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Part D. Rearing, Parental, Foster, and Hand (Panel 9)

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Panel Members: James Enderson, Chairman, Robert Berry, Richard Olendorff, and John Snelling.

Although the pre-hatching period in the artificial rearing of raptorial birds is usually attended by a good deal of apprehension on the part of the person in charge, the rearing of hatched young to adulthood can be accomplished quite easily. For perspective, this panel outlined some of the characteristics of the rearing of young by wild adult Peregrines and then explored the various techniques and possible pitfalls involved in captive rearing.

Stan Temple presented time-lapse motion picture data obtained from wild nesting Peregrines on the Yukon River in the summer of 1970. A more complete report on this work is in press (*Living Bird*—Enderson, Temple, and Swartz). Throughout the first week after hatching young Peregrines were brooded by the adult over 95% of the time where ambient temperatures averaged 57 F.

After the first week, there was a rapid drop in the attentiveness of the brooding adults. Brooding occurred 10% of the time after the age of three weeks. Correlations in the amount of brooding of young by the adults appeared to occur with changes in weather conditions. As one would expect, brooding was more frequent during rainy periods, and when temperatures were below the average for the period. The implications of these data are that young Peregrines will require the artificial application of heat almost constantly until they are five to seven days old, and thereafter can tolerate room temperatures and lower.

The time-lapse films showed that young Peregrines were fed within four hours after hatching, and that the average rate of feeding by adults approximated two feedings per young per day in the first five days of life, and that this rate increased to nearly three feedings per day per young at least until the young were 25 days old. The interval between feedings was as high as seven hours within the first few days of life, and then decreased to about four to five hours thereafter. On the average, each feeding session by the adult lasted only about ten minutes. There were no instances where young Peregrines up to the age of four weeks were observed feeding themselves. Unfinished prey items were never left on the nest ledge by the adults. The time-lapse films also showed that there was a very marked decrease in the participation of the male on the nest ledge after hatching. The female did virtually all of the feeding and brooding. Two day old young Peregrines were very sensitive to over-heating in direct sunlight and actively sought shade at that age.

In regard to foster rearing in captivity, Bob Berry commented on numerous recorded instances of the adoption of the young raptors by foster parents of their own or other species. It also appears that lone adults will adopt young of various ages. Generally, these adoptions have followed an unsuccessful attempt by a broody pair or lone adult to produce young of their own in captivity. There have been unsuccessful attempts to cause adoption after the foster parents have stopped "brooding." There have also been the cases of a captive Gyrfalcon and a captive Peregrine Falcon, that have adopted and successfully raised young without entering into a breeding cycle at all. Successful foster rearing has occurred in accipiters, buteos and falcons.

Richard Graham described an instance in 1971 in which a pair of Prairie Falcons, after the incubation of infertile eggs for four weeks, readily accepted a pair of very young Prairie Falcons and reared them. On the other hand, a pair of Peregrine Falcons, that had not incubated eggs, killed a Prairie Falcon chick as soon as it was placed with them. Fran Hamerstrom related an account of a Golden Eagle that accepted a one-day-old chicken, and one of a Red-tail, which after accepting an adopted Red-tail chick, also adopted a white mouse.

According to Bob Berry, there are three major pitfalls in allowing captive adult raptors to rear young. The first is that after a diet of day-old chickens, cannibalism of the young raptor by the adults can occur. This circumstance was seen in Henry Kendall's Prairie Falcons, where the adults attempted to eat the young. Adult Sparrow Hawks cannibalized their young in a project operated by Tom Cade. Fran Hamerstrom also cautioned against feeding captive adults food such as day-old chickens that are similar to birds they will later be expected to adopt. A second problem, experienced by Berry, was the failure of a Goshawk to brood her nine-day-old young. A third problem, experienced by Heinz Meng in 1971, was the failure of the adults to feed the young, even though they appeared to be doing so. Don Hunter cited his own experience in which an adult Goshawk adopted a very small chicken even though it had been fed day-old chickens prior to that time. It was pointed out that the peeping of young raptors, or for that matter, young chickens, may inhibit the adult from killing them. Hunter also cited an instance where a pair of Red-tails incubated and

raised a young goose until it was large. Phil Shultz said that his pair of Prairie Falcons immediately brooded orphan Prairie Falcon chicks, but did not feed them for two or three days, and they had to be fed by hand until that time.

On the subjects of artificial brooding and hand-feeding of young raptorial birds, John Snelling spoke of hand-rearing 19 artificially hatched Kestrels on day-old chickens, pigeons, mice, and sparrows. The food items were plucked or skinned, and then the bones finely chopped with scissors. The temperature of the still-air brooder was 95 F for the first week after hatching, 90 F up to three weeks, and 72 F thereafter. He also said that he had had a good deal of trouble rearing eagle chicks in Africa, where he had no means of accurately controlling brooding temperature.

Richard Olendorff reported on a project involving the hand-rearing of Red-tailed Hawks, Ferruginous Hawks and Swainson's Hawks. Immediately after hatching the young buteos were left in the incubators at 99 F, and showed no distress. After 12 hours, heat was applied by means of incandescent lamps and the proper temperature was obtained by trial and error. If the birds were too cold, they shivered, and if too hot, they panted. The appropriate brooding temperature from the first to the third day appeared to be about 88 F and between the fifth and the sixth day, it appeared to be about 81 F and about the eighth day, 77 F. Thereafter, the application of artificial heat was unnecessary. The birds were brooded separately and it was pointed out that if three or four had been brooded together, perhaps less heat would have been necessary. The young buteos were fed every four hours, beginning within a few hours after hatching.

James Enderson mentioned that the down on artificially brooded young falcons does not appear to fluff readily after hatching and that stroking with a feather can raise the down and reduce the heat loss. Brooding temperatures on several freshly hatched falcon chicks he reared were held between 90 and 95 F. Chicks that are too hot tend to pant and stretch; those that are too cool tend to chirp, and pull their head under their abdomen. After the fourth day, the brooding temperature was lowered to 87 or 88 F for the next four days. Bob Berry also reported that young Goshawks and Peregrines show stress at temperatures below 88 or over 92 F in the first week of life. In regard to temperature, Heinz Meng mentioned that he placed a newly hatched Peregrine chick in a long box with a heat source, a light bulb, at one end, so that the bird could regulate its own temperature by moving toward or away from the bulb. After about the first week, the chicks can tolerate room temperatures. A still-air styrofoam brooder was used by Enderson, and a thermometer kept at the level of the upper surface of the chick at all times.

Young falcon chicks kept on a relatively smooth surface such as paper towel seem unable to keep their legs beneath them or to raise their heads readily, while those kept on coarse gravel do not experience that trouble. Bob Berry mentioned that he had experienced the same problem in Peregrines and Goshawks, and solved it by placing the birds on a soft towel in a bowl. Fran Hamerstrom mentioned that she has provided emergency heating for the young by placing it inside of her shirt! She noted that chicks covered with a piece of

cloth are usually resting and when the cloth is removed they quickly raise their head in anticipation of being fed. She has used an unorthodox brooding technique in the cases of very young harriers, horned owls and other species. The young are carried under clothing just above the belt, supplying warmth, contact and motion to the chick. When older, the chick is placed in a strawberry box on a cloth pushed into the box. The chick is then covered with a cloth to provide weight because "when a brooding raptor rises to feed its chick, the youngster is exposed to light and lack of tactile pressure. Light and the release from pressure are the dinner bell. When I take a chick out from inside my shirt, or remove the sock from the basket, I am giving the same signal, and the heavy-headed chick has not wasted its precious time and energy in vain waving its head about nor struggling for footing before this time." According to Berry, artificially brooded chicks do not readily submit to being brooded by adult birds, although they eventually learn the source of the heat.

Richard Fyfe noted that wild Prairie Falcon chicks are negatively photophobic in that they turn away from the light and huddle towards the rear of the ledge.