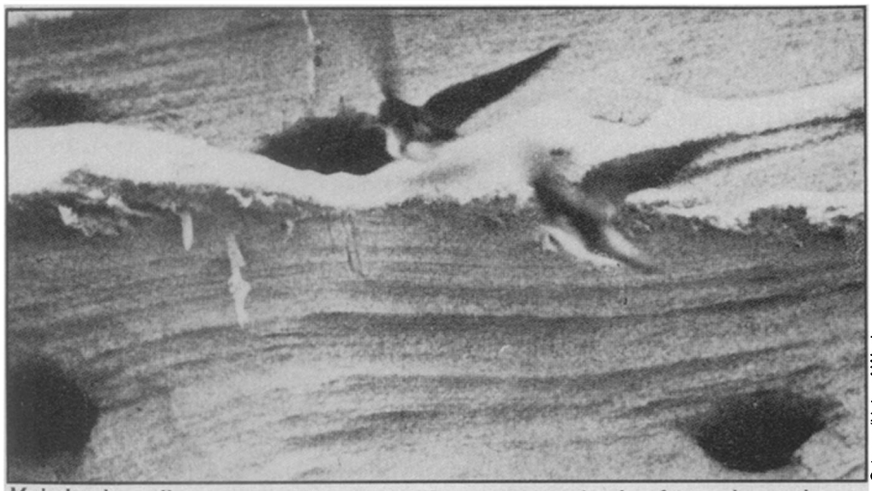
Promiscuity: A bitter pill for swallows



Science/Univ. of Wash.

Male bank swallow pursues his mate into burrow, protecting her from other males.

With the number of divorces, separations and unmarried couples seeming on the increase, sociologists and anthropologists are examining more closely the question "How natural is monogamy?" Shortly before her death, the late Margaret Mead suggested that traditional family structure might metamorphose, out of the failure of monogamy, into a more communal arrangement where children would be raised by several "mothers" and "fathers"

One way to approach the question is to study the extent of monogamy among animals, where such structures are rooted basically in survival and instinct. Bank swallows, for instance, have been observed to mate not only for the duration of the egg-laying period, but well beyond the time necessary simply to ensure reproduction of offspring. "At first glance, bank swallows seem the classic example of a monogamous, monomorphic bird species," say Michael D. Beecher and Inger Mornestam Beecher of the University of Washington department of psychology.

But first glances, and what the Beechers say may be misinterpretations in previous studies, can be deceiving. "In the course of a long-term study of the bank swallow, *Riparia riparia,* we have discovered that males of this species appear to routinely and actively pursue a mixed reproductive strategy (MRS)," the researchers report in the Sept. 21 SCIENCE. MRS means that in addition to pursuing monogamous family life — complete with secure homes burrowed into sandbanks — male bank swallows "routinely seek promiscuous copulations with other females, both before and after pair-bonding" with their mates.

Following more than 2,000 observation hours from 1970 through 1977, the Beechers color-marked and banded 20 to 30 individual swallows within a colony and studied their interactions. They first observed that for about one week after "pair formation," the male bank swallow pursues his mate on every flight from the burrow. The flights — as many as 100 per day — are used to collect nesting materials or to gather food. These "spectacular," "acrobatic" pursuit flights were previously thought to be part of the mating process.

But the Beechers say they represent "the male attempting to protect his mate from insemination by other males." They report they have identified in more than 100 cases that one or more additional males pursue the female when she ventures from the nest for the express purpose of "promiscuous copulation." This conclusion, they say, is based on the observation that already-mated males are frequently chasers, and "since males never have more than one mate ... the activity is not part of mate acquisition."

And some of the chase scenes are worthy of Hollywood. In-flight confrontations between the chasing and guarding male sometimes involve "a vigorous face-to-face fight," the researchers report. Or, the guarding male may attempt to persuade his mate to get back to the burrow by either subtly bumping her or more emphatically knocking her to the ground or fighting and then heading back to the burrow.

In addition, chasing males seem to pursue only females in the fertile period — as evidenced by their chasing mated birds or those who are alone but are heavier in flight (an indication she may be carrying fertilized eggs). In other situations, swallows have been seen copulating with dead birds and even group-"raping" a lone, heavy-flying female.

"To the best of our knowledge this is the first documentation of an MRS as a persistent aspect of social behavior of a nonhuman vertebrate species," say the researchers. The behavior is "so prominent," they say, "that closer investigation of the natural history of other monogamous species living under the appropriate conditions may reveal that MRS is indeed a relatively common pattern." □

More on cosmic background anomaly

It's beginning to seem as if we really are going somewhere. The traditional picture of the expanding universe has space expanding like a dough with too much yeast in it. The galaxies ride along with this expansion like raisins in the dough. Now it is beginning to appear that our raisin at least is moving through the dough as well. Such an impression comes from a few recent studies of classes of distant galaxies and of the cosmic background radio radiation. The latest cosmic background study that can be read to support this possibility is reported in the Sept. 15 ASTROPHYSICAL JOURNAL LETTERS by Edward S. Cheng, Peter R. Saulson and David T. Wilkinson of Princeton University and Brian E. Corey of Massachusetts Institute of Technology.

The cosmic background radiation is a radio flux that was generated by processes operating in the earliest moments of the universe. Since then that flux has pervaded space, expanding with the universe, always present everywhere in it. That at least is the theory, and it used to seem borne out by observations. The radiation does seem to have the spectrum of a blackbody or perfect thermal radiator, as the universe as a whole ought to have. The temperature it represents comes out to about 3° Kelvin, appropriate to the age of the universe. Observers from earth find it in every direction they look, certainly a presumption of all-pervasiveness.

There is at least one hitch to this, the growing evidence for a temperature anomaly, especially from work by George Smoot, M. V. Gorenstein and Richard Muller (SN: 7/16/77, p. 44). The observations of Cheng, Saulson, Wilkinson and Corey were made by balloons that flew from Palestine, Tex., in May 1975 and in August 1978. The first carried a radiometer that received 19.0-gigahertz waves; the second had radiometers at 24.8 gigahertz and 31.4 gigahertz. The balloon flight to 27 kilometers up was chosen to minimize problems with atmospheric absorption of the radiation.

According to the observers the best reduction of the data shows a "dipole," that is, a forward-and-backward anomaly, in which the temperature is slightly higher in one direction than in others. The excess is 3 millidegrees Kelvin, and lies toward right ascension 12.3° and declination −1°. The standard interpretation of a dipole anomaly is that the earth and whatever the earth is attached to is moving through the background at some velocity.

Cheng, Saulson, Wilkinson and Corey point out that although their result is consistent with other measurements of the cosmic blackbody, all of these taken to-