

material. Centric fusions could thus result in a reduction of the diploid number from 60 in *L. irroratus* to 48 in *L. pictus*. A pericentric inversion involving the X-chromosome could have produced the metacentric chromosome found in *L. pictus*.

Genoways (1973) described the Y-chromosome as a medium-sized metacentric chromosome. It would appear that polymorphism for the Y-chromosome exists to some extent in populations of *L. pictus*. While polymorphism appears to be minimal, it could be that our investigation failed to locate small amounts of existing polymorphism because our samples were taken from well within the range of *L. pictus*. Examination of more peripheral populations where environmental selection is severe for certain genotypes could provide valuable information concerning interlocality polymorphism in *L. pictus*.

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## SURGERY ON A RED-TAILED HAWK (*BUTEO JAMAICENSIS GMELIN*)

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#### ABSTRACT

The left wing of a male Red-tailed Hawk was treated for the presence of necrotic tissue. Techniques involved the use of local anesthesia and blunt surgical procedures. The animal survived the surgery and was recovering, but died because of an attack by predators.

#### INTRODUCTION

In March of 1975, officials of the Tennessee Wildlife Service brought to the Biology Department of the University of Tennessee at Chattanooga a wounded male Red-tailed Hawk (*Buteo jamaicensis*) weighing approximately 1.6 Kg (3.5 lb) and measuring about 508 mm (20 inches) in length. The bird had been injured in the "wrist" region of the left wing and was unable to fly. There was a puncture wound about 1/2 cm in diameter on the dorsal wing surface immediately over the carpals; the surface area, including the metacarpal articulation as far proximally as the distal portion of the radius and ulnar bones, was extensively invaded by necrosis. The ventral wing surface featured a small hole about 1 mm in diameter between the carpals and the metacarpals, obviously a continuation of the larger puncture on the dorsal surface. Left to its own devices, the bird would probably have died. Even if the hawk were otherwise tended, its chances of survival were not good unless the wound was treated.

#### PROCEDURE

Since there was no literature immediately available dealing

with avian general anesthetics and considering the dangers inherent in blind administration of general anesthesia, it was decided to attempt to desensitize the wound area with local anesthesia and to utilize physical restraint to immobilize the hawk. It was later discovered that the use of local anesthetics in birds is contraindicated due to possible toxic effects. This is especially true for small birds (Sanford, 1971). The muscle and dermal tissue was liberally infiltrated with 2% xylocaine containing 1:100,000 epinephrine and the feathers were plucked from the area around the wound. We had no specialized equipment available for either muzzling or restraining such a bird. The entire procedure was of, necessity, makeshift. One author held the bird, the other performed the surgery. The former wore heavy coverings along his arms and over his chest; but the surgeon was forced, for the sake of manual dexterity, to forego protection of hands or face. Contrary to our apprehensions, this presented no problem—the bird made no attempt to struggle, in spite of constant manipulation of the injured wing as well as much probing and pulling in the wound area. This suggests that the animal experienced no pain.

The necrotic tissue was removed with care using blunt surgical techniques. A solid plug of necrotic tissue approximately 20 mm long and 10 mm in diameter, adjacent to the hole in the wing, was excised as a unit. All visible fragments of necrotic tissue were removed. The entire wound was cleansed with 70% ethyl alcohol. The surgical procedure expanded the wound to about 24 mm in diameter, from the dorsal to the ventral wing surface. The skin on the ventral wing surface was left intact, since it appeared to be uninfected. There was no evidence of gangrene or of broken bones. Attempts at dressing the wound were unsatisfactory. Initially, the wound area was covered and secured with a gauze bandage. This was unwieldy and impractical, since any wing movement displaced the bandage. The next attempt consisted of a taped-on dressing, but the bird quickly tore this off. Finally, the wound was inundated with

Aureomycin antibiotic surgical powder, packed with Gelfoam, and the area left otherwise exposed.

The bird was removed, for the duration of recuperation, from the campus laboratory to the home of one of the authors. When offered food that evening, it readily consumed three adult white mice. Subsequent recovery was rapid, and at no time was there any indication that the bird was deteriorating physically. Mobility of the wing was being established; within one month, the bird was capable of folding it normally. At the end of two months, it was capable of spreading the wing in a normal manner. Feathers had recovered the area which had been plucked earlier, and it appeared that the animal would be attempting flight within days. Unfortunately, during this period the hawk (while sitting outdoors on its perch) was apparently frightened by some unidentified predator. The attack left no visible wounds, but the animal was discovered the next morning sitting upon the ground, entangled in its tether. It appeared to be heavily fatigued and died within 24 hours.

#### DISCUSSION

That the animal ultimately died was unfortunate, but this had no bearing on the success of the surgery. Plainly, the treatment accorded the bird was adequate. The muscle tissue had been grossly insulted by the wound and the subsequent formation of necrotic areas. Gangrene had not developed and, by the time of the bird's death, the entire wound was recovering.

The exact cause of the original wound will never be determined, but several alternatives seem likely. The possibility that it was made by a bullet is considered small. This conclusion is based on the following: the hole on the dorsal wing surface was about 5 mm in diameter, which is similar to a .22 caliber bullet, but there was no exit hole on the ventral surface, nor was there any sign of a slug or fragments imbedded in the muscle of the wing. It is possible that the hawk had been attacked by a larger bird of prey; but if that were true, one would have expected the predator to complete the kill. This possibility is rendered still less likely by the further observation that there are very few birds in this region that would attempt an attack on a Red-tailed Hawk. It could have been an overly enthusiastic stoop on a mating flight, but more likely, the hawk flew into a pointed obstacle and injured itself. This latter hypothesis has the additional advantage of being able to account for the bird's survival, following injury, for what was apparently days, judging from the condition of the wound.

Shortly after the animal's death, the authors contacted C. J. Sedgwick, a veterinarian at the San Diego Zoo in California, and were advised that an isotonic solution should have been administered orally immediately after discovering the exhausted animal. It is possible that this would have saved the bird, since it was pointed out that in its struggles, the animal must have lost a large quantity of electrolytes as well as water, and these should have been replaced along with the lost water. Giving the bird only water may actually have contributed to its demise, since water alone would tend to dilute the remaining free electrolytes.

The ability of this large predatory bird to resist infection and neural shock was surprising, since the wound was extremely filthy and filled with debris prior to surgery. It is also worth noting that during the entire surgical procedure there was no indication of bleeding. It is possible that this was due to the use of blunt techniques. The area which required cleaning was large; it was necessary to scrape away some healthy tissue to ensure that all necrotic tissue had been removed. Blood vessels were not observed in the area and, although the healthy tissue lost some lymph and was quite red in appearance, bleeding was non-existent. It should be emphasized that the local anesthetic was either surprisingly effective or the entire wound area was senseless for some other reason. The authors have performed numerous operations on small mammals, frequently for afflictions similar to this hawk's, without experiencing such success with local anesthesia. This suggests rather strongly that sensory enervation of the hawk's wing is sparse compared with enervation of mammalian limbs. This agrees with the observation of Sykes (1964).

The handling and restraining of a protected bird was authorized under aegis of U. S. D. I. Fish & Wildlife Service Migratory Bird Salvage Permit #PRT 7-28-S-Z-NV issued to R. G. Litchford.

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## Warning to Women: Stop Smoking or Stop Using "the Pill"

The Planned Parenthood Medical Committee of New York has issued a warning that women must be asked to choose between cigarettes and "the Pill" if they are currently using both. The recent warning came in the wake of research reported independently by two eminent medical researchers, Dr. Howard Ory and Dr. A. K. Jain, which shows that smoking is the most important single cause of fatal myocardial infarctions in women on the Pill, and that the incidence increases substantially among heavy smokers.

## SOME MAYFLIES (EPHEMEROPTERA) OF MIDDLE AND EAST TENNESSEE

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The purpose of this paper is to establish current distributional records for 25 species of mayflies collected between fall 1975 and spring 1976 from seven counties in Middle and East Tennessee. Wright and Berner (1949) had previously reported distributional records for numerous species from the same regions of Tennessee.

Specimens were either preserved in the field or returned to the laboratory, where the nymphs were reared to the imago stage. A listing of species, dates and locations of collections follow for Blount, DeKalb, Overton, Polk, Putnam, Roane and White Counties in Tennessee.

### BLOUNT COUNTY

*Isonychia tusculanensis* Berner

Pistol Creek, Maryville, Tennessee, May 26, 1976.

*Stenacron interpunctatum* (Say)

Pistol Creek, Maryville, Tennessee, May 26, 1976.

### DEKALB COUNTY

*Hexagenia limbata* (Serville)

Center Hill Reservoir, Tech Aqua Dock, August 2, 1975.

### OVERTON COUNTY

*Paraleptophlebia jeanae* Berner

Roaring River, May 4, 1976.

*Ephemerella dorothea* Needham

Roaring River, May 7, 1976.

*Ephemerella needhami* McDunnough

Roaring River, May 3, 1976.

*Ephemerella temporalis* McDunnough

Roaring River, May 7, 1976.

*Ephemerella rotunda* Morgan

Roaring River, May 4, 1976.

*Isonychia bicolor* (Walker)

Roaring River, May 4, 1976.

*Pseudocloeon veteris* McDunnough

Roaring River, May 2, 1976.

### POLK COUNTY

*Hexagenia limbata occulta* Walker

Ocoee Reservoir Three, May 23, 1976.

*Ephemera guttulata* Pictet

Tumbling Creek, Cherokee National Forest, May 22, 1976.

*Ephemerella rotunda* Morgan

Ocoee River, Copperhill, Tennessee, April 4, 1976.

*Ephemerella invaria* (Walker)

Ocoee River, Copperhill, Tennessee, March 28, 1976.

*Epeorus pleuralis* (Banks)

Caney Creek, Cherokee National Forest, May 25, 1976.

*Epeorus vitrea* (Walker)

Tumbling Creek, Cherokee National Forest, May 22, 1976.

*Stenonema quinquespinum* Lewis

Caney Creek, Cherokee National Forest, May 25, 1976.

### PUTNAM COUNTY

*Caenis amica* Hagen

Green Valley Herford Pond, May 14, 1976.

*Ephemerella rotunda* Morgan

Blackburn Fork, April 18, 1976.

*Ephemerella septentrionalis* McDunnough

Blackburn Fork, April 3, 1976.

*Ameletus lineatus* Traver

Mill Creek, Calf Killer Drainage, April 3, 1976.

*Callibaetis fluctuans* (Walsh)

City Lake on Falling Water River, March 14, 1976.

*Stenonema tripunctatum* (Banks)

Blackburn Fork, April 14, 1976.

*Stenonema annexum* Traver

Blackburn Fork, April 11, 1976.

### ROANE COUNTY

*Leptophlebia cupida* (Say)

Bear Creek, Oak Ridge, Tennessee, March 15, 1976.

*Habrophlebiodes americana* (Banks)

Grassy Creek, Oak Ridge, Tennessee, May 26, 1976.

*Ephemerella needhami* McDunnough

Bear Creek, Oak Ridge, Tennessee, April 16, 1976.

*Ephemerella temporalis* McDunnough

Bear Creek, Oak Ridge, Tennessee, April 20, 1976.

*Ephemerella rotunda* Morgan

Grassy Creek, Oak Ridge, Tennessee, April 20, 1976.

*Stenonema tripunctatum* (Banks)

Bear Creek, Oak Ridge, Tennessee, April 10, 1976.

*Stenonema vicarium* (Walker)

Grassy Creek, Oak Ridge, Tennessee, May 8, 1976.

### WHITE COUNTY

*Ephemerella needhami* McDunnough

Taylor Creek above Fancher's Falls, April 14, 1976.

*Ephemerella rotunda* Morgan

Taylor Creek above Fancher's Falls, April 14, 1976.

*Stenonema pulchellum* (Walsh)

Taylor Creek above Fancher's Falls, April 14, 1976.

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