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COYOTE-BADGER ASSOCIATIONS

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Abstract.— Four observations made in Jackson Hole, Wyoming, indicate that coyote-badger associations are best considered as phoretic (accidental and nonobligatory) rather than a form of social symbiosis as has been previously suggested.

Occasional reports of coyote-badger associations generally consider them (explicitly or implicitly) to be some form of social symbiosis ranging from commensalism to social mutualism. Four observations of coyote-badger associations I made on the National Elk Refuge, Jackson, Wyoming (26 July, 1, 7 and 10 August 1976) prompted me to reconsider previous interpretations of these associations.

Van Wormer (1964) and Rimington (in Seton 1909) imply that the association is a *commensal* relationship in which the coyote benefits by capturing prey missed by the badger without the badger being adversely affected. On one occasion I observed a coyote attending to an apparent ground squirrel hole about 25 m from where a badger was digging at a hole the coyote had left less than one minute before. The coyote suddenly pounced, thrust its muzzle into the hole, then withdrew it and trotted away, apparently unsuccessful in its attempt to capture a ground squirrel. This type of association would be analogous to various species of reef fish accompanying goatfish in order to capture prey that elude the goatfish (Hobson 1968). The badger is, however, not totally unaffected. The coyote occasionally nips the badger (Hill in Dobie 1961, M. Wells pers. comm.), and Rathbun et al. (1980) describe three coyotes killing a half-grown badger. In addition, the coyote sometimes steals prey from the badger (Shoemaker in Dobie et al. 1965, Price in Dobie 1961). This occasional cleptoparasitism is perhaps a natural progression from the capturing of prey missed by the badger. Also, observations of badgers following coyotes (Robinson and Cummings 1947, Warren 1910) suggest that the badger benefits from the association. During all four of my observations, the badger followed the coyote at least part of the time.

Several observers imply a stronger relationship in the form of *social mutualism* (Cahalane 1950, Dobie 1961, Grinnell in Dobie et al. 1965, Ryden 1975, Young and Jackson 1951). This is supported by observations of the two traveling side-by-side (Suter in Cahalane 1950) and changing leaders. On 26 July 1976 I observed a coyote and badger change leadership several times during the 55 minutes they were in view. The leader often looked back at the follower and paused as if waiting for the other to catch up. A similar observation was made by Robinson and Cummings (1947). In addition, badgers apparently unearth prey chased into burrows by coyotes (Dobie 1961, Dobie et al. 1965). On 10 August 1976 I observed a badger approach a coyote that was lying down near an apparent ground squirrel hole. The badger stuck its muzzle into the hole at which point the coyote arose, walked to another nearby hole and stuck its nose in as if sniffing. The badger immediately ran to that hole and began digging. The coyote then laid down and appeared to watch the badger dig. At one point the coyote leaped up, approached the digging badger, and poised as if ready to pounce on prey. Nevertheless, I observed no prey being caught, and the badger quit digging. It may be that the coyote possesses a superior sense of smell for detecting the presence of ground squirrels (Dobie 1961).

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My observations support the belief that there is a *mutual attraction* between the two species. The widespread occurrence of reported coyote-badger associations (Alberta, Oregon, Montana, North Dakota, South Dakota, Wyoming, Colorado, Texas, New Mexico, and Mexico) suggest an inherent propensity for the association. In addition to associating while hunting, on two occasions I saw them rest together in the same clump of sagebrush. Nevertheless, the association is neither obligatory nor prolonged, conditions necessary for any type of *"true" social symbiosis* (Wilson 1975). Rather, this nonobligatory association comes closest to being *phoretic* (Cheng 1970). Whether one (or both) species seeks out the other is not known. Meeting may be somewhat accidental or promoted by their aggregation at a common prey resource. I suggest that coyote-badger associations are initially analogous to the associations that coyotes develop with ravens and magpies (Murie 1940). Continued associations are probably prompted by both individuals learning that food may be obtained (perhaps more efficiently) by the association and enhanced by the coyotes' own social tendencies. For example, badgers have been observed associated with two (Hill in Dobie 1961) and three coyotes (Cortez in Dobie 1961). On 7 August 1976 I observed a badger following two adult coyotes. The badger always trailed behind the larger coyote as it wound its way around clumps of sagebrush. Whether this attachment to a particular individual is common in coyote-badger associations may be determined with additional observations.

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