

The
American Philosophical Society

HELD AT PHILADELPHIA
FOR PROMOTING USEFUL KNOWLEDGE

YEAR BOOK 1960

JANUARY 1, 1960 - DECEMBER 31, 1960

THE AMERICAN PHILOSOPHICAL SOCIETY
INDEPENDENCE SQUARE
PHILADELPHIA 6
1961

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Grant No. 292—Johnson Fund (1959), \$700. Life history and behavioral studies of solitary wood- and ground-nesting wasps and bees in southeastern Arizona.

The field studies were carried on July 17-31, 1959, in the vicinity of the Southwestern Research Station of the American Museum of Natural History located in the Chiricahua Mountains of southeastern Arizona, near Portal. The grant provided travel expenses to and from the Station, and housing and subsistence during the grantee's residence there.

Studies of the wood-nesting bees and wasps were made by setting out 300 traps at 50 stations, 25 on the desert floor at about 4,000 feet elevation, and 25 in the mountains at elevations ranging from 4,500 feet to 8,900 feet. The traps consisted of blocks of straight-grained white pine $6\frac{1}{2}'' \times \frac{3}{4}'' \times \frac{3}{4}''$, each containing a boring $\frac{1}{8}''$, $\frac{3}{16}''$, $\frac{1}{4}''$ or $\frac{1}{2}''$ in diameter and $2\frac{1}{2}''$ or $6''$ in length. A bundle of traps was placed horizontally at each station; each bundle contained one each of the $\frac{1}{8}''$ and $\frac{1}{2}''$ borings and two each of the $\frac{3}{16}''$ and $\frac{1}{4}''$ borings. The traps were set out early in April by the foreman of the Station according to directions furnished by the grantee. Typical stations selected were branches of mesquite, acacia, sycamore, oak, and juniper, trunks of agave, yucca, and pine, and wooden fence posts.

The completed nests were collected and studied during the grantee's residence at the Station. A total of 63 of the 150 traps set out on the desert floor were used by bees or wasps; only 16 of the 150 traps set out in the mountains were occupied. It is conjectured that the lower rate of occupancy in the mountains is probably due to the abundance of natural nesting sites in fallen timber, as contrasted to the scarcity of such sites on the desert floor.

The following megachilid bees were reared from traps: *Chelostomoides occidentalis* (Fox), *Megachile* (*Sayapis*) *policaris* Say, *Anthidium maculosum* Cr., *Ashmeadiella occipitalis* Mich., *A. biscopula* Mich., *A. cactorum cactorum* (Ckll.), *A. meliloti meliloti* (Ckll.), *A. bigeloviae* (Ckll.), *A. opuntiae* (Ckll.), and an unidentified, and possibly undescribed, species of *Osmia* (*Nothosmia*); the parasitic meloid beetle *Nemognatha nigripennis* Lec. was reared from a nest of *Ashmeadiella occipitalis* and the chalcid wasp *Leucospis affinis affinis* Say was reared from a nest of *Megachile policaris*. The following wasps were reared from traps: the vespids *Ancistrocerus tuberculiceps* (Sauss.), *A. lineiventris fulvicarpus* Cam., *Stenodynerus rectangulis rectangulis* (Vier.) and *S. toltecus* (Sauss.); the pompilid *Dipogon iracundus* Tow.; and the sphecids *Isodontia elegans* (Sm.) and *Trypoxylon tridentatum* Pack.; the cuckoo wasp *Chrysis inflata* Aar. was reared from a nest of *Ancistrocerus lineiventris fulvicarpus* and from two additional vespid nests from which no host wasps were reared; the parasitic bombyliid flies *Anthrax irrorata* Say and *Toxophora* sp. were reared from two vespid nests from which no host wasps were reared. Specimens of the immature stages of most of these

bees and wasps were preserved for subsequent taxonomic studies of the larvae. No details of the biologies were known previously for any of these bees and wasps except *Isodontia elegans* and *Trypoxylon tridentatum*. The detailed biological accounts of all of these species will be included with similar trap-nesting studies from New York, metropolitan area of Washington, D. C., coastal North Carolina and peninsular Florida in a report now in preparation.

Observations were made on the prey and nesting habits of several sphecoid wasps nesting in the ground on the desert near Portal (Krombein, 1960). The species studied were: *Tachytes exornatus* Fox which preys on nymphs of the grasshopper *Conalcea* sp.; *Cerceris bicornuta fidelis* Vier. and Ckll. which preys on large weevils belonging to *Eupagoderes*; *Cerceris frontata frontata* Say which preys on *Eupagoderes* sp. and *Cleonus pulvereus* Lec.; and *Eucerceris triciliata* Scul. which preys on a small weevil *Minyomeres languidus* Horn.

Some insect collections were made on flowers of *Euphorbia albomarginata* which occurs in prostrate mats along the roadsides in the desert. An annotated list has been prepared of the small wasps, bees and flies that visit these flowers near Portal (Krombein, 1961).

KROMBEIN, K. V. 1960. Biological notes on several southwestern ground-nesting wasps. *Bull. Brooklyn Ent. Soc.* 55: 75-79.

—1961. Some insect visitors of mat euphorbia in southeastern Arizona. *Ent. News.* In press.

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Grant No. 2640 (1959), \$1,500. Bumblebees of the Western Hemisphere.

This study concerned the critical examination of all available type material of Western Hemisphere and certain circumpolar bumblebee species housed in various European museums. During a period of three and one-half months in early 1960, the grantee made the necessary preparations and visited sixteen such institutions located in London and Oxford, England; Copenhagen, Denmark; Lund, Uppsala, and Stockholm, Sweden; Helsinki, Finland; Berlin and Munich, Germany; Vienna, Austria; Paris, France; Turin, Italy; and Amsterdam and Leiden, Netherlands. He examined many of the famous collections, such as those of Linné, Fabricius, Kirby, Banks, Westwood, Lepeletier, Spinola, DeGeer, Dahlbom, Zetterstedt, Schönherr, Nylander, Smith, Handlirsch, Friese, and others; these are some of the important repositories of many types of our species. Other noted collections, such as those of Pittioni (England) and Bischoff (Germany) also were studied.

Approximately 30,000 specimens of *Bombus* and *Psithyrus* were seen during the trip, and of these about 500 were either typic or cotypic specimens of species chiefly from North and South America, and a few from Europe, East Asia and the Orient. The types (and/or cotypes) associated with seventy descriptions of Western Hemisphere or circumpolar species originally assigned to *Apis*, *Bombus*, *Psithyrus*, or *Apathus* were studied and extensive notes were made on the structure, classification, and present condition of each. In addition, the types of thirty-two infraspecific cate-