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FIVE NEW RATS OF THE GENERA *HYDROMYS* AND *MELOMYS* FROM NORTHERN AUSTRALIA.

By

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(Figures 1-2.)

As a result of encouraging volunteer collectors by the provision of instructions and gear, and the personal efforts of Museum workers on the rare opportunities afforded for field work, the acquisition of indigenous mammals has shown a marked increase over the past fifteen years. New forms of marsupials, rodents, and bats are occasionally identified, and opportunities must be sought for the preparation of papers dealing with as many species as possible in order to close up the gaps and aid in working out the zoo-geographical relationships of the unique mammalian fauna.

Of the five new forms described here, one species of *Hydromys* was collected by the author on Lawn Hill Creek, about 100 miles south of Burketown, which is in the Gulf country of north-western Queensland, while an interesting new *Melomys* was secured by a colleague, Mr. F. A. McNeill, when on vacation at Hayman Island in the Whitsunday Group on the north-eastern coast of that State.

The submission of various kinds of mammals for identification regarding economic and health matters is another source of interesting material. In connection with the investigation of Weil's Disease in the cane fields of north Queensland, over a hundred specimens of rats have been submitted for examination by Sir Raphael Cilento, Director-General of Public Health in that State, and Professor Harvey Sutton of Sydney University, amongst which were five specimens of the previously little known *Melomys littoralis*, providing the extension of range noted below from the Cairns district 260 miles southward to Ayr.

The value of voluntary field activities, however, is strikingly shown by several small collections received from Groote Eylandt off the western and rather hostile shore of the Gulf of Carpentaria. The first mammals were collected by Sir Hubert (then Captain) Wilkins for the British Museum (Natural History), which financed the expedition, resulting in the description of new species not represented in an Australian Museum. A few years later, by the kindly interest and efforts of the late Rev. H. E. Warren between 1928-1930, supplemented by those of his successor at the Groote Eylandt Mission Station, Mr. H. L. Perriman, a representative series of mammals was received in the Museum containers, including not only described species, but also a strikingly new species of *Hydromys*, and a new *Melomys* as well. A new *Hydromys* from Moa or Banks Island, Torres Strait, is here added to the long series of important donations received as a result of the very active interest in the indigenous mammalian fauna shown by Mr. A. S. Le Souef, C.M.Z.S., Curator of Taronga Zoological Park.

In expressing appreciation of the efforts of past and present voluntary collectors, one may appropriately pay tribute of sincere regret at the tragic passing of the Reverend H. E. Warren, in the Bass Strait air disaster of 1934, from the band of willing helpers in fields beyond one's reach.

The text figures were kindly prepared by my colleague, Miss Joyce K. Allan, Assistant Conchologist to the Australian Museum.

Hydromys grootensis sp. nov.

Diagnosis.—A strikingly distinct large-footed insular species, distinguished from all known members of the genus by its general amber-toned coloration, and unusually broad fleshy hindfeet, which are also very stoutly clawed. Cranially distinguished by having the smallest adult upper molar series coupled with unusually heavy incisors and zygomatic arches, large nasals, and the largest palatal foramina known in the genus. Habitat: Groote Eylandt, Gulf of Carpentaria.

Colour.—Remarkable for its yellowish-brown colouration, which lacks the grey or black elements of other species and might be regarded as generally amber in tone. Above, compared with Ridgway's colour chart, the darkest shade is provided by the chestnut-brown tipping of the longer hairs, which tends to form a darker dorsal line extending from the nose-tip to the tail-base. Intermixed with the dark tipping is the shining light cinnamon-brown to tawny tipping of the softer pile, and the whole upper surface, excepting the head, is grizzled with pinkish-buff hairs, which predominate on the sides, giving them a clear colouration. Basal fur of back unusually pale, about drab grey. Below, the pinkish-buff tipping becomes richer and imparts a warm buffy wash to the cartridge-buff tone of the hair-tips; basal fur a very light drab-grey. Manus and pes sayal to snuff-brown with a mingling of shining buffy hairs. Tail with the light tip unusually short, covered with coarse dark chestnut-brown hairs to within an inch of the tip which becomes yellowish white. The short fur of the head and muzzle of a less grizzled cinnamon to chestnut-brown, and there are light buffy patches on the cheeks behind the eyes.



Figure 1.

Left hindfoot of *Hydromys grootensis* sp. nov., showing the unusually heavy structure and breadth, short stout claws, enlarged and coarsely granulated interdigital pads, and remarkably elongated hallucal pad.

External Characters.—Hindfoot remarkably broad and thick with short fleshy digits, and enlarged and heavily granulated pads, the hallucal being specially elongate (Figure 1), and the claws unusually stout.

Skull and Dentition.—Skull stoutly built, with unusually heavy zygomatic arches, and large nasals, which are placed farther back than usual, the tips being actually behind the rear edge of the incisors and the tapered posterior ends extending much farther into the interorbital region than in other forms. Palatal foramina longer and wider than those of *H. chrysogaster* and therefore the largest known for the genus. Upper molar series smallest of the genus, but incisors longer and stouter than those of adjacent mainland species, second only to those of *chrysogaster* in size.

Dimensions of Holotype, Male.—Wet skin: head and body about 305; tail 240; hindfoot, length 63·5, breadth at base of 1st–5th digits 19·5; ear about 18 mm.

Skull: Incomplete basally; nasals, length 19·4, greatest breadth 5·7; interorbital width 7; palatal foramina 7·2 × 3·8; upper molar row 7·8; breadth of 1st upper molar 2·9.

Habitat.—Groote Eylandt, off the west coast of the Gulf of Carpentaria.

Holotype.—Adult male, No. M. 4476 in the Australian Museum collection. Collected and presented in 1928 by the late Reverend H. E. Warren.

Remarks.—The comparatively large incisors coupled with the smallness of the molars, and the remarkable stoutness of the hindfeet with their enlarged and more rugose pads and blunter claws are such as to suggest a marked difference in habits due to the animal's insular habitat. The specific name is therefore associated with the island to simplify consideration of the geographical distribution of members of the genus.

Hydromys lawnensis sp. nov.

Diagnosis.—A medium-sized buffy grey species, distinguished from all others of the genus in having the tail definitely longer than the head and body in both sexes. Also characterized by the comparatively great length of the hindfoot, which in the adult holotype is only 1 mm. less than that of the much larger *H. chrysogaster reginæ* holotype, and considerably longer than the hindfeet of *H. longmani*, which has a greater head and body length. The upper molar series is the longest known for the genus. Fur finer than in *H. longmani* and a clearer more buffy grey above, lacking the heavy black pencilling of the back of that species. Habitat: Lawn Hill Creek, north-western Queensland.

Colour.—General colour of back grizzled greyish to buffy brown, which is clearest on the nape, shoulders, and upper back, the pencilling of blackish hairs being closest on the top of the snout, head, and lower back. Light tipping of fur ranging from pinkish to cinnamon-buff. The sides becoming clearer greyish buff which merges into the pinkish buff tipping of the belly fur. Basal fur above about pale neutral grey; below much paler, almost pallid neutral grey. Manus shining mummy-brown, the dark colour contrasting markedly with the buffy-grey limb. Pes with a dark prout's brown outer edge, the rest of the surface paler, more buffy brown. Basal two-thirds of tail blackish brown, the final third white.

External Characters.—The tail is definitely longer than the head and body in both sexes, instead of being shorter as in all other species of the genus. Hindfoot proportionately very long, measuring 65 mm. in the adult male holotype, with a total length of 535 mm., compared with the 66 mm. pes of the type of *H. chrysogaster reginæ* with a head and body length of 656 mm.

Skull and Dentition.—Interorbital constriction comparatively rather broad and the adult male palatal foramina exceeding the length of those of *H. longmani*. Upper molar series apparently the largest of the genus, the length of the row, and possibly the width of m^1 , exceeding that of the much larger *chrysogaster reginæ*.

Dimensions of Holotype, Adult Male.—Fresh specimen: head and body 259; tail 276; hindfoot, length 65, breadth at base of 1st–5th digits 17.5; ear 18.5 mm.

Skull: greatest length 54.2; basal length 49.6; zygomatic breadth 26.2; nasals 18.7×5.5 ; interorbital width 7.1; palatilar length 25.1; palatal foramina 6.5×3.4 ; upper molar row 9.3; breadth of m^1 3.1 mm.

Habitat.—Lawn Hill Creek in north-western Queensland, near the border of the Northern Territory which it actually crosses. Holotype and allotype from Adel's Grove about 12 miles south of Lawn Hill Station and about 100 miles south of Burketown.

Type Specimens.—Holotype, adult male, No. M. 5650; allotype, young female, M. 5651, in the Australian Museum. Collected by E. Le G. Troughton, 16th June, 1934.

Remarks.—The discovery of this well defined species in a locality intermediate between that of *longmani* of the Atherton Tableland in the east, and *caurinus* of the East Kimberley region of the north-west, is of interest in bridging a wide break in generic distribution, because of which the specific name has been associated with the habitat. The proportionately greater tail and hindfoot length, and longer upper molar row, specifically distinguish this animal from both these nearest known mainland species, quite apart from the differences in colour.

Hydromys moae sp. nov.

Diagnosis.—A small-bodied, relatively large-skulled insular species, differing from the north Queensland *H. chrysogaster reginæ* and *longmani* in dimensions and coloration. Distinguished from *H. esox*, the most adjacent Papuan species, in general proportions, cranially, and in lacking the black head markings and buffy whitish manus and pes of that species. Habitat: Moa or Banks Island, Torres Strait.

Colour.—General tone of the back sepia, composed of the soft prout's brown tipping of the fur, variegated and intensified in parts by the intermingling of ochraceous-buff to ochraceous-tawny and the shining blackish seal-brown longer hairs. Top of head, from snout-tip to behind ears, a light seal-brown, softly flecked with buffy tips. Sides of body a clearer buffy sepia owing to the natural reduction of the darker tipping, but the cheeks and edge of belly with a strong ochraceous-buff wash. Manus pale prout's brown. Pes with an outer edging of pale prout's brown continued from the leg, remainder of surface more buffy. Undersurface a greyish pale buffy, sprinkled with shining light ochraceous-buff hairs. Tail with slightly over the final fourth white, about the basal three-fourths seal-brown above, paler below.

External Characters.—Hindfoot comparatively long and slender, twisted as in typical *Hydromys*, with webbing well developed, and usual slender arched claws, not short and stout as in *grootensis*. Foot and ear proportionately much larger than in *esox*, the foot being about as in *longmani* but other dimensions smaller, much smaller altogether than *chrysogaster reginæ*. Tail proportionately rather short, only exceeding that of *melicertes*, which has a smaller foot, and a little shorter than that of *esox* with a much smaller foot.

Skull and Dentition.—Distinguished by having the smallest palatal foramina known for the genus, while the interorbital constriction is also narrower than that of the small Papuan *esox*, or the north Queensland *longmani*. Skull narrower generally than in *longmani*, but the nasals slightly longer and wider, therefore much longer than in *esox* and differing in having the tips above the front edge of the incisors, while their hinder borders extend well back into the frontal region. Molars comparatively large and heavy, slightly more so than in *longmani*, much as in southern *chryso-gaster* but smaller than *reginæ*, larger than in *esox*.

Dimensions of Holotype.—Dry skin, doubtful sex: tail about 220; hindfoot, length 58, breadth at base of 1st-5th digits 16; ear 18 mm.

Skull: greatest length 52·7; basal length 48; zygomatic breadth 24; nasals 18·6 × 5·5; interorbital width 6·4; palatilar length 24·5; palatal foramina 4·7 × 2·8; upper molar row 8·5; breadth of 1st upper molar 3 mm.

Habitat.—Moa or Banks Island, Torres Strait, as far as at present known.

Holotype.—Skin and skull of adult No. M. 4558 in the Australian Museum collection; paratype immature skin and skull No. M. 4559. Presented in April, 1929, by Mr. A. S. Le Souef, C.M.Z.S., Curator of the Taronga Zoological Park.

Remarks.—This well defined island species, in common with other insular forms, has a comparatively large skull in relation to the moderate body and tail proportions. Apart from the small palatal foramina and interorbital width, which apparently distinguish it from all known species of *Hydromys*, it lacks the generally sombre brown coloration of *beccarii* of Key Island and New Guinea, and has a larger hindfoot, and only one quarter instead of two-thirds of the tail is white; it also lacks the dark head markings described for *esox*, and has larger feet, which are darker in colour.

Melomys limicauda sp. nov.

Diagnosis.—Most nearly allied with *M. rubicola* from Bramble Cay, Torres Straits, in the proportionately long and rugose tail, which is, however, relatively not so long and is much more coarsely scaled. Differing markedly in the much longer and wider ear, and in having an entirely white throat, chest, and inguinal region, and shorter and broader hindfeet. The skull, apart from the relatively stouter build and greater breadth, which is most marked in the rostral and cranial region, is distinguished from that of *rubicola* by the much larger bullæ. Habitat: Hayman Island, Whitsunday Group, Queensland.

Colour.—Generally similar but decidedly paler throughout than in *rubicola*, notably lacking the rich tawny wash which extends along the back of that species from crown to rump. Undersurface definitely paler, the fur entirely ivory white on the throat, chest, centre of belly, and inguinal region. On the back the general colour is a buffy sayal brown softly pencilled with the darker brown of the fur-tips, the crown and rump brighter. Cheeks, sides of body, and limbs of a clearer greyish brown washed with avellaneous. Manus and pes white-haired, the manus with a slight line of darker hairs extending across the wrist to the outer edge, the mark much narrower than in *rubicola*. Tail dark brown above, lighter below.

External Characters.—Tail of adult male holotype proportionately much shorter than in males of *rubicola*, but much as in females of that species, measurements of the Museum series of *rubicola* suggesting that only males are characterized by the unusually long tail; no doubt females of *limicauda* when available will also show a relative reduction of tail-length and prove that a relatively shorter tail is

characteristic of the species. Tail covering coarser grained and more rugose, the individual scales (Figure 2) more globose or inflated, more crowded, elongate, and overlapping than in *rubicola* so that they do not tend to form such well-defined rings. Hindfoot much the same in general appearance, but decidedly shorter and broader, with larger or more inflated pads. Ear much larger and more leaf-like, being considerably longer and wider, reaching about the centre of the eye when pressed forward, instead of not nearly reaching to the posterior canthus as in *rubicola*. Pelage rather longer and sparser than in *rubicola*, averaging about 16 against 13 mm. in length on the middle of the back.

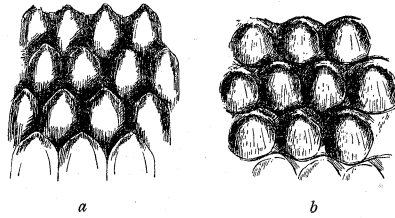


Figure 2.

Showing (a) the coarser, more inflated and elongate overlapping tail-scales of *Melomys limicauda* sp. nov., in comparison with (b) the less rugose and more rounded ones of *Melomys rubicola* Thomas.

Skull and Dentition.—Skull decidedly broader and more stoutly built than that of an adult male *rubicola* of greater head and body length, the difference in breadth being marked in the rostral region and wider palatal foramina. The tympanic bullæ differ markedly in their greater size and breadth, being 5·7 in greatest length by 6·2 mm., against 5 by 5·3 mm. wide in *rubicola*.

Dimensions of Holotype, Old Male.—In spirit: head and body 155; tail 165; hindfoot 31·5, breadth at base of 1st-5th digits 9·5; ear, length 19, greatest breadth 17·5 mm.

Skull: greatest length 40·3; basal length 35·8; zygomatic breadth 21; nasals 13·7 × 4·3; interorbital width about 6; palatilar length 18; palatal foramina 6·5 × 2·6; upper molar row 6·4; breadth of m¹ 2 mm.

Habitat.—Hayman Island in the Whitsunday Group, on the north Queensland coast between Bowen and Mackay.

Holotype.—Old male, No. M. 5928 in the Australian Museum collection. Collected in January, 1935, by Mr. F. A. McNeill, Invertebrate Zoologist to the Museum, while on vacation at the island.

Remarks.—This very distinct species is readily distinguished from its closest though geographically distant ally by its larger ears and bullæ, as well as by the much coarser rasp- or file-like appearance of the tail, to which the specific name refers; the latter feature, of course, distinguishing the animal from the widely distributed *M. cervinipes* of the mainland and *M. banfieldi* of Dunk Island. According to its collector, the interesting species was attracted to the camp buildings, where it disregarded such foods as butter and meats and favoured desiccated coconut and dried fruits more in accordance with the natural diet. An immature female was recently received from Mr. Hans Kroyer, who has since obtained an adult specimen to be forwarded when fully preserved.

It seems evident that the marked specific distinctions, such as the larger ears, correlated with enlarged bullæ, and the more pronounced foot-pads and coarser scaling of the tail, which are probably of assistance in climbing, are features developed in accordance with the rugged and more varied conditions of Hayman Island, in contrast with the restricted low-lying sandy area of Bramble Cay. The warmer coloration of the Museum series of *rubicola* collected by the late Charles Hedley, F.L.S., in September, 1924, appears to contrast with the description by Oldfield Thomas of his holotype collected in 1845 by John Macgillivray during the voyage of H.M.S. "Fly." The fur of the undersurface in recent specimens is grey-based throughout and buff-tipped, contrasting strongly with the present species, and suggesting that the original series of *rubicola* had faded in long preservation.

Melomys mixtus sp. nov.

Diagnosis.—A small form, intermediate in various cranial and external features between *australius* and *murinus*. Differing from the former in its definitely longer hindfoot, shorter ear, colour of belly, somewhat wider interorbital region, shorter palatal foramina, and longer upper molar row. The geographically more distant insular *murinus* agrees in foot-length but has a decidedly longer ear, and relatively larger skull, though the upper molar row is actually smaller. Habitat: Groote Eylandt, Gulf of Carpentaria.

Colour.—Apparently brighter above than in *australius*, being definitely richer than the buffy-brown described for that species, and with a more sharply defined whitish undersurface as described for *murinus*. General tone of back about cinnamon-brown composed of the ochraceous-tawny and prout's brown tipping of the fur. Cheeks, limbs, and sides clearer ochraceous brown owing to the reduction of dark pencilling and a wash of cinnamon. Hairs on manus and pes light buff, a dark line extending from the forearm along the outer edge of manus to the base of the second digit. Tail about prout's brown above, paler below.

External Characters.—As indicated in the diagnosis, the dimensions are somewhat intermediate, the hindfoot in both sexes being definitely larger than in *australius*, much as in *murinus*, but the ear actually shorter than in both allies.

Skull and Dentition.—The skull agrees in general proportions with *australius*, but differs in having a decidedly longer molar row, while the palatal foramina are shorter and the interorbital width is greater. The molar row is larger, the palatal foramina shorter, and the interorbital width equal to or even comparatively larger than in the proportionately stouter skull of *murinus*.

Dimensions of Holotype.—Adult male (in alcohol): head and body 105; tail 111; hindfoot, length 25, breadth at base of 1st-5th digits 5·7; ear 13·5 mm.

Skull: greatest length 28·6; basal length 24·4; zygomatic breadth 15·2; nasals 10·1 × 3·4; interorbital width 4·8; breadth of brain-case 13; palatal foramina 4·5 × 2; upper molar row 5·5; breadth of m¹ 1·6 mm.

Habitat.—Groote Eylandt, on the west coast of the Gulf of Carpentaria.

Type Specimens.—In the Australian Museum collection: Holotype, adult male, No. M. 5397, collected and presented by Mr. H. L. Perriman in 1933; allotype, young female, collected and presented by the late Rev. H. E. Warren in 1930.

Remarks.—Although Oldfield Thomas considered it possible that all the small forms of *Melomys* from each side of Torres Strait and the islands between might later be regarded as sub-species of the one variable animal, it would be difficult to reconcile specifically the mixed features of this island form with its nearest known mainland or insular allies.

When examining the typical series of Murinae in the British Museum (Natural History) I noted of *M. australius* that the warm buff of the sides continues over the belly, almost reproducing the ochraceous buffy tone of the belly of *M. lutrillus*, thus indicating that the undersurface of *australius* is definitely darker than the contrasting underparts of the new form.

Melomys littoralis Lonnberg.

This medium-sized species of coastal north Queensland has hitherto been known only from the original female and young collected on the beach near the mouth of the Russell River a little north of Cairns, described by Professor Lonnberg¹ in 1916, and the subspecies from Hinchinbrook Island, *M. littoralis insulæ*, described by Troughton and Le Souef² in 1929.

During the examination of more than a hundred rats recently submitted for identification by Sir Raphael Cilento, Director-General of Public Health in Queensland, and Professor Harvey Sutton of the School of Public Health and Tropical Medicine at Sydney University, in connection with their investigation of the occurrence of Weil's Disease in the Queensland cane-fields, five specimens were identified, which extend the range of this species considerably southward.

One adult male of the small series is from Ingham, 144 miles south of Cairns by rail and a few miles south from Hinchinbrook Island, where *insulæ* occurs. Three males and one female are from the Ayr district, 260 miles from Cairns, and 50 miles south of Townsville. These specimens not only add greatly to the known range, but also serve to confirm the distinctness of the hitherto little known species. The general appearance and dimensions conform well with the original measurements, though the body and tail dimensions of the type, taken from a skin, appear somewhat smaller, a variation which may be checked later by an examination of the crania.

Additional specimens from the Ingham district have recently been identified amongst a collection of rats submitted for examination by officials of the Colonial Sugar Refining Company in regard to the investigation of economic damage by rats in the cane-fields of northern Queensland. According to their field observations it appears that although this species, per individual, actually chews less fibre, its climbing abilities aided by the use of the semi-prehensile naked scaly tail result in deeper chewing of standing cane well above ground, causing the breaking down of a much larger proportion of stalks. It is of considerable interest to find that this species of *Melomys*, previously known on the cane-fields as the "Tree Rat," is regarded as actually causing greater economic damage individually than either the indigenous *Rattus culmorum*, known as the "Cane Rat," or the introduced long-tailed species, *Rattus rattus*.

¹ Lonnberg.—Kungl. Sv. Vet. Akad. Handl., lii, 2, 1916, p. 5.

² Troughton & Le Souef.—Australian Zoologist, vi, 1, 1929, p. 96.