

gent), but at least two have been discovered in New Guinea rain forests (205), while Kusnezov (90, 91, 92) has described many new parasitic myrmicines from temperate South America. A few other species have been found in Africa and Australia (24).

The "ultimate stage" in permanent social parasitism has been added with the discovery by Kutter (94) and Stumper (154) of the European myrmicine *Teleutomyrmex schneideri* Kutter, a parasite of *Tetramorium caespitum* (Linné). Like most permanent parasites, this remarkable ant lacks the worker caste. The queens are quite small and have flattened bodies and curved, incrassate legs—all aberrant adaptations which allow them to fasten themselves onto the bodies of the host queens. Gösswald's histological study (61) shows that the body of the *Teleutomyrmex* has undergone extreme degeneration. Mouthparts, the sting, the central nervous system, and various exocrine glands are all notably reduced. The metapleural gland is missing, thus breaking the one anatomical character that in the past seemed to be absolutely diagnostic for the Formicidae.

The earliest evolutionary stages of permanent social parasitism have been described by Wilson & Brown (205, 206). In *Monomorium metoecus* Brown and Wilson, the worker caste is still present and, on first examination at least, appears fully functional. In *Kyidris yaleogyna* Wilson and Brown workers are present in abundance but their behavior is somewhat degenerate. LeMasne (108) has supplied the remaining steps in *Plagiolepis*. In *P. grassei* LeMasne, the workers are scarce and appear only after the sexuals, a unique reversal of the usual order in ants. In the closely related *P. xene* Staercke, the worker caste has disappeared altogether. LeMasne (109) has found the two species together in one nest of the host *P. pygmaea* (Latreille), thus making the first record of true double parasitism in nature.

Douglas & Brown (46) have described *Myrmecia inquilina* (subfamily Myrmeciinae), the first true parasite among the lower ants. Parasitic species are now known from all major subfamilies except the Ponerinae and Dorylinae.

King & Sallee (88) have recorded the puzzling occurrence of mixed colonies of *Formica clivia* Creighton and *F. fossiceps* Buren. Both workers and sexuals of both forms are produced. King & Sallee have considered the alternative possibilities that the two forms are either (a) genetic morphs or (b) distinct species linked in an aberrant symbiosis. The field data are inconclusive. The case deserves further attention in view of the more recent, surprising evidence that food is transmitted in natural conditions among species of the *F. rufa* group (33).

The slave-making species of *Polyergus* and the *Formica sanguinea* group have been the object of several important behavioral studies (5, 42, 44, 133, 165). Dobrzańska & Dobrzański (42, 44) in particular have apparently solved the classic problem of how the raids are organized. There are no scouts or raid leaders, and any individual or small group