

9-1930

## The Romance of the Great Golden Digger

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### Recommended Citation

Abbott, Roy L. (1930) "The Romance of the Great Golden Digger," *Science Bulletin*: Vol. 3: No. 1, Article 3. Available at: [https://scholarworks.uni.edu/science\\_bulletin/vol3/iss1/3](https://scholarworks.uni.edu/science_bulletin/vol3/iss1/3)

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# SCIENCE BULLETIN

A Service Bulletin for Teachers of High School Science. Published Monthly by the Extension Division and Edited by the Department of Natural and Physical Science.

IOWA STATE TEACHERS COLLEGE  
Cedar Falls, Iowa

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VOLUME III

SEPTEMBER, 1930

NO. 1

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## THE ROMANCE OF THE GREAT GOLDEN DIGGER

Every year for the last fifteen years (and perhaps for much longer) a number of digger wasps have made their nests in the hard-packed sandy soil between Professor Fullerton's room and the heating plant on the campus of the Iowa State Teachers College.

This particular wasp, The Great Golden Digger, is a hunting wasp, a solitary species, and although thirty or forty of them are nesting this year in an area of perhaps one hundred square feet, they are extremely individualistic and unsocial, and are apparently colonial only because they were raised there and have come back to nest on the old home site.

Each individual is a queen, and she is queenly in both appearance and manner. Nearly two inches in length, black, and golden-brown on legs and body, with a yellow, alert face, and powerful, purplish-black wings, and a long, poisonous sting, she presents an appearance at once dainty, yet capable; inviting, yet repelling. There are no males in the vicinity, for, having fertilized the eggs, their task is done. The house-planning, building operations, egg laying and nest provisioning are jobs for the queen. I will now follow one of these amazons and see what she is about.

Here is one now just starting a burrow. She has chosen a suitable site, though by what criteria I know not, and has fallen to the work of excavation with great energy, seizing and tearing the earth loose with her jaws and feet, then kicking it back vigorously with her legs,

for all the world like a dog digging out a rabbit. She is making a hole about one-half inch in diameter, and will sink her shaft about six inches nearly straight down, turning an inch or so to one side at the bottom. She usually goes into the burrow head first, and then backs out with her load of dirt held firmly in her jaws and supported by her front legs. As the digging progresses, a considerable heap of dirt accumulates, but she manages to keep it back from the entrance by depositing each "armful" at a distance of several inches, supplementing this by vigorous kicks of her powerful legs. She works at a high speed, is always nervous and fidgety as if she realized she had a vast stint of work to do and didn't know how she'd find time to do it all.

Another wasp alights near the place—probably by mistaking it for her own—and begins to reconnoiter. Instantly the owner springs to the defense of her property. With raised wings and erect antennae she rushes at the interloper with what might be described as a kind of "shooing" motion, and the invader, apparently realizing her mistake, "shooes" easily. As I watch, some red ants come pestering about. She ignores them for a time, but finally becoming seemingly exasperated, she grabs right and left at them, and lays one of them low with a savage nip of her mandibles, the others retiring hastily. I place obstacles in her path; these she seizes in her jaws and drags away. One of these, a pebble weighing more than her own body, she carries six inches away, giving it a final, annoyed push with her head.

Finally, after four or five hours of strenuous and unremitting toil, during which time she has excavated fifty or sixty cubic centimeters of solid earth, the nest is finished. What next?

She comes out, wipes her antennae, walks briskly about for a moment near the entrance, then springs into the air and begins a slow, more or less circling flight around the entrance to the burrow, keeping close to the ground as if inspecting the landmarks by which she may know the place on her return—making a “thorough locality study” as the Peckhams have it.

These excellent observers drew elaborate diagrams showing the path of the wasp around her nest, but I am at a loss to know how they did it; her flight is altogether too rapid and erratic for any very accurate tracing of her path. But, at any rate, she does fly around the locality, seemingly studying the “lay of the land,” then rapidly rising into the air passes swiftly in nearly a straight line out of sight. I can follow her with my eye for nearly one hundred feet, when she disappears in the general direction of a weed patch.

I wait patiently by her nest until she returns. In exactly twenty minutes she reappears, flying heavily as if greatly burdened, makes one or two circles, then alights a few inches from the entrance, and goes waddling awkwardly up to her door, half carrying, half dragging a green grasshopper which she deposits with its long antennae almost touching the mouth of the burrow. Will she now drag it in to the nest? Never, at the first trip, if allowed to follow her instincts. No; she must first make a preliminary trip of inspection—something may have happened while she was away hunting. So, in she goes, head first, then comes backing out in a second or two, whirling almost instantly to back into the burrow again. She then seizes the grasshopper by the antennae and drags it out of sight. In a few minutes she is back

again at the surface, ready for another grasshopper hunt. This time she “takes off” with little or no “locality study.” While she is gone, let us inquire a little about the grasshopper she brought in and carried into the burrow.

How did she catch him? Not much of a trick for our powerful huntress. Like an aeroplane from the sky she probably shot down on the luckless “hopper” as he sat exposed on a weed stalk; a long, jabbing sting was thrust through his thin armor, and before he had time to make more than a single lusty kick or to expectorate a few drops of grasshopper molasses, he was paralyzed, seized with jaw and leg, and wafted on powerful wings into the air.

The great French student of insects, Henri Fabre, says that the wasps he studied (close relatives of the Golden Digger) always chose female grasshoppers as prey, but such is not the case with this species. Females are chosen more commonly, it is true, but male or female, the paralyzed grasshopper is to serve as food for the young wasps. An egg, nearly a quarter of an inch long, is laid on the helpless “hopper” always at the same place on the under side near the front legs, and the soft-bodied grub which hatches from it will thus have fresh meat to feast on throughout its larval life. One grasshopper, of course, will not supply its needs, but the provident mother has placed eight or ten more victims alongside the original one, so food will be in plenty. All it needs to do now is to eat to satiety, lay on fat, and go through the transformations Nature has fatally blocked out for it, becoming at last a wasp which will dig its way out of the subterranean birthplace, and if it chances to be a queen will become fertilized, dig holes in the ground and fill them with grasshoppers for offspring that she will never see, just like her parent did for her.

Roy L. Abbott.