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Figure 1 | A model of promiscuity. Gerlach *et al.*[1] report that the offspring of female dark-eyed juncos have greater lifetime fitness when sired by a male outside the social pair, suggesting an evolutionary advantage for female promiscuity.

these F_1 extra-pair males did not benefit their social partners, as they had no influence on the number of offspring produced within their home nests. Nor were they any better or worse than their male counterparts born from social pairs at defending their social partner from the attentions of other males: the number of offspring lost to extra-pair paternity was the same for F_1 extra-pair and within-pair males.

The reproductive advantages observed by Gerlach *et al.* for the offspring of promiscuous matings tie in with several theoretical predictions. If females prefer sneak matings with attractive males, one would expect them to have more-attractive sons, which in turn will sire more extra-pair offspring. This is a variant of evolutionary biologist Ronald Fisher's theory of runaway sexual selection[5]. Although Fisher was focusing on the evolution of peacocks and other highly ornamented species that exhibit extreme polyandry (few males mating with many females), his logic also applies to female promiscuity within social pairing.

Gerlach *et al.* looked for direct support for runaway sexual selection in dark-eyed juncos, but found no evidence that F_1 extra-pair males were morphologically different from F_1 within-pair males. That said, the preference of junco females for promiscuous liaisons may be more strongly influenced by the song and display traits of males than by morphology, but such traits were not measured in the authors' study.

The increased production of offspring by extra-pair daughters also cannot be explained by runaway sexual selection, but it does suggest that there is a positive genetic covariance between male attraction and female offspring production. Such an advantage is predicted by 'good genes' models of sexual selection if genetic quality underlies both a male's capacity to attract extra-pair matings and a female's fecundity and parenting ability[6,7].

In Gerlach and colleagues' study[1], the additional offspring produced by F_1 extra-pair females were sired by the social partner, and did not come from extra-pair liaisons. How this is achieved and what purpose it might serve is rather mysterious. Perhaps F_1 extra-pair females pair with males that are in better condition. These males might themselves contribute to the higher production of offspring through enhanced male parental care, or simply be more successful in warding off the attentions of extra-pair males and so grab a greater proportion of paternity. Another possibility is that females invest more in offspring sired by these superior males, as occurs in other species[8], and indeed in juncos[9], because such offspring will have inherited their father's better condition. Such ideas need further investigation.

Gerlach and colleagues' fitness analysis shows that the value of promiscuity becomes clear only through multi-generational, direct measurements of viability and reproductive success from parents down to their grand-offspring. This is needed not only for the offspring of social pairs, but also for those derived from promiscuous copulations; measuring proxy components of fitness provides only half-answers. The authors' approach will therefore be a model for future studies in this field. ■

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50 Years Ago

Computer Logic: The Functional Design of Digital Computers. By Dr. Ivan Flores — The book … contains a very solid treatment of logical design; the binary system, adders, multipliers, control units, input and output devices, magnetic tape, and so on, all will be found described here, together with the usual ration of Boolean algebra and formal logic … Only a small part of the book is concerned with programming, but this part I found unsatisfactory. It seems a mistake, now that modifier registers are the order of the day, to introduce the reader first to the old-time procedure for modifying instructions in the arithmetic unit. The last chapter, on programming a particular scientific problem, is a veritable museum piece … It exhibits the most primitive form of machine language coding possible, in which even the conversion of relative addresses in sub-routines to absolute addresses must be done by the programmer himself before his programme is punched.
From *Nature* 11 November 1961

100 Years Ago

There is not the slightest doubt that birds and mammals are now being killed off much faster than they can breed. And it is always the largest and noblest forms of life that suffer most … And the worst of it is that all this wanton destruction is not by any means confined to the ignorant or those who have been brought up to it. We have had our warnings. The great auk and the Labrador duck have both become extinct within living memory … When wild life is squandered it does not go elsewhere, like squandered money; it cannot possibly be replaced by any substitute, as some inorganic resources are: it is simply an absolute dead loss, gone beyond even the hope of recall.
From *Nature* 9 November 1911