

# HARPAGORNIS ASSIMILIS HAAST, 1874, A SYNONYM OF HARPAGORNIS MOOREI HAAST, 1872 (AVES: ACCIPITRIDAE)

R.N. HOLDAWAY

Department of Zoology, University of Canterbury, Christchurch 1, New Zealand.

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## ABSTRACT

Holdaway, R.N. (1990). *Harpagornis assimilis* Haast, 1874, a synonym of *Harpagornis moorei* Haast, 1872 (Aves: Accipitridae). *New Zealand Natural Sciences* 17: 39-47.

The taxonomic status of *Harpagornis assimilis* Haast, 1874 (Aves: Accipitridae) is discussed in relation to the characters supposedly separating it from *Harpagornis moorei* Haast, 1872. Length measurements of the pooled sample of specimens from both nominal taxa had a size-independent variability similar to that in the living harpy eagle *Harpia harpyja*, whose bone lengths approach that of the smallest New Zealand material, and which is sexually size dimorphic. This suggests that *Harpagornis assimilis* was based on the smaller sex of a single, sexually size-dimorphic species. *Harpagornis assimilis* is therefore a junior synonym of *H. moorei*.

KEYWORDS: Accipitridae - New Zealand - fossil - taxonomy - *Harpagornis moorei* - morphometrics.

## INTRODUCTION

Haast (1874) proposed the name *Harpagornis assimilis* for the smaller of two partial skeletons of eagles found in swamp deposits at Glenmark, North Canterbury, New Zealand. In his description, he stated that it differed from *Harpagornis moorei* Haast, 1872, only in being somewhat smaller. He pointed out that the type specimens of both taxa were from adult birds and that the minor differences in morphology between comparable bones from the two type series were individual differences "of no specific value". Haast was aware that there is often pronounced sexual size dimorphism in accipitrids, and suggested that the smaller bird was just the male of *Harpagornis moorei*. But he had little material, and "as I am not able to settle this point at present, I shall propose for the second and smaller specimen the specific name of *H. assimilis*, in order to point out the close relationship of both". *Harpagornis assimilis* has been accepted or rejected as a valid taxon by various workers since Haast, but none of these has presented evidence in support of their views. Owen (1879) did not mention that the smaller bird had been given a separate name, and he included descrip-

tions and illustrations of both nominal taxa in his memoir. Lydekker (1891) listed *H. assimilis* as a synonym of *H. moorei* but with a query. Hamilton (1893) listed most of the material known at the time, separating that referred to each nominal species. Lambrecht (1933) listed *H. assimilis* as a synonym of *H. moorei*, but then gave dimensions for both, including separate ranges for the humerus, ulna, radius, femur, tibiotarsus, and tarsometatarsus. Oliver (1930, 1955) recognised both species, listing their bone lengths and geographic ranges separately.

Scarlett (1972) gave ranges of dimensions for six elements (femur, tibiotarsus, tarsometatarsus, humerus, ulna, radius) and illustrated these and five others (coracoid, scapula, sternum, carpo-metacarpus, and unguis phalanx). He noted that "*H. assimilis* [was] a name we now regard as a synonym for *moorei*". The current New Zealand Checklist (Kinsky 1970) also states definitely that *H. assimilis* was simply the male of *H. moorei*.

Important avian bone deposits excavated in the Honeycomb Hill series of caves in northwest Nelson include the remains of more than 10 eagles (Millener 1984, Worthy 1987, Worthy & Mildenhall 1989). These and other recent finds

provide sufficient material to allow the taxonomic status of *H. assimilis* to be resolved. Haast's description of *H. assimilis* as a smaller species than *H. moorei* leads to the prediction that the dimensions of eagle bones from New Zealand subfossil sites should fall into two size ranges, with the type series of each species falling within the appropriate range. The size distributions should be mutually exclusive, or at least display much greater variability than that for existing species of large eagle. As most members of the Accipitridae are sexually size dimorphic (Brown & Amadon 1968), it is possible that morphometric differences between two taxa where the female of the smaller species was about the same size as the male of the larger would be largely obscured by the overlap of dimensions. This is unlikely in the present instance because there is no other instance of sympatry between extremely large, closely related accipitrids, and there are no morphological differences between the type material of *H. assimilis* and *H. moorei* (author's unpublished data).

Therefore, Haast's suggestion that there may have been two sympatric species, a suggestion set in taxonomic concrete by his publication of the name *H. assimilis*, cannot be supported if the variability within the pooled sample from both nominal species does not exceed that for a living species of similar size (Cracraft 1976). If the distributions were discrete, but monomodal, it would suggest that two monomorphic species were represented: size monomorphy is highly unusual in the large eagles.

Conversely, Haast's counter proposal that the smaller taxon represents the other sex in a sexually size-dimorphic *H. moorei* can be rejected if the size distributions for the major bones are monomodal.

Practically, *Harpagornis assimilis* cannot be supported if the range, and variability independent of size (measured by the coefficient of variation) for all dimensions of specimens assigned to both nominal taxa are commensurate with those from living species of large accipitrids, and the variability is much less than that between living taxa. The harpy eagle (*Harpia harpyja*) was used for comparison because, although it is not phylogenetically close to the genus *Harpagornis* (author's unpublished data), it is the largest

living eagle.

Evidence for broad sympatry of the nominal taxa would also strongly favour rejection of *H. assimilis*.

In this note, I present measurements and basic statistics for the major axial and appendicular bones attributed to both nominal species. The relative geographic distribution of specimens assigned to both nominal species is evaluated. Size distributions for all major elements are described, and the validity of *Harpagornis assimilis* Haast, 1874 is discussed. The evidence for sexual size dimorphism within *H. moorei* is also assessed.

## MATERIALS AND METHODS

I measured all major elements of the axial and appendicular skeleton of specimens attributed to both nominal taxa, which were complete enough for meaningful measurement. Measurements were made with vernier calipers, to the nearest 0.1 mm. Many otherwise intact bones were worn on their articular surfaces, so lengths are minimal values in many instances. The length was usually underestimated by less than 2 mm, which is less than 1% for many of the long bones. The magnitude of the discrepancy was insufficient to affect the conclusions reached here.

Material was measured in the collections of Canterbury Museum (CMNZ, Christchurch), National Museum of New Zealand (NMNZ, Wellington), Otago Museum (OMNZ, Dunedin), and the Palaeontology Department, British Museum (Natural History) (BMNH, London). These four collections contain most of the known material. One measurement, the width of a furculum held in the Southland Museum (SMNZ, Invercargill), was not made personally.

Where elements from both sides of an individual from one site were available, the measurement of the left side element was used unless it was too badly worn. Mean lengths of left and right elements for single individuals were not used because only a few individuals were recognisable, and in those the different sides usually differed by less than 1%.

I tabulated basic statistics (mean, standard deviation, range, and coefficient of variation

(CV)) for bone lengths (and width for the furculum), and constructed frequency dot-diagrams of lengths. Frequency histograms were not used because the small sample sizes resulted in marked size-class-dependent effects on the shapes of the distributions. Lengths were considered adequate measures of individual size for this analysis; a detailed analysis of morphometrics will be given elsewhere.

The descriptive statistics and dot diagrams were examined to see if the overall variability was greater than expected for a single taxon, and for evidence of sexual size dimorphism. The range and CV for each element were also compared with data from specimens of *Harpia harpyja*, the extant harpy eagle of Central and South America, in the collections of the British Museum (Natural History), Tring (BMNH), and the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (NMNH). A list of specimens used for this study is given in Appendix I.

Site records for each taxon were tabulated, and compared to assess the extent of sympatry. Material collected after 1955 has been referred to *Harpagornis moorei*; the distribution data for this material was not used in this analysis.

## RESULTS

The measurements by which Haast differentiated *Harpagornis moorei* and *H. assimilis* (Haast 1874) are given in Table 1, along with my own measurements of his material. Measurements of bones which Haast (1874) attributed to *H. moorei*, but which are not part of the type series, are also given. Hamilton (1893) summarised the collections available in the early 1890s; his measurements (Table 1) demonstrate that some shrinkage occurred during the first years of storage. Such shrinkage is normal in bones recovered from swamps. Although neither Haast nor Hamilton stated explicitly his measurement landmarks, the three sets agree well and observer bias was considered not to be a significant factor in this study.

When Hamilton (1893) remeasured the type material in the Canterbury Museum, (including the second, non-type, series of *H. moorei* from Glenmark) and compared them with Haast's, he

Table 1. Lengths of major limb bones from the type series of *Harpagornis moorei* Haast, 1872, and *Harpagornis assimilis* Haast, 1874, and from material referred to *Harpagornis moorei* by Haast (1874). Metric equivalents (mm) of original Imperial measurements (inches) in square brackets. + indicates minimal measurement because of wear on bone. - indicates none available.

Element and authority	Nominal taxon	
	<i>H. moorei</i>	<i>H. assimilis</i>
<b>Femur</b>		
Haast	169.2 (6.66)	154.7 (6.09)
Hamilton <sup>1</sup>	(166) <sup>2</sup>	155
Present	166.9	153.3, 154.5
<b>Tibiotarsus</b>		
Haast	241.8 (9.52)	226.6 (8.92)
Hamilton	236, 239	227
Present	239.8+, 242.1	219+, 219+
<b>Tarsometatarsus</b>		
Haast	154.4 (6.08)	149.1 (5.87)
Hamilton	155	148
Present	154.8, 153.6	147.6, 147.7
<b>Humerus</b>		
Haast	-	217.7 (8.57)
Hamilton		216
Present		216.4
<b>Ulna</b>		
Haast	255.5 (10.06)	237.5 (9.35)
Hamilton	250, 250	232, 235
Present	254.4+	231.2, 236.1
<b>Carpometacarpus</b>		
Haast		113.8 (4.48)
Hamilton		113
Present		113.1+

<sup>1</sup> Hamilton (1893).

<sup>2</sup> not measured by Hamilton but quoted by him as conversion from Haast's (Imperial) measurement.

miscalculated the conversions from inches to millimetres. For example, he converted Haast's 4.48 inches for the carpometacarpus length to 105 mm, not 113.8 mm. He concluded that Haast's measurements were inaccurate, but his own measurement of 113 mm for that same bone agrees well with Haast's, as does his 155 mm for the *H. assimilis* femur, and the other bones as well.

Summary statistics for the lengths of princi-

pal bones referred to both nominal species are given in Table 2, and for four skeletons of *Harpia harpyja* in Table 3. The coefficients of variation (size-independent measures of variation, Sokal & Rohlf 1979) for *Harpagornis* were less than, or equal to, those for *Harpia harpyja*. The mean CV for *Harpagornis* was 6.72% (range 4.14-10.71%), just over one-third of that for all bone dimensions in a between-species analysis of 13 species of large accipitrids (17.63%, range 9.27-26.84%; author's unpub. data). Therefore, the size-independent variation in the lengths of the main bones in the pooled samples of the nominal taxa *H. moorei* and *H. assimilis* was about the same as that in a living species of sexually size-dimorphic accipitrids and far less than that expected between species in the Accipitridae. The variability values indicate that only one species was represented in the sample.

This was confirmed by inspection of the frequency dot-diagrams of size distribution for the various bones (Fig. 1). Measurements of the type series specimens of both taxa, and of the material that Haast (1874) referred to *H. moorei*,

Table 2. Measurements (mm) and descriptive statistics for the lengths (width for furculum) of the principal axial and appendicular bones of skeleton of *Harpagornis moorei* Haast, 1872 and *Harpagornis assimilis* Haast, 1874.

Element	Mean	Range	SD	SE <sub>x</sub>	CV	n
<b>Non-paired elements</b>						
Cranium +						
premaxilla	159.63	151.2-166.9	6.61	2.204	4.14	9
Mandible	122.68	116.0-130.8	5.55	1.961	4.52	8
Furculum	101.85	95.3-110.0	6.73	2.749	6.61	6
Sternum	153.22	140.3-167.2	12.48	5.583	8.15	5
Pelvis	177.26	157.0-197.5	14.92	5.641	8.42	7
<b>Paired elements</b>						
Scapula	127.48	116.7-142.3	9.39	3.831	7.36	6
Coracoid	94.10	78.1-106.6	10.08	3.187	10.71	10
Humerus	230.58	208.0-256.0	14.51	3.520	6.29	17
Ulna	254.48	228.1-281.5	16.51	3.892	6.49	18
Radius	235.58	211.7-263.5	16.66	4.809	7.07	12
Carpometacarpus	117.21	105.5-131.4	8.65	2.234	7.38	15
Femur	162.82	140.3-175.8	10.91	2.728	6.70	16
Tibiotarsus	235.68	213.1-255.1	13.23	3.819	5.61	12
Tarsometatarsus	148.56	131.5-164.9	8.70	1.898	5.86	21

Table 3. Measurements (mm) and descriptive statistics for lengths (width for furculum) of the major axial and appendicular bones of *Harpia harpyja*.

Element	Mean	Range	SD	SE <sub>x</sub>	CV	n
<b>Non-paired elements</b>						
Cranium +						
premaxilla	118.5	109.3-127.2	8.96	4.482	7.57	4
Mandible	85.6	79.5-92.8	6.31	3.156	7.37	4
Furculum	70.5	59.6-80.5	9.87	4.936	14.00	4
Sternum	128.7	117.3-135.4	9.45	4.727	7.35	4
Pelvis	133.3	119.7-147.4	13.00	6.502	9.76	4
<b>Paired elements</b>						
Scapula	102.6	94.4-111.7	7.85	3.927	7.66	4
Coracoid	75.7	69.3-82.9	6.16	3.079	8.14	4
Humerus	183.1	164.0-204.7	18.07	9.034	9.87	4
Ulna	215.3	187.5-229.0	25.84	12.920	12.00	4
Carpometacarpus	96.2	87.4-106.8	8.90	4.452	9.26	4
Femur	120.5	112.1-129.7	7.20	3.602	5.98	4
Tibiotarsus	173.6	155.5-192.3	17.08	8.542	9.84	4
Tarsometatarsus	109.3	101.3-117.8	7.53	3.763	6.88	4

fell well within the limits of the range for the whole sample.

Although the sample sizes were small, a trend towards bimodality was discernible in some of the distributions (Fig. 1A, B, C, D, L, M). The distributions for two indicators of body size, total head length (Fig. 1A) and femur length (Fig. 1L), were divided at subjectively assessed cut-points (groups indicated by horizontal lines in Fig. 1), and these a posteriori groups differed significantly (Student's *t*, unequal variances: head length,  $t=10.907$ ,  $P<0.001$ ); femur length,  $t=6.799$ ,  $P<0.001$ ). The observed trend and these differences suggested that the parent population contained two size classes which, judging from the continuity of most size distributions, overlapped. This suggested that the parent population was sexually dimorphic in size. Which was the larger sex could not be determined from the data presented here; it is usual in most members of the Accipitridae for the female to be larger, but in the Old World vultures, the male is larger (Brown & Amadon 1968).

The geographical distribution of the two nominal species as listed by Oliver (1955), the last worker to recognise both taxa, is summarised in Table 4. The type specimens for both

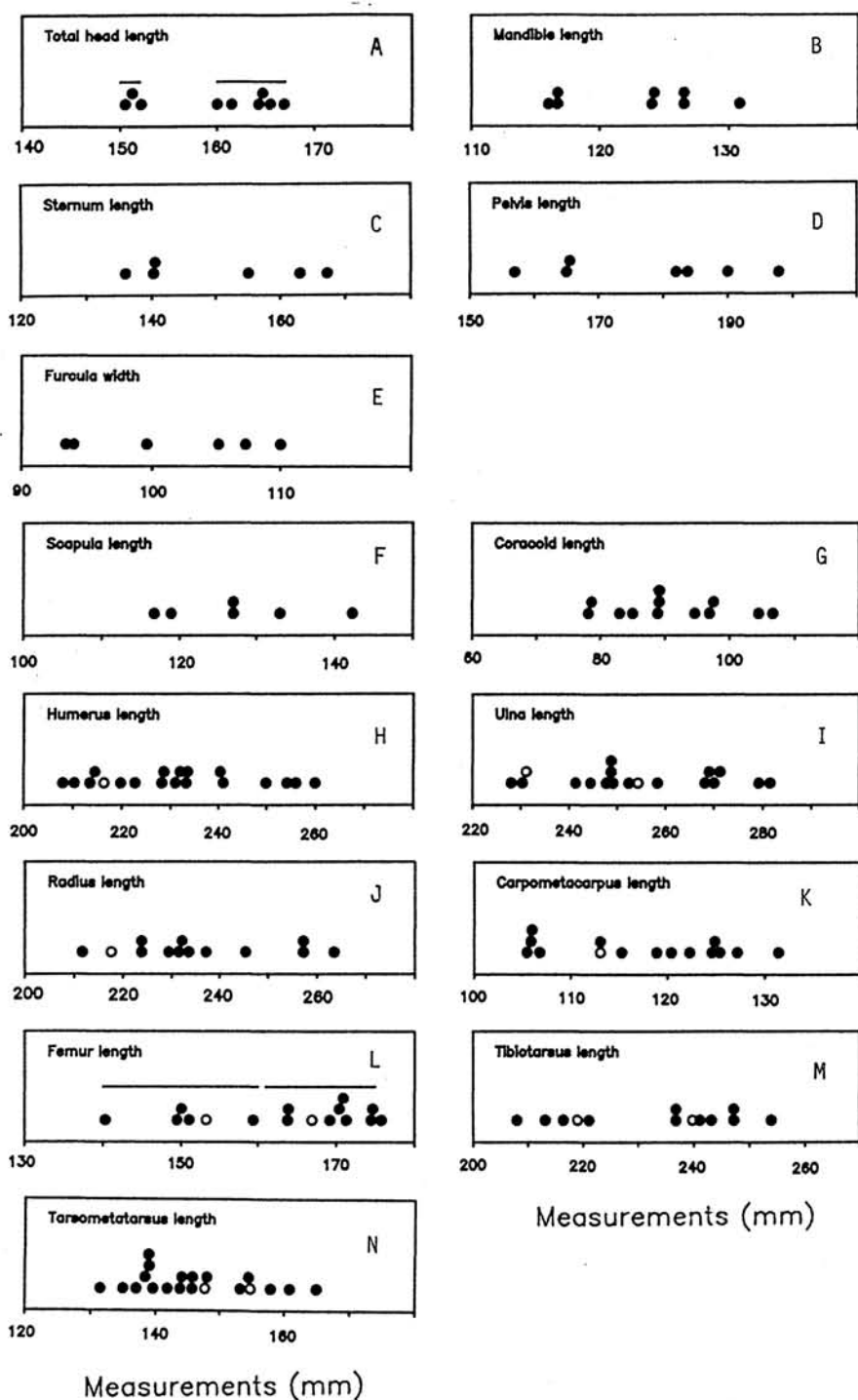


Figure 1. Dot distribution diagrams of lengths or width (mm) of major axial and appendicular bones referred to *Harpagomis moorei* and *H. assimilis*. Lengths are total lengths, taken over maximum extremities. Note different scales. Horizontal lines denote a priori groups used in statistical tests (see text). Open circles denote values for type material for the two nominal species.

Table 4. Localities from which bones attributed to *Harpagornis moorei* and *Harpagornis assimilis* have been recovered, as listed in Oliver (1955), the last publication to discriminate the distributions. Note that this is not (and is not intended to be) a complete list of localities for *Harpagornis moorei*: not only have several new localities been discovered since Oliver's work, material had been collected from other sites before then but was either unrecognised in collections, or Oliver did not locate the specimens. \* = sites from which only a single bone has been recovered.

Site	<i>H. moorei</i>	<i>H. assimilis</i>
<b>North Island</b>		
Te Aute	x	
Waingongoro <sup>1</sup>		*
<b>South Island</b>		
Wairau Bar	x	
Lake Grassmere	x	x
Pyramid Valley	x	x
Banks Peninsula	*	
Glenmark	x	x
Motunau		*
Enfield	x	
Kapua		*
Dunstan	*	
Hamilton Swamp	x	x
Warrington		*
Castle Rocks	x	x

<sup>1</sup> The Waingongoro record (Mantell; Lydekker 1891) is doubtful; there is evidence that Mantell mixed the collections from Waingongoro with those he obtained from Waikouaiti, north of Dunedin (T. Worthy, pers. comm.). The Waikouaiti site is similar to several others in the South Island which have produced eagle remains recently, whereas there are no other records from the extensive midden, and associated dune, deposits in the North Island. The distribution of *Harpagornis moorei* will be discussed elsewhere.

taxa came from the same horizon in a stream-side swamp at Glenmark, North Canterbury (Haast 1872, 1874); they were only a few hundred metres apart (Haast 1874, 1879). Specimens referred to both taxa were recovered from five of the 14 sites listed by Oliver (1955). The taxa were represented equally (i.e., one of each) at four of the five sites where they occurred together. The genus was represented at five of the remaining nine sites by single bones. Therefore,

sympatry was demonstrated, or could not be ruled out, at 10 of the 14 sites. Of the remainder, the record from Waingongoro has been questioned, the Wairau Bar material consisted only of claws, and artefacts made from bone fragments, and that from Enfield was removed to England and never described, or even listed, in the literature available to Oliver. If two species of large eagle were present in New Zealand, the evidence available to workers who recognised them, indicated that they were not only broadly sympatric geographically, but they also occurred in roughly even numbers in several areas.

At Honeycomb Hill caves, about 10 individuals have been identified, and these would probably, on Haast's or Oliver's criteria, have been assigned evenly to the nominal taxa (author's unpublished data). Two of the 6 individuals represented by femora at the Honeycomb Hill caves would have been within the range accepted by earlier workers for *H. assimilis* and 4 within that for *H. moorei*. Oliver (1955) gave the humerus length for *H. moorei* as 210 mm, as against 218 mm for *H. assimilis* which indicates some inconsistency in the referral of specimens to the nominal taxa even by those who accepted the distinction.

## DISCUSSION

Not unexpectedly, the data presented here supported Haast's (1874) suggestion that *Harpagornis assimilis* cannot be separated taxonomically from *Harpagornis moorei* Haast, 1872. The pooled samples showed variation consistent with their being derived from one taxon. The variability in the length measurements was less than that expected if more than one species were represented in the samples and this has been used as a criterion for lumping nominal species taxa in subfossil birds by, for example, Cracraft (1976).

The two nominal taxa would also have enjoyed largely sympatric distributions. No other species-pair of very large eagles is known to be site sympatric over most of their ranges (Brown & Amadon 1968), or to co-exist in equal numbers at the same sites.

The degree of bimodality in the data was consistent with the suggestion that the population was sexually size dimorphic, as in most other

large eagles. In eagles, the female is the larger bird (Brown & Amadon 1968); Haast's guess that the smaller bird he named *H. assimilis* was a male of the species he had previously described was almost certainly correct.

The analysis showed that there was insufficient variability within the mensural data for the pooled samples to support distinguishing two taxa based on size, which was the sole character used by Haast (1874). Therefore, *Harpagomis assimilis* Haast, 1874 must be reduced to subjective synonymy with *Harpagomis moorei* Haast, 1872. Morphology was not included in the original diagnosis (Haast 1874), and comparison of the femur from the type series of *H. moorei* with that from the type series of *H. assimilis* revealed, as indicated by Haast (1874), that they did not exhibit more than individual variation (author's unpublished data).

The data presented here provide a formal basis for the present taxonomic situation (e.g., Kinsky 1970). The taxonomic conclusions and a classification of *Harpagomis moorei*, with a synonymy and designation of lectotypes, are given below.

## SYSTEMATIC PALAEOLOGY

Order Ciconiiformes (*sensu* Sibley *et al.* 1988)

Family Accipitridae

Genus *Harpagomis* Haast, 1872

Type species, by monotypy, *Harpagomis moorei* Haast, 1872

*Harpagomis moorei* Haast, 1872

*Harpagomis moorei* Haast, 1872: 193; pl. X, fig. 1, 4, 5; pl. XI, fig. 1, 1a, 2, 5. -Haast, 1874: 62; pl. VII, fig. 1-6; pl. IX, fig. 1-3. -Owen, 1879: 141; pl. CV, fig. 1-3; pl. CVI, fig. 3-6; pl. CVII, fig. 1-7. -Haast, 1881: 234. -Lydekker, 1891: 25. -Hamilton, 1893: 92, pl. VII C, D. -Hamilton, 1894: 227; pl. XXIII, fig. 4. -Rothschild, 1907: 85. -Oliver, 1930: 392. -Lambrecht, 1933: 411, 707. -Oliver, 1945: 137. -Oliver, 1955: 604, (not illustration). -Brodkorb, 1964: 272. -Kinsky, 1970: 78 (in list).

*Harpagomis assimilis* Haast, 1874: 64; pl. VIII, fig. 1-7. -Owen, 1879: 143 (as *H. moorei*); pl. CVI, fig. 1, 2, 4. -Haast, 1881: 232; pl. IX, fig. 1-4. -Lydekker, 1891: 25 (as ?synonym). -Hamilton, 1893: 92. -Hamilton, 1894: 227; pl. XXIII,

fig. 1-3. -Oliver, 1930: 394, unnumbered figure (mislabelled *H. moorei*). -Lambrecht, 1933: 411 (as synonym). -Oliver, 1955: 605, unnumbered figure p. 604 (mislabelled *H. moorei*). -Brodkorb, 1964: 273 (as synonym) -Kinsky, 1970: 78 (as synonym, in list).

*Harpagomis haasti* Oliver, 1945: fig. 46 (lapsus).

## TYPE DATA

*Harpagomis moorei* CMNZ AV 5104 (pt), left femur, 2 pedal ungual phalanges, 1 rib (missing), F. Fuller, Mar 1871, Glenmark. *Harpagomis assimilis* CMNZ, AV 5102, pelvis, right and left tarsometatarsus, right and left tibiotarsus, right and left femur, right humerus, right and left ulna, left carpometacarpus, left scapula, one rib, four phalanges, one ungual phalanx, Canterbury Museum party, Aug 1873, Glenmark.

## DESIGNATION OF LECTOTYPES

To facilitate comparisons between the two nominal taxa, and association of other elements with the recognised taxon, it is desirable that the name be based on the element in the type series with the greatest number of potentially useful morphological features. For *Harpagomis moorei*, I designate as **lectotype** the left femur labelled TYPE catalogued as part of AV 5104 in the type collection of the Canterbury Museum. It is in perfect condition, with muscle scars clearly visible, and minimal abrasion. The 2 ungual phalanges marked TYPE, and rib (presently missing) become **paralectotypes**. The other material catalogued under AV 5104, and also labelled on the bones as TYPE in the same hand as the series above were not part of the original collection or included in the description and therefore have no taxonomic standing. The TYPE inscriptions on the bones are most likely post-description additions.

For the reasons outlined above, I also designate the left femur catalogued under AV 5102, in the Canterbury Museum, as **lectotype** of the name *Harpagomis assimilis* Haast, 1874. The other bones included under AV 5102, see above, all become **paralectotypes**.

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#### APPENDIX I

SPECIMENS OF *HARPAGORNIS MOOREI* AND  
*HARPIA HARPYJA* MEASURED FOR THIS STUDY,  
BY ELEMENT AND REPOSITORY

##### *Harpagomis moorei*

Cranium CMNZ, AV 5684, AV 5685; NMNZ, DM 2134, S 22473.1, S 23479, S 23611, S 27773, S 25580; OM, C 40.8. Mandible BMNH, unnumbered; CMNZ, AV 5323, AV 5685, AV 12355; NMNZ, DM 2134, S 23611, S 27773; OM, C 40.8. Furcula NMNZ, DM 2134, S 22472.1, S 23611, S 27773, S 23825; SM, unnumbered. Sternum CMNZ, AV 6177; NMNZ, DM 2134, S 22473.2, S 22473.3, S 27773; OM, C 40.8. Pelvis BMNH, 75.12.15.34; NMNZ, DM 2134, S 22473.4, S 22473.5, S 23030, S 27773; OM, C 40.8. Scapula BMNH, unnumbered; CMNZ, AV 5333; NMNZ, DM 2134, S 23051.2, S 27773; OM, C 40.8. Coracoid BMNH, 4; CMNZ, AV 13014; NMNZ, DM 2146, S 22472.2, S 22472.3, S 22653, S 23611, S 22653, S 23453, S 27773; OM, C 40.8. Humerus BMNH, 8, A423; CMNZ, AV 5102 (paralectotype, *Harpagomis assimilis*), AV 5333, AV 29361, AV 36396; NMNZ, DM 2143, DM

2145, DM 2146, S 22736, S 23030, S 23431, S 23432, S23433, S 23825 (3), S 27773; OM, C 40.8. Ulna BMNH, 12, 13; CMNZ, AV 5102 (paralectotype, *H. assimilis*), AV 5104, AV 5324, AV 5329, AV 36405; NMNZ, DM2134, S 22472.6, S 23030, S 23434, S 23436, S23437, S 23438, S 23825, S 23611, S 27773; OM, C 40.8. Radius BMNH, 14, A 423; CMNZ, AV 5104, AV 5329, AV 5333; NMNZ, DM 2134, S 22472.4, S 23825, S 23073.2, S 23440, S 23441, S 27773; OM, C 40.8. Carpometacarpus BMNH, 35, 36; CMNZ, AV 5102 (paralectotype, *H. assimilis*), AV 6291, AV 11163; NMNZ, DM 2134, S 22472.7, S 22653, S 23456, S 23457, S 23611, S 23825, S 25582, S 27773; OM, C 40.8. Femur BMNH, 10; CMNZ, AV 5102 (lectotype, *Harpagomis assimilis*), AV 5104 (lectotype, *Harpagomis moorei*), AV 28366; NMNZ, DM 2138, DM 2143, DM 2145, S 22472.9, S 23030, S 23462, S 23464, S 23611, S 23825 (2), S 27773; OM, C 40.8. Tibiotarsus BMNH, 16; CMNZ AV 5102 (paralectotype, *H. assimilis*), AV 5104, AV 5322, AV 5324, AV 5333; NMNZ, DM 2134, S 22472.11, S 22473.7, S 23467, S 23470, S 23611, S 27773; OM, C 40.8. Tarsometatarsus BMNH, 19, 93.1.30.21; CMNZ, AV 5102 (paralectotype, *H. assimilis*), AV 5104, AV 12263, AV 16221; NMNZ, DM 2134, DM 2137, DM 2139, DM 2143, S 22472.14, S 23073.1, S 23473, S 23474, S 23475, S 23825 (2), S 27773; OM, C 03.60, C 40.8.

##### *Harpia harpyja*

BMNH, 1872.10.25.1, 1862.3.19.14, 1862.3.14.19; NMNH, USNM 429223.