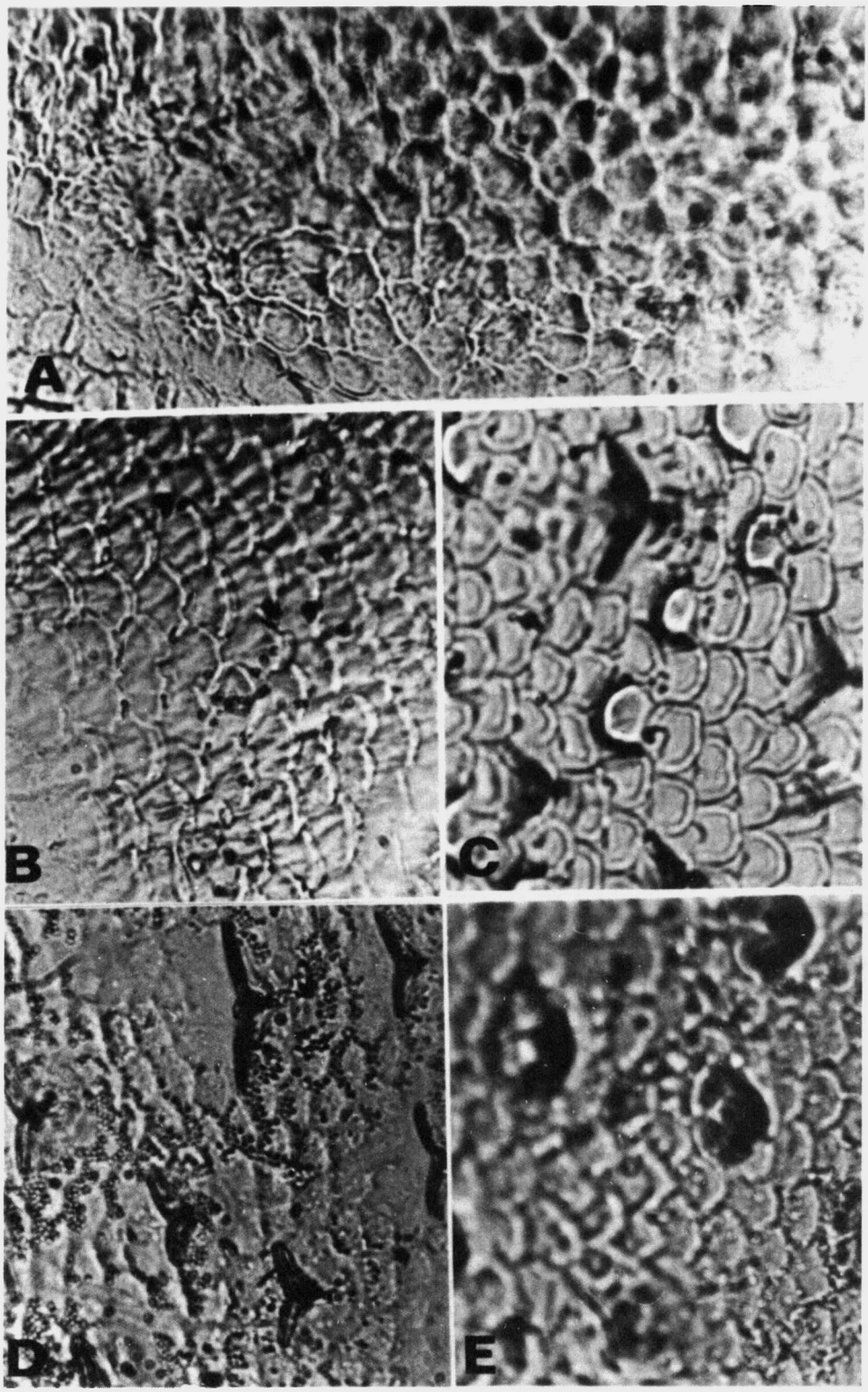

FIG. 1—Light micrographs of replicas of the integument of Isopoda: A) *Cymothoa* sp. (posterior end). B) *Ligia* sp. (abdomen). C) *Oniscus asellus* (pleon). D) *Porcellionides pruinosus* (peraeon). E)*Armadillidium vulgare* (pleon). All X 600.

The replica method discloses features useful both to the field of micromorphology and taxonomy. Impressions of related taxa often reflect similarity; thus, they are phyllogenetically important. This investigation received support from the Academic Grant Fund of Loyola University.

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USE OF *NEOTOMA* NEST FOR BREEDING BY GAMBEL'S QUAIL

Though primarily herbivorous, woodrats (*Neotoma* spp.) also consume a variety of animal materials, including small eggs and nestling birds (Vorhies, C. T., and Taylor, W. P., Univ. Ariz. Col. Agric. Tech. Bull. 86:453-529, 1940; Walsberg, pers. obs.). On 9 May 1984, we located an active nest of Gambel's quail (*Callipepla gambelii*) inside of an occupied woodrat nest. The quail nest was attended by a male bird (contrasting with the normal case in which the female takes sole charge of incubation) and the nest was ultimately successful.

The woodrat nest was located in Sonoran Desert Scrub approximately 8 km south of Apache Junction, Maricopa Co., Arizona. The woodrat was not trapped for identification; both *N. lepida* and *N. albigula* occur in the area. The *Neotoma* nest consisted of a mass of sticks, rocks, and cactus, approximately 1 m in diameter and 0.8 m high. It was placed on the ground and contained several tunnel entrances. The quail nest was located about 15 cm inside of a tunnel leading into the rodent nest. The quail nest was composed of a grassy bowl with 11 eggs. When the nest was first found, an adult woodrat was observed sitting on, then walking across, the quail nest and eggs. Later inspection of the quail nest revealed fresh *Neotoma* scats among the eggs. Upon our approach, the woodrat fled out of the *Neotoma* nest and entered nearby vegetation. We simultaneously flushed a male *Callipepla* that had been sitting quietly outside of the rodent nest, about 40 cm from the quail nest and the woodrat. We collected one egg and found it to contain a viable embryo approximately midway through development.

We inspected the nest on May 12, 16, 20, 21, and 22. On each visit except May 21, the male quail was observed incubating the clutch. On May 16 and May 21, the woodrat was also observed in or within 0.5 m of the rodent nest. Throughout this period, the rodent nest showed other evidence of occupation; i.e., fresh *Neotoma* scats and newly cut vegetation. On May 23, the nest contained only eggshells of which the blunt end had been removed in the fashion typical of hatching. There was no evidence that the shells had been gnawed or otherwise disturbed by the woodrat. Thus, a male quail apparently managed to successfully incubate a clutch despite repeated visits to the nest by a potential predator.

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THE TAXONOMY OF *NEIVAMYRMEX GRACIELLAE* (MANN) (HYMENOPTERA:FORMICIDAE:ECITONINAE) INCLUDING AN ORIGINAL DESCRIPTION OF THE QUEEN AND FIELD OBSERVATIONS

The name, *Eciton gracellae*, was assigned to this species by W. M. Mann (1926) in his original description of nine workers taken from a file running through grass in an orange grove in Ototonilco, Jalisco, Mexico. Borgmeier (1953, 1955) emended the spelling of the species to

"*graciellae*," transferred it to the genus *Neivamyrmex*, and redescribed three of Mann's cotype workers. Additional workers were collected in Oaxaca, Mexico, by E. M. Fisher in 1970. These were the only collections of this species, of which we were aware, prior to our recent trip to Jalisco, Mexico. In June, 1984, we observed three colonies of *N. graciellae* at the Chamela Biological Station. Two queens were removed from two colonies, and workers were sampled from all three.

Neivamyrmex graciellae (Mann)

Eciton gracellae, Mann, 1926, p. 97 (worker:description).
Neivamyrmex graciellae, Borgmeier, 1953, p. 10 (worker:list);
Borgmeier, 1955, p. 29, 388, Taf. 23 (worker:key, desc., Fig. 3);
Kempf, 1972, p. 154 (worker:catalgo); Watkins, 1976, p. 3, 16, 36, 50, 82, 92, 98 (worker:keys, fig's., map, lists); Watkins, 1982, p. 200, 203, 204, 207, 211, 216, 221, 223, 241 (lists, keys, fig's., map).

WORKER—Described by Mann (1926) and Borgmeier (1955).

QUEEN (W-305)—Nonphysogastric. Length 16.7 mm. Reddish brown gaster with slightly lighter head, alitrunk, and petiole. Yellowish brown legs. Body surface smooth, except for setae-bearing punctations. Setae abundant, short, appressed on gaster, erect on all other surfaces.

Head—Frontal view (Fig. 1C): median length 2.1 mm; width 2.3 mm; upper surface slightly concave in middle; upper corners broadly rounded; sides almost straight; frontal depression forms a narrow triangle from clypeus to head middle; lower border of clypeus broadly concave. Each eye consists of a small yellow pigment spot without a distinct convex cornea, located laterally on upper one-third of head. Antennal scape gradually thickened distally; proximal width 0.15 mm; distal width 0.3 mm; length 1.1 mm. Antennal flagellum not thickened apically; length 2.4 mm; width 0.15 mm; 11 segments. Mandible slender, weakly curved inward, and with a slight convexity on inner median border; length 1.2 mm. Dorsal view (Fig. 1B): sides of head rounded; frons indented; occipital margin about one-half head width, moderately concave, with district outer corners. Lateral view (Fig. 1A): anterodorsum of head rounded; posterior surface almost straight; occiput narrow, slightly extended.

Alitrunk—Dorsal view (Fig. 1B): length 4.8 mm; gradually widened from pronotum to propodeum; greatest width 2.0 mm; all sutures indistinct. Lateral view (Fig. 1A): height at propodeum 1.5 mm; dorsum of promesonotum gradually rounded to an almost level propodeal surface which bluntly rounds into a steeply declining posterior surface; pronotal-mesopleural suture distinct up to mesothoracic spiracle; a distinct lamella extends from the orifice of metapleural gland anteriorly along lower border of propodeum; meso- and metathoracic spiracles very small (0.1 mm); propodeal spiracle oval and relatively long (0.4 mm); orifices of meso- and metapleural glands distinct; bulla of metapleural gland large and distinct in undried specimens. Length of hind leg 7.5 mm (coxa 1.2 mm; trochanter 0.2 mm; femur 1.7 mm; tibia 1.6 mm; tarsus: seg. one 1.2 mm, seg. two 0.5 mm, seg. three 0.4 mm, seg. four 0.3 mm, seg. five 0.4 mm). Apices of metatibia and metatarsal segments one-four with stout spines. Claws without teeth on inner borders.

Petiole—Dorsum transversely concave in middle. Dorsal view (Fig. 1B): broadly trapezoidal with rounded corners; median length 1.0 mm; greatest width 2.1 mm. Lateral view (Fig. 1A): height of node 1.0 mm; spiracle prominent; anteroventral tooth large, triangular with blunt apex.

Gaster—(nonphysogastric, Fig's. 1A,B,D). Elongate with triangular notch in apex of fifth sternite; length 8.9 mm; greatest width 3.2 mm; greatest height 2.4 mm.

MALE—Unknown.

SPECIMEN DATA—*Workers*—Mexico, Jalisco, Ototonilco, W. M. Mann, Dec.?, cotypes No. 29045 U.S.N.M.; Mexico, Oaxaca, 13 miles north Oaxaca, E. M. Fishers, 31-VIII-1970, L.A.C.M.; Mexico, Jalisco, Chamela Biological Station, J. F. Watkins, 8-VI-1984(W-306), 9-VI-1984(W-305), 17-VI-1984(W-324). *Queens*—Mexico, Jalisco, Chamela Biological Station, J. F. Watkins, 9-VI-1984(W-305), 17-VI-1984(W-324), deposited in Watkins collection, Baylor University.

STUDY AREA AND FIELD OBSERVATIONS—The Estacion de Biologia Chamela is a field station of the Instituto de Biologia of the Universidad Nacional Autonoma de Mexico. It has an area of 1400 ha and is located about two km from the Pacific coast in the state of Jalisco, at km 59 on the highway from Barra de Navidad to Puerto Vallarta. The topography is low hills and canyons without permanent streams. Average annual rainfall is 733 mm, and the dry season is from November to mid-June. The dominant vegetation is deciduous tropical forest generally less than 8 m in height.

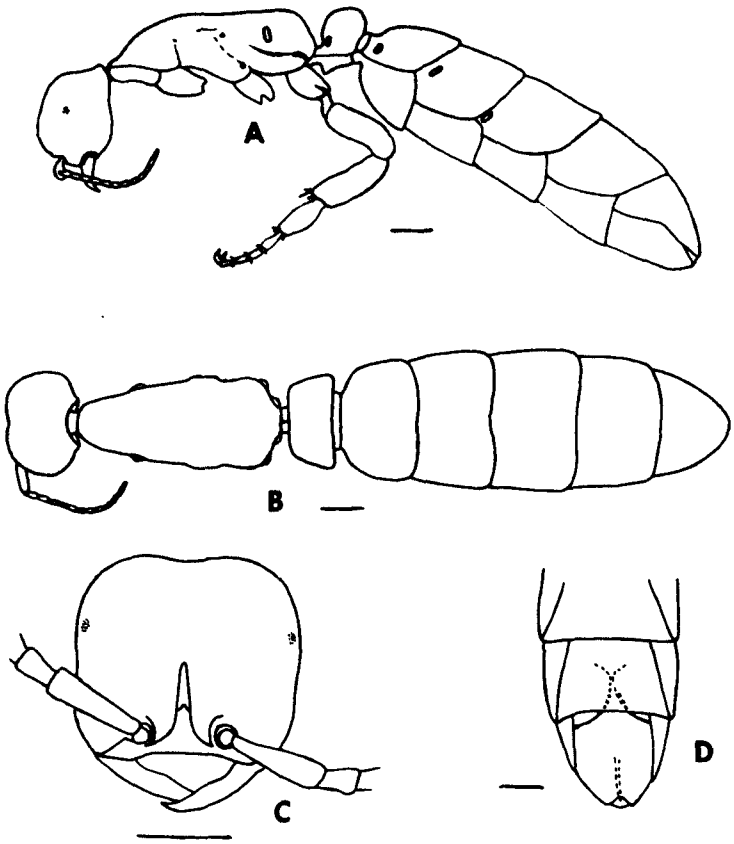

FIG. 1—Queen of *Neivamyrmex graciellae*. A. Lateral view without front and middle legs. B. Dorsal view without right antenna. C. Frontal view of head with incomplete antennae. D. Ventral view of terminal gastric segments. Scale lines are 1.0 mm.

Army ant colonies are relatively abundant in this area and numerous columns may be seen crossing the station's roads and trails at night. During June, 1984, we observed 36 colonies (10 species) including three colonies of *Neivamyrmex graciellae* as follows:

Colony No. W-305—Dr. Stephen H. Bullock, resident Investigador Associado, called my attention to a swarm of ants on the steps of a sidewalk near the headquarters weather station about 8:00 a.m. on 9 June 1984. Upon examining this "disorganized" swarm, the nonphysogastric queen was discovered running about among several hundred workers including newly eclosed callows. A gardener was watering nearby flower beds and this may have forced the colony to emerge from a subterranean cavity. A small sample of workers and the queen were removed from the swarm and preserved. Two mites were attached to the queen's alitrunk. Columns of workers were observed in this general area for the next two days. While collecting the queen, I (J.F.W) was stung several times on the hands and arms by the aroused workers. Having previously experienced the very mild stings of several other species of *Neivamyrmex*, I was greatly surprised by the severity of these strings. I experienced a strong burning sensation similar to that resulting from a fire ant (*Solenopsis*) sting at each point of insertation around which a welt one to one and one-half centimeters in diameter arose almost immediately. Although the burning sensation disappeared after a few minutes, red patches of skin were still visable after two hours.

Colony No. W-306—A weak raiding column was observed on the station's paved entrance road about 500 m from the headquarters about 11:00 p.m. on 8 June 1984. The column did not contain callow workers and extended from a small hole near the center of the road and disappeared into a cavity under the edge of the pavement. A few of the workers were carrying captured ant larvae.

Colony No. W-324—A migrating column of workers including numerous newly eclosed callows was discovered about 4:00 a.m on 17 June 1984. The column, about one cm wide, was crossing

the dirt EJE Central road near the 1,000 m marker. Some workers were carrying their own colony brood of small larvae (about 1.0 mm long), and other workers were carrying ant larvae and pupae captured from other colonies. At 5:20 a.m., a moving "swarm" of workers about one m long and ten cm wide with the nonphysogastric queen running unaided near the middle appeared along the column. The queen and several hundred workers were collected and preserved. Sixteen mites were removed from the queen's body.

We thank Dr. Jose Sarukhan, Director, Instituto de Biologia, Universidad Nacional Autonoma de Mexico, and M. en C. Luis Alfredo Perez J., Jefe de la Estacion de Biologia Chamela, for inviting us to study at the station and for providing our food and lodging. Also we are grateful to Dr. Stephen H. Bullock, Investigador Associado, for his kindness and assistance during our work at the station. This research was supported by University Research Committee Grant 005-F83-URC and the Department of Biology of Baylor University.

Resumen—Aunque la trabajadora de *Neivamyrmex graciellae* fue describido por W. M. Mann en 1926, la reina ha quedado sin descripcion hasta ahora. Este trabajo tiene una descripcion original y illustraciones de la reina, con una lista de datos de especimenes conacidos, y observaciones en el campo sobre tres colonias encontradas en la Estacion Biologia Chamela, Jalisco, Mexico.

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ESENBECKIA BERLANDIERI (RUTACEAE) REDISCOVERED IN EXTREME SOUTHERN TEXAS

Esenbeckia berlandieri Baill.(joypoy) is a rare tree of central and northern Mexico (Standley, 1923). It was previously known in the United States from four specimens at a locality about 4.8 km northwest of Los Fresnos, Cameron Co., Texas (Morton, 1930). This locality has since been cleared of most vegetation (Correll and Johnston, 1970). The only other published record of *E. berlandieri* in southern Texas was at or near Santa Maria in the southwestern corner of Cameron Co. (Clover, 1937). The exact location is not known. With the destruction of the vegetation at the Los Fresnos site, *E. berlandieri* was presumably eliminated from the native flora of southern Texas.

In 1984, Don Heep of San Antonio, Texas discovered a tree on the banks of the Resaca del Rancho Viejo between Olmito and San Benito, Cameron Co., Texas, about 12-15 km southwest of the original Los Fresnos site. Michael R. Heep identified it as *E. berlandieri*. A second specimen was found about 10 m from the first, and a third, much larger specimen was found about 80 m southwest of the first two.

The first two trees are somewhat shrub-like, with several ascending stems from a short (< 50 cm) main trunk. The first specimen found is 6-7 m tall, with three stems 10.5, 5.1 and 3.5 cm dbh; the second specimen is 7-8 m tall, with two stems 11.5 and 6.4 cm dbh. The third specimen is arboreus, with one main trunk that has branches arising off of it above about 2 m. The height

(> 10 m) and dbh (22.3 cm) of this specimen exceed the previous descriptions for this species (Standley, 1923; Morton, 1930; Correll and Johnston, 1970; Vines, 1960).

The trees are in a densely wooded strip of remnant woodland dominated by *Pithecellobium flexicaule* (Benth.) Coult. (Texas ebony), *Ehretia anacua* (Teran and Berl.) I. M. Johnst. (anacua), *Ulmus crassifolia* Nutt. (cedar elm), and *Condalia hookeri* M. C. Johnst. (brasil). Many of the other associated species, i.e. *Amyris madrensis* Wats., *Chiococca alba* (L.) Hitchc. (David's milkberry), *Randia rhagocarpa* Standl. (crucillo), *Tillandsia baileyii* Small, *Xylosma flexuosa* (H.B.K.) O. Ktze. (brush-holly), and *Pisonia aculeata* L. (devil's claw) have tropical and subtropical distributional ranges, and reach the northern limit of their ranges in southern Texas. These three trees may be the only extant wild specimens of *E. berlandieri* remaining in the U.S.A.

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PREDATION ON LARK SPARROW EGGS BY A MASSASAUGA RATTLESNAKE

Predation by snakes on bird eggs or nestlings is often suspected but rarely observed. Newman (1970), Best (1978), Gates and Gysel (1978), Wray and Whitmore (1979), and Best and Stauffer (1980) report heavy egg and nestling loss of various passerine birds and suspect various local snake species are important predators. Best (1974, 1978), Facemire and Fretwell (1980), Finch (1981), and Joern and Jackson (1983) observed actual predation by colubrid snakes of the genus *Masticophis, Coluber, Elaphe* and *Lampropeltis*. Best (1978) suspected that massasaugas (*Sistrurus catenatus*) were nest predators on field sparrows (*Spizella pusilla*) but he never observed predation by this species. Newman (1970) reported that lark sparrows (*Chondestes grammacus*) suffered heavy nest mortality in southern Oklahoma; black rat snakes (*Elaphe obsoleta*) and blue racers (*Coluber constrictor*) were suspected predators. While rattlesnakes (*Crotalus*) occasionally consume bird eggs (Klauber, 1972), massasaugas have only been reported to eat small mice, birds, frogs and lizards (Smtih, 1950; Greene and Oliver, 1965; Klauber, 1972).

In the sand prairie region of Stafford Co., Kansas, we located a lark sparrow nest on a section of grazed prairie. The birds nested on the ground at the base of a clump of little bluestem grass (*Andropogon scoparius*). The nest contained six eggs, three of which were cowbird (*Molothrus ater*) eggs. At 0945 on 18 July 1979, the pair of lark sparrows was observed near the nest, making short periodic flights between the ground near the nest and a small dead tree a few meters away. Investigation revealed a 453 mm (total length) massasauga ingesting one of the lark sparrow eggs. This activity did not disrupt the nest structure in any way. The lark sparrows remained in the vicinity until observations ended at 1200 but did not return to the nest. They abandoned the nest by the following morning and were not observed near it for the remainder of the summer.

Support for studies which made this observation possible was provided by NSF Grant DEB 79-05123 to the Junior Author.

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