A very beautiful species, allied to *S. ciliata*, Hook, from the Eastern Archipelago. On the younger stems the leaves are oblong-spathulate with cilia sub-equally distributed along their ambit. *W. Mitten Musci Austro-Americana, London, 1869, p. 122.*

Hab.—Pimpama, Burpengary, and Ashgrove (C. J. Wild).

Whilst out with the Field Naturalist Section last month, in the vicinity of Enoggera Waterworks, I met with Weisia Pimpamæ, *C. Muell.*; this being a second locality, I think the discovery worthy of note.

ON THE PHALANGISTIDÆ OF THE POST-TERTIARY PERIOD IN QUEENSLAND;

By C. W. De Vis.

Remains of Phalangers are entirely absent from the post-tertiary fossils of Queensland as yet made known. Possibly the arboreal habits of the family were unfavourable to the committal of its relics to drifts entombing those of animals whose haunts were 'flood and field.' For whatever reason bones referrible to this family are almost of the scarcest, and but for the fact that in the search for such fossils there was found a gathering place enriched by agencies of unusal range and efficacy, it would probably not have fallen to the lot of the present writer to submit for recognition the existence of the family at a period earlier than that of the Wellington Caves.

The bones of Phalangistidæ, so far determined, are but a minute fraction, about a nine-hundredth, of the number surrounding them in their present receptacle; yet the small company of nine yields evidence in their diversity of form that the family was even in their day one of long-drawn descent: while from their frequently great size, which rendered their preservation the easier, we may fairly suppose that no small number of feebler species perished without leaving such 'foot-prints on the sands of time.'

The following notes accounting for determinations made at different times, as the fossils presented themselves, are offered as they were written.

Koalemus, a progenitor of the *Koala*.—

The Koala, or Native Bear, is now one of the few types of Australian life which has not been recognised as a part of its ancient economy : yet it is one of which no one could be surprised to find an ancestral form among the past modifications of marsupial structure. Apart from the necessity of supposing that a member so far removed from its tribe has passed through unknown stages of segregation, we are invited by the jungle-loving Crowned Pigeon and Musk Rat to believe that a land clothed, as they tell us, with vegetation of tropical luxuriance was neither powerless to sustain, nor slow to mould, a host of tree-dwellers more numerous and varied than it can do in the comparative barrenness of its latter days, and among them 'Native Bears.' But for a positive trace of such an animal the writer has, until now, waited and searched in vain. The fossil which has at length given the clue required is the end of a long bone, which fortunately happens to be sufficiently characteristic to determine the status of its erstwhile possessor as one closely allied to, but not congeneric with, the recent genus Phascolarctos. This animal it is proposed to distinguish by the name—Koalemus* ingens.

Distal end of left fibula.—

It has been recorded† that the external wall of the epecto-sphyre‡ is in the Wombats impressed by a shallow groove. Of

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* Gr. Koálemos, a stupid fellow. It would be a curious coincidence if the native name Koala were also found to refer, as it well might, to the stupidity of the living animal.

† Owen,

‡ No name has, to the writer's knowledge, been given to the process or part external to the outer malleolus—it is, therefore, to avoid pleonasm, here termed the epectosphyre in relation to the ectosphyre as, for like reason, the outer malleolus may itself be designated.

this groove, it may be observed that it deserves to be added to the several signs of affinity between the Wombats and the Phalangers which have attracted notice from systematists. But in the Phalangistidæ it not merely exists, but is so deeply sunken as to divide the epectosphyre into two angular processes, and confer a characteristic form on this part of the bone—and in none is the peculiarity more emphasized than in the aberrant genus Phascolarctos in which the separated segments are most produced and enlarged.

The ectosphyre in Phascolarctos has a semilunate convex surface, sloping obliquely downwards, backwards, and outwards, and defined exteriorly by a roughened depression occupying the internal half of the epectosphyre—the deepest part of the depression forms a groove between the ectosphyre and the anterior segment of the epectosphyre which is produced downwards into an obtuse trihedral pyramid—the depression extends shallowly across three-fourths of the inner base of the posterior segment, the latter is thus imperfectly separated from the ectosphyre in continuity with which it is obliquely produced—this segment is considerably broader and thicker than its fellow. The shaft is subcylindrical, slightly flattened exteriorily, with the flatter surface separated from the rounder by a feeble ridge descending from the postero-interior end of the edge of the posterior surface where it forms a slight angle—distally the shaft suddenly and widely expands to its junction with the epiphysis. The groove dividing the epectosphye is angularly contracted at its base.

With this the fossil bone has a strong general resemblance in form and arrangement of parts. The following differences seen in Koalemus may be taken as the characters of the genus exhibited in this limited portion of the skeleton. The anterior segment of the epectosphyre produced but very slightly at its anterior angle, forming a roughened triangular plane, impinging by the posterior angle upon the side of the posterior segment. The groove segmenting the epectosphyre is broadly concave at the base. The shaft subquadrate, flattened on the exterior and anterior sides which meet

in a strong angular ridge continued distad to the anterior segment. Expansion of the shaft proximad of the epiphysis very moderate.

The measurements of the articulating head are thrice those yielded by the recent bone in a full-grown animal, those of the shaft nearly four times. Taking the weight of an adult Koala at 20 lbs., that of its extinct precursor may, on the hypothesis of like proportions, be estimated at five-hundred weight or more.

Postcript.—

Since the foregoing notes were written, a fraction of a skull has been met with, which is clearly to be traced to the Phascolarctina as we may now perhaps venture to term this outlying section of the Phalangistidæ, and—unopposed by any obvious objection other than inadequate size, which may, without violence be attributed to youthfulness—must needs be ascribed to Koalemus ingens. It may, indeed, very possibly belong to another species, or even genus ; but, if so, the naming is for those whose merit the discovery may be.

The fossil comprises the premaxillary with its palatal process ; the dentition exhibited includes the sockets of i^1 and i^2, with i^3, c, and a fang of pm^4 in place. The information to be gathered from this is not extensive, yet not altogether without interest. The socket of i^1 is exceedingly large for one of the Phalangistidæ—it is in length more than equal to the combined length of the sockets of i^2 and i^3 and is proportionately wide. Owing to the hardness of the matrix its cavity has not been cleared out, but it evidently extends far back, and causes a bulging of the bone centrad of the nasal process ; at its outlet it is oviform, its narrower end extending centrad of the middle of the socket of i^2, causing here, too, a thickening of the bone, on the ectal side of which is the socket of i^2. This socket indicates a fang about equal in size to that of i^3 ; i^3 is a short, stout columnar tooth, slightly conical near the apex, which is ground down to a small horizontal surface ; it is less procumbent than in Phascolarctos The canine is in form quite unlike, though structurally it is similar to, that of the recent genus —it is a strongly compressed obtuse cone, in outline a nearly

equilateral triangle, with its apex bevelled by two pyramidal faces—one on the caudo-ental side, the other a facet of wear on the rostro-ectal side, separated by an oblique apical edge, as in Phascolarctos. The tooth is relatively much larger than in Phascolarctos, and more carnassial in aspect—at the same time the structure of its apex forbids us to suppose that its functions were in any degree more carnassial than that of the Koala. In the great development of the rostral incisor we may recognise a possible remanet of relationship with Phascolomys.

The length of the fossil to the fang of pm^4 is 43 m.m.—the ordinary distance between the same points is in the Kaola 25 m.m.

Archizonurus* *Securus*—an extinct Phalanger.

The surprise naturally felt on learning that in bye-gone times there were animals in Australia almost as large as any in Africa, America, Europe, or India, is misgrounded. The wonder should be that the living mammals we find here should be as puny as they are, and to explain it we should be intent to discover the cause of the degradation in size which reflection and discovery alike tell us must have taken place. If it be a cause within the remedy of us, the intelligent animals, who seek to thrive in the land by virtue of its supply of nutriment, to apply that remedy, and so restore its pristine ability to sustain even in a wild state, beasts as bulky as those of other regions. Such is the practical reflection once more suggested by a relic of past life, from which it appears that the very 'possums' of old were in size the Bears of the present day.

The fossil, now the subject of study, leaves no room for doubt or misapprehension. It is the distal third of a shoulder blade, in good preservation, distinguished by a large dilated and incrassated coracoid, which firmly denies all relationshp with

* Chief-girdle-tail.

families other than the Phalangistidæ, and even with Phascolarctos, the aberrant genus of that family. As the weight of the animal attested by the fossil is to be reckoned in hundredweights, one could hardly conceive it to belong to that division of the Phalangistidæ, the Petaurists, which are flotant in their leap from tree to tree; it is, however, satisfactory to find in the fossil no inducement on structural grounds to refer it to that division. Archizonurus was, in short, a true Phalanger, as will be seen from the description.

The glenoid fossa is elongate and proportionately narrow. Its anterior or rostral two-fifths relatively broad and but slightly dilated posteriorly—its caudal three-fifths suddenly but very moderately expanding. Its form is thus hardly to be distinguished from that of the Toolah, Phalangista (?) *archeri*, but it differs from this, and, indeed, from the rest of the Phalangers, in not having its rostral edges brought together and produced at the point into a bicipital tubercle; the external edge is on the contrary reflected upon the ectal surface of the bone. The coracoid is a thick oval process attached longitudinally by the greater part of its upper side, but so as to leave free a distinct exterior, and a longer interior end; it is separated from the glenoid fossa by a broad and deep groove, which, in the middle, is interrupted by a strong ridge passing from the middle of the posterior edge of the process to the place of the bicipital tubercle—a well marked groove extending more or less upon the ectal as well as the ental surface adjacent to the root of the process is characteristic of Phalangista and its allied genera—an interrupting ridge is present as a rule, but subject to much variation in its position and direction. Its variability extends to individuals—of ten scapulas of *P. archeri*, no two are alike in this respect. One, however, belonging to this species is sensibly identical with the fossil, and all vary from it less than do the other species and genera (Cuscus, Pseudochirus). The triceps insertion is into a pit within an elongate triangular depression defined by the parted edges of the ectal and ental surfaces, of which the latter is the more prominent—the insertion has therefore the peculiarity of appearing on the ectal instead of on the ental aspect of the bone as usual in the Phalangers.

On the ental aspect the fossil is remarkable for the depth of the depression between the meso-and post-scapular to accommodate doubtless a correspondingly volumnious *subscapularis* or posterior division thereof. In most recent Phalangers this region of the scapula is, if at all, but slightly concave, but in *P. archeri* it constantly presents a deeper concavity. The meso-scapula on this side is in the fossil inordinately concave. On the ectal aspect there is little to excite attention, save an unusual flatness of the region around the insertion of the spine, contrasting with the concavity on either side of it produced by the elevation of the margins in most Phalangers—the fossil in this instance resembles Cuscus ssp. and Phalangista *vulpina* rather than *P. archeri*.

On the whole, the Cuscus-like Phalanger placed in Phalangista as *P. archeri** is evidently the species most retentive of characters impressed on the group by this one of its precursors. The Toolah *P. archeri*, is restricted in its habitat to the warm and rainy scrubs of the north-east coast. It is therefore almost necessary to infer that Archizonurus became extinct through the gradual disappearance of similar conditions in higher latitudes.

The greatest breadth of the glenoid fossa in the fossil is sixfold that of *P. archeri*, its length has nearly the same proportion. *P. archeri* is 310 m.m. in length, sine cauda, and weighs about four pounds. Archizonurus may therefore be estimated to have been about six feet in length and 850 lbs. in weight.

Cuscus *procuscus*.—

The arthral end of a scapula to which this cabinet name has been given, brings us into nearer contemplation of the recent genus Cuscus than was permitted to us by Archizonurus. Size and geological remove are, indeed, the only considerations inimical to its appropriation to that genus, and—though the writer is disposed to give to them overbalancing weight in any case of doubt—without

* The affinity of the Toolah with Cuscus is seen not only in the quality of its fur, but in the sculpture of its molar surfaces—it is in fact a subgenus of Cuscus.

sufficient reason to doubt on structural grounds, he cannot presume to traverse the practice of high authorities.

On testing the present fragment by comparison with the scapulas of most of the modern Phalangers, it is found to approach nearest and, indeed, very near to C scus *orientalis*, a result not without significance. From resemblance in the few points of mere specific differentiation which so small a part of the skeleton is able to yield, it would, of course, be rash to adduce the degree of affinity indicated by them is proof of a hypothesis to be pleaded, yet the indications, such as they are, may be permitted to suggest that the zoological community between the home of *C. orientalis* (the New Hebrides), New Zealand and Queensland, which has already been traced on the surface, may eventually be traced below it.

The form of the glenoid fossa of this—a right scapula—is reproduced in that of C. orientalis, but with a little less expansion and concavity for the head of the humerus. The fossil has its bicipital tubercle well developed. The coracoid process is imperfect, having lost both the free angle of its ecto-rostral end and the extended portion of its ento-caudal termination. The continuity of the sulcus separating it from the glenoid fossa is not broken by a distinct connecting ridge—the entire absence of such being also a peculiarity in *C. orientalis*. On the ental side of the base of the process is a large irregular cavity for insertion of ligament; no distinct remains of this excavation have been seen by the writer in recent Phalangers, except in the New Hebridean Cuscus in which it appears as a small but obvious fossa amidst a little roughness of the adjacent surface. In its passage towards the ectal side of the bone the groove is limited caudad by a sharp edge continued from the ental margin of the glenoid fossa rostrad of the bicipital tubercle—reaching the ectal surface it expands upon it and forms a deep well-defined rounded depression, better retained in *C. orientalis* than in other Phalangers.

The size of the animal revealed by this fossil was much the same as that of Archizonurus.

Pseudochirus *(?) notabilis.*—

In a maxillary containing the premolar $\underline{pm^4}$ with three succeeding molars there is transmitted a well-kept record of another type of Phalanger. The premolar is a distinctly bicuspidate tooth, consisting of an anterior subpyramidal and a posterior conical cusp, united by a narrow mesial linking ridge; a deep valley on either side of the ridge is closed on the ectal side by a raised basal rim, on the ental by a cingulum passing from the ental side of one cusp to the other, divided by a notch nearly opposite the entrance of the valley, and enclosing a dilated basal area on that side of the tooth. The general form of this premolar is recognisable in that of Phalangista, and in the atttitude of the two there is about the same degree of obliquity; but for a decidely near approach to the fossil tooth the writer sought in vain among the Phalangers, until, turning out the contents of a lady's reticule, brought from the Fly River, New Guinea, he found a part of a skull of a young Cuscus, with the deciduous premolar in place. With differential details, this tooth is so similar to that of the fossil that both might well be referred to the same genus, but inspection of the molars of the fossil at once advises us of the danger of deducing such affinity from a single tooth, in this instance at least. From Cuscus and Phalangista alike they lead away—proximately to Pseudochirus and Petaurista—ultimately to Phascolarctos. In these genera the same leading characters are exhibited by the molar surfaces—in all we note the ectal edge of the series, as supinated to view, much the higher, its central line concave, each lobe traversed by concentric folds of enamel—the outermost fold forming serially the edge of a line of depressions on the summit or side of the ectal margin—the innermost edging a lower line of hollows more or less distinct. In Phascolarctos both rows of pits are so pronounced as to give a peculiar facies to the teeth—the ectal row runs along the summit of the cusps, the central folds are well nigh aborted. In Petaurista the outer fold being near the edge, the pit is converted into a lateral indentation of the summit—the central folds are few. In Pseudochirus (*lemuroides*, *mongan*, *caudivolvulus*) the marginal indents are similar—the central folds more numerous. In Petaurista and

Pseudochirus the marginal indents are each more or less closed below by an interrupted outer cingulum forming a line of denticles upon the base.

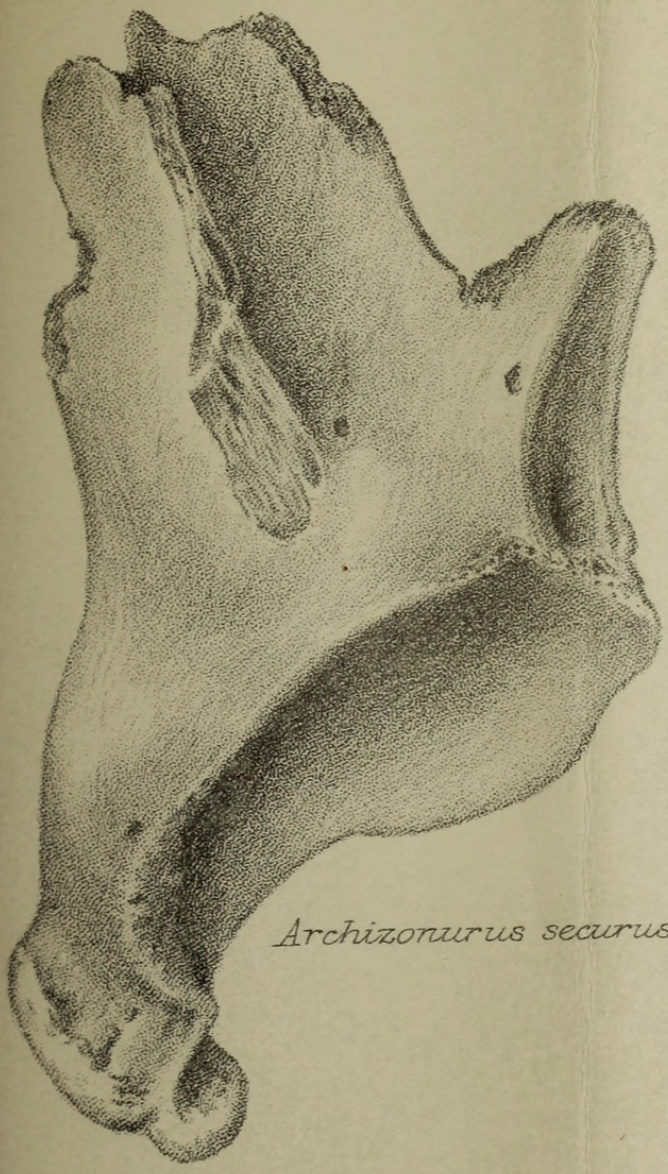
The teeth of the present fossil have the rows of depressions as distinct semicircular pits—those of the outer series deep infundibuliform excavations of the margin opening upon the summits of the cusps to an extent which gives on the whole the facies of Phascolarctos rather than that of recent Phalangers, but not as in Phascolarctos limited externally by a continuous lateral edge. The mesial folds of enamel are two in number and well marked.

The writer, wishful to avoid the evil of an unnecessary genus, has sought to reconcile these teeth with those of one or other of the ptychodont Phalangers, but seeing how much further they are removed from all recent generic modifications known to him than those are one from another, he is almost fain to admit their claim to a higher than specific rank. The claim, however, will be better considered by some later observer with fuller materials before him. Provisionally the fossil is referred to Pseudochirus as the most likely among living genera to have been transmitted through it, but at the same time a possible affinity with Cuscus on the one hand, and even Phascolarctos on the other, is not to be altogether ignored.

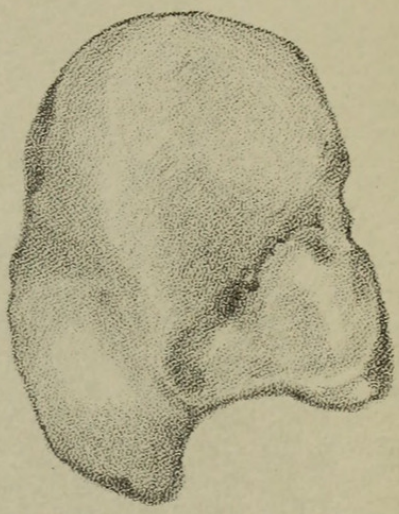
As to size, the extinct Pseudochirus in view was as large as a Koala (Phascolarctos) and would consequently weigh about 20 lbs. The recent species are comparatively small.

Phalangista *sp.*—

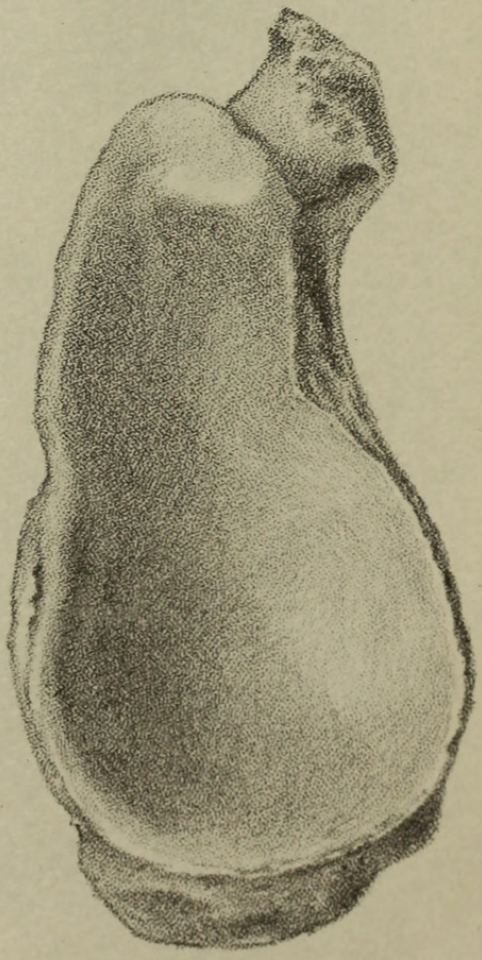
A penultimate lower molar in its segment of the jaw offers no means of distinguishing it from the corresponding tooth in *P. vulpina*. Until better instructed, we cannot, however, admit this unique claim of the common 'possum to the honours of high antiquity.



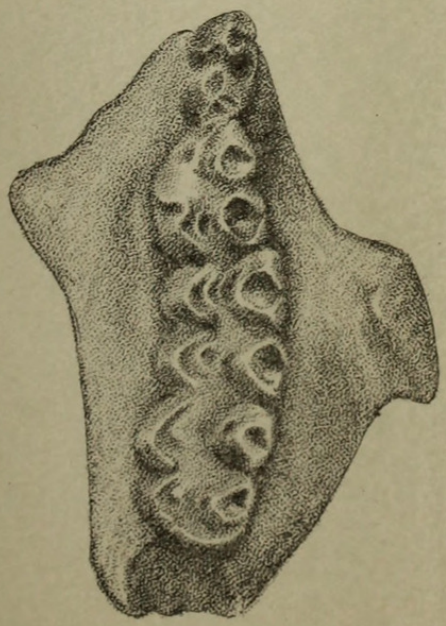
Archizonurus securus



Koalemus ingens



Cuscus procuscus



Pseudochirus notabilis
(Twice Nat. size)

C. Edmonds del. et luth.