PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

Additional Evidence of the Affinities of the Extinct Marsupial Quadruped Thylacoleo carnifex (Owen)

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PHILOSOPHICAL TRANSACTIONS.

I. *Additional Evidence of the Affinities of the Extinct Marsupial Quadruped* Thylacoleo carnifex (Owen).

By Sir Richard Owen, *K.C.B., F.R.S., &c.*

Received October 5,—Read November 25, 1886.

[Plate 1.]

Since the first indication of a large extinct Carnivore by a tooth obtained by Major Sir T. L. Mitchell in the cavern discovered by him in Wellington Valley, Australia,* fossil remains from that and other localities of the same Continent have been successively transmitted to me, which I have referred to the extinct genus and species *Thylacoleo carnifex*. Papers descriptive of these fossils have been admitted in the 'Philosophical Transactions,' and their value has been enhanced by the comments they have excited in the works of contemporary palæontologists.† These eminent authors received the support, in reference to objections to my conclusions, of the (then) Curator of the Australian Museum, Sydney, Mr. Gerard Krefft, who, in his contribution to the 'Annals and Magazine of Natural History,' series 3, vol. 18, 1866, p. 148, records his opinion that "the famous marsupial Lion was not much more carnivorous than the Phalangers of the present time."

* 'Three Expeditions into the Interior of Eastern Australia,' 8vo., 1838, vol. 2, p. 359, plate 32, figs. 10, 11.

† Falconer, Dr. Hugh, F.R.S.: 'Proceedings of the Geological Society of London' for March, 1857; 'Quarterly Journal' of the Society, June, 1862, p. 353; 'Palæontological Memoirs and Notes,' 8vo., 1868, vol. 2, p. 437. Professor Boyd Dawkins, F.R.S.: 'Quarterly Journal of the Geological Society of London,' vol. 20, 1864, p. 412. Professor W. H. Flower, F.R.S., 'On the Affinities and probable Habits of the extinct Australian Marsupial *Thylacoleo carnifex*, Owen'; 'Quarterly Journal of the Geological Society of London,' vol. 24, 1868, p. 307.

The species of carnivorous Phalanger is not named. No evidence of such by fossil specimens has reached me, nor have I found such exceptional habit of an existing species of *Phalangista* elsewhere noted.

As the palæontogical survivors of Dr. FALCONER and Mr. KREFFT have not signified any opinion of the fossil evidences, more or less fragmentary, of *Thylacoleo* discovered subsequently to the papers above cited, I deem it due to them to make known the most complete and instructive example of the mandibular and dental structures of the mooted species which have yet reached me.

The subject of the annexed drawings (Plate 1) is the right "ramus" of the lower jaw, which was extricated in the present year (1886) from breccia of the Wellington Valley cave. A careful cast of this specimen has been transmitted to me by G. P. RAMSAY, F.L.S., successor to Mr. KREFFT, and present Keeper of the Australian Museum of Natural History, Sydney, New South Wales, together with the three drawings of the original specimen, natural size, herewith annexed.

The dentition of this specimen closely repeats the characters of the mandibular teeth described and figured in fragmentary specimens.* The additional characters, which I interpret as decisive of the carnassial nature of *Thylacoleo*, are those of the hinder end of the lower jaw, including the articular process. This part is a "condyle" transversely extended, antero-posteriorly convex, as in both Lion and Tiger. The angle, *a*, of the ramus is bent inwards as in other Marsupials, including the smaller existing pouched Carnivores. In *Thylacoleo*, to add to the force of the biting actions of the mandible, a subsidiary ridge ending in the process, figs. 1 and 3, *b*, is developed from the outer side of the broad angle of the jaw; the homologue of this ridge and process, wanting in placental *Carnivora*, is developed in the largest of the existing marsupial ones, *e.g.*, *Thylacinus cynocephalus*. The coronoid process of the mandible in *Thylacoleo* (figs. 1–3, *d*) rises high above the condyle, and broadens antero-posteriorly as in the feline placental Carnivores. The entry of the dental canal is shown at *e*, fig. 2; the exit at *f*, fig. 1.

As the figures in Plate 1 are of the natural size, descriptive dimensions are omitted.

What to me is of most interest in this decisively instructive fossil are the evidences of carnivorous modifications superinduced upon the primitive, and at present prevailing, *diprotodont* marsupial type. In the mandible of the vegetarian kangaroo (*Macropus*) the incisive part of the dental series is represented, as in *Thylacoleo*, by a single pair of large incisors; but these, as in the allied genera *Dendrolagus*, *Bettongia*, *Hypsiprymnus*, are procumbent, depressed instead of compressed, having a smooth flattened upper surface with lateral margins, instead of the sharp-pointed and hinder trenchant border of the corresponding tooth of *Thylacoleo*.

The tooth answering to the trenchant carnassial premolar (figs. 1 and 2, p. 4) in *Thylacoleo* has also the largest crown of the molar series in the above-cited gramini-vorous Marsupials, but in them the margin of the crown is broken by notches in which

* See 'Phil. Trans.,' 1871, p. 238, Plate 13, fig. 1, and Plate 14.

as many vertical grooves on the side of the crown terminate. Moreover, the so modified premolar is followed in the vegetarian Diprotodonts by four broad-crowned bruising teeth, instead of the suddenly reduced couple of conical molars (*m*, 1 and 2, figs. 1 and 2, Plate 1) by which *Thylacoleo* resembles the placental Leonines. I view with interest the engrafting of a carnivorous modification upon a marsupial type of teeth and bone in a species equal as to size and force to grapple with and slay its ancient vegetarian contemporaries—the greater herbivorous Diprotodonts and Nototheriums, the large, now extinct, Kangaroos, *Sthenurus*, *Protemnodon*, and the huge extinct Wombats (*Phascolonus*)—types of pouched mammalian families, surpassing in bulk any of the allied still existing species.

The picture of mammalian life in the Australian continent paralleled, of old, that still manifested in Asia and Africa: huge herbivorous quadrupeds were kept in check by large and powerful carnivorous ones, but both were represented by species of a lower grade of organisation; and the inferior cerebral development of the *Marsupialia* may be taken into account when we attribute to the advent in Australia of the Bimanous race the extirpation of the beasts affording the greatest quantity of animal food, and the consequent reduction of the pouched families to such smaller existing species as are still able to escape by concealment in burrows, trees, and brush forests.

Addendum.

(Added 22nd December, 1886.)

Since communicating the foregoing Paper, I have received from George Frederic Bennett, Esq., Corresponding Member of the London Zoological Society, a large portion of a mandible of *Thylacoleo carnifex*, discovered in the post-pliocene bed of King's Creek, Toowoomba, Queensland, Australia; it is in the same semi-fossilised condition as the Diprotodont remains from that locality.

The specimen may be seen, together with the cast of the entire mandibular ramus from the Wellington Valley Cave, New South Wales, in the Geological Department of the British Museum of Natural History, Cromwell Road.

R. O.

Description of the Plate.

Fig. 1. Mandible of *Thylacoleo carnifex*, nat. size, outside view.
Fig. 2. Mandible of *Thylacoleo carnifex*, nat. size, inside view.
Fig. 3. Hind end of mandibular ramus of *Thylacoleo carnifex*, nat. size.

(References to parts in these figures are explained in the text.)

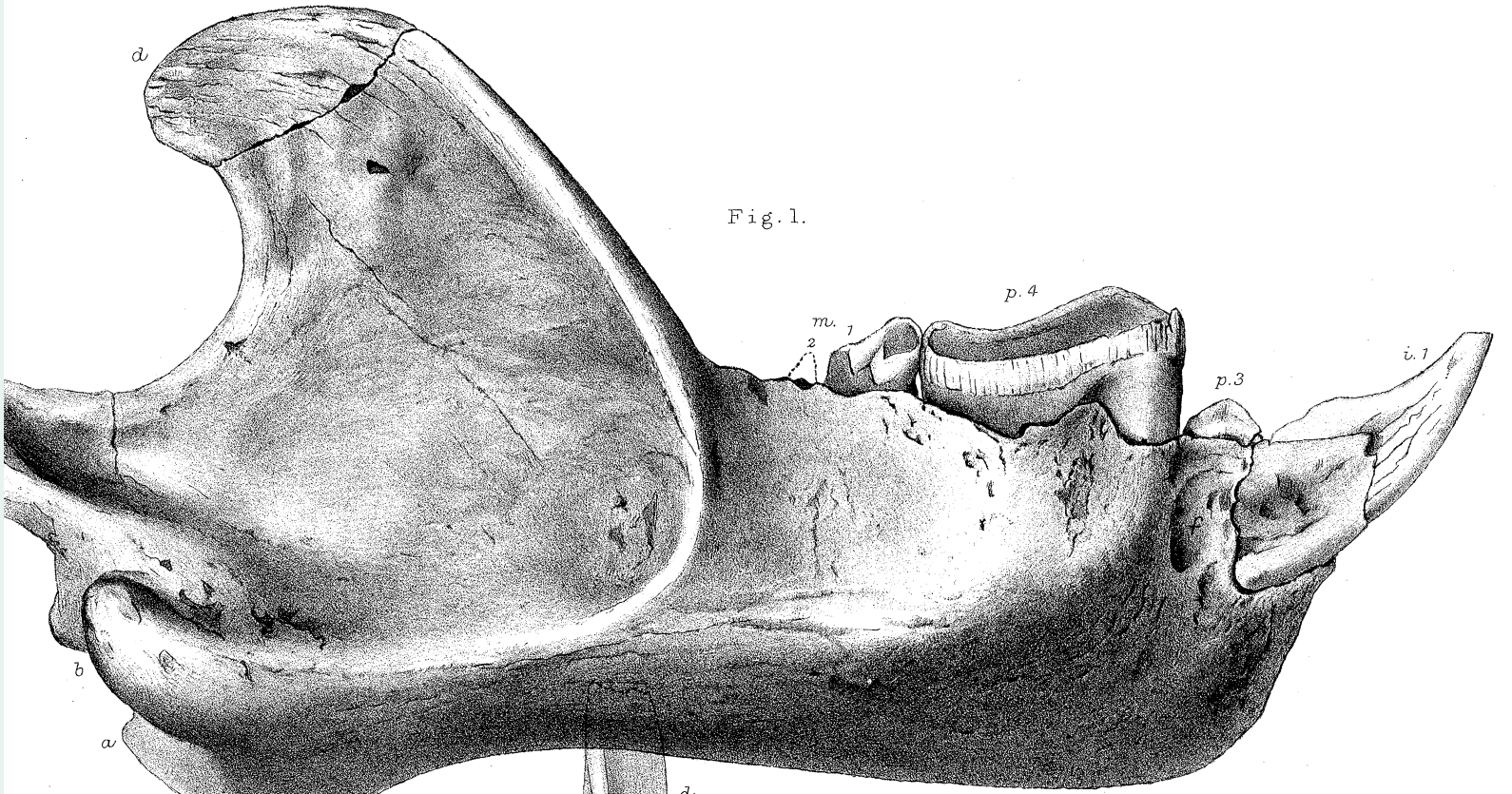

Fig. 1.

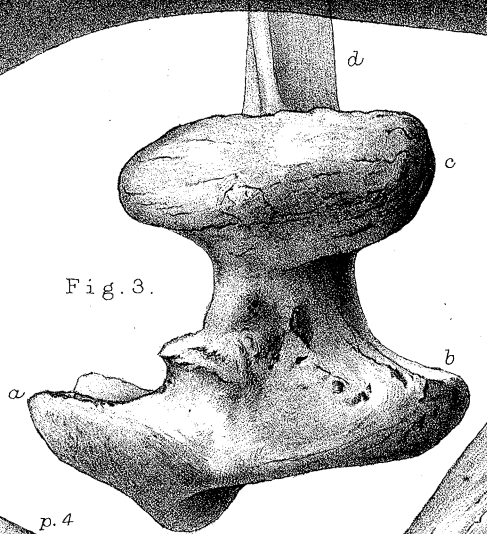

Fig. 3.

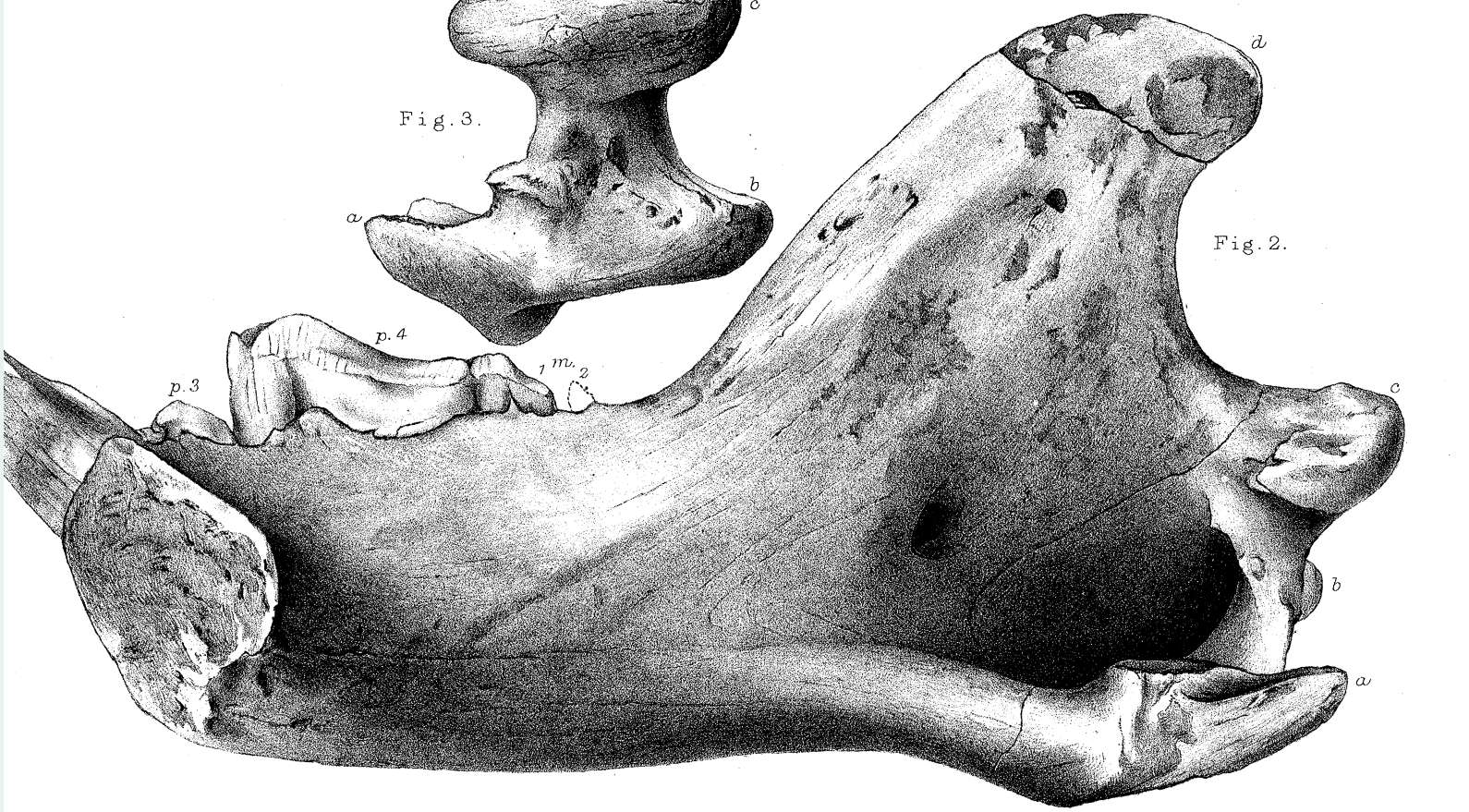

Fig. 2.

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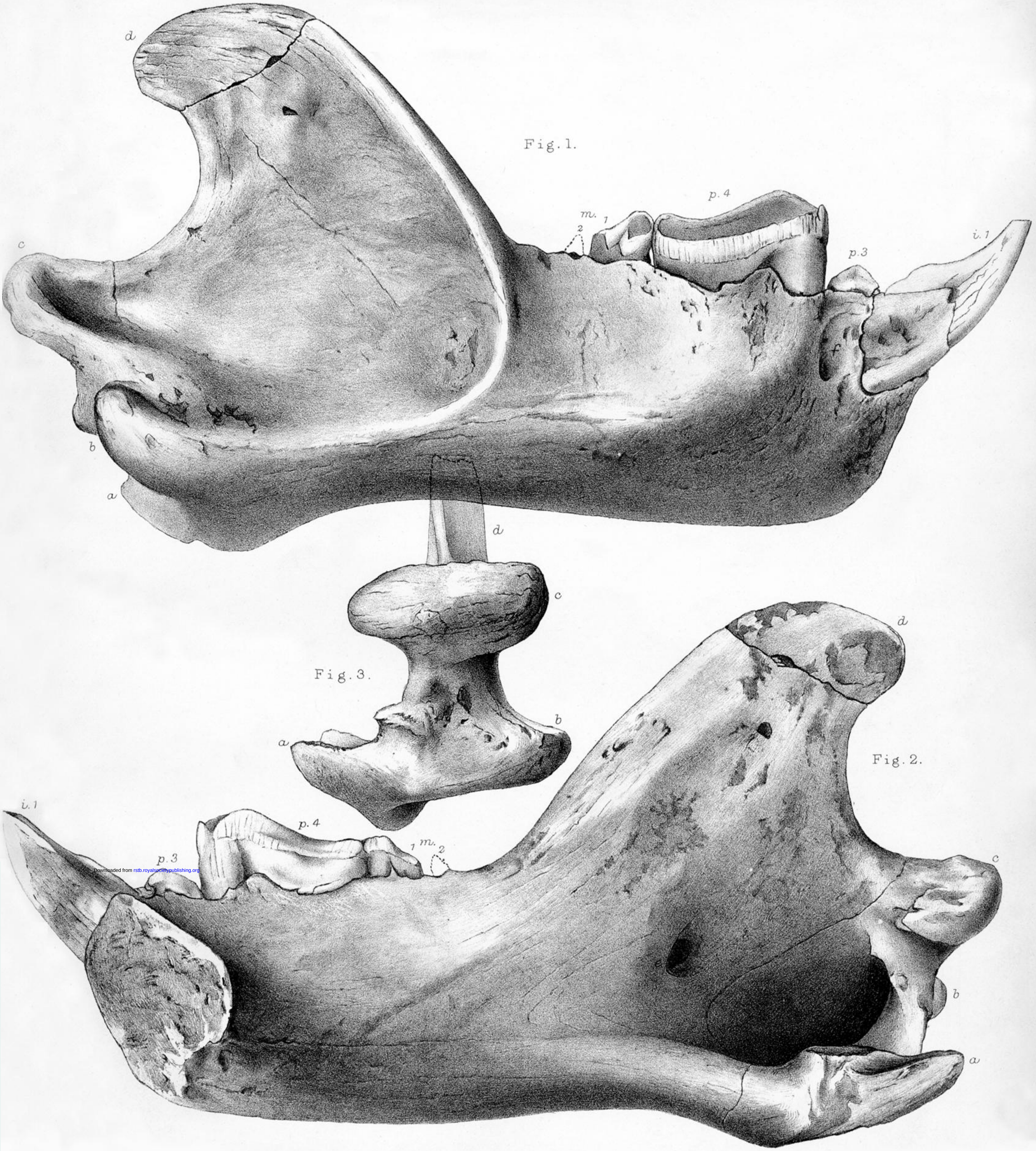
C.H.Barrow, del.
W.H.Wesley, lith.

West, Newman & Co. imp.



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