

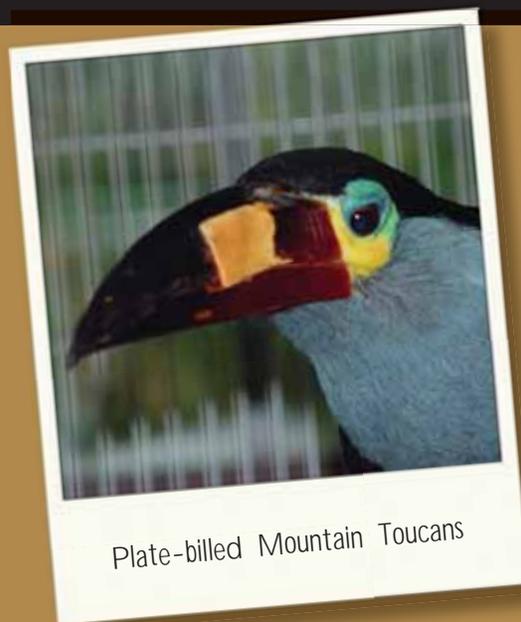
SOFTBILL PROPAGATION IN U.S. ZOOS: A Thirty Year Perspective

Part I – The ‘70’s

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The three decades following the establishment of the American Federation of Aviculture have seen remarkable developments in the management of captive birds in North America. Several species of macaws and cockatoos, as well as a variety of other parrots, are now maintained as self-sustaining populations, chiefly in the private sector. Species of waterfowl, such as Ringed Teal, Hooded Mergansers, and North American Ruddy Ducks, formerly considered rarities, have now become standard features in collections. A number of pheasants once unobtainable in America can now be procured from breeders. The dream of creating a stable population of critically endangered species, then re-establishing them in the wild from captive-bred stock is being achieved with California Condors and Whooping Cranes, and appears to be on the verge of success for other birds.

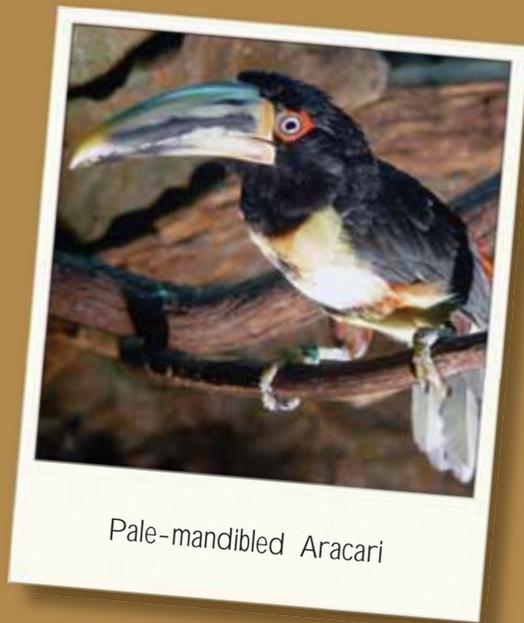
The role of soft-billed birds as U. S. zoo animals has changed profoundly over this period. Through 1972, when import restrictions to combat Exotic Newcastle’s Disease were imposed, softbills were essentially unmanaged. When imported birds were ridiculously inexpensive and easy to replace, the expenditure of paid time spent meticulously monitoring individual specimens, maintaining their records, and providing them with the same standard of veterinary care expected for “Charismatic Megavertebrates” could be difficult to justify to a municipal Park and Recreation Department or a society’s Board of Directors. Literally hundreds of birds might be exhibited in one aviary, quite often as single specimens, or, almost as often, as “flocks”, when a single pair should ideally have



This is one of the five Plate-billed Mountain Toucans (Andigena lamnirostris) at The Dallas World Aquarium, presently the only ones in a North American Zoo. The first fully successful captive breeding of this bird took place at the Los Angeles Zoo in 1974. Further chicks were reared in 1975. Photo by Natalie Lindholm

been maintained. When breeding did take place, it was a matter of interest and congratulation, but, in most cases, the goal of predictably repeated successes, culminating in a stable population, did not exist for softbills. More often than not, as soon as one species had bred (and sometimes been written about), institutional interest might focus on the next species to do so. Thus, in 1970, when the San Diego Zoo held over a thousand taxa of birds, 34 species and subspecies of birds (mostly psittacines) were fully reared. The most successful U.S. Zoo in 1970 was St. Louis, where the total number of bird taxa fully reared was 46, while over 400 were kept there. That year, the Bronx Zoo held over 400 taxa and reared 40, Los Angeles held over 400 and reared 41, San Antonio held around 500 and reared 13, and the Lincoln Park Zoo held nearly 300 and reared five (Lindholm, 1993). And very few of those reared were softbills, the majority being aquatic species and gamebirds.

As of 2005, the only U.S. zoo maintaining Pale-mandibled Aracaris (*Pteroglossus erythropygius*) is The Dallas World Aquarium (where they have bred, and where this/these picture(s) was/were taken). In the 70's and '80's however this Ecuadorian endemic was rather commonplace, and was the first taxon in its genus to be bred in captivity. From 1974 through 1977, the Los Angeles Zoo hatched 15 specimens, some sent to other collections. Photo by Natalie Lindholm



Faced with this sudden difficulty in acquiring birds in the 1970's, American zoo bird staff took an increasing interest in sustained propagation. Institutional support for captive breeding was encouraged by the dramatic increase in environmental consciousness that exploded across the country at the beginning of the '70's. Zoos were quick to add "conservation" to their mission statements. While that, in time, translated into an enormous range of research and *in situ* projects around the globe, for a great many places in the '70's, the most immediate expression of "conservation" was captive breeding programs. While emphasis, of course, was placed on propagating threatened animals, breeding almost anything at all was likely to enhance a zoo's public image, especially to potential benefactors or an electorate contemplating a funds increase.

When U.S. Newcastle's restrictions were imposed in 1972, initially bird imports stopped altogether. Eventually, imports were allowed, provided the birds underwent a quarantine period at a government or commercial facility (of which there were initially few). Quite aside from the fact that these stations were often not conducive to acclimating more delicate species, the quarantine costs drove up the price of birds phenomenally. Further expense was incurred by the element of risk during quarantine: Should a single specimen in a facility exhibit symptoms of Newcastle's disease, all remaining birds present were to be destroyed, returned to their country of origin, or, more recently, subjected to another complete quarantine period. Thus, for example, a pair of Red-eared Waxbills that could be bought at a Woolworth's for \$3.95 in the spring of 1972 might cost \$40 in 1974.

Coinciding with Newcastle's restrictions, a host of other factors complicating the procurement of birds by zoos came to be in the 1970's. The United States Endangered Species Act and the Convention on International Trade in Endangered Species (CITES) were created in that decade. At the same time, a number of countries that had been major sources of commercial bird shipments either entirely prohibited their bird trade, or curtailed it severely. Mexico, Costa Rica, Colombia, Ecuador, Peru, India, and Thailand come to mind.

Such was the atmosphere in 1974, the year the American Federation of Aviculture was incorporated. To attain a perspective of how things have gone since then, I will present some of the data on birds bred in captivity collected by the Zoological Society of London, published in its *International Zoo Yearbooks* (Zoological Society of London, 1960-1998). For this, the first of a four part examination, I have naturally selected 1974, the year AFA was founded. For the second installment, I have chosen to present the IZY data from 1985, as breeding records from the San Diego Zoo for 1984 were inadvertently not submitted. (Unfortunately it appears bird breeding records for the San Diego Wild Park were omitted for several years around this time). The third installment of this article will present the records for 1996, the last year IZY breeding records were published. In the final installment of this article series, I will offer in update with some statistics for 2005 from *ISIS* (the International Species Information System). Examining the data from these years, it will be immediately obvious that much has happened and much has changed in three decades.

In 1974, the *International Zoo Yearbook* records 37 species of softbilled birds hatched among 25 U.S. collections. In 1985, 101 species and subspecies hatched among 56 collections. In 1996, 150 softbill taxa hatched among 63 institutions. A closer look at these three years should reveal much about the evolution of zoo aviculture.

Having compiled the data for 1974, I was struck by two things. While the total number of species hatched that year is only a fraction of those hatched in the '80's and '90's, it includes some highly interesting

birds. My other observation is how much of these activities were dominated by a handful of institutions, and that many of these breedings took place in single enclosure or series of exhibits. In particular, of the 37 species hatched in 1974, ten bred at the San Diego Wild Animal Park, and for seven of these, it was the only place to do so. Eight of the ten Wild Animal Park hatchings took place in the enormous aviary which marked the entrance, from the Park's opening in 1972 until it was replaced by another, smaller one, in a different spot, several years ago. This aviary was stocked, in 1971 and '72 (before the imposition of Newcastle's Quarantine) with small flocks of African and Asian birds. This resulted in a fairly high mortality, but, in those days before safe surgical sexing, also produced breeding pairs. Thus this exhibit became the site, in 1973, of the first breeding in the Western Hemisphere of any African Roller or any *Tockus* hornbill, when Lilac-breasted Rollers and Red-beaked Hornbills fledged there. (As can be seen from the IZY records both species bred again in 1974, though Lilac-breasted Rollers were never hatched at the Park after that). 1973 was the first year rollers were ever hatched in America, the Houston Zoo achieving possibly the world's first breeding of the Indian Roller, a success repeated in 1974 and 1976. Prior to 1973, the only complete success with hornbills in the Western Hemisphere had been at Honolulu Zoo, where a Southern Pied Hornbill was raised in 1953 (Lint, 1955, Paul Breese, pers. com.), followed in 1972 by the first of several year's successes with the same species at Seattle's Woodland Park Zoo (Hutchens, 1976). A second 1973 success, also at the Wild Animal Park,

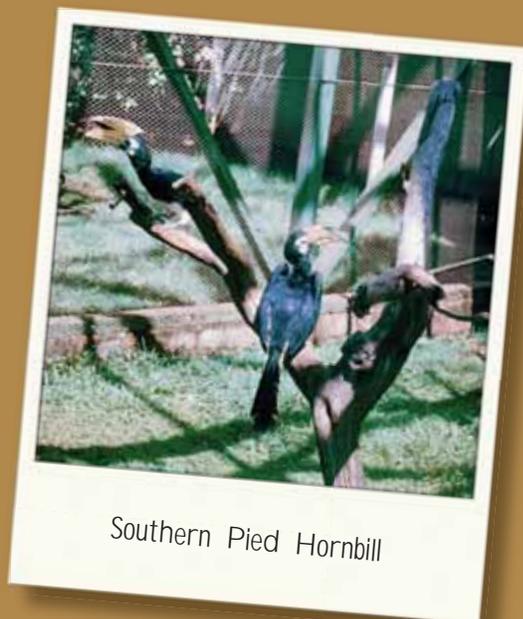
was the parent-rearing of Northern Ground Hornbills, out in the huge East African enclosure, shared with herds of hoofed-stock. This was also repeated in 1974, the same year Los Angeles attained the world first breeding of Tropic Hornbills (Jennings, 1976, Jennings & Rundel, 1976).

With seven species, the Bronx Zoo (New York Zoological Park) comes in second in the number of softbill species hatched in 1974. Again, this has much to do with the opening of a major exhibit in 1972, in this case the World of Birds, which remains the most elaborate indoor bird facility in any zoo. And again, this building was stocked before the imposition of Newcastle's restrictions. Thus, the 1974 successes include the rearing of the first, and so far only one of the more than 200 species of Antbirds to be fully raised in captivity. Not only was the Rufus-faced Ant Pitta one of the many species gathered especially for the grand opening of the World of Birds, but it was procured by the incomparable softbill specialist Charles Cordier (Bell & Bruning, 1976), who commenced collecting for the Bronx Zoo in 1941, and sent his last shipment there, from Bolivia, in 1983 (Lindholm, 1988). No one keeps antbirds now.

While the Bronx Zoo's 1974 Ant Pitta success was unique, the then also notable hatching of Green Wood-Hoopoes was only part of a truly amazing achievement. New York was only the second place to breed this species in captivity, the first being the late, lamented Winged World in Morecambe, the U.K., in 1968. The Bronx Zoo's first breeding was in 1973, and through 1986, the *International Zoo Yearbook* records that it was propagated there every year, with a total of 135 hatched and 115 reared. Needless to say, specimens were quickly surplussed to other zoos, and in the '70's and '80's, more than fifty were hatched at the Denver, Houston, and San Antonio zoos, all from New York stock. Meantime, New York was recording its own second generation breedings. However, by the early 1990's, the U.S. zoo population was down to around a dozen birds scattered among a few collections, when the importation of wild specimens reversed the decline. As of 2005, there are around 50 Green-Wood Hoopoes distributed among fifteen institutions.

Another species which appeared, in 1974, to have a promising future has not fared so well. The Crimson-rumped Toucanet, as of 2005, is held by only one U.S. collection that's open to the public: The Dallas World Aquarium. This is the first member of the Ramphastid family to

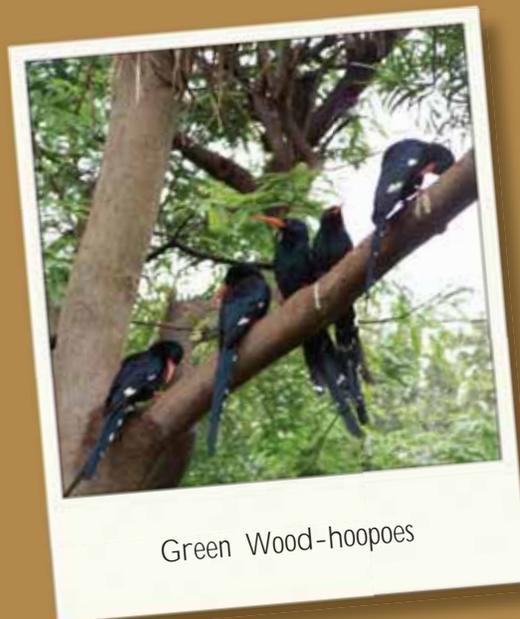
*Here is the first hornbill hatched in the Western Hemisphere, with one of its parents. This breeding of a Southern Pied Hornbill (*Anthracoceros albirostris convexus*) took place at the Honolulu Zoo in 1953 (When Hawaii was still a territory). No other U.S. collection hatched hornbills until 1972, when the Woodland Park Zoo in Seattle achieved success with the same species.
Photo by Paul Breese*



be bred in captivity in North America, at the Los Angeles Zoo. Reproduction commenced there in 1970, when pairs formed from a flock of fifteen exhibited in a walk-through aviary with “about 300 other birds of 75 species” (Rundel, 1976). The *International Zoo Yearbook* documents hatchings every year from 1970 through 1976, with a total of 35 hatched, and 29 reared. Full second generation breeding occurred in 1974, and a number of pairs were sent to other collections. Sadly, no further propagation occurred after 1976, and the species was not bred in an American Zoo again until 1984, when St. Louis had a single success.

In 1974, however, encouraged by these remarkable results with Crimson-rumped Toucanets, the Los Angeles Zoo made a concerted attempt to breed other ramphastids (Rundel, 1976, Rundel et al, 1975). That year’s results included the first complete success with the Plate-billed Mountain Toucan (The IZY documents that the Pittsburgh Conservatory Aviary hatched two in 1972, but failed to raise them). Los Angeles set up two pairs in 1974, hatching three chicks, and rearing two to fledging that year, and hatching and raising two in 1975 (Tobin & Rundel, 1975). Pale-mandibled Aracaris hatched chicks for the first time in captivity in 1974, though none lived past 26 days. Three were hatched and two successfully hand-raised in 1975 and five were hatched and raised in 1976. Some of these were sent to other zoos. The one which hatched in 1977, but did not survive, was the last ramphastid hatched at Los Angeles until Toco Toucans were bred there in 1990. Los Angeles was the 13th U.S. collection to hatch Tocos (the world first hatchings occurring at South Carolina’s Riverbanks Zoo and Florida’s Jacksonville Zoo in 1977). However, Los Angeles was the first collection to produce a fertile Toco egg, again in 1974 (Rundel, 1976). Curl-crested Aracaris and Swainson’s Toucans also laid eggs for the first time in captivity there, in 1974, though none hatched. It is not surprising that the Los Angeles Zoo had accumulated, by the early 1970’s, the largest collection of ramphastid species anywhere.

In retrospect, several factors were involved in the decline of Los Angeles’ ramphastid program after so promising a beginning. One was the decay of the unique aviary complex, a series of multi-story “cylinders” (as Jean Delacour derisively referred to them) arranged along a hillside. Built in the early 1960’s, these enclosures were much criticized (Delacour observed that birds “fly back and forth, not up and down!”). However, quite a range of species were bred there. Only a decade after their construction, dete-



Green Wood-hoopoes

Green Wood-hoopoes (Phoeniculus purpureus) at the Honolulu – These are about one tenth of the U.S. Zoo population as of 2005. The first U.S. breeding took place in 1973 at the Bronx Zoo, where 135 were hatched (and 115 reared) through 1986. Photo by John Del Rio

rioration of the aviaries themselves and the visitor’s walkways that surrounded them was evident, and reached a dangerous level by 1980, when they had to be closed to the public. They were gradually demolished in stages, while some birds were maintained in the remaining ones, but plans to replace them only got as far as the construction of a second walkthrough aviary.

Of course, after 1972, procuring toucans in particular, and softbills in general, became much more difficult and expensive, not only because of the Newcastle’s Disease legislation, but by export restrictions imposed by Mexico, Ecuador, Peru, and other countries which had previously allowed free trade in birds. When Los Angeles Zoo began stocking a new off-exhibit breeding facility in the late 1970’s, the emphasis was instead on propagating Psittacines. This was partially fortuitous – a confiscated shipment of especially rare parrots confiscated from Australia was received. At any rate, in the early 1980’s, Los Angeles was distinguished for the first captive breeding of Pesquet’s Parrot, with some continued success, as well as for producing numbers of Hooded Parakeets and Northern Rosellas. Following the creation of the California Condor propagation project in the mid-1980s, the efforts of the Los Angeles Zoo bird department became focused on birds of prey, with the result that softbills never again attained the prominence they had held in the 1970’s.

While lasting success did not result from the 1970’s ramphastid breeding programs, another promising situation apparent in the 1974 breeding records developed in an entirely different direction. It will be

noted from Table I that 99 Bali Mynahs were hatched among twelve U.S. collections in 1974, and that 60 are recorded to have survived past fledging. Four of these zoos achieved at least partially second generation breedings.

Success on this level was a recent development. The first full rearing of a Bali Mynah in the Western Hemisphere and the first in any public zoo took place at the San Diego Zoo in July, 1962, following four unsuccessful attempts by the same pair that same year (Lint, 1962). San Diego continued to hatch this species each year through 1965, being the only U.S. institution to do so until 1965, when the Pittsburgh Conservatory Aviary was also successful. None were hatched in the U.S. in 1966 or 1969, though Milwaukee became the third U.S. zoo to breed Bali Mynahs in 1967, followed by San Antonio in 1968 and Brookfield in 1970. It was not until 1971 that more than two U.S. Zoos hatched this bird in a given year. In 1971, San Diego Zoo hatched six, but only reared five. However three other collections bred them for the first time that year. Los Angeles hatched one, which did not survive. The Dallas Zoo hatched eight, all of which survived. And the National Zoological Park, in Washington D.C., hatched nineteen, all recorded to have survived. The grand total for 1971 was thus 34 Bali Mynahs hatched among four U.S. zoos, of which 28 were fully reared. In 1972, the U.S. total was 40 hatched among six collections, of which 25 survived, and in 1973 it was 64 hatched among nine collections, with 48 surviving. And, as noted above, for 1974

the *International Zoo Yearbook* records 99 hatched among twelve U.S. zoos, with 60 surviving.

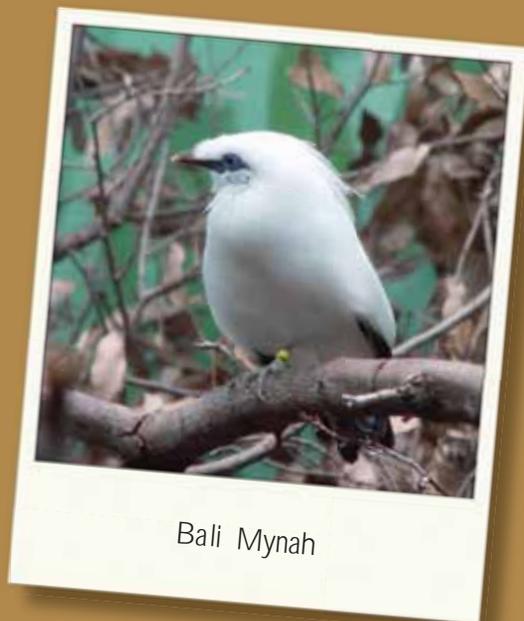
Of course, one would like to imagine that this explosion was due largely to the captive breeding that commenced in the 1960's. In fact, the sudden jump in American Zoo Bali Mynah reproduction was definitely influenced by the importation of around 100 specimens in 1970.

The Bali Mynah was only described to science in 1912, from a female collected in 1911 by the author of its description, Erwin Stresseman (1889-1972, who would go on to be considered one of the greatest ornithologists of the Twentieth Century). As might be gathered from so late a date of discovery, this species' habitat has always been limited, comprising, at least since the time of its description, a very small portion of the island of Bali, about 200 sq km in the north-western corner. It is widely believed that the total population in this range never exceeded 1,000 specimens. The first documented export of living specimens were the five received in 1928 by Alfred Ezra, the eminent English aviculturist, who, in 1931, was also the first to achieve a successful captive breeding (like San Diego, after four failed attempts the same year). The Dutch had attained complete control of Bali in 1911, incorporating it into the Dutch East Indies, and were sparing in allowing further exports. Both the San Diego and Bronx Zoos exhibited it in the 1940's, but into the 1960's it was considered one of the rarest birds a zoo could procure.

When the San Diego Zoo obtained its breeding birds in 1961, the Republic of Indonesia had declared its independence of the Dutch sixteen years previously, but export of Bali Mynahs remained a guarded privilege. The late K.C. Lint, long-time Curator of Birds at San Diego, wrote: "This bird is loved and widely protected by the Balinese. A personal trip to the government headquarters located at the famous Bogor Botanical Gardens and Institute for the Conservation of Nature in Indonesia was necessary before special permits could be issued by Director T. Made Taman of Kepala Lembaga Pengawetan Alam (name of the Gardens). The permits obtained allowed the exportation of four of these birds from the Surabaya [sic] Zoo in Java" (Lint, 1962).

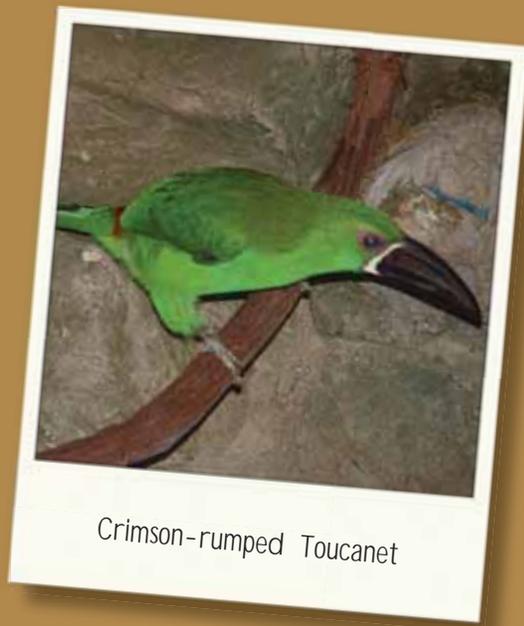
The difference in circumstance between that transaction in 1961 and in 1970, when more than 100 were exported, many for sale by dealers, is easily explained. Achmed Sukarno, Indonesia's President since 1945, was deposed in a military

This Bali Mynah (Leucopsar rothschildi) is North American Studbook #1900. It hatched at the Lowry Park Zoo in Tampa in 1991, and now resides at the Dallas Zoo. Dallas Zoo began hatching this species in 1971, being one of the first eight zoos in the U.S. to do so. (1971 was also the first year Los Angeles and the National Zoological Park hatched any). Through the 1970's Dallas Zoo produced 19 Bali Mynahs. Photo by Natalie Lindholm



Bali Mynah

This *Crimson-rumped Toucanet* (*Aulacorhynchus haematopygus*) resides at The Dallas World Aquarium, which is presently the only North American collection open to the general public holding this species. However, this was the first ramphastid species captive-bred in the U.S., when Los Angeles Zoo commenced hatching chicks in 1970, fully rearing a total of 29 through 1976.
 Photo by Natalie Lindholm



hatched, of which 71 survived), as well as 1980 (when 83 survived out of 126 hatched) (Lindholm, 1996). The all time high was reached in 1981, when 23 U.S. collections hatched a total of 152, but raised only 66. In 1982, although only thirteen institutions bred Bali Mynahs, 134 were hatched and 70 were reared. From 1983 through 1988, the number of collections ranged from eleven to fifteen, with the numbers hatched each year dropping dramatically. In 1983 127 hatched (of which 81 survived). Then, in 1984, 80 hatched, with 53 reared. In 1985 32 were reared out of 58 hatched, while in 1986, only 39 hatched, of which 28 were reared. Although 78 were hatched and 43 reared in 1987, the next year only 44 were hatched of which 34 were reared.

coup (with suspected U.S. backing) in 1966. While the subsequent changes in government policy were widely considered “a victory in the Cold War”, they were definitely a setback for wildlife conservation. Rosemary Low (1998, p.411) writes: “In 1966, Indonesia was opened up to foreign investors and within ten years virtually all of the rainforests had been signed away as timber concessions”. In the same way, the export of protected wildlife was greatly relaxed, with result that such species as Pesquet’s Parrots and Proboscis Monkeys, till then considered fabulous rarities, were, for a time, commercially imported to the United States by private parties. President Sukarno, for all his notoriety, maintained an interest in conserving his nation’s unique natural treasures, and held a personal dislike for the wildlife trade (Ryhiner & Manix, 1958, p.201). K.C. Lint, for one, always considered him a perfect gentleman.

Large-scale importation of Bali Mynahs to the U.S. did not last long. The Newcastle’s importation ban of 1972 was followed by the United States Endangered Species Act of 1973, which included this species among its initial list of regulated foreign birds. However, the birds that did come in the early 70’s had a permanent effect on the American Zoo Population. While, as noted above, a total of five U.S. collections hatched it from 1962 through 1970, a total of twelve collections hatched 99 specimens in 1974 alone. The next year, 86 hatched (with 53 surviving) among fourteen U.S. collections. The number of institutions fluctuated from twelve to fifteen from 1976 through 1978, then hit twenty in 1979 (when 146 were

The annual number of U.S. zoos breeding Bali Mynahs dropped below ten for the first time since 1973 in 1989, when nine collections produced a total of 43, of which 27 were reared. From 1990 through 1992, the count rose from ten, to 16, to 17 collections, while numbers produced stayed rather remarkably constant. In 1990 51 were hatched and 37 raised, in 1991, thirty were reared out of 58 hatched, while 35 survived out of 60 hatched in 1992. In 1993, a total of 19 U.S. collections hatched 93 specimens, for which I do not have mortality figures. The next year only 51 hatched among 11 collections, and in 1995, 25 hatched among nine collections. In 1996, the final year the *International Zoo Yearbook* published breeding statistics, 14 places hatched 47, but reared only nineteen.

There is a clear explanation for this dramatic fluctuation in breeding results for Bali Mynahs in U.S. zoos since the beginning of the ‘80’s. In 1982 the Bali Mynah became the first softbill, and one of the very first birds, to be designated an SSP (Species Survival Plan) animal. The goal for such species is not only to create a self-sustaining captive population, but one with maximum genetic diversity, reflecting as many of that population’s “founders” as possible. Through the ‘70’s and into the early ‘80’s, as is made obvious by the above statistics, breeding as many of this endangered species as possible appeared to be everyone’s goal. Each year, more zoos added them to their collections for the first time, and often bred them shortly thereafter.

However, it became apparent by the 1980’s, that a rather small percentage of the more than 100 birds imported in the 1960’s and ‘70’s had actually produced chicks. A handful of zoos which had been

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especially successful were the source for most of specimens in the rest of the country, and often, only one or two pairs had produced the chicks. What is worse, records had not been consistently maintained (as was so often the case in the '60's and '70's), so that frequently, the ancestry of captive-bred birds was in doubt, if not a complete mystery. It was commonplace in the '70's to maintain flocks of Bali Mynahs in walk-through aviaries, and keeping track of exactly who was breeding in these exhibits wasn't always done. Pairs were allowed to form on their own, rather than being chosen for genetic value. In all, the rapidly increasing North American population was rather unmanaged until 1982 when its SSP was established.

While this bird had always been considered "very rare", and was a standard example of an "Endangered Species" in the education programs of zoos through the 1970's, the status of its wild population had deteriorated profoundly in less than a decade preceding the creation of its SSP. A 1976 survey, when 127 individuals were actually observed, resulted in a population estimate of 500 to 1,000 birds in the wild (King, 1979). Although by 1982 the range of the wild population was confined within the boundaries of Bali-Barat National Park, trapping was discovered to be "prevalent" in the park that year (Collar & Andrew, 1988), and by 1984 it was estimated that no more than 180 specimens remained there. Fewer than 100 wild mynahs remained by 1988 (Collar & Andrew, 1988). Continued poaching reduced this number to about fifteen in 1990 (Birdlife International, 2000). The release and subsequent reproduction of captive-bred birds raised it to around 50. In 1999 however, only twelve could be accounted for (Birdlife International, 1988). That same infamous year, armed men burst into the Bali-Barat holding facility and made off with every one of the 39 captive-bred birds (gathered from around the world) then awaiting release into the park.

This rapacious demand for Bali Mynahs in the '80's and '90's apparently originated entirely within Indonesia. As previously noted, commercial shipments to the U.S. were prohibited with the passage of the Endangered Species Act in 1973. In 1975, when the Convention on International Trade in Endangered Species (CITES) was established, this species was immediately placed on Appendix I, forbidding commercial transactions among participating countries. For a while, it really wasn't all that difficult or expensive to procure captive-bred Bali Mynahs in the U.S. (A prominent American zoo in the 1970's was awarded the AZA's "Zoo Goof of the Year" award when it gave some away to a pet store in the mistaken belief it was another zoo). Mean time, however, a single Bali Mynah in a cage became a status symbol

for wealthy Indonesians, and while officially illegal to possess, by 1999 such an item was easily worth 2,000 American dollars (Birdlife International, 2000). (When there were essentially no more Bali Mynahs to poach, the criminals turned their attention to the closely related Black-winged Starling, of Java, Bali., and nearby small islands Never previously considered an endangered bird, and "officially protected" in 1979, it has, since the 1990's,. been officially listed as an endangered species, with its population reduced to a few thousand)(Birdlife International, 2000).

With such a disastrous collapse of the wild population in the 1980's, it was obvious the captive population was a precious resource, and managing the newly created Species Survival Plan became a deadly serious business. Under the terms of an SSP, all participating institutions are required to follow the instructions of its officers. The immediate task at hand was to insure maximum genetic diversity, to make sure the American zoo population would not come to consist largely of birds of undocumented ancestry, or be descended from a handful of particularly prolific individuals. So breeding was restricted to pairs chosen for their genetic value as determined through a studbook. And it quickly became apparent, as someone soon observed "that there were reasons unrepresented founders were unrepresented". It was indeed frustrating when excellent results had been achieved by "tossing some birds in a cage and watching them breed", while the results of setting up pairs chosen for maximum genetic value were, all too often, nothing at all.

As previously noted, in the mid-1980's, following the formation of the Bali Mynah SSP, there was a profound drop in numbers bred annually. As might be imagined, there was a corresponding decrease in the American zoo population. Robert Webster, Curator of Birds at the Toledo Zoo, is a consummate arranger of statistics. According to his data, in 1985, the North American zoo population of Bali Mynahs was 395 birds. The following year it had dropped to 336. Over the next three years it dropped to 274, then rose over the next to years to 313 specimens in 1991. The next year saw a dramatic plunge to 253 specimens, then a rise to 273 in 1993. The number remained the same in 1994, then dropped to 251 in 1995, then 242 in 1996. The population rose by a few specimens each year till it stood at 265 in 1999, then fell to 242 in 2000 and 217 in 2001.

According to the SSP, as of mid 2005 there were 212 birds distributed among the 61 participating collections (all in the U.S.). Over the previous year there had been 18 hatched, while the total number of

deaths was 30. At present, it is estimated that without the addition of any further founding birds, the U.S. population would still possess at least 90% of its gene diversity 50 years from now – a reassuring result of two decades of effort to maintain a genetically healthy population. The AZA's Passerine Taxon Advisory group has decided on a U.S. zoo target population of 250 specimens. To maintain that number, around 50 hatches a year will be authorized. Thirty-nine pairs have been recommended for breeding attempts for the 2005-2006 season (Ross, et al, 2005). (Many of the other birds are maintained as single sex groups). Martin Vince, Assistant Curator of Birds at Riverbanks Zoo, tells me that after years of intensive management, setting pairs up for breeding has become rather "routine and predictable". If a newly set up pair don't commence reproductive activities in two months or so, it is most unlikely they ever will. So, one need not waste more than one season on an unproductive pairing. It is reassuring to see, from studbooks and SSP reports (Ross, et al, 2005), that a healthy proportion of the current population consists of birds less than five years of age. According to Martin, the major logistic at present is recruiting further zoos to hold specimens.

For the time being, maintaining a genetically healthy self-sustaining U.S. population is the main focus of the SSP. Until the disastrous year 1999, a great deal of effort, time, and expense had gone to bolstering what was left of the wild population, including the 1987 export of 40 American zoo-hatched birds to the Surabaya Zoo (from whence San Diego's first breeding pair had arrived in 1961!) as a source of birds for release. For several years in the '90's, releases indeed had a positive effect (Birdlife International, 2000). When conditions again allow for liberating captive-bred birds into Bali Barat, or some other secure place, the Bali Mynah SSP will be ready.

Returning to an examination of 1974's breeding records, it can be said that the remarkable results obtained with Bali Mynahs that year were due in part to this species being both spectacularly beautiful and, until captive breeding became widespread, famously expensive and difficult to obtain. The same could be said of another species which puts in a rather surprising appearance in the 1974 breeding records, along with the further qualification of extreme sexual dimorphism. Ever since its introduction to aviculture in 1941 (Lindholm, 1988), the Andean Cock of the Rock has always held a distinguished place in any collection of softbills privileged to obtain it. Although a pair from the original 1941 importation hatched (but did not rear) chicks in the New Jersey aviaries of Mrs. Milton Erlanger sometime in the 1950's (Lindholm, in. lit., Van Oosten, 1957), public zoo propagation did

not take place until the 1970's. Since the differences between adult males and females is dramatically obvious, this is likely due to specimens exhibited in enclosures that lacked any sort of sheltered, cave-like sites for nest-building, as well as being maintained either in grossly overcrowded mixed species aviaries, or show-cased in glass-fronted displays too small to allow nesting.

As can be seen from the 1974 IZY data, two American zoos hatched Andean Cocks of the Rock, though neither raised them to maturity. This was to be the only breeding at Fort Worth. However the National Zoo had already hatched (and lost) a chick in 1972 (the first zoo hatching anywhere), and in 1975 hatched two more, which also died before fledging. The one hatched at the Bronx Zoo in 1978 likewise failed to survive. Full success was finally achieved in 1979, when three hatched at the Houston Zoo and one of these was hand-reared to independence, though only with an enormous amount of effort (Berry, 1980, Berry et al, 1982).

In 1974 Houston Zoo was already establishing a distinguished record in softbill breeding, hatching six species that year. The full rearing of two Sulfur-breasted (or Keel-billed or Rainbow-billed) Toucans (Berry & Coffey, 1976) was a world first breeding (and the first fully successful North American captive rearing of any member of the genus *Ramphastos*). Seven more were reared (out of ten hatched) the following year, the last U.S. zoo Keel-bill breeding until the 1990's.

In common with the San Diego Wild Animal Park's Lilac-breasted Rollers, Red-billed Hornbills, and Northern Ground Hornbills, and the Bronx Zoo's Green Wood-Hoopoes, the 1974 breeding of Indian (or Black-billed) Rollers at Houston had been preceded there the previous year by the first captive breeding in the U.S. In all, Houston hatched ten Indian Rollers in the '70's: Two in 1973, five in 1974, and three in 1976. All were fully reared, and the International Zoo Yearbook records the 1976 hatchings as being at least partially second generation. However, no further Indian Rollers were hatched in a U.S. zoo until 1983, when San Antonio was successful.

The three Blue-crowned Motmots that Houston fully raised in 1974 were the first hatched there. Houston was only the fourth U.S. collection to propagate Motmots, after Philadelphia, the Pittsburgh Conservatory Aviary, and the San Diego Zoo (Lindholm, 1991). I am not aware of any other collection that has bred Audubon's Oriole, which barely enters the U.S. in the Rio Grande Valley.

Persons familiar with Houston Zoo's magnificent achievements in softbill breeding might be surprised to find that in 1974 no Turacos were bred there, though four species were hatched among five other U.S. collections. Prior to that year, Houston hatched two Gray Go-Away Birds in 1969, one Gray Go-Away Bird and a White-cheeked Turaco in 1970, and one White-cheek in 1973 (Lindholm, 1987). As will be seen in the next installment of this discussion, in 1985 alone 44 turacos representing nine species and subspecies hatched there. As previously seen with other intriguing statistics, there are clear explanations, which I will present in the next issue of this journal. To return to 1974, it should be noted that the male Gray Go-Away Bird which produced a chick at (the now long defunct) Houston Busch Gardens that year was the same bird that sired the chicks hatched at the Zoo in 1969 and 1970 (Young, 1976).

Another collection which stands out for the number of softbill species bred in 1974 is the Woodland Park Zoo in Seattle, where five taxa hatched. Although none of the five Green-backed Titmice chicks survived to fledging, this record stands as the first U.S. Zoo propagation of any member of the Titmouse Family (Paridae). Titmice have never been terribly common as American zoo animals, although some native species have been kept here and there, and the Green-backed Tit's close relatives, the Great, Blue, and Yellow-cheeked Tits, were acquired by several places in the '80's and '90's. The only Parid propagation in an American institution which I am sure of is of native Tufted Titmice at the Tennessee Aquarium at Chattanooga in recent years. While a common bird along the Himalayas, as well as other parts of China, the Green-backed Tit has never been widespread in aviculture, and doesn't appear to have shown up in the big shipments from China of the 80's and 90's.

As previously mentioned, Woodland Park was the first place to breed Hornbills on the U.S. mainland, commencing in 1972 (Hutchins, 1976), nineteen years after Honolulu had hatched the same species, the Southern Pied Hornbill. The breeding pair reared chicks every year from 1972 through 1975, producing a total of nine, of which eight were reared.

The African Robin-Chats, of the genus *Cossypha*, have proven to be prolific in American Zoos. The Bronx Zoo hatched 57 (and reared 36) White-browed Robin-Chats (*C. hueglini*) from 1976 through 1992, and in the '80's, the Brookfield Zoo hatched out a number of Blue-shouldered Robin-Chats (*C. cyano-camptor*) (from a female imported in the '60's!). Commencing in the '90's, the San Diego Zoo has been repeatedly successful with White crowns (*C. albica-*

pilla), and, in 2005 alone, at least five U.S. collections hatched Snowy-headed Robin-Chats (*C. niveicapilla*). However, Seattle's 1974 rearing of White-brows is the first fully successful breeding for the genus in any public zoo. (In 1973 two hatched at Woodland Park but died before fledging). The only previous record for the U.S. was of the Natal Robin-Chat (*C. natalensis*), which was reared repeatedly in the 1960's in the aviaries of Edward Marshall Boehm, in New Jersey (Everitt).

I like to think that Seattle's 1974 breeding record is due in part to that fact that Jan Roger Van Oosten was the Director of the Woodland Park Zoo from 1972 through 1974, and had been closely involved with the zoo since the early 60's. (In 1965 he loaned the zoo 20 Ecuadorian Hummingbirds.) Jan died May 1, 2005. To a great many people, he's most remembered for his work with Lories and Lorikeets (His name appears 22 times in the index of Rosemary Low's (1998) *Hancock House Encyclopedia of the Lories*). However, in his teens and twenties, he maintained a softbill collection that most of us can now only dream of, and wrote it up extensively in the *Avicultural Magazine* (Van Oosten, 1957). We corresponded about Cocks of the Rock. At any rate, the form and direction a zoo's bird collection takes depends a great deal on the individuals working with it. That influence, combined with such circumstances as disease outbreaks, politics, the economy, conservation crises in far places and within our own borders, and the interest and curiosity of general public shapes our zoo collections and they way they develop over the years. I hope I have demonstrated that in this discussion of '70's zoo softbill aviculture, and aim to continue doing so with a look at the '80's, '90's, and beyond.

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TABLE I.

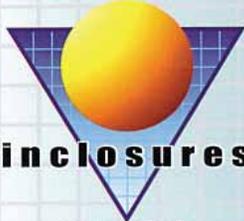
Softbilled Birds hatched in U.S. Zoos and Related Institutions in 1974, as documented by the *International Zoo Yearbook* (Olney et al, 1976). Numbers in parentheses indicate juvenile mortality. An asterisk indicates at least one parent is captive-bred.

Uganda Green Pigeon (<i>Treron calva granviki</i>) San Diego Wild Animal Park	1(1)
Blue-tailed Imperial Pigeon (<i>Ducula concinna</i>) Los Angeles	2(2)
Red-crested Turaco (<i>Tauraco erythrolophus</i>) San Antonio	3(3)
White-cheeked Turaco (<i>Tauraco l. leucotis</i>) Chicago (Brookfield)	2
New York (Bronx Zoo)	not specified
Hartlaub's Turaco (<i>Tauraco hartlaubi</i>) New York (Bronx Zoo)	4
Gray Go-Away Bird (<i>Corythaixoides concolor</i>) Houston (Busch Gardens)	1
Laguna Hills (Lion Country Safari, California)	3(3)
Kookabura (<i>Dacelo novaeguineae</i>) Houston Zoo	7
San Antonio	4
San Diego Zoo	3*
Blue-crowned Motmot (<i>Momota momota</i>) Houston Zoo	3
Southern Lilac-breasted Roller (<i>Coracias c. caudata</i>) San Diego Wild Animal Park	1
Indian Roller (<i>Corcias benghalensis</i>) Houston Zoo	5
Hoopoe (<i>Upupa epops</i>) Evansville, Indiana	1
Eastern Green Wood Hope (<i>Phoeniculus purpureus marwizi</i>) New York (Bronx Zoo)	5
Northern Red-billed Hornbill (<i>Tockus e. erythrorhynchus</i>) San Diego Wild Animal Park	1(1)
Tropic Hornbill (<i>Penelopides panini</i>) Los Angeles	2(1)
Southern Pied Hornbill (<i>Anthracoceros a. albirostris</i>) Seattle	2
Northern Ground Hornbill (<i>Bucorvus abyssinicus</i>) San Diego Wild Animal Park	3(2)

Crimson-rumped Toucanet (<i>Aulacorhynchus haematopygus</i>) Los Angeles	5*
Pale-mandibled Aracari (<i>Pteroglossus torquatus erythropygius</i>) Los Angeles	6(6)
Plate-billed Mountain Toucan (<i>Andigena laminirostris</i>) Los Angeles	3(1)
Red-breasted Toucan (<i>Ramphastos dicolorus</i>) San Diego Wild Animal Park	1(1)
Sulphur-breasted Toucan (<i>Ramphastos sulfuratus</i>) Houston Zoo	2
Rufous-faced Antpitta (<i>Grallaria erythrotis</i>) New York (Bronx Zoo)	1
Andean Cock-of-the-Rock (<i>Rupicola peruviana</i>) Fort Worth Washington DC (National Zoological Park)	1(1) 1(1)
White-browed Robin-Chat (<i>Cosypha heuglini</i>) Seattle	2
White-crested Laughing Thrush (<i>Garrulax leucolophus</i>) Columbia (Riverbanks) Houston (Busch Gardens) Kansas City	2(1) 7 10(10)
Fukien Gray-sided Laughing Thrush (<i>Garrulax caerulatus berthmyi</i>) San Diego Wild Animal Park	1(1)
Green-backed Tit (<i>Parus monticola</i>) Seattle	5(5)
Golden-masked Tanager (<i>Tangara larvata</i>) New York (Bronx Zoo)	6
Audubon's Oriole (<i>Icterus graduacauda</i>) Houston Zoo	2
Blue-eared Glossy Starling (<i>Lamprotornis chalybaeus</i>) San Diego Zoo San Diego Wild Animal Park	2 2(1)
Rueppell's Glossy Starling (<i>Lamprotornis purpuropterus</i>) San Diego Wild Animal Park	2(1)
Superb Starling (<i>Spreo superbus</i>) Denver Indianapolis New York (Bronx Zoo) San Diego Zoo San Diego Wild Animal Park	7(5) 1(1) 6 2 3(1)

Bali Mynah (<i>Leucopsar rothschildi</i>) Cincinnati Houston Zoo Kansas City Los Angeles Monroe (Louisiana Purchase) New York (Bronx Zoo) San Diego Zoo San Diego Wild Animal Park Seattle Toledo Topeka Washington DC (National Zoological Park)	16(11)* 3 20(10) 12(4) 3 4 4(2)* 4(3)* 9 2(2) 6 16(4)*
Plush-capped Jay (<i>Cyanocorax chrysops</i>) Oklahoma City Topeka Tucson (Gene Reid Zoo)	1(1) 2 1(1)
Red-billed Blue Magpie (<i>Urocissa erythrorhynchus</i>) Philadelphia	2
Himalayan Red-billed Blue Magpie (<i>Urocissa erythrorhynchus occipitalis</i>) Seattle	7(5)
Western Raven (<i>Corvus corax sinuatus</i>) San Diego Zoo	3

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