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Notes on the Ant Pogonomyrmex californicus, Buckley (Hym.: Formicidae).

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(Plate V.)

Pogonomyrmex californicus[1] is one of the most interesting species of the genus to which the well-known Occident ant (*P. occidentalis* Cr.[2]) belongs. Its habits are somewhat different from those of *occidentalis* yet the close relationship between the two species is distinctly noticeable.

DISTRIBUTION AND HABITAT.

Pogonomyrmex californicus is one of the more common ants of the southwestern desert states, especially California and Arizona. Wheeler[3] reports it from California, Texas, and Grand Canyon, Arizona; Miss Helen Green[4] from southern California; and the writer from the vicinity of Mojave and Needles, California, and Cameron, Arizona.

The ant nests exclusively, as far as is known, in sandy or pebbly soil of deserts. This accounts for its abundance in the Mojave and Painted Deserts of California and Arizona. Apparently it has never been found to construct nests on the "baked" areas[5] of deserts for it is probably unable to excavate the hard soil.[6].

[1] A description of this species is given by W. M. WHEELER, New agricultural ants from Texas. Psyche, IX (1902), 391.

[2] See McCOOK, H. C., The Honey Ants of the Garden of the Gods, and the Occident Ants of the American Plains. J. B. Lippincott & Co., Philadelphia, 1882.

[3] WHEELER, W. M., Ants; their structure, development and behavior. Columbia Univ. Press, New York, 1926, p. 566. Also, IDEM, New agricultural ants from Texas. Psyche, IX (1902), 393, and, IDEM, The ants of the Grand Canyon. Bull. Amer. Mus. Nat. Hist., XXII (1906), 333.

[4] GREEN, HELEN E., Preliminary study of the ants of Southern California. Jour. Ent. and Zool., XXIII (1931), 25.

[5] These "baked" areas are bare flats which do not support vegetation. In the Mojave Desert they are seasonal lakes which have dried up.

[6] WHEELER, W. M., Ants; (1926), 190.

Wheeler [7] states that *californicus* is the most abundant and characteristic ant of the "warm desert zone" of the Grand Canyon which extends from the Angel Plateau to the banks of the Colorado River at the bottom of the canyon. The altitude, moisture and temperature of this lower zone are similar to those of the habitats of the ant in the desert south of the canyon.

In the typical habitats of the ant there is very little moisture and shade and an abundance of sunlight and high temperatures. The wind blows quite steadily over the Mojave Desert which greatly hastens evaporation. Shantz and Piemeisel [8] record the mean temperature of Mojave, California as 62.7 degrees over a period of 35 years and of Needles, California as 84.4 degrees for the mean maximum and 57.6 degrees for the mean minimum over a period of 23 years. The annual precipitation for Mojave is recorded as 4.86 inches over a period of 38 years and for Needles, 4.26 inches over a period of 28 years.

The following vegetation is typical of the desert areas occupied by nests of *californicus*: (Fig. 1).

Atriplex polycarpa (Torr.) S. Wats.
Covillea glutinosa (Engelm.) Rydb.
Opuntia spp.
Yucca mohavensis Sarg.
Phacelia sp.
Festuca octoflora Walt
Parosela spinosa (Gray) Heller
Franseria dumosa A. Gray
Sarcobatus vermiculatus (Hook.) Torr.
Aristida sp.

The Formicaries.

The nests, or formicaries, of *P. californicus* are often mere holes in the sand [9] with sand sometimes piled on one side. Wheeler [10] states that their nests are "low, flat craters from 6 inches to a foot in diameter with elegantly rounded slopes and slanting, usually somewhat eccentric entrances." This type of

[7] Idem, The ants of the Grand Canyon. (See footnote [3].)
[8] Shantz, H. L., and Piemeisel, R. L., Indicator significance of the natural vegetation of the southwestern desert region. Jour. Agr. Res., XXVIII (1924), 780 & 783.
[9] Wheeler, W. M., Psyche, IX (1902), 393.
[10] Idem, Bull. Amer. Mus. Nat. Hist., XXII (1906), 341.

nest is shown in Figure 2. The writer has found both types of formicaries and he is inclined to believe that the mound type is more characteristic of the Mojave Desert region.

The incipient mounds of *californicus* are small and fan-shaped and in their immature stages resemble those of *P. occidentalis* in the semi-desert regions. Wheeler [11] states that the deälated queens construct the incipient mounds in pure sand "which is also the substance in which the adult colonies are found."

The size of the colonies varies from one to a few hundred individuals.[12] Apparently they never approach the numerical strength of colonies of *P. occidentalis*. The workers make no attempt to clear away vegetation surrounding the nest. [13]

Harvesting Activities of the Ant.

Perhaps the outstanding activity of these ants is the harvesting of seeds from plants in areas adjoining the colonies. Apparently three of the chief seeds harvested are those of *Phacelia sp.*, *Aristida sp.* and *Sarcobatus vermiculatus*. The writer found these seeds in the chambers of most of the nests opened and the mounds were commonly surrounded with bracts of these and other seeds.

Harvesting activity in the Mojave Desert seems to be confined to the early morning and late evening hours. Many of the ants even work at night. During the heat of the day I found the entrances of all nests of *californicus* closed with sand or pebbles. When nests were opened under these conditions the ants were from one to a few feet below the surface where the soil temperature was noticeably lower.

Explanation of Plate V.

Fig. 1.—A section of the Mojave Desert, California. The two plants in the foreground are *Yucca mohavensis* Sarg. while a greater part of the vegetation in the background is composed of *Covillea glutinosa* (Engelm.) Rydb. Original.

Fig. 2.—A mound of *Pogonomyrmex californicus* Buckley on the eastern edge of the Mojave Desert, near Needles, California. The periphery of the mound is covered with husks from harvested seeds. The handkerchief serves to illustrate the relative size of the mound. Original.

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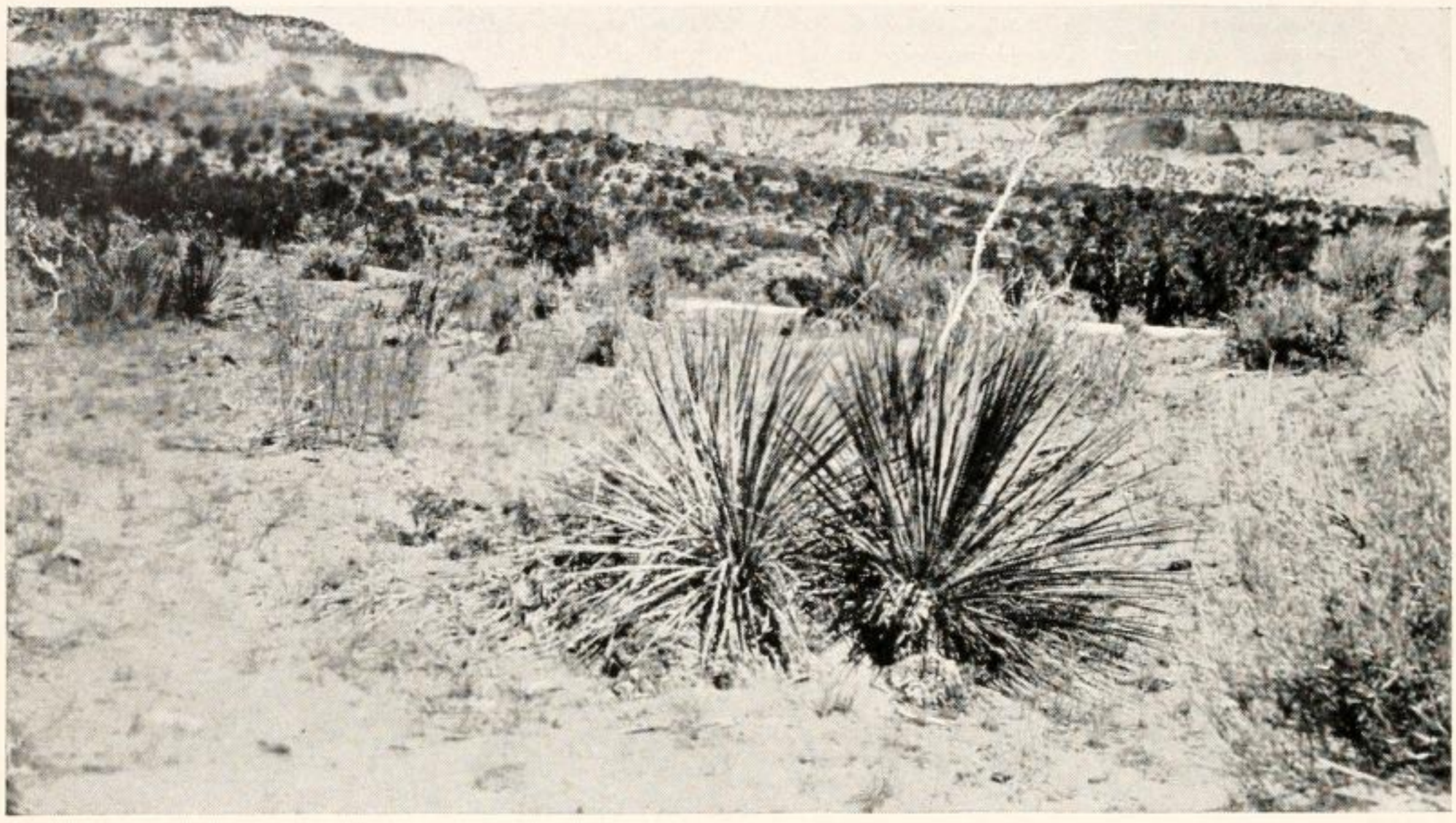
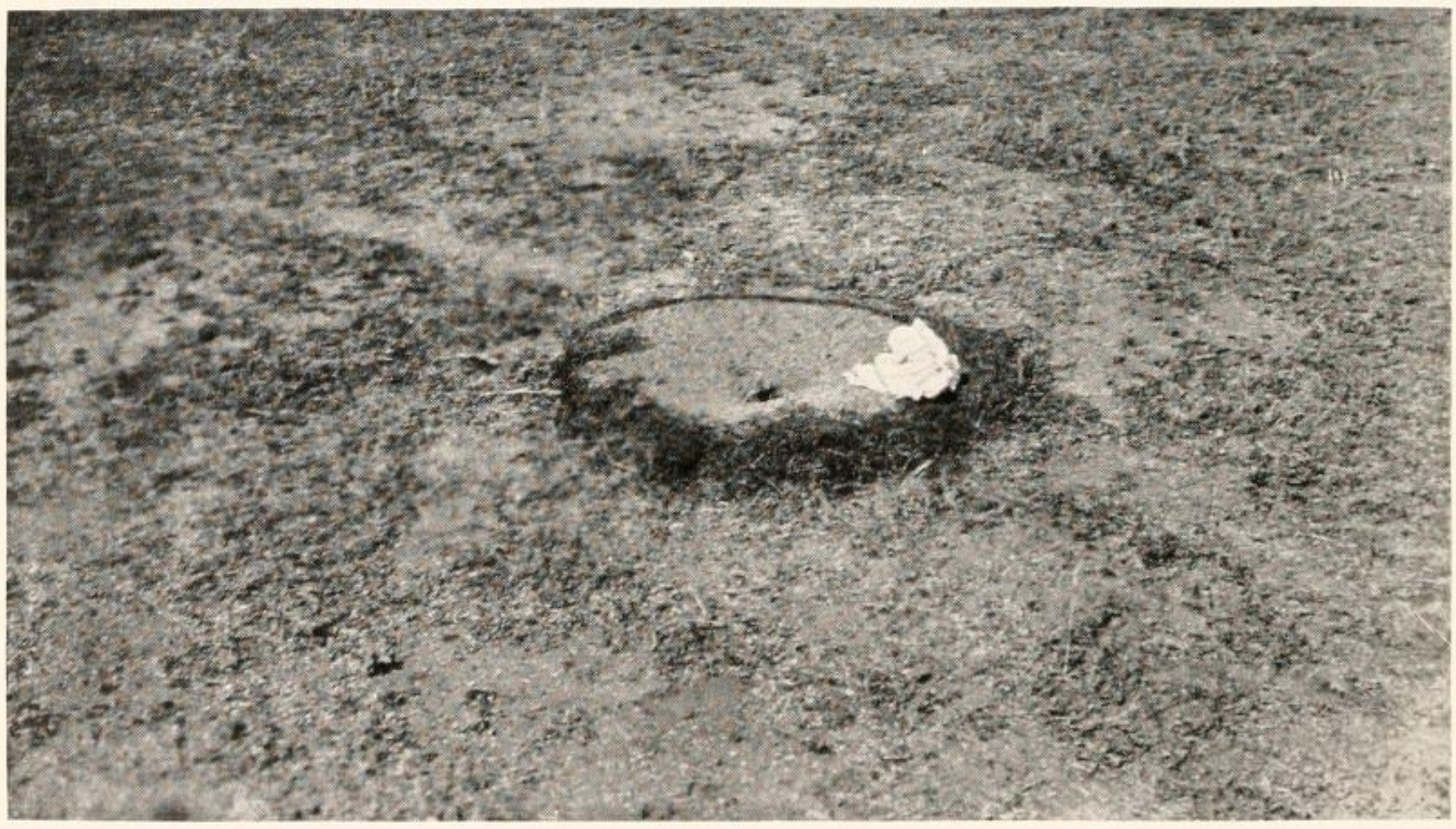
[11] Idem, Ants, (1926), 190.
[12] *Ibid.*, p. 284.
[13] *Op. cit.*





ANT, POGONOMYRMEX CALIFORNICUS.—COLE.