

Sexual dimorphism in peafowl. Colorfully plumaged peacock (rear) courts drabber plumaged peahen (front).

Poulards in Peafowl

How to Turn a Peahen into a Peacock

by

Nancy Bent, Kevin Bittle, and Lisa Walsh,
Chicago Zoological Society
Brookfield, Illinois

Indian Peafowl *Pavo cristatus* have been exhibited at Brookfield Zoo since it opened in 1934. As is common in many zoological parks, the birds have been given free range of the zoo grounds during the summer months. However, during the colder months the birds are confined to heated quarters, as winters in the Chicago region are too harsh for them to be at liberty. On nice days in winter the birds have access to a large covered coop from which they can be herded inside for the night.

The fact that the birds must be confined for the winter limits the size of the park's population, as they cannot be too crowded without causing battles among the males. In the past we

have limited the population to the number that could comfortably be housed in the winter quarters by not allowing the peahens to nest. This required searching out each nest, a time-consuming and not always successful strategy.

In 1984 two of our peahens managed to hide their nests, which presented us with five more birds to add to the wintering area. We did not want to stop exhibiting peahens, as we felt that showing the differences between the male and female birds

teaches an important lesson about sexual dimorphism in birds. Having a few peahens also helps to stimulate the males to display. What we needed was a permanent solution to the problem of unwanted reproduction.

After some discussion with the zoo's veterinarians, we decided to perform an ovariectomy (spaying) on each hen. In early 1985 five peahens underwent this surgery, which involved the removal of their ovaries and oviducts. Ovaries were removed along with the oviducts to prevent any future problems with egg peritonitis. All recovered without incident and were released into the park with the males later in the spring. Their behavior was unchanged and they reacted to

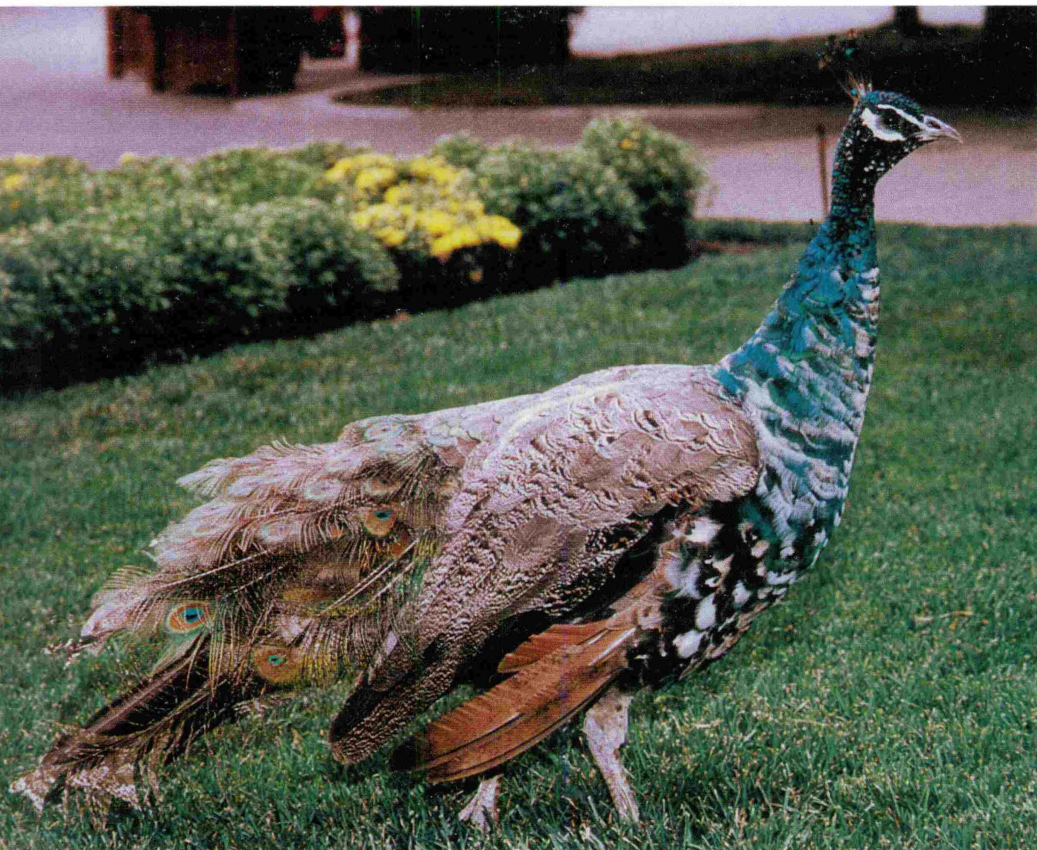


Photo by Jim Schulz

Peahen "Curly toes" in the midst of molting into male plumage. Compare with the peacock in figure 1.

years her train has continued to lengthen with each molt, similar to the growth seen with increasing age in males (Johnsgard 1986), and she now resembles a full adult male.

Of the remaining females that underwent the surgery in 1985, three died in accidents unrelated to the surgery while still in female plumage. "Curly Toes" (named for an obvious physical characteristic) did not begin to display any male plumage until early in 1997. We photographed her in the midst of her fall molt when she was showing more male feathers. "Gypsy," a female donated to the zoo in 1989 and spayed in 1990, began to molt into male plumage in 1995.

What causes this phenomenon? A brief refresher in the anatomy of female birds will help. Unlike female mammals, female birds only have one ovary and oviduct, that on the left side (the right fails to develop in the embryo, being present only as a vestige). This reduction is thought to reduce weight for flight, and to protect the developing egg. If there were two mature eggs present in parallel oviducts, a sudden jolt of the bird's body might crack them (Wely 1982).

In many sexually dimorphic birds, such as peafowl, the development of the plumage is estrogen-dependent. That is, the dull plumage found in females is dependent on the presence of estrogen, and the more ornamental male plumage develops in the absence of estrogen (Hegelin & Kimball 1997). This has been demonstrated in a number of species in the Galliformes (the family of chicken-like birds to which the peafowl belong). Ovariectomized females, older females, and females with diseased ovaries have all been found to molt into partial or full male plumage because they do not produce enough estrogen (see citations in Hegelin & Kimball 1997 for more information).

The ovaries of pullets (young female chickens) were often removed in prior days, since the resulting poulards grew faster and put on fat more readily, giving a flesh considered to be of superior quality (the French "poulard" means "fat pullet"). Poulards also molt into plumage midway

the males as they always had – they just did not nest.

The story could end here as an interesting technique to control reproduction in a long-lived and popular zoo animal. However, in 1994 we noticed something unusual in our peahen "Duck" (so named because she tended to stay at our Formal Pool with the waterfowl). Duck molted her plumage as usual in late summer, but when the new feathers on her neck started to break from the sheaths they were blue instead of green. Duck was growing male plumage.

As her molt continued Duck developed a small train of eye feathers instead of the usual short brown tail coverts found on females. Her primaries came in the chestnut color of the male, her white lower abdomen turned blue, and she even exchanged her brown crest feathers for blue ones. When she had completed her molt she looked exactly like a young male, with full adult body plumage and a short train of eye feathers. In successive



VSP
Innovations
in
Veterinary
Products

Veterinary Specialty Products, Inc.

Product Catalog

We specialize in avian, exotic and small animal products
P.O. Box 812005 Boca Raton, Florida USA 33481 (561) 362-7340

<p>ELECTRONIC SCALES & THERMOMETERS</p> <p>CLOACAL & MOUTH SPECULUM</p> <p>FEEDING TUBES</p>	<p>LEG BAND CUTTER</p> <p>PERCH STAND</p> <p>HEATING PLATFORMS</p> <p>CORDLESS DREMEL</p>
--	---

AND MORE

LOOK IN OUR CATALOG

**VETERINARY
SPECIALTY PRODUCTS, INC.**
(561) 362-7340 fax (561) 362-9982
ORDERS (800) 362-8138
Web Address www.vet-products.com

between that of a rooster and a hen, and grow spurs. The reverse operation, castration of young roosters, produces a capon. Capons and poulards are almost identical in outward appearance (see Welty 1982 for more information).

The removal of the ovaries of the Brookfield Zoo peahens produced peafowl poulards. It is probable that our peahens took a number of years to change plumage because they were fully mature laying hens when the surgery was performed, instead of young, sexually immature pullets. They undoubtedly had high enough levels of estrogen circulating in their bloodstreams that it took several years for the hormone levels to fall to low enough levels to stimulate the growth of male plumage. Interestingly, there seemed to be no correlation between the age of the peahen and her shift in plumage.

It is also interesting to note that Duck, the peahen who changed plumage first and most completely, resembles a peacock much more than a chicken poulard resembles a rooster. This could be due to individual differ-

ences between the two species. On the other hand, chicken poulards are eaten at a fairly young age while they are still fat and tender, and never have the chance to fully mature. It would be interesting to know of any aged chicken poulards, and whether they grew to more closely resemble roosters over time.

Our experiment at population control in the zoo's peafowl community had an unexpected conclusion, but not a totally unwelcome one. It has been very interesting to observe the changing plumage of our "peahens," and our visitors certainly prefer the more brightly colored birds. We are still interested in exhibiting both sexes and so are on the lookout for more peahens, but until that time we'll enjoy observing our peafowl poulards.

Literature Cited

- Hagelin, Julie C. and Rebecca T. Kimball. 1997. "A female Gambel's Quail with partial male plumage." *The Wilson Bulletin* 109: 544-546.
- Johnsgard, Paul A. 1986. *The pheasants of the world*. Oxford: Oxford University Press.
- Welty, Joel Carl. 1982. *The life of birds, third edition*. Philadelphia: Saunders College Publishing.



Our 68th Bird Mart EVERYBODY'S BIRD MART

August 20, 2000

L.A. County Fairplex, Bldg.#4
Pomona, California

9:30 A.M. to 4:00 P.M.

Admission \$5.00

Kids under 12 free

The Pomona Bird Mart has become the marketplace for buyers and sellers.

**BIRDS • CAGES • FEEDERS
NEST BOXES • VITAMINS
SEED • PERCHES • GIFT ITEMS**

parking \$4.00

Use White Ave. parking lot
(Tram service from parking lot to building G)

Everybody's Bird Mart
P.O. Box 1465, Thousand Oaks, CA 91358

(805) 494-1499

The Original, The #1 Bird Mart

Magnolia Bird Farm

We
Buy
Birds

•
We
Sell
Birds



Complete Bird Supplies

8990 Cerritos Ave.
Anaheim, CA 92804
(714) 527-3387

12200 Magnolia Ave.
Riverside, CA 92503
(909) 278-0878

(closed for vacation, first 2 weeks of August)

OPEN 9 TO 5 DAILY
Closed Sun., Mon. & holidays



Peahen "Duck" three years after she started molting into male plumage. Compare with the peacock in figure 1.

Photo by Erica Benson