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**Successful exchange of prairie-chicken eggs between nests in two remnant populations.**— Declining fecundity may be a classic symptom of inbreeding depression, and is expected in isolated populations that have fallen below about 50 individuals (Franklin 1980, Shaffer 1981, Simberloff 1982, Brussard 1985). Sterility of males was suspected as a contributing factor in the extinction of the Heath Hen (*Tympanuchus c. cupido*) (Gross 1928). Currently, each of the three remaining populations of Greater Prairie-Chickens (*T. c. pinnatus*) in Illinois contains fewer than 50 individuals, and 28 years (1963–1990) of nest data for the Jasper County population show significant declines in egg fertility and egg success (hatched eggs/total eggs) (Westemeier, unpubl. data). The number of Illinois prairie-chickens declined from millions throughout the state about 1860 to estimates of 25,000, 2000, 500, and 76 in increasingly scattered population in 1933, 1962, 1972, and 1990, respectively (Westemeier 1985, unpubl. data).

Following a joint decision by the Illinois Dept. of Conservation (IDOC), Illinois Natural History Survey (INHS), Illinois Nature Preserves Commission, and Illinois Endangered Species Protection Board to address possible inbreeding depression in Illinois prairie-chickens, an effort was undertaken in 1990 to exchange clutches of eggs under incubation in Jasper and Marion counties. The objective was to enhance genetic variation in both gene pools by mimicking natural dispersal. The two populations, about 56 km apart, are supported by a total of 858 ha of intensively managed sanctuaries. Except for one intervening lek with four males in spring 1990, about 42 km from the Jasper population, former lek sites between

the two managed populations have not been used for 14–25 years. Movements by prairie-chickens of 42–56 km, and more, are possible (Hamerstrom and Hamerstrom 1973), but current exchanges of genetic material are unlikely in Illinois.

This paper describes what we believe is a first attempt to exchange eggs between prairie-chicken nests. An exchange of grown birds between the two populations was deemed unlikely to succeed because of the large numbers needed, the probability of high dispersal and mortality, and difficult logistics (Toepfer 1988, Moe 1990).

To find one or more prairie-chicken nests of reasonably synchronized incubation in each population, three teams (of four to six searchers each) searched 146 ha of sanctuary grasslands between 25 April and 31 May 1990 (86 person-days). Searchers walked side by side, each viewing a 1.5-m swath and using a 1.5-m staff to carefully part vegetation to view possible nest sites (Westemeier and Buhnerkempe 1983). The risk of stepping on active nests was lessened, where possible, by each nest searcher walking in wheel tracks made in grasslands the previous summer or fall by combines, which harvested grass seed, or by tractors, which pulled mowers. Estimates of the stages of incubation were made by submerging three eggs of each clutch in water (Westerskov 1950). When incubating hens were flushed off their clutches, search teams promptly left the sanctuary areas to allow for a quick return by hens. To reduce the risk of desertion and predation, nests were not revisited until clutches were believed to be within one week of hatching (incubation period = 25 ± 2 days [Silvy 1968, McEwen et al. 1969, Svedarsky 1979]). Ages of prairie-chicken embryos were estimated by making slight adjustments of criteria for Ring-necked Pheasant (*Phasianus colchicus*) embryos which hatch in 23 days (Labisky and Opsahl 1958).

Among seven prairie-chicken nests located in Jasper County and three in Marion County, two clutches were estimated potentially synchronous in that incubation had not started. In Jasper County on 25 April, a hen flushed from a 10-egg clutch when searchers were about 10 m from the nest. In one Marion County nest on 27 April, no hen was present at a clutch of 12 eggs. Both nests were in fields of smooth brome (*Bromus inermis*), which largely concealed both nests.

On 18 May 1990 at 07:30 h CST, we made simultaneous checks of the two experimental nests. Both clutches were being incubated. The hen at the Jasper County nest flushed when the examiner was still 5 m from her nest. Of the 10 eggs still present, two were estimated to be at 16 days of incubation, one was estimated to be either at 23 days of incubation or addled, and the remaining seven eggs were not checked. In contrast to the hen at the Jasper nest, the hen at the Marion County nest jumped aggressively at the examiner's searching stick from a clutch of 15 eggs and then ran off in a wheel track. A check of three eggs in the Marion nest indicated about 16 days of incubation. While an observer remained about 30 m from each nest (to avoid repeated flushing of hens), the other team members made a decision by telephone to proceed with the egg exchange. At 08:00 h, the eggs were removed from each nest and substituted with warm pheasant eggs. This substitution was made in case either hen returned to her nest unseen by the nearby observers. During the transfer, eggs were kept warm by each vehicle's heater. At 09:00 h, the pheasant eggs were removed and the exchange of prairie-chicken eggs was completed in each nest. Neither hen was observed during the 1.5 h required to make the exchange. Temperatures from 07:30–12:00 h ranged from 11 to 23°C, respectively; winds, from calm to 6 km/h; and skies, from clear to partly cloudy.

On 23 May, one egg, withheld from the Marion County nest for genetic studies and for a more accurate determination of incubation stage, hatched in an incubator by 08:15 h. At 11:45 h on the same day, the Jasper County nest, which contained 14 eggs from the Marion County clutch, was observed to be successful, with the chicks ready to leave the nest. This time the hen at the Jasper County nest flushed about 3 m from the examiner. A final check

of the Jasper County nest on 29 May revealed that 12 of 14 eggs had hatched; two intact eggs contained embryos that had died at about six and 24 days of incubation. The Marion County nest, which contained 10 eggs from the Jasper nest, was also successful by 29 May: eight eggs had hatched (exact date unknown); one intact egg contained a dead, 10-day embryo; and another intact egg was addled and showed no sign of a germinal disc or embryo.

Thus, the three dead embryos died six to nine days before, and eight days after, the day the exchange was made, so no mortality was attributable to the exchange. The hatching rate was in fact lower for seven clutches not exchanged (45%) than that of the two exchanged clutches (84%) ($\chi^2 = 6.112$, df = 1, $P < 0.02$). For 112 eggs not exchanged, 11 were missing, 32 were infertile, 50 had hatched, and 19 contained dead embryos whose deaths were unattributable to researcher activities. The missing eggs may have resulted from partial depredation in three clutches or from the breaking of rotten eggs which then stuck to the hens' feathers and brood patches and were carried off inadvertently. One hen extended her incubation period to $\geq$35 days before her 16 rotten and apparently sterile eggs began to break under her. Although such attentiveness indicates a prairie-chicken will extend her incubation period, the physiological costs of such an extension may jeopardize her survival or that of her brood. We believe the stages of incubation for clutches considered for an exchange should be in close synchrony.

This project demonstrated the tenacity of incubating prairie-chickens and, thus, the feasibility of exchanging eggs between clutches. Prairie-chickens readily accept a sudden change in clutch size, eggs from different members of their own species, or pheasant eggs among their eggs (Westemeier 1988). The technique described here offers hope for enhancing genetic variability. If some of the young from the egg exchange ultimately breed, increased heterozygosity in the two populations may be achieved.

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**Occurrence of the Andean Condor in the Perijá Mountains of Venezuela.**—The occurrence of the Andean Condor (*Vultur gryphus*) in Venezuela was first documented by two specimens now in the British Museum which were collected near the city of Mérida (Fig. 1); the most recent was a juvenile taken ca 1912 by Briceño Gabaldón (Swann 1921; Phelps and Phelps, Jr. 1958). Since then, this rare species was thought to be extinct in Venezuela (Phelps, Jr. and Meyer de Schauensee 1979), and Alden (1975) recommended excluding it as occurring in the country. However, on 7 July 1976, Zonfrillo (1977) observed three condors along the road from Mérida to Jají: one near the waterfall at La Chorrera, 30 km from Mérida, and two adults (one male) three km nearer Jají. The area appeared to be good nesting habitat, but no signs of nesting were seen. The birds were considered visitors from the Santa Marta or Andes mountains of Colombia, the nearest known condor breeding localities (Hilty and Brown 1986).

Since 1976, there have been no more sightings near Mérida, and the status of the condor still remains uncertain in Venezuela and in other countries of the Andes Mountains where it is considered in danger of extinction (USFWS 1986). Indeed, in Venezuela and Colombia, few regions seem to remain appropriate for this species due to human intervention, except the high Perijá Mountains that form the frontier between the two countries. It was here, on 27 August 1985 that Leonel Lanier, a mountain climber, ascended to the Páramo of Tetari and observed a condor flying above Torote-jopa Peak (in Venezuela) at an elevation of 3225 m, between 11:00 and 15:00 h. Again in 1986, Lanier conducted an expedition to the Páramo