Ant Intelligence

When we think of intelligent( ) members of the animal kingdom, the creatures that spring immediately to mind( ) are apes( ) and monkeys. But in fact the social lives of some members of the insect kingdom are sufficiently( ) complex( ) to suggest more than a hint( ) of intelligence. Among these, the world of the ant( ) has come in for considerable( )scrutiny( ) lately, and the idea that ants demonstrate( ) sparks( ) of cognition ( )has certainly not been rejected( ) by those involved in these investigations( ).

Ants store food, repel ( )attackers and use chemical signals to contact one another in case of( ) attack( ). Such chemical communication( ) can be compared to the human use of visual and auditory( ) channels( ) (as in religious( ) chants( ), advertising images and jingles( ), political slogans ( )and martial( ) music) to arouse ( )and propagate( ) moods( ) and attitudes. The biologist( ) Lewis Thomas wrote, 'Ants are so much like human beings as to be an embarrassment( ). They farm fungi( ), raise aphids( )* as livestock( ), launch ( )armies ( )to war, use chemical sprays( ) to alarm( ) and confuse ( )enemies, capture slaves( ), engage( ) in child labour, exchange information ceaselessly( ). They do everYthinG but watch television. However, in ants there is no cultural transmission( )—everything must be encoded( ) in the genes( )—whereas in humans the opposite is true. Only basic instincts ( )are carried in the genes of a newborn baby, other skills being learned from others in the community as the child grows up. It may seem that this cultural continuity( ) gives us a huge advantage over ants. They have never mastered( ) fire nor progressed( ). Their fungus farming and aphid herding( ) crafts( ) are sophisticated( ) when compared to the agricultural skills of humans five thousand years ago but have been totally overtaken( ) by modern human agribusiness( ).

Or have they? The farming methods of ants are at least sustainable( ). They do not ruin environments or use enormous amounts of energy. Moreover, recent evidence suggests that the crop( ) farming of ants may be more sophisticated and adaptable( ) than was thought.

Ants were farmers fifty million years before humans were. Ants can't digest( ) the cellulose( ) in leaves—but some fungi can. The ants therefore cultivate( ) these fungi in their nests, bringing them leaves to feed on, and then use them as a source of food. Farmer ants secrete( )

antibiotics( ) to control other fungi that might act as 'weeds'( ), and spread( ) waste to fertilise( ) the crop.

It was once thought that the fungus that ants cultivate was a single type that they had propagated, essentially unchanged( ) from the distant( ) past. Not so. Ulrich Mueller of Maryland and his colleagues( ) genetically screened( ) 862 different types of fungi taken from ants' nests. These turned out to be highly diverse( ): it seems that ants are continually domesticating( ) new species( ). Even more impressively( ), DNA analysis of the fungi suggests that the ants improve or modify( ) the fungi by regularly swapping( ) and sharing strains( ) with neighbouring ant colonies( ).

Whereas prehistoric( ) man had no exposure( ) to urban( ) lifestyles - the forcing( ) house of intelligence - the evidence suggests that ants have lived in urban settings( ) for close on a hundred million years, developing and maintaining underground cities of specialised chambers( ) and tunnels( ).

When we survey Mexico City, Tokyo, Los Angeles, we are amazed ( )at what has been accomplished ( )by humans. Yet Hoelldobler and Wilson's magnificent ( )work for ant lovers, The Ants, describes a supercolony( ) of the ant Formica yessensis on the Ishikari Coast of Hokkaido. This 'megalopolis( )' was reported to be composed of 360 million workers and a million queens living in 4,500 interconnected( ) nests across a territory ( )of 2.7 square kilometres.

Such enduring ( )and intricately( ) meshed( ) levels of technical achievement outstrip( ) by far anything achieved by our distant ancestors( ). We hail( ) as masterpieces( ) the cave( ) paintings in southern France and elsewhere, dating back some 20,000 years. Ant societies existed in something like their present form more than seventy million years ago. Beside this, prehistoric man looks technologically primitive( ). Is this then some kind of intelligence, albeit ( )of a different kind? Research conducted( ) at Oxford, Sussex and ZUrich Universities has shown that when desert ants return from a foraging( ) trip, they navigate( ) by integrating bearings( ) and distances, which they continuously update in their heads. They combine( ) the evidence of visual landmarks( ) with a mental library( ) of local directions, all within a framework( ) which is consulted ( )and updated. So ants can learn too.

And in a twelve-year programme of work, Ryabko and Reznikova have found evidence that ants can transmit( ) very complex messages. Scouts( ) who

had located food in a maze( ) returned to mobilise( ) their foraging teams. They engaged in( ) contact sessions( ), at the end of which the scout( ) was removed in order to observe what her team might do. Often the foragers( ) proceeded( ) to the exact spot in the maze where the food had been. Elaborate( ) precautions( ) were taken to prevent the foraging team using odour( ) clues( ). Discussion now centres on whether the route through the maze is communicated as a 'left-right' sequence( ) of turns or as a 'compass ( )bearing and distance' message.

During the course of this exhaustive( ) study, Reznikova has grown so attached to( ) her laboratory ( )ants that she feels she knows them as individuals—even without the paint spots( ) used to mark them. It's no surprise that Edward Wilson, in his essay, 'In the company of ants', advises readers who ask what to do with the ants in their kitchen to: 'Watch where you step. Be careful of little lives.'