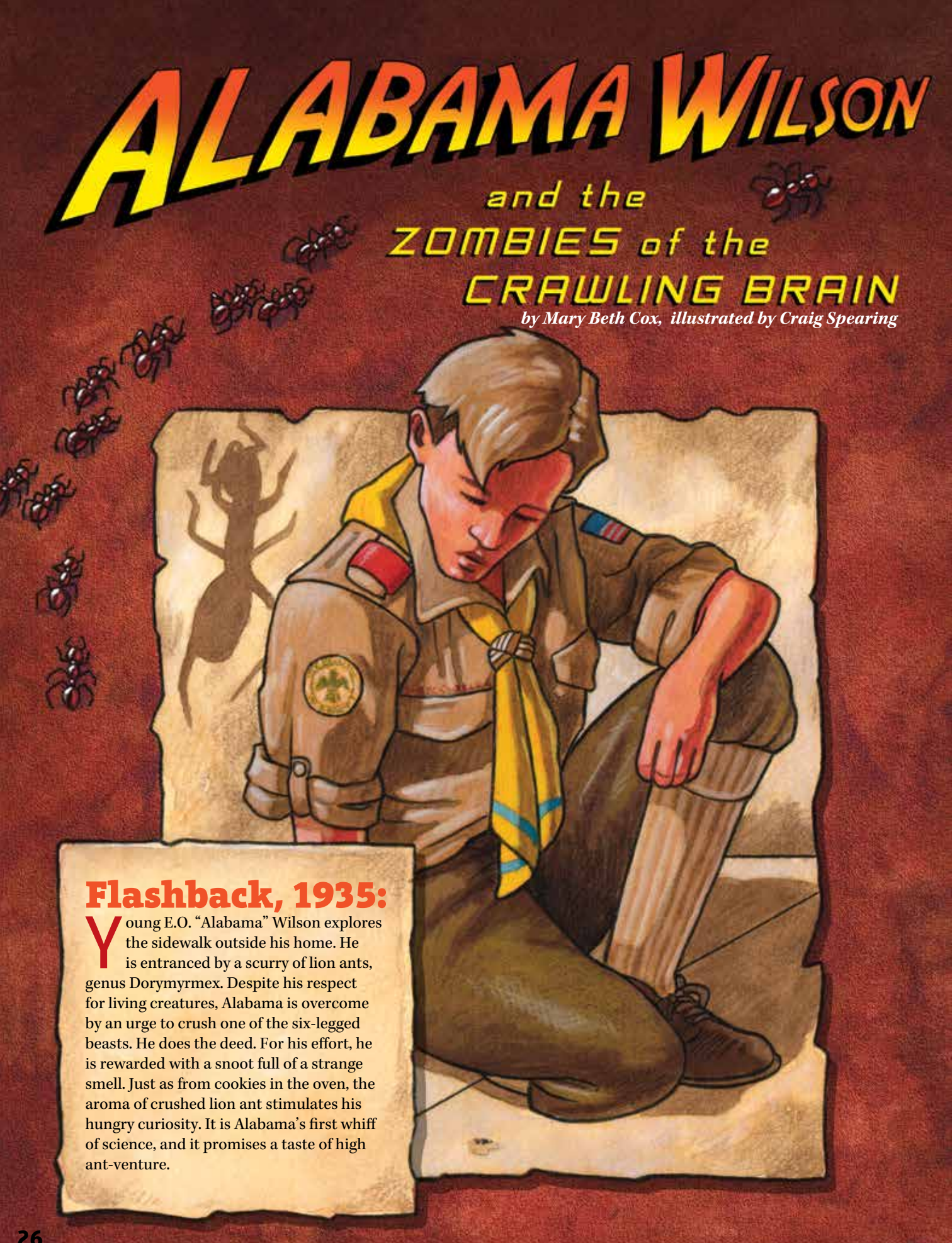
ALABAMA WILSON and the ZOMBIES of the CRAWLING BRAIN

by Mary Beth Cox, illustrated by Craig Spearing



Flashback, 1935:

Young E.O. "Alabama" Wilson explores the sidewalk outside his home. He is entranced by a scurry of lion ants, genus Dorymyrmex. Despite his respect for living creatures, Alabama is overcome by an urge to crush one of the six-legged beasts. He does the deed. For his effort, he is rewarded with a snoot full of a strange smell. Just as from cookies in the oven, the aroma of crushed lion ant stimulates his hungry curiosity. It is Alabama's first whiff of science, and it promises a taste of high ant-venture.

Fast-forward to 1958:

Now grown up, Alabama Wilson has rocked the scientific world with an amazing discovery. He has uncovered a tantalizing clue to how ants communicate. Ants have a gland located at the base of their stingers. The gland produces a special chemical called a pheromone. Ants use this pheromone to paint invisible trails to food they have found. Other ants pick up the scent of the pheromone and follow the trail to the eats. It is a powerful signal. An ant trail made of one teaspoon of this pheromone could circle Earth 5,000 times!

Alabama's gut tells him that there are more ant pheromones awaiting discovery. He is obsessed with deciphering the ants' secret chemical language. He goes on the hunt in pursuit of the fearsome fire ant. Alabama stalks his quarry through cow pastures dotted with the tiny pyramids that are the fire ants' mounds. Armed with his trusty kitchen strainer, he stakes out the pasture's streams, bent on capturing the fire ants' royal flotillas. These are barges of live worker ants transporting their queen downstream to a new home. Alabama scoops, strains, and bottles waterborne fire ants by the thousands.

The hard work and stings suffered pay off. The fire ants reveal to Alabama their unspoken language of the living . . . and the dead. He learns that ants recognize that other ants are "alive" by detecting the carbon dioxide from their respiration, or breathing. Carbon dioxide is the ants' chemical sign for "life."

Alabama also finds that carbon dioxide has an ominous opposite. Oleic acid is a chemical released by decomposing corpses. Oleic acid is the ants' sign for "death."

Alabama cannot resist the temptation to experiment with this dreaded substance. He dabs oleic acid on a few living ants. In so doing, he labels the ants with a chemical toe tag. The oleic acid ants are zombies, insects of the living dead. Alabama watches with fascinated horror as worker ants detect death's odor on the zombies. The workers become undertakers, dragging the squirming, struggling, living "corpses" from the mound and disposing of them in the great ant cemetery beyond. Shaken but undeterred, Alabama presses on. He discovers patterns in the ants' chemical language. Lightweight chemicals, such as carbon dioxide, are made of only a few atoms. These chemicals are gases that are easily transmitted through the air. This makes them perfect for general broadcasts to wide audiences. Ants

use lightweight chemicals for alarms and warnings of danger.

Heavier chemicals, made of more atoms, are used for private communication. Manufacturing heavy chemicals requires ants' bodies to expend more energy, but there is a payback for the energy cost—many atoms arranged in many combinations mean many possible chemical words. Of all the possibilities, only one chemical is the secret password. Trail pheromone is this kind of chemical password. Ants lay a pheromone trail to food that only their friends and family can follow. The encryption in the chemical code ensures that uninvited guests don't show up for lunch.

As Alabama's research digs deeper, his prediction of more pheromones proves true. Every mound of ants uses 10 to 20 pheromones to communicate a wealth of information. But the boon is also a curse. In the glands of invading ants, pheromones can become a terrifying weapon. Invaders attacking a mound can bombard defenders with a mixed concoction of chemicals called propaganda pheromones. To ants, the mix of scents in propaganda pheromones is like the cacophony of noises in a stampeding crowd. The confused blend of chemicals spreads panic among defenders and throws orderly mounds into chaos.

Inevitably, the years spent translating pheromones lead Alabama Wilson to a startling conclusion: Pheromones are more than chemical words. Pheromones are a way of life. They enable communication, and communication enables organization. Because of pheromones, individual ants can organize into a colony. In the colony, complex behaviors emerge. Workers are assigned specialized jobs to increase colony productivity. The needs of individuals are sacrificed for the good of the whole. Single ants unite and act as one. On the strength of many,the colony becomes a kind of superorganism. The superorganism has the power to outcompete other insects. It dominates territory and takes control of valuable resources.

Is there even more to it than that? An artificial intelligence expert at Indiana University, Douglas Hofstadter, suggests that the ant colony superorganism may be capable of more than even Alabama Wilson suspects. Individual ants collect, process, and pass on information via a chemical communication network. Isn't that what brain cells do? Could it be that an ant colony can "think?" Is it possible that the superorganism is conscious?

Finale:

A graying Alabama Wilson strolls the sidewalk of his boyhood home. He is a pioneer in the study of ant pheromones. Back in '35, he embarked on an incredible journey because a crushed lion ant released an alarm pheromone from its pygidial gland. In Alabama's opinion, ants are too few and too loosely organized for any colony to be "thinking." But there's no harm in watching. If ever a mound does become a writhing, crawling brain, Alabama Wilson would be the first to know.

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