are mostly made of *Caiman crocodilus crocodilus* and *Caiman c. fuscus*. While a men's loafer shoe from Italy will command U.S. \$550 to \$800, these imports retail at \$250 to \$375. In shape and style it is very difficult to tell them apart. However, Singapore exports tend to be stiffer than European manufactured goods. They are better now than the same goods we saw imported a year ago. Volume is on the increase. One retailer commented that he sold about a dozen pairs of \$700 shoes a year.

Prices are indeed high, as I've noted on my nearly daily visits to the boutique shops along Madison and Fifth Avenues here in New York. A ladies belt of caiman sells for up to \$550, men's belt \$125, clutches at \$1200 to \$2000, overnight or cosmetic bags at \$4000, tote bags of crocodile at \$6000.

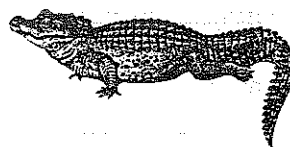
Handbags of American alligator can be had starting at \$1300. Recently we see bags labeled "Genuine Alligator" that have alligator skin on one part and crocodile on other parts. Such combinations of skins and species cause no end

of problems to the importers, who only receive CITES documents for one species. We are also commonly seeing crocodile being imported and labeled by the manufacturer as "Genuine Alligator". Caiman products are by far the commonest species, and are now seen on top-of-the-line manufactured products, side by side with crocodile and alligator, without discretion. The commonest crocodile product import is usually made of New Guinea crocodile, *Crocodylus novaeguineae*. Each high fashion department store has genuine crocodilian products displayed as part of a complete fashion line which includes cloth, embroidered, and calf skin bags. In another room is the artificial textured designer handbags at \$125 to \$300. Artificial is very big and goods are often quite attractive.

We have recently seen numbers of imports of crocodilian products which have been manufactured in Paraguay and Argentina. Many of these are of broad-snouted caiman, *Caiman latirostris*, and the species is listed as an endangered species under U.S. law the products are seized on entry into the United States.

Here in New York, yacare caiman, *Caiman c. yacare*, continues to appear in nearly the majority of shipments of raw and tanned flank skins, often from SE Asia, even though such skins should not be available on the market under present prohibitions in Brazil, Paraguay, and Bolivia. Shipments continue to be laundered through many countries, are transshipped around the world. I wonder who is paying the freight- if it is indeed being paid? Tanned and finished caiman skin flanks are selling at about \$50 - \$60 a square foot to the manufacturers as best as we can ascertain.

Finally, Jon Hutton writes and informs us the TRADE section of the NEWSLETTER was conjectural and narrow in outlook and as valueless as any piece of writing on the subject he has ever seen. Jon sent us some corrections which we included in the section. Jon also suggests that we ask Kevin van Jaarsveldt and others to write a few paragraphs. We welcome all contributions and would be delighted to include all reports and views. If we get them they are in the NEWSLETTER - Peter Brazaitis.



PERSONALS

Esteban Damian Astort, formerly of the Buenos Aires Zoological Garden, with whom we have been corresponding for several years, died suddenly in October of 1987 at the age of 34. Although we never met him, he initially contacted us through a mutual friend, and his frequent letters conveyed his enthusiasm for the field. We miss his correspondence.

Dr. Frank A. Beach, an animal behaviorist, best known to croc people for his 1944 paper in the *AMERICAN NATURALIST*, "Responses of captive alligators to auditory stimulation," in which he reported on responses of alligators to recorded bellows and French horn playing, died in June at the age of 77.

On a happier note, Dr. I. Lehr Brisbin of the Savannah River Ecology Laboratory married Brenda Robinson Brooks on 6 March 1988. The editors wish them much happiness and the advice that the second time around tends to be *much better* than the first time.

Robert Godshalk was married on October 4th and moved to Seattle, Washington. He is working on a paper on the ecology of *C. intermedius* that he had started to write with the late Prof. Fred Medem.

Goran Blomberg of East Lansing, Michigan reported, "Doctoral dissertation written -- now is being (carefully) cut in half so the reader can 'see the forest instead of the trees.' Have plans to publish two other papers, one on crocodiles. Early 1987 became Assistant Managing Editor of *THE JACK-PINE WARBLER*, Michigan Audubon Society's scientific publication."

Prof. Harold Cogger of the Australian Museum, Sydney, wrote, "While my research is primarily concerned with snake systematics, my job interests involve all aspects of herp conservation and education -- hence my wish to keep up-to-date in crocodilian conservation,

management and ecology. My special concern is with encouraging our local legislators and regulatory agencies to move away from enforcement-based nominal protection to effective biological conservation."

Harvey (Jane) Cooper-Preston of Northern Territory spent the early part of 1988 recuperating from leg surgery as a result of a crocodile bite. She has coauthored a paper with Grahame Webb on the effect of temperature on incubation of crocodiles. It will appear in the *AMERICAN ZOOLOGIST*. She is finishing her Ph.D. on "freshies."

Dr. C. Kenneth Dodd, Jr. of the National Ecology Research Center, U.S. Fish and Wildlife Service, Gainesville, Florida, is "Working on status of Red Hills salamander in south-central Alabama where I will delimit the best habitat for possible acquisition. Monographs on the biology of the flattened musk turtle and the loggerhead sea turtle due out shortly."

Prof. Jean Pierre Dufaure of the Laboratory of Cell Biology, University of Clermont Ferrand, Aubiere, France, is studying the biology of the reptilian epididymis and the extra-cellular matrix of crocodilian skin.

While accompanying Satoshi Kimura, Sadao Tambe and John Behler on their visit to China, Huang Chu-chien suffered a heart attack. After a lengthy hospital stay he has recuperated enough to plan to visit Japan in 1989. Earlier in 1988, Prof. Huang was made Director of the Institute of Bioengineering of the Huaxia Academy of China.

Marco Lazcano is studying for a master's degree in wildlife ecology, under the direction of Frank Mazzotti at the University of Florida, Gainesville.

People in Venezuela have so much trouble pronouncing John Thorbjarnarson's name that they have given up trying. Instead they have dubbed him 'Juan Caiman,' a name that is

now recognized by biologists and ranchers all over Venezuela.

Prof. Harry Messel, who is, at least in name, retired, is still busy attending meetings, writing papers and being an advocate for protection of *C. porosus* in Australia.

Tony Pooley wrote, "Turn 50 years on 29/5/88. Now consider myself an active, mature, prime state breeding male. Available on loan to suitable endangered species breeding programs." No comment, other than, "Happy birthday, a little late!"

Juan Carlos Troiana is working with the Provincial Fauna and Flora Directorate in Formosa, Argentina, on hematology of *Caiman latirostris* and *Caiman crocodilus yacare*.

Dr. Kent Vliet reported in March that he was "working as a post-doctoral associate, teaching and coordinating labs" at University of Florida, Gainesville. It seems that every time we turn around, Kent is featured in the news media. He has been on two National Geographic television programs that we know of, and he was the main event, along with some mention of George Campbell and Peter, in the recent article in the New Yorker. Way to go, Kent! Even our relatives know who you are!

After 34 years of travelling to the Reptile House of the Bronx Zoo, Peter Brazaitis gave up the familiar trip and is now Assistant Curator of the Animal Department, Central Park Zoo, which is another branch of the New York Zoological Society. One of the major advantages of the job is that he's right by New York's exclusive Madison Avenue shopping district, which has boutiques loaded with crocodilian products.

Some of Dr. Myrna Watanabe's photos of the Chinese alligator have been incorporated into a permanent exhibit at the London Zoo. Her biological consulting company has close relations with companies funding ventures in biology,

biochemistry and other technologies; market-based technology publishing ventures; and chemical and commodity import/export brokerages. Commercial enterprises looking for financial packages may contact her. Right now she is looking for more clients and sources for commodity trades, especially direct sources for sugar.

REQUESTS

Johan Marais, Assagay Safari Park and Crocodile Farm, 5 Old Main Road, Assagay, P.O. Box 73, Botha's Hill 3660, South Africa (FAX: 27 31 7771207) sent the following:

CROCLIT is a computerized bibliographical database on crocodilian literature and will include references pertaining to taxonomy, physiology, biology, nutrition, farming, disease, marketing or any other aspect involving crocodilians.

This information is being fed into an MSDOS IBM-compatible PC with a 30MB hard drive, a 5.25 inch floppy drive and a 3.5 inch floppy drive. The database that is used is called 'Q & A.' The format of data input is essentially as follows: unique reference number which includes month and year of input; author(s); author's address; title; publication; volume; number; number of pages; date; holding library and a series of keywords. Specific references can be searched for using any of the above criteria and then printed out.

So far, just over 1000 references have been fed in and a lot more will be fed in during the weeks that follow. I am experiencing some problem areas and will have to rely on a lot of outside assistance. I need to locate most references. Any help or suggestions would be welcome. Wayne King suggested I include an abstract with each reference, or even two sentences describing its contents. I am very keen on doing this. Another limitation is that I am doing CROCLIT in my private capacity and I have to employ a part-time computer operator to punch in information. Needless to say, this is an expensive exercise. I would like some feedback from the C.S.G. as CROCLIT can only become efficient and successful if it has the blessing of the C.S.G.

Gwen M. Allen, Peace Corps, San Francisco de Tinoco, Osa, Costa Rica is gathering information on crocodile husbandry and farm management. She would like any reprints that could be sent to her.

Dr. Hubert Bosch, Löbbecke Museum and Aquazoo, D-4001 Düsseldorf 1, Federal Republic of Germany, tel.: (49) (0211) 899-6151, is a parasitologist seeking the following parasites associated with crocodilians: Pentastomid lung-worms, *Subtriquetra* sp. (reddish, 1-2 cm from nasal cavity), *Sebekia* sp. (whitish, 1-2 cm from bronchia), and *Leiperia* sp. (whitish, up to 5 cm from pulmonary system).

Floris Deodatus, s/c P.N.U.D. project CAF/86/001, B.P. 872, Bangui, Republique Centrafricaine, wishes to set up a program to train local people in crocodile farming techniques. In order to do this he needs manuals, articles and reports in French. He would appreciate it if anyone who has these materials in French would send copies of them to him.

Dr. Mohammed Isahakia, National Museums of Kenya, Institute of Primate Research, Box 24481, Karen, Nairobi, Kenya, would like literature on crocodile farming technology and marketing.

Dr. Jeff Lang, Biology Dept., University of North Dakota, Grand Forks, ND 58202, USA, would like to obtain eggshells from fresh and/or hatched eggs of the following species: *A. sinensis*, *C. crocodilus* (all forms), *C. latirostris*, *Melanosuchus*, *P. trigonatus* and *P. palpebrosus*, *C. cataphractus*, *C. intermedius*, *C. rhombifer*, *Osteolaemus*, and *Tomistoma* for a study of comparative eggshell morphology. Eggs from captive-bred or wild nests are useful. Eggshells should be cut longitudinally, rinsed gently, air-dried, packed suitably and sent to Dr. J. Lang, c/o Div. of Amphibians and Reptiles, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560, USA. Contact Jeff at the above address or at tel. (701)

772-0227 or (701) 777-4564 prior to sending any material. (Note: CITES export permits from the country of origin are required and must be attached to the package. The Smithsonian has endangered species salvage permits for importation into the U.S. - eds.)

Back in February 1988, the Natal Parks Board was looking for someone to carry out a research project on "quantitative analysis of the diet of the Nile Crocodile at Lake St. Lucia." Anyone interested should contact the Director, Natal Parks Board, 3200 Pietermaritzburg, Natal, Republic of South Africa.

Ariel Zilber, Farm Manager, Mamba Village, P.O. Box 85723, Mombasa, Kenya, would like information and papers on the effect of stocking density on the growth rate of crocodilians.

QUOTATION

"If conservation is not a whimsical luxury, sustained-surplus-utilization mustn't be opposed by sentiments alone. Why waste a resource if there is no place in the wild for a created surplus!" Lala A. K. Singh.

CORRECTIONS

In reference to the Ethiopian crocodile project we reported on in the last issue, Jon Hutton informs us that the statement concerning the deaths of large numbers of young (out of 2700 collected, only 93 survived a year) attributed to him by our correspondent were not made by him. Rather it was received in a letter from D. M. Bruessow to Dr. Chris Fogg. Mr. Bruessow is reported to be managing the Ethiopian farm on behalf of CLAL, the Israel crocodile consultants. Jon says that it is his opinion after speaking with Mr. Mahamued that any problems with the project lies with the poorly conceived FAO scheme and not with the Ethiopians.

In NEWSLETTER Volume 6, January 1987 to December 1987, we reported an 80% hatching rate for crocodile eggs at the Jurong Crocodile Paradise Pte. Ltd. farm in Singapore. Mr. Richard Tan Chye Hock, the Asst. General Manager, informs us that the 80% hatchability is on fertile eggs and not on the total number of eggs collected.

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