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The biology of the fungus-growing ants
Part I. New forms.

by

NEAL A. WEBER

The biology of the fungus-growing ants. Part. I. New forms.¹

by NEAL A. WEBER, University of North Dakota

(With 11 figures)

The new fungus-growing ants (Attini) here described were collected in the course of studies on the general biology of these ants from 1934 to 1936 in the West Indies and Northern South America. New forms are described in the genera *Mycocepurus*, *Myrmicocrypta*, *Apterostigma*, *Sericomyrmex*, *Mycetophylax*, *Trachymyrmex*, and *Acromyrmex* (*Moellerius*). A number of new forms in the genus *Cyphomyrmex* will be described in a subsequent paper. Many records extending the range of previously known species will be included in later studies of individual species and genera from the broad standpoint of habits, fungus grown, nest structure, ecology and other phases of their biology.

Of special interest are the nine new forms of *Apterostigma*, including the aberrant *A. epinotale*, from British Guiana and Trinidad which materially add to the evidence pointing to the Guianan Region, that great lowland area between the Orinoco and Amazon Rivers, as the center of distribution of this peculiar genus. It may be noted that eight of the 23 known forms occur on the small island of Trinidad, which belongs essentially to the Guianan Region, while not a single form is known from the West Indies of which Trinidad is only politically a part.

Mycocepurus smithi Forel *trinidadensis*,
var. nov. (Fig. 1)

Worker: Length 1.7-1.9 mm. — Compared with the original description and redescriptions and figures of Dr. W. M. Wheeler and Dr. Santschi and with a worker taken by myself on the island of St. Lucia, next island to the north

¹) Many of these new forms were taken while I was the recipient of a National Research Council Fellowship in Biology with headquarters at the Imperial College of Tropical Agriculture, Trinidad, B. W. I. I am also indebted to the late Dr. W. M. Wheeler for aid in the determination of ants, particularly for determining many while I was living in Trinidad. My thanks are due Major J. F. Phipps, R. E., Chief Commissioner of the British Section of the British Guiana-Brazil-Surinam Boundary Commission, for his kindness in affording me transportation by boat to the Commission Base Camp on the Oronoque River, British Guiana, in a region uninhabited and practically unexplored.

of the type locality, St. Vincent, the workers of this variety differ chiefly in sculpture. The anteriorly directed convex and blunt ridge between the anterior mesothoracic spines is more reduced or practically absent. Between the sharply carinate sides of the first gastric segment the surface is longitudinally and finely rugulose. Pale ferruginous. Spinosity as in the figure (Fig. 1).

Female: Length about 3.5 mm. — Similar to the worker, with the usual sexual differences. Dorsolaterally the pronotum bears on each side a pair of acute tubercles whose bases are confluent and the more posterior is the larger. Scutum in profile gently convex, from above slightly impressed medially, rugulose with finer reticulations between. Epinotal spines large and acute with stout bases, slightly diverging when viewed from above. Postpetiole from above roughly hexagonal with sides acutely angulate, 1.7 times as wide as long. Sculpturing heavier than in worker, color dark ferruginous with ferruginous appendages.

Described from one colony taken by myself June 23, 1935, in the Northern Range north of Arima, Trinidad, B. W. I., at an elevation of about 1800 feet. The species is widely distributed in Trinidad but local and I have taken it in such representative localities as St. Augustine, Mayaro Bay, and Basin Holl Forest Reserve. The workers show sufficient variation to make identification uncertain without a knowledge of all three castes of the described varieties. To the distribution of this species may be added Antigua, B. W. I., (H. E. Box) and the Indian village of Apura on the Courantyne River, Surinam, by myself.

Myrmicocrypta urichi, sp. nov. (Figs. 2-3)

Worker: Length 1.9-2.1 mm. — Postpetiole from above about 1.8 times as wide as long, with convex sides diverging posteriorly. Anterior and posterior margins of first gastric segment straight, sides convex, slightly longer than wide. — Head and thorax opaque, finely shagreened; mandibles, first gastric segment, and appendages sub-lucid, finely punctate. — Pilosity of squamate to narrow-squamate hairs, moderately abundant except on thorax where confined largely to projections. — Thorax and appendages dark ferruginous, head and gaster dark brown.

Female (dealate): Length 3 mm. — Similar to the

worker with the usual sexual differences. Scutum and scutellum in profile forming a slight convexity except for impression at their junction. Epinotal spines short but well-developed. Postpetiole from above in form of longitudinal $1/2$ of an ellipse, $2\frac{1}{2}$ times as wide as long. First gastric segment coarsely striate at base, surface punctate. Color darker than in the worker.

Male: Length 3.4 mm. — Head, excluding mandibles, a trifle longer than wide back of eyes, occipital corners in form of obtuse angles, posterior pair of ocelli extending farther back than occipital angles, median ocellus on same level as angles. Behind each posterior ocellus is a small tubercle and behind these the head is transversely and deeply excised to the short neck. Anterior clypeal margin convex. Eyes hemispherical, not quite $1/2$ length of head, excluding mandibles. Frontal lobes in form of high sub-vertical carinae not covering antennal insertions. Antennal scapes sub-cylindrical, extending as far as posterior border of median ocellus, as long as first two joints of funiculus taken together. Mandibles well-formed, triangular, with 6 distinct teeth on cutting edge and larger apical tooth.

Pronotum with 2 pairs of tubercles on each side, the more dorsal and posterior the larger. Scutum with a pair of longitudinal median carinae and carinae on margins, all with irregular small tubercles, each terminating posteriorly in a large tubercle. Scutellum irregularly bidentate behind. First gastric segment medially impressed, slightly wider than long.

Head and thorax opaque, shagreened, mandibles and first gastric segment semilucid, finely reticulate. — Pilosity of scanty, short, and recurved white hairs. — Black, appendages and mandibles ferruginous.

Described from one colony containing all castes taken by myself March 9, 1935, under coconuts bordering Mayaro Bay, Trinidad, B. W. I. The colony was collected and kept under observation until I left for British Guiana the following August. Additional information on this colony will be given in a subsequent paper.

Two colonies taken by myself June 25, 1935, in the Nariva Swamp, Trinidad, B. W. I., belong to this species. The workers are somewhat paler and show a certain variability in size of thoracic tubercles.

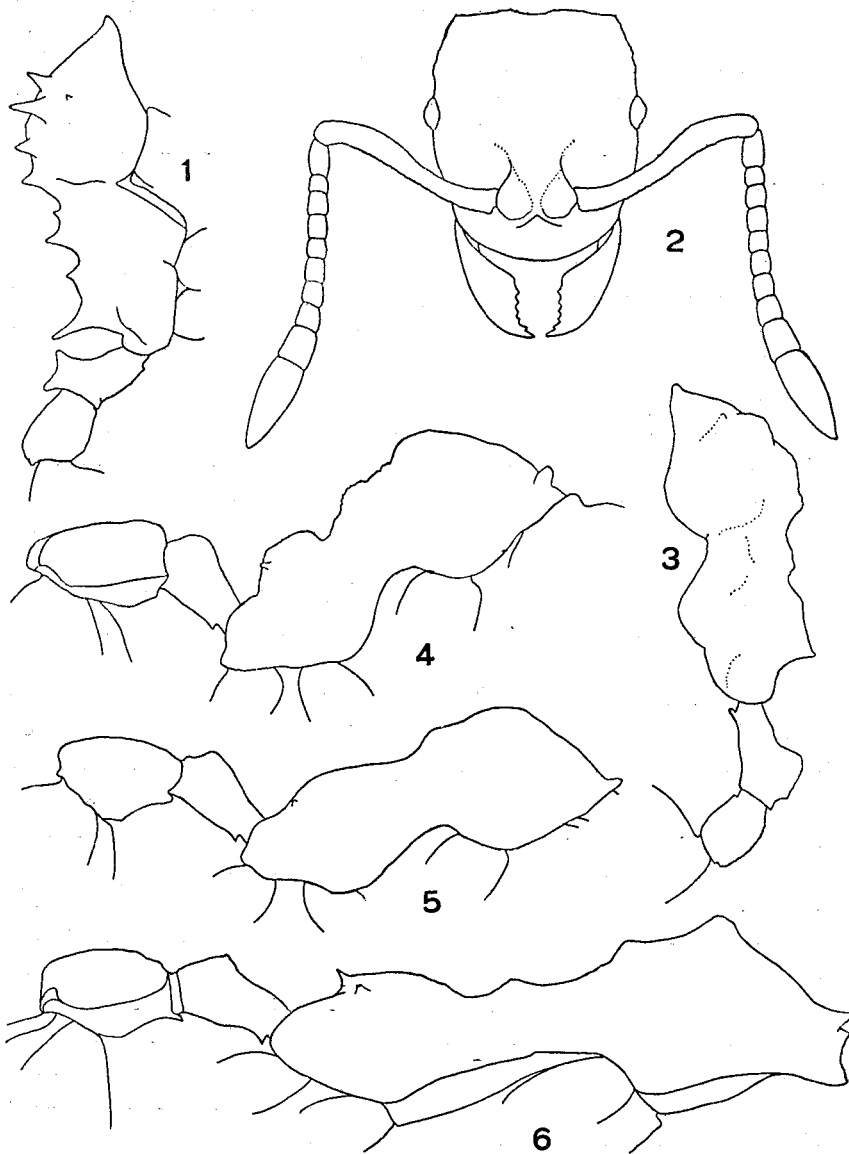


Fig. 1. *Mycocepurus smithi* Forel var. *trinidadensis* n. var. — Fig. 2. *Myrmicoecrypta urichi* n. sp., head. — Fig. 3. *Idem*, thorax. — Fig. 4. *Apterostigma ierense* n. sp. — Fig. 5. *Apterostigma dorotheae* n. sp. — Fig. 6. *Apterostigma epinotale* n. sp. (Neal A. Weber del.)

This species resembles *M. buenzlii* Borgmeier, also found in Trinidad. The worker, however, differs in arrangement of thoracic tubercles, in having shorter epinotal spines, in darker color and in other ways. The female differs chiefly in shorter pronotal and epinotal spines, reduced rugulosity of thorax, and in having smaller squamate hairs.

The male differs in having more deeply excised occipital region, longer antennal scapes, and higher pronotal tubercles.

I take pleasure in dedicating this species to my friend Mr. F. W. Urich, the well-known naturalist of Trinidad, with whom I made many interesting trips about the island and whose hospitality I frequently enjoyed. His contributions to myrmecology date back nearly half a century.

Myrmicocrypta spinosa, sp. nov.

Worker: Length 3.4-3.6 mm. — Head, excluding mandibles, $\frac{1}{4}$ longer than wide, occipital margin concave but broken medially by a pair of tubercles which represent medial extensions of irregular carinae crossing dorsal surface anterior to occipital corners, these latter produced in form of tubercles. Sides parallel, produced in front and back of eyes as slight convexities. Anterior clypeal margin convex, covering bases of mandibles when closed, posterior margins obliquely raised as teeth. Eyes small, hemispherical, a little closer to mandibular insertions than to occipital angles. Frontal lobes convex, reflexed to cover antennal insertions, developed posteriorly as irregular carinae which enclose a frontal area. Antennal scapes feebly sinuate, expanded towards distal $\frac{1}{2}$, exceeding occipital angles by a distance equal to $2\frac{1}{2}$ times their distal diameter. All joints of funiculus distinctly longer than broad, terminal joint as long as joints 7-9 taken together. Mandibles with 7-8 teeth, gradually enlarging apically.

Pronotum with two distinct pairs of tubercles, a larger dorso-medial and a lateral pair. Mesonotum in profile with massive lateral pair of tubercles, sometimes truncate, two more medial and posterior pairs with acute apices and a pair of smaller and acute tubercles whose posterior base descends to the mesoepinotal impression; spaces between the tubercles concave. Basal surface of epinotum laterally with carinae which rise posteriorly to acute teeth. Basal and declivous surfaces enclosing an angle of about 60° .

Petiole pedunculate, node and peduncle of equal length, the latter rising smoothly and with flat dorsal surface. Postpetiole shorter than petiole, with flat ventral and slightly concave dorsal surfaces. Postpetiole from above with evenly convex sides and anterior margin; posterior margin straight, slightly wider than long. Anterior and posterior margins of first gastric segment slightly convex, distinctly longer than broad. Legs long and slender.

Head and thorax opaque and shagreened, the former sparsely rugulose; gaster sub-lucid, finely punctate; mandibles and appendages sub-lucid, the former finely striate, the latter punctate. — Hairs of body squamate, sparse, on thorax only one or a few about projections, more abundant on antennal scapes and legs. — Ferruginous, borders of mandibles infuscated. In some specimens head and gaster are darker than rest of body.

Described from two colonies taken from the same log September 8, 1935, by myself about 23 miles west of Kartabu Point, British Guiana. The log was rotted and reclining against other trees in virgin swamp rain forest. Under the rotted bark about six feet above the ground was one colony and a few feet along the log was the other colony at a height of 8 feet. In this same log near one of the colonies was the nest of *Apterostigma amiae*, sp. nov.

A dealate female taken by myself August 20, 1935, near the Forest Settlement, Mazaruni River, B. Guiana probably belongs to this species. It was collected as it wandered over the top of a fallen log near a *Cyphomyrmex* colony and was evidently seeking to find a suitable place in which to develop a fungus garden and colony independently. The insect is about 3.5 mm. long with coarsely sculptured integument which is opaque on head and thorax and shagreened, and is sub-lucid and finely reticulate on gaster. The color is grayish brown with more ferruginous appendages.

Myrmicocrypta elisabethae, sp. nov.

Female (dealate): Length 3.2 mm. — Head, excluding mandibles, $1\frac{1}{4}$ times as long as wide, occipital margin nearly plane, barely impressed in the middle, sides sub-parallel, feebly convex in front of and behind eyes. Anterior clypeal margin evenly convex, posterior margins raised as compressed, acute, and reflected teeth in front of antennal insertions. Frontal lobes in form of sub-vertical carinae which end posteriorly in the form of low ridges surrounding a circular pre-ocular concavity. Eyes convex, situated closer to occipital margin than to mandibular insertions. Antennal scapes moderately stout, feebly curved distally, exceeding occipital margin by a distance equal to twice their distal diameter. Joints 5-8 of funiculus about as broad as long, other joints longer, terminal joint slightly shorter than joints 6-9 taken together.

Pronotum with two distinct pairs of lateral tubercles, a small, acute anterior pair and a much larger and blunter post-

erior pair. In profile, scutum of mesonotum feebly convex, scutellum projecting backward in form of pointed tooth slightly deflected apically. Epinotal spines large, acute, backwardly directed, declivous surface of epinotum vertical.

Petiole with peduncle distinctly longer than node, the latter trapezoidal in profile and, from above, with carinate sides. Postpetiole, from above, hexagonal, twice as broad as long, anterior margin with lateral extensions appearing in profile as tubercles. Anterior margin of gaster straight and as broad as maximum breadth of postpetiole.

Finely reticulate, thorax sparsely and indistinctly rugulose, anterior margin of first gastric segment coarsely rugose. — Squamate hairs of head moderately abundant, on scutum of mesonotum forming two median and dorso-lateral longitudinal rows, on sides of thorax confined to pronotal and epinotal protuberances, absent from sides of petiole, sparsely covering dorsum of postpetiole and gaster but only in small part obscuring integument, abundant on antennal scapes and legs. — Ferruginous, dorsal surfaces of head, mesonotum and gaster darker.

Described from one female taken by myself September 5, 1935, in heavy virgin rain forest a few miles from the Forest Settlement, Mazaruni River, British Guiana.

This species is of the same size as *M. buenzlii* Borgmeier but is much paler and is less coarsely sculptured and pilose. *M. unidentata*, described here from the worker, cannot belong to this species because of the distinct and reflected frontal lobes, reduced tubercles of the thorax, and very different postpetiole.

Myrmicocrypta unidentata, sp. nov.

Worker: Length 1.8 mm. — Head, excluding mandibles, 1.1 times as long as wide, occipital margin broadly convex, with rounded and shallow medial impression, sides sub-parallel, feebly convex in front of and behind eyes, anterior clypeal margin convex, posterior sides raised as acute teeth. Eyes small, convex, situated in middle of sides. Frontal lobes moderately large, reflected. Frontal region shallowly concave in middle, not distinctly marginate. Cutting margin of mandibles without distinct teeth, apical tooth well developed. Antennal scapes of moderate proportions, inflated and slightly curved distally, exceeding posterior margin by a distance equal to less than their distal diameter. Joints 2-9 of funiculus about

as broad as long, terminal joint equal in length to joints 4-9 taken together.

Pronotum lacking the anterior and dorso-lateral pair of tubercles, sides with low carinae ending dorsally where the tubercles are in other species. Mesonotum, in profile, high and convex, with three pairs of blunt tubercles of which the anterior is largest; from the posterior tubercle the mesonotum drops abruptly to the mesoepinotal impression except for a single stout and pointed tubercle on this declivous surface which is larger than any preceding. Basal surface of epinotum carinate on margins and produced behind as small but distinct teeth.

Peduncle of petiole shorter than node, the latter rising smoothly and convexly to a posteriorly descending dorsal surface. Postpetiole in profile with evenly convex dorsal and ventral surfaces, slightly shorter in length than petiole; from above trapezoidal, anterior and posterior margins parallel, feebly impressed postero-medially. First gastric segment slightly longer than wide, anterior and posterior margins straight. Legs of moderate length.

Opaque finely shagreened, mandibles finely striate. — Hairs of head numerous, narrow-squamate; sparse on thorax, being confined to projections, squamate; sparse on pedicel and gaster, squamate; more numerous on antennal scapes and legs but not greatly obscuring integument, narrow squamate. Pale ferruginous, darker on head, mandibles brown.

Described from one worker taken by myself August 23, 1935, in virgin greenheart (*Nectandra Rodei* Schomb.) forest near the Forest Settlement, Mazaruni River, British Guiana.

This species is noteworthy in small size, single large tooth or tubercle on declivous surface of mesonotum above the mesoepinotal impression, reduced spinulation and sparse pilosity of thorax. It cannot belong to *M. elisabethae* n. sp. here described because of the very different frontal lobes, pronotal spines, and postpetiole.

Myrmicocrypta guianensis, sp. nov.

Worker: Length 1.7-2 mm. — Head, excluding mandibles, 1 1/5 times as long as wide, occipital margin convex except for broad and distinct medial impression, corners somewhat angulate; sides slightly convex, impressed at eyes; anterior clypeal margin convex, posterior margins raised in form of compressed and reflected teeth. Frontal lobes raised

in form of sub-vertical carinae. Eyes very convex, situated half-way between occipital corners and mandibular insertions. Mandibles with 6 distinct teeth along cutting edge and a much larger apical tooth.

Pronotum with distinct though small anterior dorso-lateral tubercles forming the end of slight lateral carinae. Mesonotum with an anterior low, massive lobe on each side, descending carinae on each side terminating in small acute teeth, and bituberculate carinae on declivous surface just above meso-epinotal impression, of which the posterior tubercle is the larger. Basal surface of epinotum margined with carinae terminating in acute and sub-vertical spines. Peduncle and node of petiole of about equal length; in profile node with almost right-angled corners and a minute tubercle on median dorsal surface. Petiole about 1 1/2 times longer than postpetiole, the latter with rounded dorsal and ventral surfaces. Postpetiole from above sub-pyriform with deeply excised posterior margin, distinctly wider than long. First gastric segment with parallel anterior and posterior margins, about as wide as long.

Sub-lucid, finely shagreened, mandibles finely striate, basal margin of first gastric segment longitudinally striate. — Hairs of head numerous, narrow-squamate; of thorax sparse, confined to projections, narrow-squamate; of pedicel and gaster sparse, squamate; of antennal scapes and legs more abundant, narrow-squamate. — Pale ferruginous, cutting margins of mandibles infuscated.

Female (dealate): Length 2.5 mm. — Similar to the worker, with the usual sexual differences, but the sculpturing is much rougher, the pilosity more abundant, and the color brown with a grayish bloom, except for ferruginous appendages. Sides of the thorax coarsely rugulose, posterior of pronotal dorso-lateral spines large, epinotal spines large and acute, postpetiole from above 1.6 times broader than long, sides convex, diverging posteriorly.

Described from one female and four workers taken by myself July 24, 1936, by the Oronoque River near its outlet with the New River of the Courantyne basin, British Guiana. The ants had formed in the sandy soil a crater 80 mm. in diameter, terminating in a turret 18 mm. high and 35 mm. in diameter in the form of a funnel opening. This led by a tunnel 8 mm. in diameter to the nest chamber 110 mm.

below the surface. The fungus garden was about 15 mm. in diameter, sessile and without bromatia. 460 cm. from this nest was a young colony of *Atta sexdens*.

This species is near *M. foreli* Mann from which it differs in distinctly smaller size, in having in the worker bituberculate carinae just above mesoepinotal impression and anterior pronotal tubercles, and in the female having pronotal tubercles and differently shaped scutellum.

Apterostigma ierense, sp. nov. (Fig. 4)

Worker: Length 2.4-2.7 mm. — Head, excluding mandibles, 1.6 times as long as wide between the eyes. Neck short but distinct. Occipital margin impressed by broad groove, with parallel sides, which is a continuation of frontal area; occipital corners more angular than in many species of the genus. Sides of head sub-parallel, clypeal margin broadly convex. Frontal lobes semi-circular, slightly reflexed. Eyes convex, $1/5$ in diameter the length of head without mandibles. Antennal scapes moderately stout, slightly bent distally, surpassing occipital margin by a distance equal to their distal diameter. Joints 2-9 of funiculus much broader than long; terminal joint longer than joints 5-9 taken together.

Thorax in profile as illustrated (Fig. 4). Anterior margin of pronotum extended as two lobes. Mesonotum with a pair of median carinae of irregular height, produced posteriorly on declivity as a pair of lobes. Basal surface of epinotum with a pair of high, acute carinae. Dorsal surface of petiole nearly flat, with slightly raised and angular sides. Petiole $1/2$ as wide as postpetiole. Postpetiole from above much broader behind, with rounded sides and dorso-medial impression. Gaster feebly marginate.

Opaque, coarsely punctate. — Pilosity abundant, of gray appressed hairs and finer, sparser pubescence. — Dark, red-brown, appendages paler.

Female (dealate): Length 2.9 mm. — Resembling the worker with the usual sexual differences. The scutellum is bituberculate behind. Declivous surface of epinotum is carinate on each side. Petiole and postpetiole are impressed on dorsal surface and the gaster is distinctly marginate.

Male: Length 2.6-3.1 mm. — Head, with mandibles but excluding eyes, roughly triangular with angularly convex occipital margin; neck distinct, cylindrical. Occipital corners obtusely angulate. Anterior clypeal margin extended in an ob-

tuse angle. Mandibles triangular, with edentate straight cutting margin. Frontal lobes large, auriculate, almost vertical. Eyes hemispherical, occupying slightly more than 1/2 of sides. Antennal scapes stout, nearly straight, exceeding occipital angles by a distance less than their narrowest diameter. All but first joint of funiculus distinctly longer than broad, terminal joint as long as next two joints taken together.

Pronotum extended as a bi-lobed structure as in worker. Mesonotum with a pair of longitudinal carinae. Scutellum produced posteriorly as a pair of converging tubercles. Epinotum with low tubercles. Pedicel, in profile, evenly rounded; petiole appreciably longer than postpetiole but distinctly lower. Gaster very feebly marginate. Legs long and slender. Wings infuscated with margins of veins and an antero-distal blotch brown.

Opaque, coarsely and sparsely punctate. — Pilosity abundant, of appressed gray hairs and finer and sparser pubescence. — Red-brown but paler than in worker.

Described from a colony consisting of males and workers taken by myself May 28, 1936, near the Maracas Waterfall of the Maracas Valley, Northern Range (Type colony), a single worker taken July 12, 1935, in the foothills north of Tunapuna, and a dealate female with three workers taken July 24, 1935 in the latter locality, Trinidad, B. W. I. The fungus garden of the colony with males was 20 mm. in diameter, cellular, and without an enveloping mesh of mycelia. The nest was under leaf mold in a steep-sided heavily forested ravine. The colony with female had a fungus garden of ordinary appearance consisting of small pellets and slivers of woody plants under debris of the forest floor.

This species resembles *mayri*, which I have taken in neighboring valleys, in size but differs in strongly carinate thorax, coarse punctation, and somewhat paler color.

The poetic name for Trinidad is *Iere*, land of the humming bird.

Apterostigma mayri Forel *pallidum*, var. nov.

Worker: Length 2.5-2.7 mm. — A distinctly paler variety. The color is a pale grayish ferruginous compared with the dark brown of the typical form. The mesonotal and especially the gastric carinae are more distinct.

Female (dealate): Length 3.3 mm. — Color and sculp-

ture as in the worker. Pale ferruginous compared with rich dark brown in dealate females of the typical form.

Described from one female and two workers taken by myself May 25, 1935, near the foot of the Northern Range north of Tunapuna, Trinidad, B. W. I.

Apterostigma dorotheae, sp. nov. (Fig. 5)

Worker: Length 2.6-2.8 mm. — Head, excluding mandibles slightly over 1 1/2 times as long as wide between eyes. Neck very slight, with expanded margin. Sides subparallel, occipital margin rounded, feebly but distinctly impressed in middle. Eyes hemispherical, situated closer to posterior than to clypeal margin, slightly less than 1/5 in diameter the length of head. Anterior clypeal margin evenly convex and extending to cutting edge of mandibles when the latter are closed. Frontal lobes broad, rounded and sub-horizontal, frontal area slightly impressed. Antennal scapes moderately stout, inflated at distal 1/2 and slightly curved, not as long as head, excluding mandibles. Joints 2-9 of funiculus distinctly broader than long, terminal joint slightly shorter than joints 6-9 taken together.

Thorax in side view as illustrated (Fig. 5). Anterior margin of pronotum extended in a pair of low, rounded lobes. Mesonotum, from above, with a pair of carinae produced posteriorly as rounded lobes. These carinae of variable development. Basal surface of epinotum with a pair of median, inconspicuous ridges. Epinotal stigmata prominent. Dorsal surface of petiole laterally produced as blunt tubercles. Petiole slightly over 1/2 as wide as postpetiole. Postpetiole, from above, hexagonal, broadly impressed postero-medially. Gaster feebly marginate.

Opaque, surface largely obscured by pilosity. — Pilosity of abundant, appressed, grayish hairs and finer and sparser appressed pubescence. Dark red-brown.

Described from a few workers of a colony taken by myself July 22, 1936 near the Oronoque River at its junction with the New River, tributary of the Courantyne River, British Guiana. The nest of the ants was 11 cm. below the nest of *A. epinotale* sp. nov., in a cavity in a mass of humus inside the rotted buttress of a stump. The fungus garden differed from that of *epinotale* in being larger, uniformly dark gray, the mycelia were more diffuse, and there were no bromatia.

The nest was pendant and also attached at the sides. There was no evidence of an envelope of fungus around the garden.

This species resembles *A. mayri* but differs in stouter habitus, higher mesoepinotal region, in having carinae on declivous surface of mesonotum produced as lobes, and in darker color.

Apterostigma epinotale, sp. nov. (Fig. 6)

Worker: Length 3.5-3.8 mm. — Head, excluding mandibles and neck, 1 1/2 times as long as wide between eyes. Neck with expanded posterior margin, over 1/3 length of head as above, much longer proportionately than in *urichi*. Sides sub-parallel, eyes small, convex, less than 1/6 the length of head as above. Anterior clypeal region straight, a distinct gap between this border and the closed mandibles. Frontal lobes large and rounded, raised at an angle of about 45°; distinct carinae extend back from these to a point posterior to the posterior margin of the eyes and are here joined by slight pre-ocular carinae, the antennal scrobes thus delimited are concave. Antennal scapes slender, gently curved, nearly as long as entire head from tip of mandibles to posterior margin of neck. Funicular joints 2-8 distinctly longer than broad, 9th joint as broad as long. Terminal joint slightly longer than joints 7-9 taken together or as the 1st funicular joint alone.

Thorax in profile as illustrated (Fig. 6.) Median longitudinal ridges on mesonotum terminating at either end in raised angles. Lateral mesonotal ridges feeble. Anterior to the mesoepinotal impression is a short pair of carinae, appearing in profile as tubercles. Basal surface of epinotum with a distinct pair of carinae of rather uniform height; epinotum with a distinct pair of spines. Epinotal spiracles large and tubular. Petiole from above less than half as wide as postpetiole, flat on dorsal surface. Postpetiole, from above, widest behind, with sides converging to anterior margin in a slight concavity, slightly impressed postero-medially. Lateral ridges of gaster high and acute. Legs long and slender.

Covered with a gray bloom largely obscuring the somewhat iridescent, moderately shining integument which is microscopically reticulate. — Pilosity of moderately abundant long, fine blackish hairs which are largely upright. Appressed pubescence only on distal parts of appendages. — Color, beneath gray bloom, bright coppery.

Described from 5 workers taken by myself July 22, 1936, near the Oronoque River at its junction with the New River, Courantyne basin, British Guiana. The ants were in their nest in a rotted buttress of an old stump. The fungus garden, pendant, was about $15 \times 20 \times 5$ mm. 11 cm. below this nest was the nest of *Apterostigma dorotheae* sp. nov.

Another small colony of workers taken by myself in this locality July 28 may be considered topotypes. Their nest was also in rotted wood but in a fallen log. The fungus garden was suspended from a root and was 41 cm. from a nest of *Trachymyrmex cornetzi* Forel which in turn was 15 cm. from a nest of *Cyphomyrmex* sp., all three being in an identical micro-habitat.

This aberrant species is unlike any known to me and is noteworthy in the possession of epinotal spines and conspicuously shining integument.

Apterostigma amiae, sp. nov.

Worker: Length 3.3-3.7 mm. — Head, excluding mandibles and neck, $1 \frac{1}{2}$ times as long as wide between eyes. Occipital margin evenly rounded, produced in back as a distinct neck with reflexed edges. Anterior clypeal margin convex. Frontal lobes hemispherical, sub-horizontal. Eyes small, very convex, much closer to occipital than to clypeal margin. Antennal scapes long, slender, expanded over distal half, exceeding occipital corners by a distance about equal to twice their greatest diameter. Second joint of funiculus broader than long, joints 3-7 about as broad as long, terminal joint longer than joints 7-9 taken together.

Anterior margin of pronotum extended in two small lobes. Thorax, in profile, much as in the average *Apterostigma* in being without conspicuous projections. In profile the pronotum is slightly convex, the mesonotum high and in outline an obtuse angle with feebly tuberculate apex and two slight convexities on the posterior descending surface. Mesoepinotal impression broad and smooth as in *mayri*. Basal surface of epinotum gently convex and rounding imperceptibly into the declivous surface. From above, the mesonotum and epinotum appear as two convexities, the mesonotum being the more convex and about $\frac{1}{3}$ wider; medial longitudinal pair of carinae faintly indicated.

Petiole in profile with flat anterior surface rounding into dorsal surface, and flat ventral surface, about $\frac{4}{5}$ as high as postpetiole. Postpetiole, in profile, trapezoidal, with flat dorsal and slightly concave ventral surfaces. From above, the

petiole is a little less than $1/2$ as wide as postpetiole, the latter having convex sides converging anteriorly as in *wasmanni*.

Gaster ovate, sides feebly marginate. Legs long and slender.

Shining, sparsely and finely rugulose. — Pilosity not greatly obscuring integument, of moderately abundant, long, grayish hairs, originally apparently appressed, but secondarily disarranged, with sparse, fine, appressed pubescence most abundant on distal parts of appendages and gaster. — Ferruginous.

Described from a series of workers taken by myself from their nest September 8, 1935, in high rain forest 23 miles west of Kartabu Point, junction of the Cuyuni and Mazaruni Rivers, British Guiana. The nest was in a rotted log resting against other trees and was about six feet above the ground.

This species resembles *mayri* in general habitus but is much larger. It also resembles *pilosum* but the frontal lobes are different, the terminal joint of the funiculus is proportionately longer, and the mesoepinotal constriction is greater.

In this same log were two colonies of *Myrmicocrypta spinosa*, sp. nov.

Apterostigma urichi Forel *nitidum*, var. nov.

Worker: Length 5.4-5.8 mm. — Differing from topotypes of *A. urichi* chiefly in the surface of the body which is distinctly shining instead of opaque. The fine, appressed pubescence is less abundant.

Male: Length 4.6 mm. — Smiliar to the males of *urichi* from Kartabo, B. Guiana, but the surface of the body is distinctly more shining and the hairs more numerous and upright. Color of body darker brown, appendages, though lighter, are still darker than in the typical *urichi*.

Described from a colony taken by myself July 8, 1936, near the Orealla Indian Mission on the lower Courantyne River, British Guiana. The ants had a well developed fungus garden enclosed in a silk-like envelope, the nest being in a rotted stump. In the wood surrounding the nest was a colony of *Subulitermes parvulus* (Silvestri), det. A. E. Emerson. Further description of the nest with evidence of the nature of this fungal silk-like envelope will be given in a subsequent paper.

Apterostigma urichi Forel *guianense*, var. nov.

Female (dealate): Length about 5.6 mm. — Differing from a toptype dealate female of the typical *urichi* in the greater development of the lobes of the anterior margin of the pronotum, in the less convex declivous surface of the epinotum, which in the toptype *urichi* is almost tuberculate, in the less strongly marginate gaster, and in the more appressed pilosity, especially on the gaster, as compared with reclinate hairs. Color and size are similar.

Described from one female taken by myself July 20, 1936, by the Oronoque River near the junction with the New River, British Guiana. The ant was with her fungus garden, about 10 mm. long, 2 mm. deep, and 8 mm. wide, in a small cavity beneath rotten bark on a living tree at an elevation of 4 feet. No other *Apterostigma* were near and she was evidently starting a new colony independently.

Apterostigma wasmanni Forel *icta*, subsp. nov.

Female (dealate): Length 3.8 mm. — Dealate females of the typical form from the same island are about 4.6 mm. long. In addition to size this subspecies differs in having the head more smooth, the frontal groove between the lobes deeper and wider at the base, the lobes of the anterior margin of the pronotum higher and more prominent, the tubercles of the scutellum posteriorly enclosing a semicircle instead of the longitudinal half of an ellipse, the dorsal surface of the postpetiole distinctly concave, and the gaster much less strongly marginate.

Pilosity of moderately abundant long hairs, which are reclinate, and somewhat sparse appressed pubescence. — Dark brown, appendages ferruginous.

Described from one female taken by myself January 3, 1935, a few miles south-east of Rio Claro village, Trinidad, B. W. I., in heavy forest. This form may deserve to rank as distinct species allied to *wasmanni* when the other castes become known.

Apterostigma fitzgeraldi, sp. nov.

Worker: Length 3 mm. — Head, excluding mandibles, 1.4 times as long as wide, occipital margin rounded except for feeble median impression, sides sub-parallel, being slightly

wider posteriorly, anterior clypeal margin convex. Eyes, seen from in front, hemispherical. Frontal lobes semi-circular, raised at a low angle. Antennal scapes stout, feebly sinuate, exceeding occipital margin by a distance equal to nearly twice the distal diameter. All joints of funiculus but first and last much broader than long, terminal joint slightly shorter than joints 5-9 taken together.

Anterior margin of pronotum extended as two low, rounded lobes. In profile the pronotum and mesonotum, anteriorly, are feebly convex, the posterior or declivous surface of mesonotum is produced as a broad tubercle. The declivity is continued sharply downward to the mesoepinotal impression which bears an upright and distinct tooth. In profile the basal surface of the epinotum is flat, higher anteriorly than posteriorly, and the declivous surface is concave. Seen from above the mesonotal tubercles appear as anteriorly diverging lobes enclosing a concave depression, the teeth in the mesoepinotal depression appear as two high and narrowly compressed and almost transverse carinae, and the basal surface of the epinotum bears on each side very feeble ridges.

Petiole in profile slightly concave anteriorly, with rounded node, 0.8 as long as postpetiole. The latter in profile with nearly flat dorsal surface evenly rounded at both ends, ventral surface in form of obtuse angle with slightly concave sides. Postpetiole from above pyriform with rounded but moderately deep postero-medial impression. Gaster distinctly but not strongly marginate. Legs moderately long and slender.

Integument opaque, largely obscured by pilosity. Mandibles finely striate, shining. — Pilosity of abundant short and appressed hairs of variable length and fine appressed pubescence. — Brown, appendages paler.

Described from one worker taken by myself June 29, 1935, in the foothills north of Tunapuna, Trinidad, B. W. I.

This species is noteworthy in the possession of distinct carinae in the mesoepinotal impression which appear as a single tooth in profile. It is intermediate in size between *A. mayri* and *A. wasmanni*, found in the same locality, but is markedly different from both in other characters. It is dedicated to my friend Mr. Desmond Vesey-Fitzgerald in memory of many trips made together to the less-known parts of Trinidad.

Sericomyrmex urichi Forel *maracas*, subsp. nov.
(Fig. 7)

Worker: Length 2.8-3.5 mm.

Head, excluding mandibles, 0.9 as long as wide, broadly impressed on posterior margin. Antennal scapes failing to reach occipital angles by a distance about equal to their smallest diameter. Antennal scrobes feeble, indicated above frontal lobes more by absence of coarse hairs than by carinae. Terminal joint of funiculus distinctly longer than joints 7-9

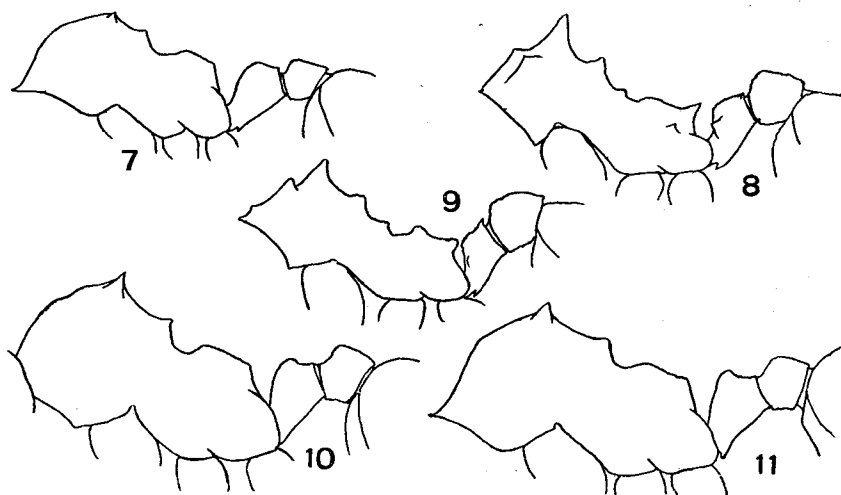


Fig. 7. *Sericomyrmex urichi* For subsp. *maracas* n. subsp. — Fig. 8. *Sericomyrmex wheeleri* n. sp. — Fig. 9. *Sericomyrmex wheeleri* n. sp. subsp. *pakeelai* n. subsp. — Fig. 10. *Sericomyrmex harekulli* n. sp. — Fig. 11. *Sericomyrmex harekulli* n. sp. subsp. *arawakensis* n. subsp. (Neal A. Weber del.)

taken together and nearly as long as joints 2-6 taken together. Joints 2-8 of funiculus broader than long, ninth joint about as long. — Thorax and pedicel in profile as illustrated (Fig. 7). First gastric segment laterally with faint ridges.

Body covered with numerous sub-appressed coarse hairs and with interspersed abundant fine yellowish hairs forming an appressed pubescence. — Pale, dull ferruginous.

Female: Length 4.9-5.3 mm. — Head, excluding mandibles, 0.9 as long as wide, broadly impressed on posterior margin. Antennal scapes proportionately a little shorter than in the worker. Proportions of funicular joints as in worker. Epinotum with low, obtuse epinotal tubercles. First gastric

segment with well-developed lateral ridges. Wings unevenly infuscated, veins brown, darker on margins. Pilosity as in worker. Color distinctly darker than in worker.

Male: Length 3.6 mm. — Head, with mandibles, pentagonal, posterior margin flat, sides, above eyes, flat; eyes convex, as large in diameter as sides between them and occipital angles. Head, from occipital to clypeal borders 0.85 as long as distance between external borders of eyes. Antennal scapes nearly straight, 0.6 as long as funiculus. Antennal club 4-jointed, terminal joint slightly shorter than joints 8-10 taken together or joints 2-7 of funiculus taken together. Epinotum smoothly convex. Dorsal surfaces of pedicel convex, without projections other than hairs. Wings infuscated as in female.

Described from one colony taken by myself October 1, 1935, in the Maracas Valley of the Northern Range, Trinidad, B. W. I. The ants were nesting between the exposed roots at the base of a tree on the side of the valley. Nest opening a crater just remade after recent rains. This led obliquely by a tunnel 8 cm. into the bank to a spherical chamber 6 cm. in diameter containing the fungus garden pendant from roots.

This form differs from typical *urichi* chiefly in smaller size, in having larger posterior mesonotal tubercles, deeper mesoepinotal depression, more appressed pilosity, and in paler and duller color. I have taken the typical *urichi* numerous times in this same valley.

Sericomyrmex wheeleri, sp. nov. (Fig. 8)

Worker: Length 2.7-3.8 mm. — Head, excluding mandibles and occipital spines, slightly broader than long, distinctly but broadly impressed on the posterior border, occipital spines long, longer than the diameter of eyes. Lateral tubercles, eyes, scrobes, scape, and clypeus as in the female. Terminal antennal joint proportionately longer, being equal in length to joints 7-9 and only a little shorter than joints 2-5 of funiculus. Thorax in profile as illustrated (Fig. 8). Seen from above the basal surface of epinotum bears two irregular and slightly diverging low ridges terminating in distinct spines. Dorsum of petiole and postpetiole broadly impressed. First gastric segment at the base with shallow medial impression, laterally with distinct ridges.

Mandibles shining, with a few pits bearing hairs along

the cutting margin and with smaller punctations more irregularly dispersed; surface, chiefly at the base, with striae. Rest of body opaque, rugulose; gaster coarsely reticulate. — Pilosity only partly obscuring integument. Clothed in reclinate, stiff hairs which appear grayish distally, blackish at the base. Pubescence yellowish, sparse, except on terminal joints of funiculi. Most specimens covered with a grayish bloom. — Dark ferruginous, appendages lighter distally.

Female (dealate): Length 4.9 mm. — Head, excluding mandibles and occipital spines, slightly broader than long, feebly impressed on posterior border. Occipital spines long, equal in length to diameter of eyes. Distinct lateral tubercles just beneath base of occipital spines. Eyes moderately convex, situated in front of middle of head. Antennal scrobes distinct, extending to base of occipital spines, bordered laterally by carinae. Clypeus convex, broadly notched in middle. Antennal scapes extending to apex of occipital spines, distal diameter twice that of proximal diameter. All antennal joints longer than broad; terminal joint shorter than joints 7-9 taken together and longer than joints 2-4 of the funiculus. Epinotum with pointed tubercles. Petiole, postpetiole, and first gastric segment with dorsal median impressions, the latter segment with distinct carinae on the sides. Pilosity as in the worker. Color darker.

Described from a colony containing several queens and many workers taken by myself August 29, 1935, several miles from the Forest Settlement, Mazaruni River, British Guiana. The nest entrance was a mere hole partly formed by cutting out a segment of the margin of a dead leaf. The nest structure, consisting of three chambers with partly pendant, partly sessile, fungus gardens will be described in a subsequent paper.

This species is dedicated to the late Dr. W. M. Wheeler whose important studies on ants at Kartabo Point, a few miles distant from the type locality, have been of great help in learning the rich neotropical fauna.

The species is close to *S. opulenta* Mann from Honduras. Three cotypes of Dr. Mann's species in the Harvard Museum of Comparative Zoology were compared with workers of this species. The workers of *S. wheeleri* are slightly smaller. Occipital, mesothoracic and epinotal spines are much higher. Proportions of the petiole and postpetiole are different. Entrance to the type colony of *opulenta* was a turret 6 inches high, to *wheeleri* a mere hole in the forest floor. Only one fungus

garden was found in *opulenta* and, as it was 4-5 inches in diameter, the colony was evidently mature.

Sericomyrmex wheeleri pakeelai, ssp. nov. (Fig. 9)

Worker: Length 3.4-4.2 mm. — Head, excluding mandibles and occipital spines, as long as broad, impressed on posterior border. Occipital spines long and blunt, a little longer than the diameter of the eyes. Short, blunt lateral spines above eyes. Antennal scrobes distinct. Antennal scapes extending to apices of occipital spines, about twice as long distally as proximally. Terminal joint of funiculus distinctly shorter than joints 7-9 and but little longer than joints 2-4. Thorax in profile as illustrated (Fig. 9). Basal face of epinotum with more distinct and even ridges and with lower epinotal spines than in typical *wheeleri*. Gaster with lateral ridges.

Pilosity more abundant and appressed than in typical *wheeleri*. In addition to the reclinate coarse hairs appearing black basally and gray distally, there are interspersed numerous finer hairs of pale yellowish color. These with a grayish bloom, obscure the integument more than in typical *wheeleri*. — Pale ferruginous.

Described from a colony taken by myself June 23, 1936, by the Oko River, a tributary of the Cuyuni River, British Guiana. The nest entrance was in the form of a turret, built against a steep slope, whose one side was 45 mm. high and whose opposite side was flush with the slope. The nest structure, consisting of 5 chambers, containing pendant fungus gardens, and the beginning of a sixth will be described in a subsequent paper.

This form differs from typical *wheeleri* chiefly in shorter terminal joint of funiculus, more abundant pilosity, color and in the characters of thorax and pedicel shown in the illustrations. It is dedicated to the Indian hunter, Pakeela, who never failed in bringing back an abundance of game to the camp and who often assisted me in my studies.

Sericomyrmex harekulli, sp. nov. (Fig. 10)

Worker: Length 3.8-4.9 mm. — Head, excluding mandibles, 0.8 as long as wide, broadly impressed on posterior margin, sides nearly straight, gently converging to the eyes. Eyes feebly convex, posterior margin and posterior angle of clypeus on same level. Anterior lobe of clypeus with nearly straight margin. Antennal scrobes extending to occipital cor-

ners but feeble. Antennal scapes failing to reach occipital corners by a distance equal to nearly twice the distal diameter of the scapes. Terminal joint of funiculus equal in length to joints 2-5 taken together or slightly less than joints 7-9 taken together. — Thorax in profile as illustrated (Fig. 10). Viewed from above the epinotal ridges, which are very low, are strongly diverging posteriorly and terminate in slightly raised angles. — Petiole and gaster with distinct dorsal median impressions, laterally marginate.

Opaque; surface obscured by pilosity. Pilosity of numerous reclinate coarse hairs, appearing gray distally, black basally, and abundant fine subappressed and pale yellowish hairs. — Ferruginous.

Described from a colony taken by myself July 27, 1936, on the Oronoque River, tributary of the New River, main upper arm of the Courantyne River, British Guiana, in about 2°42' N. Lat. The nest of the ants was in the form of a crater leading by a narrow tunnel downward at a slight angle 8 cm. to a chamber, elliptical in form and 8 cm. high \times 15 cm. wide. 5 cm. beneath this chamber was a second elliptical chamber 6 \times 10 cm. In both were pendant fungus gardens with well-developed bromatia.

This species seemed fairly common in this region and the workers were never observed to form turret openings to their nests.

The species is named from the Arawak Indian name for *Sericomyrmex*.

From two cotypes of *S. lutzi* Wheeler this species differs in larger size, much shallower impression on posterior margin of head, higher posterior mesonotal tubercles, more angular epinotum, and in more abundant pubescence.

Sericomyrmex harekulli arawakensis, subsp. nov.
(Fig. 11)

Worker: Length 3.4-5 mm. — Proportions of head much as in typical *harekulli* but antennal scapes slightly longer, failing to reach occipital angles by a distance equal to their distal diameters rather than about twice the diameter. Terminal joint of funiculus equal to joints 7-9 taken together. Thorax and pedicel in profile as illustrated (Fig. 11). Color a paler ferruginous.

Female: Length 5.4-5.7 mm. — Head, excluding mandibles, 0.86 as long as wide. Antennal scapes failing to reach occipital corners by a distance less than their distal diameters.

Epinotal declivity with low, rounded tubercles. First gastric segment distinctly marginate laterally. Wings infuscated, veins pale brown margined by darker brown.

Described from a colony taken by myself August 16, 1935, near the Forest Settlement, Mazaruni River, British Guiana. Entrance to the nest was in the form of a crater beneath which were three chambers containing pendant fungus gardens to be described in a subsequent paper.

Sericomyrmex myersi, sp. nov.

Worker: Length 2.6 mm. — Head, excluding mandibles, 0.9 as long as broad, broadly impressed at posterior margin. Antennal scrobes feeble, not reaching occipital corners. Antennal scapes not quite extending to occipital corners. Terminal joint of funiculus about as long as joints 6-9 taken together or joints 2-6 taken together. Joints 2-9 of funiculus broader than long.

Thorax, in profile, with pronotum evenly convex, rising steeply to the acutely pointed anterior mesonotal tubercles. Posterior mesonotal tubercles slightly lower than anterior because of truncate apex. Mesoepinotal depression moderately deep and rounded, rising to the angular anterior margin of basal surface of epinotum. Basal surface of epinotum bordered by distinct, though irregular, diverging lateral ridges which terminate in stout epinotal tubercles. These are as massive at the base as the mesonotal tubercles and obliquely truncate at apex. Declivous surface of epinotum irregularly concave.

Sloping anterior surface of petiole very slightly convex. Dorsal surface in profile slightly concave, angle between the two surfaces irregularly rounded. Dorsal surface of post-petiole in profile plane, rising anteriorly.

Gaster and pedicel from above with longitudinal median impression, gaster feebly marginate on sides. Legs of moderate length and stoutness.

Opaque, surface obscured by pilosity. — Abundant fine, whitish pubescence, with sparser and coarser reclinate, dark hairs. — Dull ferruginous, appendages paler distally.

Holotype: One worker taken at King Frederick William, the Fourth Falls on the Upper Courantyne River, Surinam, December 29, 1935, by Dr. J. G. Myers (No. 5931).

This species, dedicated to my friend Dr. Myers, who discovered it, differs from two cotypes of *S. lutzi* Wheeler in distinctly

smaller size, more shallowly impressed posterior margin of head, feebler antennal scrobes, in much lower anterior mesonotal tubercles, higher epinotal tubercles and in other ways. From *S. urichi* Forel and *S. harekulli* sp. nov. it differs chiefly in lower anterior mesonotal tubercles, in higher epinotal tubercles, and in smaller size.

Mycetophylax brittoni Wheeler *littoralis*, var. nov.

Fifteen worker cotypes of *brittoni* were compared with workers taken by myself along the east of Trinidad upon many occasions. These specimens differ from the typical form in the following: Thorax in profile evenly convex instead of flattened; basal surface of epinotum separated from declivous surface by a pair of small but distinct tubercles, postpetiole from above distinctly longer than broad, sides and anterior margin forming an even convexity. Hairs of head somewhat shorter, finer, and more numerous. Color black with appendages dark brown. The *brittoni* cotypes were distinctly paler in color though this may be caused by fading.

The males, 2.3-2.5 mm. in length, have the head, excluding mandibles, a trifle longer than wide back of eyes and the occipital margin straight with angulate corners. The epinotum is without tubercles but with a faint indication of angularity at the point where they would be situated. The color is black with dark brown appendages and pale brown mandibles. Wings hyaline, veins yellowish brown.

Type Colony: Mayaro Bay, Trinidad, B. W. I., March 11, 1935, N. A. Weber (63).

Trachymyrmex relictus Borgmeier *fitzgeraldi*,
subsp. nov.

Worker: Length 2.9-3.5 mm. — This form differs from topotypes of *T. relictus* chiefly in slightly smaller size, greater development of spines and tubercles, in darker color, and in more abundant pilosity. The occipital spines are distinct and surmounted by acute tubercles. Beneath these, on the lateral margins, are several aggregations of irregular, acute tubercles. The lateral spines of pronotum are directed slightly forward, the tubercles of the mesonotum, epinotum, and pedicel are higher and more numerous than in the original illustration of *relictus*.

The fine appressed hairs and the coarser reclinate hairs, especially on the gaster, are more numerous than in the topotypes; the thorax and gaster are darker brown.

Described from a series of workers taken by myself April 23, 1935, in the Nariva Swamp, Trinidad, B. W. I.

This form is named in honor of my friend Mr. Desmond Vesey-Fitzgerald, my companion on this expedition into the swamp.

Trachymyrmex ruthae, sp. nov.

Worker: Length 4-5 mm. — Head, excluding mandibles, as broad as long. Medial impression of posterior margin broad, rounded, and passing over dorsal surface of head to frontal area in a rounded groove whose margin are slightly carinate and further delimited by setigerous tubercles. Occipital corners without spines, bisected by a rounded groove and bordered by setigerous tubercles. Sides of head beneath occipital corners tuberculate. Eyes moderately convex, situated dorso-laterally at a distance from the mandibular insertions slightly less than the diameter of the eyes. Antennal scrobes complete except dorso-medially. Clypeus projecting in a lobe which is broadly notched medially. Mandibles with large apical tooth, subapical tooth less than half the size of the apical tooth, and 5-6 much smaller teeth along the cutting border. Antennal scapes exceeding occipital angles by a distance slightly less than their distal diameters. Terminal joint of funiculus slightly shorter than joints 7-9 taken together and slightly longer than joints 2-4 taken together.

Thorax with compressed, spatulate inferior pronotal spine and stout and acute lateral pronotal spine which is largest spine of body, distinctly larger than epinotal spine. Between these spines the pronotum is in some workers transversely carinate and bears 5-8 irregular, acute, and setigerous tubercles. Mesonotum surmounted by a disk bearing on its rim irregular tubercles, in this resembling *Mycocepurus*. The most posterior lateral tubercle, viewed from the side, is generally in the form of an irregularly bituberculate spine. MesoePINOTAL impression deep and rounded. Basal surface of epinotum not distinctly carinate laterally but bearing here a series of irregular tubercles. Epinotal spine large, stout, and acute.

Anterior and posterior surfaces of petiole, viewed laterally, plane. Anterior face of postpetiole nearly vertical and at right angles to dorsal or posterior surface, the latter irregularly tuberculate. Viewed from above the postpetiole is twice as broad as the petiole and is broadly impressed postero-

medially. — Gaster not distinctly impressed medially but coarsely marginate on sides; coarsely tuberculate. Legs moderately long and stout.

Opaque, finely shagreened; dorsal surfaces of gaster coarsely reticulate. Prosternites are covered with a silvery bloom. — Tubercles of body bearing reclinate to upright hairs, appearing black basally, gray distally. Aside from pubescence on funiculi and tarsi the body is otherwise free from pilosity. — Dark ferruginous, gaster brown.

Female: Length 5.5-6.5 mm. — Head broadly impressed on posterior margin and with impression carried over head to median ocellus as a smooth, shallow groove, bordered laterally by tuberculate carinae. Lacking occipital spine as in the worker. Antennal scapes exceeding occipital corners by a distance equal to less than their distal diameter. Lateral pronotal spines low but stout. Mesonotal scutum densely and finely tuberculate. Epinotal spines large and stout. Integument and pilosity as in the worker. Brown, appendages lighter.

Male: Length 3.8-4.4 mm. — Head, excluding mandibles. 0.9 as long as broad between external margins of eyes. Eyes convex, greater in diameter than the distance from them to the lateral ocelli. Clypeus deeply notched. Antennal scapes long and but slightly bent distally. Terminal joint of funiculus longer than joints 2-5 taken together or joints 10-11 taken together. Pronotum with distinct lateral tubercles in place of lateral spines in the female. Scutum of mesonotum high, convex, and overshadowing pronotum. Epinotum convex, with a slight angularity in place of spines. Postpetiole, in profile, rounded above, 0.8 as high as postpetiole. Gaster ovate. Legs long and slender. Surface of body finely reticulate. Mayrian furrow distinct, transversely crossed on anterior arms by short carinulae. Hairs very sparse, short and curved. Dark brown, mandibles and appendages lighter. Median and parapsidal light brown streaks on the scutum.

Described from all castes of a colony taken by myself July 24, 1935, in the foothills north of Tunapuna, Trinidad, B. W. I.

The entrance to the nest was in the form of a circle of twigs loosely adhering together. This led by three tunnels, first to the original small chamber 4.5 cm. in diameter \times 2.5 cm. high and thence to a deeper and larger chamber $2 \times 11 \times 5$ cm. high, the latter containing the fungus garden which was partly pendant, partly sessile. Photographs

and fuller descriptions of the nest and the biology of this species will be given in a subsequent paper.

In close proximity and, in fact, surrounding this nest were nests of *Apterostigma urichi*, *Apterostigma* sp., *Cyphomyrmex rimosus* subsp. and *Pheidole* sp., together with a dealate female *Pheidole* and a dealate female of *Apterostigma*.

This is a very distinct species quite unlike any known to me.

Trachymyrmex guianensis, sp. nov.

Worker: Length 3.6 mm. — Head, excluding mandibles, as broad as wide, broadly impressed on posterior margin, occipital angles with a low, rounded spine densely covered with slender, acute tubercles. Lateral margins irregularly convex; viewed from in front, a bifurcate tubercle projects below the occipital spine and the margins project slightly beyond the eyes, which are moderately convex and situated in front of the middle. Anterior clypeal margin convex, broadly notched in middle; posterior margin raised laterally in front of the frontal lobes as a high, acute crest. Frontal lobes rounded posteriorly, acutely angular in front. Antennal scapes sub-cylindrical, slightly curved and smaller in diameter at basal 1/4, exceeding occipital angles by a distance less than their distal diameter. Terminal joint of funiculus slightly longer than the adjacent joints 7-9 taken together and slightly shorter than joints 2-5 taken together.

Lateral pronotal spines large, straight and acute, directed anteriorly and laterally. In front of these a dorso-lateral carina extends to the anterior margin; a slight carina extends downward from this point for a very short distance and another irregular and tuberculate carina extends over the dorsal surface to the other side, the junction of the three carinae being raised. Between the lateral pronotal spines are two distinct and bifurcate median tubercles and a lateral tubercle at the base of the spines. Inferior pronotal spines large, straight and stout. Mesonotum, in profile, with an anterior raised tuberculate convexity and a posterior tuberculate convexity prolonged apically in laterally compressed, truncate spine. Basal surface of epinotum without carinae, bearing a discontinuous row of small tubercles on either side. Epinotal spines long, slender, and acute.

Petiole, from above, slightly over 1/2 as wide as postpetiole. Dorsal surface of epinotum bearing four small tubercles. Dorsal surface of postpetiole with numerous sub-equal

tubercles. Gaster densely and coarsely tuberculate, marginate on sides, tubercles on sides and posteriorly partly fused.

Opaque; with abundant fine whitish papillae and a grayish bloom. — Pilosity of sparse, coarse, and black hairs arising from the tubercles of body and mostly recurved. — Ferruginous with gaster brown and appendages lighter.

Described from one worker taken by myself July 17, 1938, on an island near the outlet of the New River, main tributary of the Courantyne River, British Guiana.

This species is close to *T. urichi* Forel from which it differs chiefly in having carinae on sides of clypeus, angular anterior margin of frontal lobes, stouter, shorter, and more coarsely tuberculate antennal scapes, in having distinct carinae in front of pronotal spines, and in lacking the distinct anterior mesonotal spine.

Trachymyrmex phippsi, sp. nov.

Worker: Length 3.5-4.1 mm. — Head, excluding mandibles, 0.9 as long as broad, sides nearly straight and diverging posteriorly, posterior margin broadly impressed in middle. Eyes moderately convex, situated in front of middle of head. Tubercle on sides of head between occipital corners and eyes reduced to a slight roughened convexity. Occipital spine large and stout, somewhat truncate and bearing several tubercles at apex. Frontal carinae low and of irregular height. Antennal scapes slightly curved, inflated at distal $2/5$, exceeding occipital corners by a distance equal to nearly $3 \frac{1}{2}$ their distal diameter. Terminal joint of funiculus distinctly shorter than joints 7-9 taken together and of nearly the same length as joints 2-4 taken together.

Lateral pronotal spines of thorax the largest spines of body, acute, directed forward and laterally; between these are two median and acute tubercles of irregular shape. Inferior pronotal lateral spines in the form of flat, rounded lamellae curved backward; ventral margins of pronotal pleurae extended downward similarly in flattened lamellae. Anterior spines of mesonotum with massive bases and irregular truncate and tuberculate apices; posterior pair of mesonotal spines less massive at the base, bituberculate. Posterior sloping surface of mesonotum on each side with an acute tubercle. Mesoepinotal impression broad and rounded. Basal surface of epinotum with a pair of anterior irregular spines, sometimes tuberculate, and

the usual epinotal spines. These latter are acute, slender and subcylindrical over more than the distal 1/2.

Anterior surface of petiole nearly plane, prolonged dorsally as a pair of elongated, acute, and slender spines which overarch the dorsal surface. Postpetiole above with a row of irregular, acute tubercles on each side terminating posteriorly in low, tuberculate spines. Gaster with strongly tuberculate lateral ridges. Legs moderately long and slender.

Opaque; finely shagreened. — Pilosity of pale yellowish, appressed hairs which are abundant but not obscuring integument because of small size. These hairs arising from tubercles are recurved. — Ferruginous. Median spot just above antennal insertions, a median spot on frons, and dorsal median streak on gaster brown. Margins of mandibles and clypeus dark brown.

Female: Length 4.7-5.1 mm. — Resembling the worker closely, with similar occipital spines, inferior pronotal spines in the form of flattened, rounded, and curved lamellae, and long, acute epinotal spines. Lateral spines of pronotum long, acute, and stout at the base, curved forward and laterally. — Ferruginous with darker blotches as in the worker and median and parapsidal brown patches on scutum of mesonotum. First gastric segment infuscated on the margins and with a hastate-shaped brown spot on dorsal surface. Wings irregularly infuscated, veins light brown.

Male: Length 3.3-3.5 mm. — Head, excluding mandibles, 0.9 as long as distance between outside margins of eyes. Lateral margins of head in front of eyes concave, back of eyes convex. Occipital corners with acute tubercles. Posterior margin broad and flat. Eyes very convex, as large in diameter as the distance from them to occipital corners. Anterior margin of clypeus nearly straight. Terminal joint of funiculus slightly shorter than joints 10-12 taken together and as long as joints 2-6 taken together.

Pronotum with distinct, straight, lateral spine, inferior angles spinose. Scutum of mesonotum in profile almost hemispherical, overarchng pronotum. Epinotal spines slender and acute. Distinct paired dorsal spines on petiole and postpetiole. Dorsal surface of gaster tuberculate.

Opaque; distinctly and finely reticulate, posterior side of head more coarsely reticulate, parts of integument finely rugulose. — Short, pale yellowish hairs sparsely distributed

over body, appressed on flat surfaces, recurved where arising from tubercles. — Dark brown, mandibles and appendages lighter. Wings lightly infuscated, veins light brown.

Described from a colony taken by myself July 30, 1936, by the Oronoque River of the Courantyne River basin in about Latitude 2°42' North, British Guiana.

The nest of the ants was 165 cm. above ground, in the rotted branch of an old tree trunk which had fallen into neighboring trees and was in an oblique position. The fungus garden was suspended from the roof of a cavity in the rotted wood and was attached at the sides and bottom. The nest will be described more fully in a subsequent paper.

This species is related to *T. phaleratus* Wheeler from which it differs chiefly in larger size, more angular frontal lobes, longer antennal scapes, more flattened and backwardly directed inferior pronotal spines, and in appressed pilosity. The male of *phaleratus* (undescribed) is much smaller, has the anterior clypeal margin distinctly notched, lacks the distinct pair of dorsal spines on petiole, has a more rugulose integument and is in other ways different.

Two dealate females taken in the same locality July 25 and July 30 may be considered topotype females. The female of July 25 was taken from beneath a mass of humus and debris on a rotted log on the ground. The female of July 29 was taken from a similar situation on another rotted log. In neither case was a fungus garden seen and they were evidently just starting to found their colonies, independently, after their marriage flight.

This species is dedicated to Major J. F. Phipps, Royal Engineers, now engaged in surveying one of the British Empire's most inaccessible and least known boundaries.

Acromyrmex (s. str.) *coronatus* Fabr. ssp. *andicola*
Em. var. *globoculis* For.

Worker: Length 2-6 mm. — Anterior part of ridge of vertex low and faint, posterior half produced as high and acute ridge. Occipital spines long, acute, deflected apically, other tubercles of head large, distinct, acute. Inferior pronotal spines well developed, acute, directed anteriorly and slightly outward. Lateral pronotal spines exceeding mesonotal spines in length, acute, directed forward. Medial pronotal spines exceeding mesonotal spines in length, acute, directed forward. Medial pronotal spines very distinct, acute, rising abruptly. Anterior mesonotal spines large, stout, acutely conic. Posterior mesonotal spines much smaller, somewhat variable in size, slender, directed backward at a slight angle. Epinotal spines of length comparable with lateral pronotal spines but more

slender and gently curving backward in most specimens. Some workers with spines straight and directed upward. Pedicel and gaster strongly tuberculate. Surface of body dull. Pubescence sparse and appressed. Sparse, recurved hairs on spines and appendages. — Dark ferrugineous; medial darker streak on gaster.

Two winged female taken by myself June 20, 1936, near the Oko River, tributary of the Cuyuni River, British Guiana, doubtless belong to this variety. They were captured singly about 9 a. m. as they flew through the bush. Since they do not belong to *A. histrix* or *A. octospinosa*, the two other known species of this region, and since intensive collecting revealed none but these three forms, they are here described:

Female (*undescribed*): Length 7 mm. — Ridges of vertex distinct and complete. Occipital spines short, stout, acute. Inferior pronotal spines flattened, acute, straight, directed forward and outward. Superior pronotal spines long, acute, directed forward and outward. Epinotal spines stout, rising upward, then sharply deflected backward and outward. Gaster irregularly tuberculate. — Entire body densely vermiculate-rugulose. Hairs short, curved irregularly. Fine sparse pubescence. Colored strikingly in dark brown and yellowish brown patches. Mesonotum yellowish brown with an antero-median blotch and lateral elongate ellipsoid blotches of dark brown. Dorsum of first gastric segment with a sharply defined hastate patch of dark brown on yellowish brown background.

In Santschi's 1935 Revision of *Acromyrmex* this variety (British Guiana — type locality) is described, from 4 workers, as having clearly recurved inferior pronotal spines, barely distinct medial pronotal spines, and a grayish pruinose surface. Four colonies taken by myself in 1935 near the Forest Settlement, Mazaruni River, and in 1936 near the Takutu River, British Guiana demonstrate the variability of these characters. Rather than introduce a separate name I have redescribed the worker of this variety on the basis of a large series.

Acromyrmex (*Moellerius*) *balzani* Emery *myersi*,
subsp. nov.

Worker maxima: Length 6 mm. — Head deeply incised, occipital angles rounded, with moderately developed spine and several low and barely distinguishable tubercles of which only one is very distinct. Antennal scapes failing to reach occipital angles by a distance equal to between 2 and 3 times their maximum width. Dorsum of first gastric

segment with large tubercles irregularly arranged but absent from medial region. Head, except occipital region, sparsely rugulose. Mesonotum sparsely rugulose, sides of thorax smooth except for slightly rugulose sutures. Surfaces of body pruinose. Hairs short, sparse, curved. Dull ferruginous.

Described from 1 worker maxima taken on the Southern Rupununi Savannas, British Guiana, November 11, 1935, by Dr. J. G. Myers (No. 5606).

Differing from the typical form in reduction of occipital tubercles and in pruinose body, from the variety *senex* Santschi in less rugulose body, and from the variety *multituber* Santschi in nearly smooth occipital region.

Acromyrmex (Moellerius) *balzani* Emery *planorum*,
subsp. nov.

Worker: Length 2.7 mm. — Worker maxima: Head deeply incised, occipital angles rounded, with acute spine and about 5 low and inconspicuous tubercles. Antennal scapes reaching occipital angles. Dorsum of first gastric segment with large tubercles irregularly arranged but tending to be absent from the medial region, and a lateral region and tending to form lateral ridges. Head, except occipital region, sparsely rugulose. Thorax finely rugulose. Surface of body faintly pruinose. Hairs short, sparse, recurved. Ferruginous.

Described from a colony taken by myself about 17 kilometers north of Ciudad Bolivar, on the llanos of Venezuela, January 27, 1935.

This subspecies differs from the subspecies *myersi* in having longer antennal scapes, in arrangement of gastric tubercles, in sparser pruinosity, and in brighter color.
