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NOTES ON SOME WESTERN AUSTRALIAN FROGS, WITH
DESCRIPTIONS OF NEW SPECIES.

BY

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(Figures 1-5.)

The material upon which this paper is based was collected by myself and others during the excursions which formed so interesting a feature of the Perth meeting of the Australasian Association in August last. Two species are described as new, and notes are given upon several others. It is suggested that two previously described species are synonymous with known forms. I have to thank Professor G. E. Nicholls, D.Sc., for his generosity in putting at my disposal his material of the species which I have dedicated to him, as well as for much assistance freely given in several other directions.

CRINIA LEAI Fletcher.

Crinia leai Fletcher, Proc. Linn. Soc. N.S.W., xxii, 1897 (1898), p. 677.

Crinia leai Fry, Records W.A. Museum, i, 3, 1914, p. 203, pl. xxviii, figs. 2 and 2a.

Crinia michaelsoni Werner, Fauna Südwest-Australiens, iv, 1914, p. 416. Nineteen individuals collected at Bridgetown, 174 miles south of Perth, 29. viii, 1926.

A larger series was collected, but a number were presented to Professor G. E. Nicholls, who had not himself taken this species. The frogs were found under discarded fence rails lying along an area of damp ground beside a creek on the property of Mr. E. G. Hall, about four miles out of Bridgetown. Fletcher's specimens came from Bridgetown and Jarrahdale; that figured by Fry from the Margaret River. The species has not been recorded from any other locality. If, however, as I suggest, *Crinia michaelsoni* Werner is synonymous, then the following localities must be added:—Donnybrook, Boyanup, Lunenberg, Bunbury, and Albany. Professor Nicholls has not found this species in the neighbourhood of Perth, and I did not find it in the wheat-belt country at Narrogin or Merredin, so the range would appear to be through the coastal belt from a little south of Perth to Albany.

This frog is somewhat more variable than the descriptions of Fletcher and Fry (*loc. cit.*, indicate. Less than half of my specimens show the characteristic dark dorsal band, which is most conspicuous in young individuals, and tends to become broken up with advancing age. During

this process, which seems to be initiated by the posterior bifurcation mentioned by Fletcher, the more persistent remnants are the anterior border, lying between the posterior halves of the upper eyelids, and the lateral margins. The anterior border is in only one individual as straight and rectangular as figured by Fry. Usually it is slightly emarginate, and the antero-lateral angles are truncated. In several individuals it persists only as a triangular spot between the eyes, with the apex directed backwards. In some this spot curves outwards and backwards on either side so as to resemble the conventional seabird of old-fashioned seascapes. The lateral margins persist in some individuals as blackish stripes, separated by a lighter grey band; in others they become broken up into lines of irregular spots. Anterior to the dark dorsal band the crown is grey, sometimes reduced to a transverse grey band between the anterior halves of the upper eyelids by the darkening of the snout. Typically a dark band runs from the tip of the snout embracing the nostril to the eye, and is sometimes continued to the shoulder. The triangular dark mark surrounding the vent is usually present. Another characteristic marking, occasionally absent, is the black band running along the outer side of the plantar surface from the tibio-tarsal articulation to the ends of the outer toes. In some examples the plantar surface is completely black. This mark is usually light-edged. An extreme example, which has this marking, has the dorsal surface apparently uniform slaty grey, except for a slightly darker small triangular spot between the eyes. Under the binocular, however, the apparent uniformity is resolved into obscure mottling with two shades of grey and black.

The undersides of body and limbs are creamy white, more or less finely freckled with brown. My series was fixed in Bles' solution before preservation in alcohol, and the coloration exhibited is close to that in life, cold greys, with in one or two individuals only a warming towards brown. Fletcher's type material, on the other hand, which is preserved in the Macleay Museum of the University of Sydney, is spirit material, and the prevailing colour is warm brown.

Though this species obviously comes fairly close to the "smooth" *Crinia* of Victoria and Tasmania, it does not show an interesting modification of the manus which characterises the latter, and with which I propose to deal shortly elsewhere.

CRINIA MICHAELSENI *Werner*.

Crinia michaelсени Werner, Fauna Südwest-Australiens, iv, 1914, p. 416.

Werner writes (*loc. cit.* p. 405):—"anstatt der von Bridgetown und Pipe Clay Creek bei Jarrahdale beschriebenen *Crinia Leai* enthält das *Michaelsen-Hartmeyersche* Material die neue *Crinia Michaelсени*." I can find nothing in his description of *Crinia michaelсени*, however, which distinguishes it from *C. leai* of Fletcher, except for some colour differences which are probably due to spirit preservation. His type comes from Donnybrook, only forty miles from Bridgetown, one of Fletcher's type localities, while a further portion of the material studied by him was from

Fletcher's other type locality, Jarrahdale. *C. michaelsoni* appears to be a synonym of *C. leai*.

CRINIA ROSEA *sp. nov.*

Eight individuals collected at Pemberton, in the Karri country, 218 miles south of Perth, 28. viii. 1926.

Diagnostic characters.—A "smooth" *Crinia* of stout *Pseudophryne*-like habit, with short stout limbs. Dark purplish-grey above, with obscure darker markings resembling those of *Crinia leai*. Closely and finely freckled below, males with throat and chest blackish. In life suffused all over with deep rose, which is easily visible on the lighter ventral surface. Arms completely dark, with palmar surface usually white, but in all cases strongly contrasted with the rest of the arm. First toe only half length of second. Strong fold across chest. Vomerine teeth conspicuous.

Types.—Holotype female and allotype male in the Macleay Museum of the University of Sydney. Paratype material will be distributed to the Western Australian Museum, Perth, the Australian Museum, Sydney, the British Museum (Natural History), and the American Museum of Natural History.

Description of holotype female.—Vomerine teeth in two conspicuous convergent ellipsoidal groups behind the choanae, closer to one another than to the choanae. Head two-thirds as long as broad; snout obtusely acuminate, projecting very slightly beyond mouth; slightly shorter than length of eye; canthus rostralis obtuse; loreal region concave; nostril equidistant from eye and tip of snout; distance between nostrils equal to the interorbital width, which is to that of the upper eyelid as three to two; tympanum not visible. Fingers free, almost cylindrical, not fringed, first much shorter and stouter than second; subarticular tubercles moderately distinct. Distance along straightened hind limb from vent to tibiotarsal articulation equal to distance along mid-dorsal line from vent to level of anterior margins of fore-limbs; heels scarcely meeting; tibia contained two and three-quarter times in distance from snout to vent, two-thirds as long as foot. Toes free, cylindrical, pointed; first and second very short; first slightly more than half length of second, which is much less than half length of third; third reaches penultimate joint of fourth, and fifth the antepenultimate; no metatarsal tubercles; sub-articular tubercles not distinct. Upper and lower surfaces smooth save for glandular granular areas extending along sides from angle of jaw and tympanic region almost to the groin, and upon posterior surfaces of thighs. A fold across chest.

Colour above uniform dark purplish-grey, obscurely mottled with darker; legs obscurely cross-barred, plantar surface darker, undersides of toes apparently white, but lightly mottled; arms wholly dark except for palmar surface, first and second fingers, and undersides of third and fourth, which appear white but are lightly mottled. Undersurface minutely freckled with brown, darker round margin of lower jaw. In

life, the whole is suffused with deep rose, which has already changed to a yellowish red in my material, and appears as if it may leach out entirely in time.

Adult ; ovaries with ripe follicles.

Description of allotype male.—The male differs from the female by its smaller size, indicated in the measurements below ; by the blackish coloration of the throat and chest ; and by the possession of a black dorsal stripe resembling that of *C. leai*, which is bifurcated for the posterior two-thirds of its length, so that it continues as two dorso-lateral, somewhat irregular black lines. This marking is very narrowly edged with greyish-white. The legs, also, are more definitely cross-barred with black.

Measurements.—

	<i>Crinia rosea.</i>		<i>Crinia leai.</i>
	♀	♂	
Snout to Vent ...	25 mm.	22 mm.	27 mm.
Width of Head	9 mm.	8.5 mm.	9.5 mm.
Width of Body	15 mm.	11 mm.	12 mm.
Forelimb ...	11 mm.	10.5 mm.	12 mm.
Hindlimb ...	29 mm.	27 mm.	37 mm.
Tibia ...	9 mm.	9 mm.	13 mm.
Knee to Knee ...	18 mm.	17.5 mm.	21 mm.

Affinities.—*C. rosea* most nearly resembles in appearance and coloration a hill form of *C. victoriana* Boulenger which I collected at Marysville, but lacks the bold mottling of the hinder under-surfaces exhibited by that species, and is much more extensively suffused with rose. Moreover it has the first digit of the manus unmodified, while in *C. victoriana* (as also in *C. froggatti*) the first digit is reduced to a metacarpal plus a small module of cartilage which is the sole remainder of the phalanges. It is of interest to note here that in *C. laevis* of Tasmania the metacarpal is capped by an unguis phalange instead of a spherical cartilaginous nodule. The condition on the second Tasmanian smooth *Crinia*, *C. tasmaniensis* Guenther, is not known. This group of *Crinia* falls into two series—*leai*, *froggatti*, and *laevis* on the one hand, and *rosea*, *victoriana* and possibly *tasmaniensis* on the other. The last species is known only, however from the types in the British Museum, though, if I am right as to its affinities, it should occur commonly enough under logs in the hardwood forests. Each of these series is probably derived from a common ancestor. The members of both series in Western Australia have retained an unmodified manus, those of Victoria have become most modified, while the Tasmanian forms, if we may judge from *C. laevis*, are intermediate. This does not necessarily indicate western derivation for the group, but it is certainly unexpected.

From *C. leai* *C. rosea* is distinguished by its stouter build, shorter limbs, and different coloration.

Variation.—The largest male and female have been selected as types. One female was used for dissection, and is not taken into account. Two

other females do not differ much from the holotype, save that both are a little lighter on the under surface, and are rather more definitely striped with black on the dorsal surface. The first finger is much shorter but not stouter than the second as in the type. Two other males generally resemble the allotype, having bifurcated dorsal bands rather better defined, with a triangular lighter grey mark anterior to the dorsal band, with its apex directed forwards also to the end of the snout. In one of these all the markings are light-edged. The cross-barring of the legs also shows more strongly. Without going further into detail here, it may be prophesied that a larger series would exhibit variations parallel to those shown by *Crinia leai*.

Habits.—*C. rosea* is a cryptozoic form found hiding under logs during the day in wet forest country. So far it is known only from Pemberton, but probably it is generally distributed in the south-western hardwood forests. The stomach of the female dissected contained only terrestrial amphipods. That of the type, which was also examined, was completely filled by a coleopterous larva. The species will probably be found to lay its eggs out of water, after the manner of its allies and of the species of the genus *Pseudophryne*.

PSEUDOPHRYNE GUENTHERI *Boulenger*.

(Figures 1-5.)

Pseudophryne guentheri Boulenger, Brit. Mus. Cat. Batr., 1882, p. 279 pl. xviii, fig. 2.

Amongst some scientific effects of the late D. B. Fry, a herpetologist of great promise who laid down his life in the Great War, which were handed over to me by his parents, is a redescription of this species, together with some drawings, which were intended for publication, but the paper of which they form a part was not completed when Fry left on active service. I have thought it appropriate to include these here.

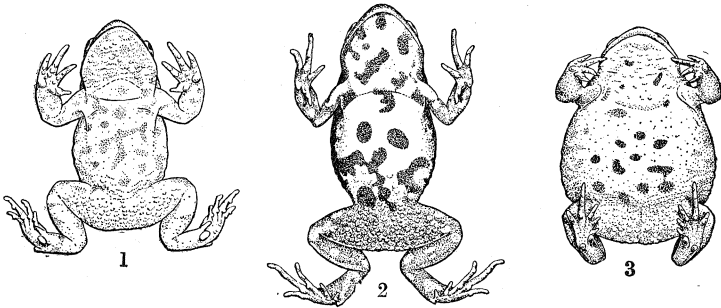
“Habit stout to moderate. Head broad, varying between $\frac{2}{3}$ and $\frac{3}{4}$ long as broad. Snout rounded, very slightly prominent, almost or just as long as the diameter of the eye; nostril nearer the tip of the snout than the eye, save in stout specimens when it is equidistant; canthus rostralis feebly marked, loreal region very slightly concave; interorbital space as broad as the upper eye-lid, flat. Tongue elongate oval, bandlike or cylindrical, entire and free behind. Vomerine teeth absent. Skin very glandular and porous, the whole of the upper surfaces—limbs sometimes excepted—with prominent warts; the scapular region is usually marked by a pair of boomerang-shaped plicae formed of close set, elongate warts; sometimes a row of small warts form an indistinct dorsal line; a pair of glands, varying in distinction beside the urostyle. In some individuals the whole upper surface is finely granular in addition to the warts. Under-surfaces more or less distinctly granular, the anterior $\frac{2}{3}$ of the belly always smooth; a fold across the chest; a marked glandular patch behind the angle of the mouth. Limbs usually short and stout. Fingers cylindrical;

first finger usually a little shorter than the second, in one instance of equal length; sub-articular tubercles well marked, sometimes raised into pads; palmar surfaces with tubercles or pads; a very conspicuous and almost round outer, and a little smaller inner metacarpal tubercle. Foot broad; toes cylindrical; plantar surfaces smooth with a large white conical inner and a slightly smaller round outer metatarsal tubercle. The length of the hind limb from the anus to the tarso-metatarsal articulation varies between the distance from the anus to the shoulder and from the anus to the axilla.

Colour (spirits and formalin).—Dark purplish or greyish above, lighter on the forehead, arms and legs. Back variegated with lighter, the markings sometimes almost white, of which one on each shoulder and a more median larger one situated rather in front of the middle of the back, are usually present. Sometimes a stripe from eye-lid to eye-lid and on the urostyle. Some of the warts light tipped. Sides uniform or spotted. Under surfaces pure white or creamy brown, the throat and thighs darkest, with very faint to almost black marblings, varying in number. Limbs variegated or spotted.

The total length of the largest specimen from the snout to the vent is 28 mm.

Localities.—Two adult specimens from Torbay near Albany, King George's Sound, South Western Australia, collected by Mr. W. B. Alexander, B.A. (Figs. 1 and 3). Six specimens in the Macleay Museum, Sydney University, also from King George's Sound have been examined, one of which is figured (Fig. 2). All specimens show considerable differences from Dr. Boulenger's original description and figure, but they seem to be merely individual variations of a most variable species.



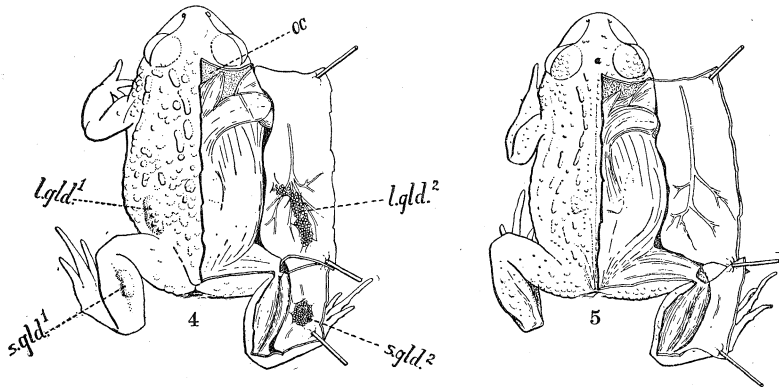
Figures 1-3.

Variation in *Pseudophryne guentheri*. Figures natural size. Drawn by D. B. Fry.

This species differs from its nearest ally, *P. bibronii* by the more warty nature of the skin, by the large parotoid which may be present on the lateral lumbar region, and by the very large metatarsal tubercles. Although these characters make confusion of the two forms impossible

one of my specimens (Fig. 2) shows that the extremes of each species approach each other more closely than the original diagnosis lead one to believe. In this example the back is but little more pustulated than in some examples of *P. bibronii*, and the parotoids figured by Boulenger are not discernible; the forehead is lighter than the back and the ventral marbling is different from that of specimens of *P. guentheri* and approaches the typical condition of *P. bibronii*. But the metatarsal tubercles are very large. The frog recently described by Andersson¹ from Kimberley district, North Western Australia, as *P. mjobergi*, differs from *P. guentheri* by the presence of a large paratoid on the shoulder and by an additional tubercle situated ventrally on the proximal end of the tarsus.

The characters of *P. guentheri* subject to noticeable variation are as follows: the width of the head, which in all the examples I have examined is narrower and more rounded than in the type specimen figured by Dr. Boulenger; the length of the toes and fingers; the degree of development of the subarticular and metatarsal tubercles; the length of the hind limb, which may be sexual, the length between the anus and the tarso-metatarsal articulation, varying between the distance of the anus from the axilla or from the shoulder; the degree of development of the lumbar paratoid gland which may be visible or invisible externally; and finally, the coloration and markings.



Figures 4-5.

Dissections of *Pseudophryne guentheri*, showing glands present in Fig. 4. absent in Fig. 5. Enlarged. Drawn by D. B. Fry.

The variation exhibited by the "paratoid glands" of this species is a subject worthy of more attention than can be bestowed upon it at present. From the outlook of the systematist the presence or absence within the one species of these glandular masses is very important.

Of the specimens of *Pseudophryne guentheri* examined, only three have been dissected. In one alone were the glands visible externally, and

¹Andersson—Kungl. Sv. Vet. Akad. Handl., lii, 4, 1913, p. 19, pl. i, figs. 5-6.

then not distinctly, being quite unlike the prominent swellings shown in Boulenger's figure of the type. In one specimen (Fig. 4) the lumbar gland is a diffuse mass, some of the individual glands being quite isolated and there is a somewhat similar patch of glands on the upper side of the shank. The external appearance of these glands, shown on the left side of the figure, is somewhat accentuated. Two other specimens were opened, but they showed no signs of sub-cuticular glands. These glands may, therefore, be present or absent."

I collected adult examples of this frog in the Geraldton district (5.ix.1926), as well as a series, of tadpoles and recently metamorphosed young. A description of the former is held over for inclusion in a general paper on the tadpoles of Australian frogs. The young generally resemble the adults, and have the characteristic metatarsal tubercles well developed, but differ as regards the ventral surface in having the belly darker, owing to the pigmented viscera showing through the skin, and contrasting strongly with the white of the throat and undersides of thighs.

PSEUDOPHRYNE MJÖBERGII *Andersson*.

Pseudophryne mjöbergii Andersson, K. Svensk. Vetens. Akad., Handl. lii, 4, 1913, p. 19, pl. i, figs. 5-6.

I suggest with some diffidence that this species is synonymous with *Uperoleia marmorata* Gray. The latter has a very wide range, and is extremely variable. I have not seen Western Australian specimens of it, but those from Port Darwin in the Macleay Museum, as well as others from Eidsvold in Queensland have the gland pattern just as described by Andersson, and I cannot find any character in his description which definitely distinguishes his species from Gray's.

PSEUDOPHRYNE NICHOLLSI, *sp. nov.*

Twenty-eight individuals collected at Pemberton, in the Karri country, 218 miles south of Perth, 28.viii.1926; four young and two half-grown collected at Deep River, Nornalup, on the south coast by Professor G. E. Nicholls, 30.xi.1925.

Diagnostic characters.—A small *Pseudophryne* of the *bibronii* type, the largest specimen measuring 24 mm. from snout to vent. Bluish to brownish black above and on the sides. Belly ranging from intense black in young to mottled with white in adults; throat black. A characteristic series of cadmium yellow spots developed as follows:—a pair on each side of the chest, opposite the arms but not extending into the axilla; a pair on the lower belly in front of thighs, sometimes confluent; and three on each hind-limb, the first on the underside of the thigh at its distal end, extending into the popliteal region, the second practically continuous with this on the underside of the shank, and the third on the upper and inner side of the foot.

Types.—Holotype female and allotype male in the Macleay Museum of the University of Sydney. Paratype material will be distributed to the Western Australian Museum, Perth, the Australian Museum, Sydney, the British Museum, and the American Museum of Natural History.

Description of holotype female.—Vomerine teeth absent. Head scarcely two-thirds as long as broad; snout rounded, not projecting beyond mouth; slightly shorter than length of eye; canthus rostralis rounded; loreal region concave; nostril nearer to tip of snout than to eye; distance between nostrils less than interorbital width; tympanum not visible. Fingers free, cylindrical, first a little shorter than second; subarticular tubercles distinct. Distance along straightened hind limb from vent to tibiotarsal articulation measured along mid-dorsal line from vent falls a good deal short of level of arms; heels not meeting by at least 3 mm.; tibia contained three and one half times in distance from snout to vent, seven-eighths as long as foot. Toes free, cylindrical, pointed; first and second very short, first shorter than second; third very slightly longer than fifth, and half the length of fourth; two not very distinct metatarsal tubercles, the outer larger than the inner; subarticular tubercles moderately distinct. Upper surface coarsely granular laterally, the granules merging into indistinct rows of low warts in the mid-dorsal region. Whole ventral surface and undersides of thighs coarsely granular, rather finer on the throat.

Colour.—Uniform dark brown above, with blackish markings not very well defined, comprising a spot surrounding nostrils, a band between eyes, an irregularly cross-shaped marking behind the eyes, and three indistinct lines along the back, one mid-dorsal, the others dorso-lateral; a faint light stripe on the urostyle; legs finely mottled black and brown above, black and white below, with the three cadmium yellow spots mentioned above, a white spot on the upper side of the foot distal to the cadmium spot, and white tips to the toes; arms mottled in the same way above and below with no conspicuous spots and tips of fingers white. Undersurface blackish grey marbled with white, darker on the throat, with cadmium spots at level of arms, and confluent in front of thighs. In life the frog appeared much darker.

Description of allotype male.—The male does not differ from the female in any important particular. The type has the throat intensely black, and the dorsal black markings more distinct, but these will be discussed under variation.

Measurements.—

		♀	♂
Snout to vent	... 25	mm.	23 mm.
Width of head	... 8	mm.	8 mm.
Width of body	... 12	mm.	10 mm.
Forelimb	... 10	mm.	10 mm.
Hindlimb	... 21	mm.	22 mm.
Tibia	... 7	mm.	7.5 mm.
Knee to knee	... 13.5	mm.	15 mm.

Affinities.—Professor Nicholls in his account of the zoology of South Western Australia published in the Handbook for the Perth meeting of the Australasian Association for the Advancement of Science, 1926, refers this frog to *P. dendyi* Lucas.² The latter was described from Gippsland, Victoria, and from a single specimen which has apparently since been lost, as it is not amongst the *Pseudophryne* in the collection of the National Museum, Melbourne. It may have been a young individual of a large *Pseudophryne* from Gippsland which I have before me, or it may be identical with or allied to a small dark form which I have taken on the north coast of New South Wales, from Port Stephens to Port Macquarie. Whatever it was, it is clearly distinguished from the species under discussion by its smooth belly, and by the yellow mark on the forelimb. A white or yellow mark in this position is of common occurrence amongst species of *Pseudophryne*, but is totally absent in *P. nichollsi*, the very granular belly of which distinguishes it from all other species of the genus.

The status of the species of *Pseudophryne* has been called in question by Andersson.³ Boulenger, in his Catalogue, allowed four species, namely *australis*, *bibronii*, *coriacea*, and *guentheri*, with a note that the second and third "may prove to be mere varieties of *P. australis*." Lucas² described two additional species, *dendyi* and *semimarmorata*, but in "Animals of Australia" (1909), written in collaboration with W. H. Dudley le Souëf, reduces the latter and *P. coriacea* to colour varieties of *P. bibronii*, allowing *P. australis* as distinct. Andersson in his earlier paper, without having seen *P. australis*, writes (p. 18): "Considering only the characteristics which are usually employed for distinguishing species of frogs, I can . . . call them *Ps. australis* quite as well as *Ps. bibronii* . . . The small differences in colour, used by Fletcher as an important characteristic as well, are not much more reliable than 'habits and temperament.' As is well known, the colour of the batrachians varies in a high degree in most species." In the later paper he claims definitely that *P. australis* and *P. bibronii* should be united under the former name, and appears totally unaware that the specimens he is discussing belong to *P. coriacea*. Incidentally he has described two new species of *Pseudophryne*, *P. mjöbergii* and *P. rugosa*, both of which, so far as I am able to judge, are synonymous with *Uperoleia marmorata*, and are not *Pseudophryne* at all.

I have already discussed the relationship between *P. australis* and the typical form of *P. bibronii*,⁴ and shown that they are totally distinct in habitat and life history. Therefore they are not merely colour varieties of a single species, but totally distinct species. If conventional herpetological methods cannot express this distinction, then we are justified in using colour which clearly does express it, since there is no intergrading between the two forms. Similarly *P. coriacea* and *P. semimarmorata* are, in my opinion, both good species, as is the small dark form from the

²Lucas—Proc. Roy. Soc. Victoria (n.s.), iv, 1891 (1892), pp. 62-63.

³Andersson—Kungl. Sv. Vet. Akad. Handl., lii, 4, 1913; lii, 9, 1916.

⁴Harrison—Australian Zoologist, iii, 1, 1922, p. 26

north coast of New South Wales, which may be identical with *P. dendyi*. I have an account of this genus in preparation, so need not discuss the matter at greater length here. The new species I describe is distinguished by a morphological character, the granulated abdomen, as well as by a characteristic coloration, but I should have felt fully justified in founding it upon the latter alone.

Variation.—The series which I personally collected at Pemberton was taken upon a limited area, and does not show any very striking variation, except that which marks the successive growth stages. The smallest individual measures 14 mm. from snout to vent, is very granular—almost papillose—on the ventral surface, and is dense black above and below, except for the four cadmium spots on the abdomen, those in front of the thighs confluent, and the spots of the same colour on the legs. The marbling of the abdomen has not yet commenced. The characteristic dorsal markings are visible, but they show more clearly in individuals of a somewhat larger size, and comprise a black bar between and upon the eyelids, sometimes broken into three spots, and sometimes with an isolated spot in front; a cross-shaped mark formed by two lines of warts running from the back of the eyes to the shoulders of the opposite side; and some obscure lines on the lower half of the back. A very narrow light ventral line is present in some of the younger individuals, which persists in others as a faint coccygeal stripe; while in a few there is a fine light line from above the vent along the backs of the thighs. The marbling of the belly varies between a “pepper and salt” condition and one in which the appearance is that of black confluent blotches upon a white ground. The throat is always darker.

Professor Nicholls’ series indicates that a wider range of variation may be expected when this frog is collected from different localities. The four young individuals are uniform black above and below, with indications of the cadmium spots on the legs. In only one are the breast spots visible to the naked eye, but a lens reveals them in all. The spots in front of the thighs are the last to appear. The smallest of these is 10 mm. from snout to vent, and the largest 12.5 mm. A larger individual 17 mm. in length still has the abdomen completely black except for the two breast spots, but the leg markings are present. The largest specimen 20 mm. in length, has the typical dorsal pattern, a granular “pepper and salt” abdomen, and only a bare indication of the yellow spots.

Habits.—My specimens are from under logs in damp forest country; those of Professor Nicholls from moss in a small creek. The stomachs of two individuals which were opened contained small black ants.

MYOBATRACHUS GOULDI *Guenther.*

A large female of this remarkable species, measuring 48 mm. from snout to vent, was captured by Dr. E. W. Ferguson under a stone on a dry hilltop in the sand plain country at Eradu, east of Geraldton. The stomach was crammed with comminuted termites, mixed with the fine reddish sand of the country. The ovarian follicles were well developed, measuring upwards of 3 mm. in diameter.