

## The type specimens and type localities of the orangutans, genus *Pongo* Lacépède, 1799 (Primates: Hominidae)

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### ABSTRACT

Uncertain type localities undermine orangutan nomenclature. Bequeathed to the British Museum, the holotype of *Pongo pygmaeus*, according to Hans Sloane's catalogue, came from Borneo and died in China. The historical evidence makes Banjarmasin its most probable type locality. William Montgomerie, Assistant Surgeon at Singapore from 1819–1827, and Senior Surgeon from 1832, supplied the holotype of *Simia morio*. In 1836 an adult female orangutan reached Singapore alive from Pontianak, Borneo. The holotypes of *S. morio*, *S. hendrikzii*, *S. straussii* and *P[ithecus] owenii* probably had the same origin, as pirate attacks endangered visits to other Bornean coasts. Absent from Brunei and north Sarawak, Malaysia, throughout the Holocene, orangutans occur there only as Pleistocene subfossils at Niah. *Pan vetus* (the Piltown mandible) probably came from Paku, Sarawak. We identify *Pongo borneo* Lacépède, 1799 as an objective senior synonym of *P. wurmbii* Tiedemann, 1808, correcting its type locality from Sukadana to near Pontianak. This is the earliest name for the western subspecies (previously thought nominotypical) unless *Pithecus curtus*, probably from the Sadong River, Sarawak, represents a separate subspecies. If so, the name *Pongo borneo* would transfer to the southern population west of the Kahayan River, genetically distinguished at species level from the Sumatran orangutan, *P. abelii*.

### ARTICLE HISTORY

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## Introduction

Effective international collaboration in wildlife conservation requires an agreed scientific nomenclature. Brandon-Jones (2006) cited the orangutan, genus *Pongo* Lacépède, 1799 as a high-profile, threatened primate with unsettled nomenclature. Extant orangutans are endemic to Borneo and Sumatra, but which of these SE Asian islands produced the holotype has remained uncertain. Evidence that the orangutan comprises two species of unconfirmed scientific name and uncertain geographic division accentuates this deficiency. Morphological characters have not distinguished whether the two species are parapatric in central Borneo or separated by a sea barrier (Brandon-Jones et al. 2004).

Accepting the Sumatran orangutan as a separate species *Pongo abelii* Lesson, 1827, Groves (2001, p. 298–300) also recognised three Bornean orangutan subspecies: the nominotypical one from ‘north of the Sungai Kapuas and (formerly) going northeast an unknown distance into Sarawak’; *P. pygmaeus wurmbii* Tiedemann, 1808 from ‘south of the Sungai Kapuas, west of the Sungai Barito’; and *P. pygmaeus morio* (Owen 1837) from ‘Sabah, south to the Sungai Mahakam’. Groves (2001, p. 300) gave the imprecise type locality ‘Borneo’ for *Simia morio* and, without corroboration, the type locality ‘Sarawak’ for *Pithecus brookei* Blyth, 1853 and for *P. owenii* Blyth, 1853, two of the names he considered its synonyms. We argue below that none of these names is actually available for this putative subspecies as their true type localities lie outside its supposed geographic distribution. Groves (2001, p. 299) construed Rothschild (1905) as restricting the nominotypical locality to the Landak River, but Rothschild (1905) supplied no historical substantiation, and was probably only applying the earliest available name to the then best-known population. Ignoring its type locality, Rothschild (1905, p. 436) employed *Pongo pygmaeus wurmbii* as a senior synonym of *P[ithecus] satyrus batangtuensis* Selenka, 1896 from near Batangtu on the right bank of the Ketungau River (c. 0°40'N, 111°35'E). We demonstrate below that the holotype of *Pongo wurmbii* was collected on the Landak River (c. 0°10'N, 109°50'E). Thus, two of the three Bornean subspecies have a tenuous nomenclatural basis.

This paper endeavours to explore the historical background of most of the available names instigated for the orangutan, especially with a view to tracing their type localities so that a sound nomenclature can be established. We discuss the geographic distribution of the orangutan, drawing attention to the significant gaps in its distribution in southeast Borneo and on the opposite coast between Sabah and western Sarawak. Humans may have caused the former gap by hunting and habitat destruction, but the latter gap seems to have existed throughout the Holocene. We note the impracticality until the late nineteenth century of Westerners obtaining orangutan specimens from Borneo except near the south or west coast, thus restricting the probable type localities of prior Bornean names. We reconcile the molecular and morphological evidence to redefine the geographic distribution of the (three, more likely four) Bornean orangutan subspecies we provisionally recognise. Although their boundary in western Borneo requires further research possibly entailing nomenclatural adjustment, we offer a provisional classification.

### **Sir Hans Sloane bequeaths the holotype of *Pongo pygmaeus* to the British Museum**

In his collection which founded the British Museum, Sir Hans Sloane (1660–1753), President of the Royal Society and President of the Royal College of Physicians, included an orangutan specimen, which was later to become the holotype of *Pongo pygmaeus* (Linnaeus 1760). It and a young chimpanzee bequeathed with it were still present in the British Museum in 1843 (Gray 1843, p. 1). A handwritten entry in Gray’s unpublished catalogue of Mammalia, ‘6b. Destroyed dry with the bones. Mus. Sloane’, records the disposal of the holotype; this was probably before 1862, as Gerrard (1862) omitted it. The entry for the chimp reads: ‘7a Africa. Mus. Sloane. Dry with skull in’.

Edwards (1758, p. 6, pl. 213) alerted Linnaeus (1760, 1763) to the existence of the juvenile male orangutan 'now preserved in the British Museum', through his description and figure, prepared after extracting the specimen from alcohol. Now hailed as 'the father of British ornithology', George Edwards (1694–1773) spent three years in Norway and France, after completing a London trader's apprenticeship in 1716. Hearing of his coveted drawings, Sloane became Edwards' chief patron, in 1733 appointing him to the post of Bedell (or Beadle) of the Royal College of Physicians, a role as custodian and administrator which he retained until 1760. His income assured, Edwards' artistic pursuits were encouraged by the physicians, and culminated in the publication of his acclaimed works: *A natural history of uncommon birds* (1743–1751) and *Gleanings of natural history* (1758–1764) (Mason 2004). His talent is evident in his plate of the orangutan, especially in the inset profile of the head, a good likeness. The plate is dated 1757. Edwards' (1758, p. 7) statement that 'the original whereof was with great care done by me, to be preserved amongst the drawings of animals, in the Museum of the late Sir Hans Sloane, Bart. now in the British Museum' indicates that the preparatory sketch was done during Sloane's lifetime. Given that Edwards was under Sloane's patronage, it is clear that this orangutan specimen was the one in the Sloane collection.

Edwards (1758) strove to make his figure more accurate than those (of a chimpanzee) published by Tyson (1699) and another one inscribed to Sloane, published in 1738, of a chimpanzee exhibited in London. The latter evidently alludes to the engraving by G. (Gérard Jean-Baptiste) Scotin (II, c. 1698–post 1755) 'from a Drawing which was taken naked from the Life, by the celebrated Mr. Gravelot' (Anon 1739; Rousseau 1986, p. 3). Their agreement 'exactly in every part, but what distinguishes the sexes' and Edwards' (1758) unmistakable illustration of a young orangutan precludes 'Mme Chimpanzee' as his subject, but she may be the chimp bequeathed with it.

Paradoxically, Edwards sent Linnaeus an orangutan skull in 1759 (Groves and Holthuis 1985, p. 414). Edwards' (1758) absence of reference to a second specimen indicates that the skull was extracted from Sloane's wet specimen. It may be the juvenile skull displayed in the cabinet of Linnaean types at Uppsala, Sweden, in August 1983 with 'clearly the characters found by Röhrer-Ertl (1984) to be those of the Bornean taxon' (Groves and Holthuis 1985, p. 416). If so, this would establish *Pongo pygmaeus* as a Bornean orangutan. The disposal of (the rest of) the holotype supports this identification because if the skull had reached the British Museum, the complete skeleton would probably have been preserved when the presumably damaged skin was discarded.

Sloane must have obtained the orangutan before his death, at age 92, in 1753. His collection was accrued mainly by the acquisition of others, the prevailing theme being botany (Cannon 1994; MacGregor 1994), then all the rage. In at least three cases there was a Leiden connection, providing him with access to Dutch sources of material. This could include the orangutan specimen in a jar of spirit brought home to Leiden by Florentius Camper, Minister from 1702 to 1713 of the Dutch Reformed Church in Batavia (now Jakarta, Indonesia). His famous son, Petrus Camper, saw eight other specimens (one of them alive) between 1770 and 1777 (Groves and Holthuis 1985, p. 415–416), but all eight were probably too late to include Sloane's specimen.

Sloane's catalogue of quadrupeds is preserved in the library of the Palaeontology Department at the Natural History Museum, London, shelf-marked 'Palaeo Library 50.h.6 (e) [MSS SLO 1] Quadrupeds, 1–1903 (fols 236–383; fols 236v–261v)' (Jones 1988, p. 49).

The index to volume 25e has four entries for 'Orang Outang' (Dobson 1953, p. 4; Clutton-Brock 1994, p. 85). In places difficult to decipher or illegible, they read:

204. The skeleton of an Orang Outang or wild man from Sumatra in the East Indies by Capt. Aprice. The hands and foot [sic] were thrown overboard in coming from the East Indies when this creature died. It was given me by Mr. Maidstone vid No. 1851. [Additional script:] *Satyrus indicus* Orang Outang [Indi; &] *Homo sylvestris* [etc.]

1777. The viscera of the Champoncie Orang outang or homo sylvestris.

1851. The homo sylvestris, Orang outang, or Chimpanze from Borneo. [?]It dyd in China & was put into rack & brought over [?]to M<sup>r</sup> Charles Lockyer who gave her to me. She is coated w<sup>t</sup> longer hair. [In different ink:] Vid No. 204.

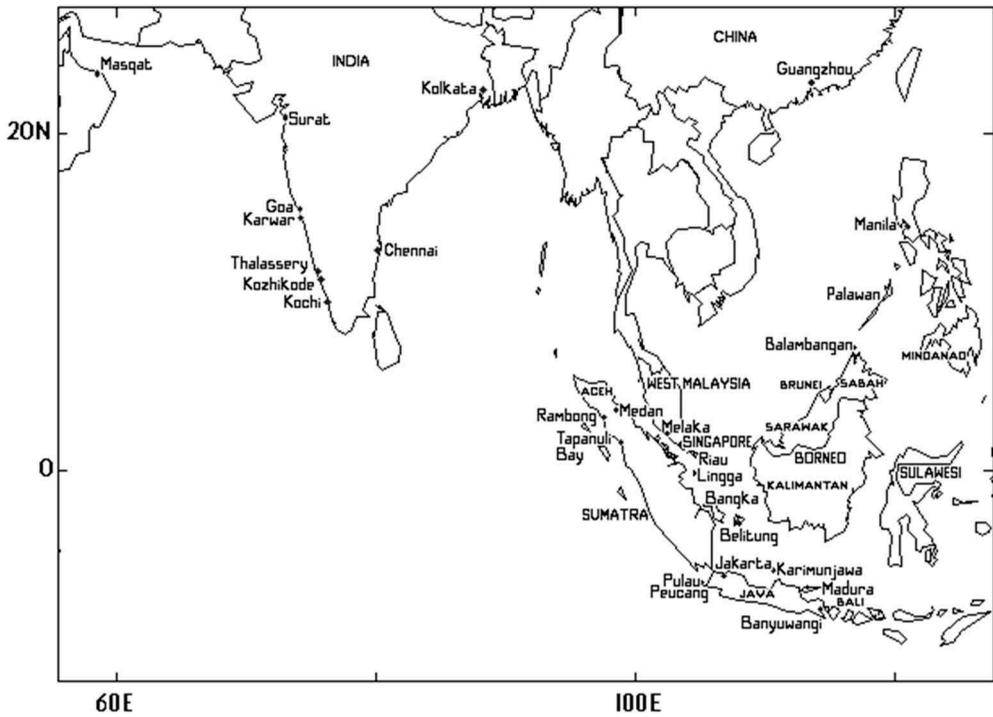
1895. The fore Paws of an Orang Outang or Chimpanzi from the Duke of Richmond's Sale by Dr Stack.

Being viscera and the first mention of the name chimpanzee (with an idiosyncratic spelling, 'Champoncie', of the then-unfamiliar name), we suspect that item 1777 is Mme Chimp, as Sloane attended her autopsy (Rousseau 1986, p. 3). Neither item 204 nor item 1895 matches Edwards' (1758) description of the orangutan holotype. Thus, by elimination, we agree with Dobson (1953) that item 1851 is the holotype. Assuming that the catalogue entries are chronological, this supplies a time frame for its acquisition: the presumed accession of item 1777 in 1739, when 'Mme Chimpanzee' died, and the probability that item 1895 was acquired at the sale of the Duke of Richmond's natural history material on 24–27 May 1751 (Chalmers-Hunt 1976, p. 57) (evidently Sloane never lost his collecting zeal, although presumably using intermediaries in later years), indicates that Sloane obtained the holotype between 1740 and 1750. The entry alleges that it originated in Borneo, died in China, and was imported in arrack (rice or palm spirit) by Charles Lockyer.

### **Charles Lockyer: donor to Sloane of the holotype of *Pongo pygmaeus***

On 15 May 1740, a Charles Lockyer of Ealing was elected a Fellow of the Royal Society; his first proposer was Hans Sloane. His date of death was 13 April 1752. Lockyer was a 'Gentleman well versed in most Branches of usefull [sic] and polite Literature, and in particular a Curious Observer of Nature, in Insects and Vegetables, and Author of a Book intitl'd [sic]: *An Account of the Trade in India*' (Royal Society Certificates of Election and Candidature). The last of his nine proposers was Thomas Stack, probably the same Dr Stack involved in Sloane's acquisition of item 1895. Stack was a 'Physitian [sic] well known to many Members of this Society for his Skill in Anatomy, Chemistry, and Natural history'. Elected on 26 January 1738, he died in 1756. Hans Sloane was also his first proposer (Royal Society Certificates of Election and Candidature). Stack translated several papers from French or Latin for the *Philosophical Transactions*, which also published a letter from him to Sloane (Stack 1739).

In the preface to his *An account of the trade in India*, Lockyer (1711) related how he served in the East India Company at Fort St. George (now Chennai, India) for 20 months before receiving a week's notice of transfer to Acheen (now Aceh, Sumatra, Indonesia; see Figure 1). He specified no date, but must have arrived at Chennai on or before 9 September 1702 when Thomas Pitt (1653–1726), President at Fort St. George, received



**Figure 1.** Map of South Asia, showing places mentioned in the text.

from the bearers, 'the young Gentlemen' James Lyde and Charles Lockyer, their letter of introduction by Charles duBois (c. 1657–1740), dated 18 February 1702. Lyde was sponsored by Robert Harley, Speaker of the House of Commons; Lockyer by another MP, Sir Francis Wyndham (Jessop 1989). This was therefore probably Lockyer's debut with the company and his first opportunity to obtain the holotype.

After a short stay in Aceh in about May 1704, Lockyer (1711), whose book does not mention the orangutan, moved to Malacca (now Melaka in West Malaysia) where he was preoccupied with commerce. Lockyer (1711, p. 180) spent four months in Canton (now Guangzhou, China). On 17 December 1704, he embarked on the *Stretham* for Mocho (now Al Mukha, Yemen) in the Red Sea (p. 191), briefly calling at Melaka, Anjengo (near Thiruvananthapuram, India), and Callicut Road (now Kozhikode, India). Through poor seamanship or adverse winds (he could not discover which, p. 202) their course was diverted to Gombroon (now Bandar Abbas, Iran), via Muscat (now Masqat, Oman).

On 27 October 1705, heavily laden with freight and passengers, the *Stretham* sailed for Surat, India, arriving on 24 November. Lockyer (1711, p. 255) had been suffering from 'Quotidian Ague' (malaria with daily bouts of fever) for the previous 10 weeks and on the Malabar Coast contracted 'Flux' (dysentery) for two months, restricting his ability to document local trade. Leaving Surat on 20 December (p. 265), the *Stretham* reached Goa by Christmas. It departed Goa on 29 December, arrived at Carwar (now Karwar) on 30 December (p. 269), left on 11 January 1706, arrived at Kozhikode on 18 January, then returned to Telichery (now Thalassery) on 25 January, revisiting Kozhikode on 1 February (p. 274).

At Thalassery, black monkeys (*Macaca silenus* or *Semnopithecus johnii*), if tame, were sold for 10–12 rupees (up to 3 German or Venetian ducats) each (p. 276). (On St. Helena, a Venetian ducat was worth 9 English shillings, p. 307). ‘The Monkeys about Calicut are larger than ordinary, and keep in great Companys in the Woods. It is very diverting to see with what Agility they jump from Tree to Tree. I cannot tell if we are allow’d to shoot them; the Gentoos [= Hindus] in other Places having a religious Regard for them’ (p. 282). The *Stretham* left Kozhikode on 10 February, took on provisions at Cocheen (now Kochi) from 12 to 15 February (p. 283–284), and reached the Cape of Good Hope on 22 May, waiting until 12 July for a convoy to accumulate (p. 288). It stopped at St. Helena from 5 to 14 August (p. 304, 307), laying up for two days from 3 September 1706 for wood and water at the small, uninhabited island of John Fernando (perhaps Fernando de Noronha), off the coast of Brazil. Frustratingly, Lockyer’s (1711) book ends without mentioning acquisitions, his port of disembarkation, date of arrival, or his occupation in the five years before its publication.

The Journal Book of the Royal Society of 18 May 1727 recorded that on 7 December 1713, a Lockyer (forename omitted) was ‘Accomptant to the South Sea Company’ when Council approved his election as a Fellow, proposed by Dr (Alexander) Stewart (c. 1673–1742). On Monday 19 March 1733, the ‘Place of Accomptant-General of the S. Sea Company, lately possess’d by *Charles Lockyer*, Esq; was by the Directors voted useless; and several Clerks, for the same Reason, were discharged’ (Anon 1733, p. 154). Beatson (1807, p. 157) recorded that this Charles Lockyer (named ‘Chief Accomptant’) was Member of Parliament (MP) for Ilchester, Somerset, from the 7th to the 9th Parliaments, i.e. from 28 November 1727 to 18 June 1747 (Beatson 1807, p. vi–vii).

Robert Harley (1661–1724), James Lyde’s sponsor for his post at Fort St. George, was Speaker from 1701 to 1705, Secretary of State for the Northern Department from 1704 to 1708 and Chancellor of the Exchequer in 1710, when he was created Earl of Oxford and Lord Treasurer in 1711. In May 1711 he co-founded the South Sea Company to fund government debt incurred during the War of the Spanish Succession. British participation (allied with the Netherlands) in the war, begun in 1701, ended in 1713 with the Treaty of Utrecht (Speck 2004). Sir Francis Wyndham (c. 1653–1715), Charles Lockyer’s sponsor, was MP for Ilchester from 1695 to the parliament commencing 21 July 1702 (Watson and Hanham 2002).

Thomas Lockyer (1699–1785) was the leading businessman in eighteenth-century Ilchester. His family had been prosperous mercers and prominent town members since the early seventeenth century (Baggs et al. 1974b). Charles’ death notice of 12 February 1752 named Thomas as his brother (Anon 1752). The discrepancy between this date of death and the 13 April 1752 given by the Royal Society might be deemed to refute this Lockyer as the author of *An account of the trade in India*, but 1752 was the year in which Britain switched from the Julian to the Gregorian calendar (Jessop 1989, p. 15). This or confusion over the date of death and date of notice of death can account for the discrepancy.

In 1722 Charles Lockyer, MP, bought Holly House and in 1728 Coldhall (or West Ealing manor at Little Ealing) and Twyfords. His illegitimate son John Lockyer or Green succeeded him in 1752, and left the estate to his widow Elizabeth and daughter Elizabeth in 1762 (Bolton et al. 1982). Charles Lockyer locally introduced the gypsy moth (*Lymantria dispar*) (Wilkes 1773, p. 20) and at his Ealing house bred numerous green-brindled

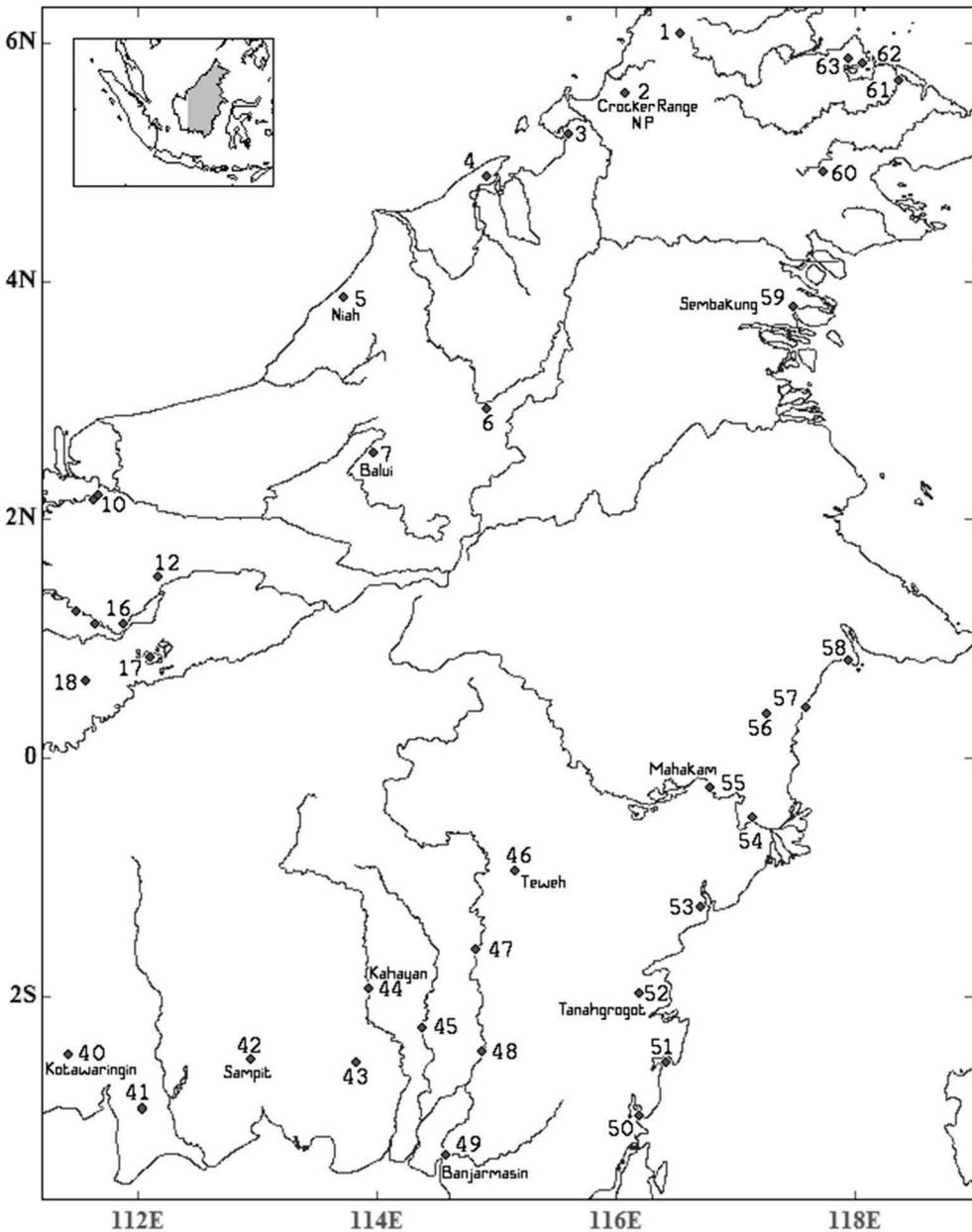
crescent moths (*Allophytes oxyacanthae*) or 'Ealing's Glory', being the only person Wilkes (1773, p. 12) knew who had seen many. In 1718 Charles Lockyer 'of London' bought part of the manor of Charlton Mackrell (near Ilchester), bequeathing it in 1752 to John Lockyer 'of Colehall in Ealing', who sold it in 1759 to (his uncle) Thomas Lockyer 'of London (later of Ilchester)' who had meanwhile purchased the rest of the manor. Thomas bequeathed the reunited manor to his daughter Mary (Baggs et al. 1974a).

John Lockyer is buried at St Mary's parish church, Ealing (Lysons 1795). The last resting place and date of birth of his father remain a mystery. Large age gaps between siblings were not then uncommon, but his description as a young man in 1702 and Thomas' birth in 1699 suggest that Charles was born in about 1685, although he could have been younger, as Sir Thomas Stamford Raffles (1781–1826), for example, joined the East India Company as a clerk aged 14 (Turnbull 2004).

If Lockyer left the East India Company to join the fledgling South Sea Company in 1711, this could explain why his book was issued in a hurried fashion with many loose ends, notably no attempt to bring it up to date. In the interim it had presumably gathered dust and Lockyer realised that he must publish or abandon the project. The South Sea Company's business, exclusively with Central and South America, would provide scant chance to supplement the book's contents. His employment could also explain why so little is known of Lockyer's life after 1711. Initially, as the South Sea Company inflated, he would probably have been inundated with work. After the crash, and perhaps especially after his enforced redundancy in 1733, he probably would have preferred to gloss over his previous occupation, especially as luminaries, such as Sir Isaac Newton (1642–1727), reputedly lost £20,000 in the speculation (Westfall 1981, p. 861). If this supposition is all correct, then the orangutan holotype was probably obtained before 1711.

The type locality of *Pongo pygmaeus* determines its application. Edwards (1758) presumed that the holotype came from Africa. Without corroboration, Wallace (1869, p. 144) and Elliot (1913, p. 188) claimed that the orangutan was first discovered in Sumatra. Elliot (1913, p. 188, 192, note 194) contended that if the Sumatran population were separated, the name *P. pygmaeus* would become geographically indeterminable, but he retained it, believing that the orangutan's exceptional individual variation precludes subspecific recognition (Elliot 1913, p. 195). Groves and Holthuis (1985) were satisfied that the holotype came from Borneo, but Röhrer-Ertl (1988) supposed that intense colonial rivalry between Britain and the Netherlands favours Sumatra as the origin of a British-owned orangutan in 1758.

At that time, however, Britain was not without access to Borneo. English trade with Banjarmasin (now in South Kalimantan province, Indonesia; see Figure 2) began in 1609. About 40 Englishmen and 100 Bugis (a seafaring people from southern Sulawesi, Indonesia, probably ultimately from southern China via Taiwan) settled there circa 1700, sacking five native settlements, 'Banjar, Banjarmasin, Kayu-tangi, Tatas and Martapura', after friction in the first year. A truce reduced personnel to 10 Englishmen and 40 Bugis. Hostilities resumed in 1706, and the English were evicted. The Dutch only occasionally visited from about 1644, with no permanent base there until 1747 (Leyden 1814, p. 23–24).



**Figure 2.** Map of localities in north, central and south Borneo, with inset map locating Borneo in Southeast Asia. 1: Mt Kinabalu; 2: Crocker Range National Park; 3: Padas River (Sungai Padas); 4: Brunei Town (= Bandar Seri Begawan); 5: Niah; 6: Sungai Silat; 7: Balui; 10: Darau, Narasit and Ilang; 12: Lanjak-Entimau Wildlife Sanctuary; 16: Batang Ai National Park. Kalimantan: 17: Danau Sentarum; 18: Batangtu, Ketungau River; 40: Kotaringin (= Kotawaringin); 41: Tanjung Puting National Park; 42: Sampit; 43: Sabangau National Park; 44: Kahajan (= Kahayan) River; 45: Sungai Lading; 46: Teweh River; 47: Tanjung-Jawa; 48: Doeson or Dusun (= Barito River); 49: Banjarmasin; 50: Klumpang Bay; 51: Pemukan Bay; 52: Passeer (= Tanahgrogot); 53: Balikpapan Bay; 54: Samarinda; 55: Mahakam River; 56: Kutai National Park; 57: Sangatta (= Sengata); 58: Sungai Menganne; 59: Sembakung River; 60: Danum Valley; 61: Abai, Kinabatangan River; 62: Elapura, Sandakan Bay; 63: Sepilok Orangutan Sanctuary.

## Captain Daniel Beeckman's voyage

That an eighteenth-century Englishman could have obtained a Bornean orangutan is confirmed by the purchase of one by Captain Daniel Beeckman (1718). Edwards (1758) regarded this animal as 'near of kin' but distinct from Sloane's orangutan. Beeckman's (1718) description being too brief (see below), this inference must derive from Beeckman's (1718) figure (reproduced in Morris and Morris 1966, p. 133), evidently by an artist who had never seen a live orangutan. Instead, it is a reanimated and more anthropomorphic modification of Tulp's (1641, pl. 14) figure (reproduced in Stiles and Orleman 1927, p. 7) of an anthropoid ape presented to stadtholder Frederick Henry (1584–1647), Prince of Orange. This latter ape is usually considered a chimpanzee from Angola, but Rijksen and Rijksen (1988, p. 9) noted that there is an 'Angkola' region (now Mandailing) in north Sumatra. The black pelage and large ears Tulp (1641) mentioned indicate a chimp, although Rijksen and Rijksen (1988) contended that the posture, pot-belly, sparse ventral hair and rather flat, virtually browless face all typify an orangutan, an impression which is strengthened by the apparent lack of nails on the foot; also absent are the long pointed fingers and characteristic knuckle-pads of a chimpanzee. (The hair distribution might be unreliable, however, as the heavily depilated limbs indicate that hair has sloughed off from partial decomposition.)

Leaving the 'Downs' on 12 October 1713 and returning on 29 October 1715, Beeckman (1718, p. 2, 205) headed fairly directly to and from his destination: Banjarmasin, Borneo. Passing between Teneriffe and Grand Canary Island on 1 November (p. 3), the *Eagle-Galley* halted at the Cape Verde Islands from 12–16 November for water, supplies and ship repairs (p. 10–15). Sighting 'Table-Land' (now Cape Town, South Africa) on 20 January 1714 (p. 18), Christmas Island on 5 April (p. 19) and Java on 6 April, Beeckman (1718, p. 20–21) anchored on 13 April at the uninhabited Mew Island (now Pulau Peucang in Ujung Kulon National Park (NP)) in the Sunda Straits to restock at a coastal town (see Figure 1). Covertly provisioning and refitting the ship at Batavia, reached on 20 April, took 42 days as the Dutch general singled out the English amongst Europeans for denial of basic necessities (p. 22). On 2 June, in convoy with the *Borneo* and the *Daulbin*, the *Eagle-Galley* sailed along the north coast of Java (p. 27), anchoring at the small island of Carimon-Java (now Karimunjawa) from 14 (p. 31) to 17 June. The *Eagle-Galley* and *Borneo* reached Banjarmasin at midnight on 29 June 1714 (p. 32).

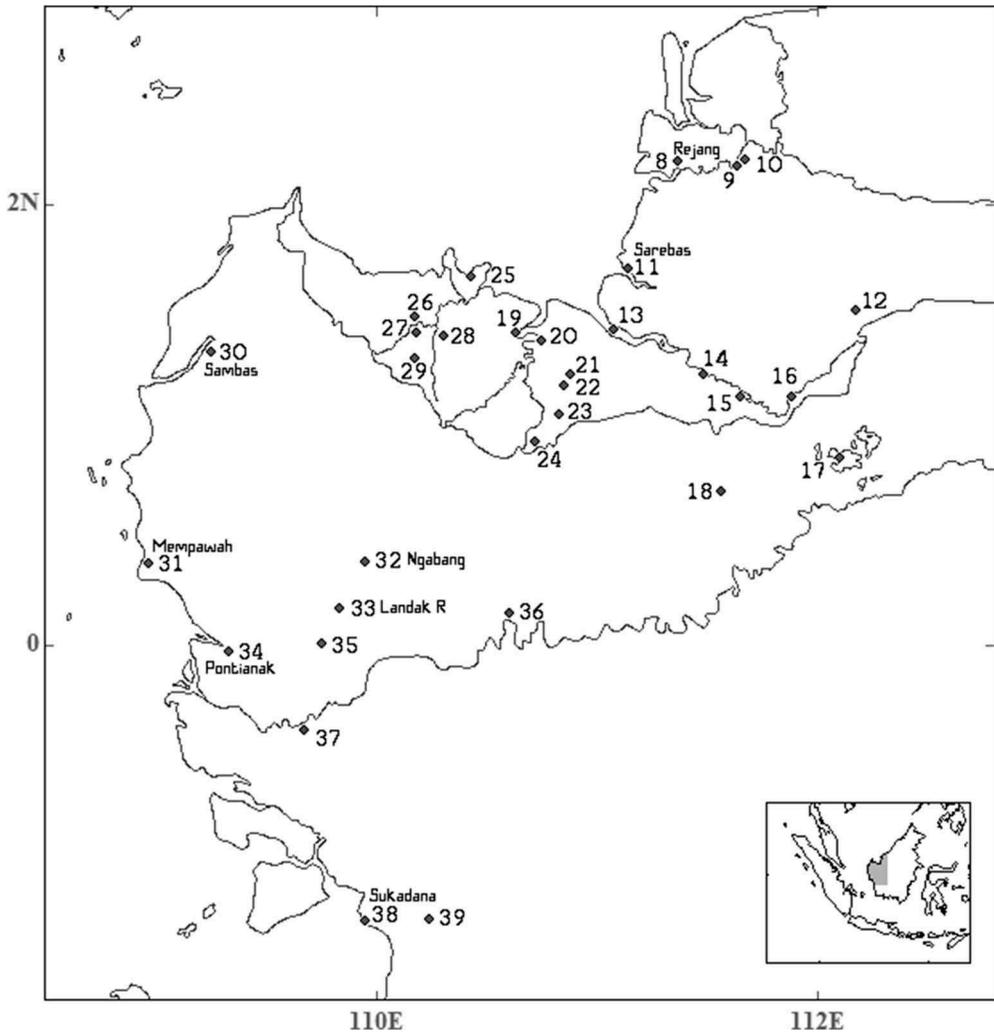
From 28 December 1714 to 5 January 1715 Beeckman (1718, p. 155–160) reprovisioned off the eastern tip of Madura. He investigated the Bali Strait as a homeward route, taking 15 days to advance 30 leagues (less than 150 km) owing to the skirting mountains funnelling the southerly winds (p. 164–166). From 16–23 January, Beeckman (1718, p. 167–175) put in at Ballamboang or Pallamboan (now Banyuwangi) for reprovisioning. That the king, 'Raja Mas Boogoos Pettey' (p. 168), had seen a European but never a European ship confirms the novelty of this route. From 4 April (p. 177) to 12 May (p. 189) the *Eagle-Galley* halted at Table Bay (now Cape Town) for supplies and ship repairs, and to allow the crew ashore to recuperate from scurvy (p. 177). The *Elizabeth* of Bristol, encountered on 11 September (p. 203), reported unrest in Britain and expectation of war with France. On 24 September (p. 204) Kinsale, Ireland, was visited for further information.

Reporting on the Bornean fauna, Beeckman (1718, p. 37–38) wrote:

The Monkeys, Apes, and Baboons are of many different Sorts and Shapes; but the most remarkable are those they call Oran-ootans, which in their Language signifies Men of the Woods: These grow up to be six Foot high; they walk upright, have longer Arms than Men, tolerable good Faces (handsomer I am sure than some *Hottentots* that I have seen) large Teeth, no Tails nor Hair, but on those Parts where it grows on humane Bodies; they are very nimble footed and mighty strong; they throw great Stones, Sticks, and Billets at those Persons that offend them. The Natives do really believe that these were formerly Men, but Metamorphosed into Beasts for their Blasphemy. They told me many strange Stories of them, too tedious to be inserted here. I bought one out of curiosity, for six *Spanish* Dollars; it lived with me seven Months, but then died of a Flux; he was too young to show me many Pranks, therefore I shall only tell you that he was a great Thief, and loved strong Liquors; for if our Backs were turned, he would be at the Punch-bowl, and very often would open the Brandy Case, take out a Bottle, drink plentifully, and put it very carefully into its place again. He slept lying along in a humane Posture with one Hand under his Head. He could not swim, but I know not whether he might not be capable of being taught. If at any time I was angry with him, he would sigh, sob, and cry, till he found that I was recon[ci]led to him; and tho' he was but about twelve Months old when he died, yet he was stronger than any Man in the Ship.

Beeckman (1718) alluded no further to the orangutan [unless it was the pet monkey which he claimed (p. 104–105) to have been instantly revived by bloodletting of the forearm when reduced to a stupor by a cannon salute on his ship in the Barito estuary]. He did not explicitly purchase his orangutan on this voyage. The only certainty is that its purchase predated his book. However, the East India Company had commissioned him to try to re-establish trade with Banjarmasin. Former attempts by both the English and Dutch had failed (p. 2). Beeckman's (1718, p. 90) was the first English visit since the eviction. To avoid being refused trade, his party feigned dissociation from the East India Company (p. 49). The occupants of a small proa invited aboard (p. 47) were astonished at the English return after their violent expulsion when many were killed and the fort and accommodation destroyed (p. 2).

Beeckman (1718, p. 34) believed Borneo the largest island 'in the whole World, except perhaps *California*'. Other than 'Banjar Masseen', he knew the other three major Bornean ports: Borneo (now Bandar Seri Begawan, Brunei); Passeer (now Tanahgrogot); and Succadana (now Sukadana; see [Figure 3](#)), only by information from the Banjars (p. 45–46). Evidently on his first visit to Borneo, and while a novice with the East India Company (p. 32), Beeckman (1718, p. 49, 102) censured previous English behaviour in Banjarmasin. The prelude to negotiating a contract on 17 July 1714 (p. 65) to buy 4000–5000 peculs of pepper (1 pecul = 60 kg) probably too preoccupied him with diplomacy to buy an orangutan, but the agreed three-month wait for the cargo to be aggregated (p. 67) supplied ample opportunity. The orangutan was therefore probably acquired before 1 November 1714 when the sultan compelled his subjects to meet their obligations and the loaded *Eagle-Galley* moved to deeper anchorage (p. 100). It might have been bought during the subsequent period of settling their affairs and paying their respects (p. 111–118), before final departure on 21 December (p. 128).



**Figure 3.** Map of locations in west Borneo, with inset map locating Borneo in Southeast Asia. 8: Rejang; 9: Binatang; 10: Darau, Narasit and Ilang; 11: Sarebas; 12: Lanjak-Entimau Wildlife Sanctuary; 13: Batang Lupar; 14: Batang Undup; 15: Marup; 16: Batang Ai National Park; 17: Danau Sentarum; 18: Batangtu, Ketungau River; 19: Sangi, Sadong River; 20: Simunjang; 21: Semabang; 22: Kundah hill (= Bukit Punda); 23: Sabal Forest Reserve; 24: Balai Ringin Protected Forest; 25: Bako; 26: Singhi; 27: Gunung Paku; 28: Semongok Forest Reserve (= Semongkok or Semenggoh); 29: Gunong Bungo; 30: Sambas; 31: Mempawah; 32: Landak (= Ngabang); 33: Landak River; 34: Pontianak; 35: Sungai Sama; 36: Sanggau; 37: Kapuas Valley; 38: Succadana (= Sukadana); 39: Gunung Palung National Park.

### **The type localities of [*Simia*] *pygmaeus* Linnaeus, 1760 and *Simia agrias* Schreber, 1799**

Lacking 'data which can satisfactorily determine to what subspecies they belong', Rothschild (1905, p. 436) believed the names *Pongo pygmaeus* and *Simia agrias* applicable only

to the Landak-Sarawak form ... . Selenka called the phase with cheek-callosities from the Landak region *Pithecus satyrus landakkensis*, while he named the phase without cheek-callosities *P. satyrus tuakensis*; to these, however, I apply the names of *Simia pygmaeus* of Linnaeus and *S. agrius* of Schreber.

Groves et al. (1992, p. 337) treated this as a type locality restriction for *Pongo pygmaeus*, but as Pontianak (now in West Kalimantan province), situated at the mouth of the Landak River, was not founded until 1770, this river is unlikely to be the type locality of *P. pygmaeus*. The holotype of *Simia agrius* Schreber, 1799 is the juvenile female in Schreber's (1799, pl. IIC) plate copied from Camper (1782, pls I–II). It arrived in alcohol in 1770 from Camper's former pupil, (Johannes Paulus) Hoffmann (also spelt Hofman), a physician in Batavia.

After signing a treaty of support for Sambas against Sukadana in return for a trade monopoly, in 1608 the Dutch abandoned their four-year-old trade with Sukadana, vacating their factory there in 1623 (Leyden 1814, p. 25). In 1770 they persuaded 'Abdul Ramman' (= Abdurrahman) of Simpang, son of an Arabian Sayyid Sharif (Hunt 1820, p. 16), 'to settle on the unfrequented shores of the river Pontiana' (Hunt 1820, p. 14), promising to develop it as the trade capital of the kingdom of Sukadana (Hunt 1820, p. 15), sold to them by the Sultan of Banten (Java) for 30,000 Spanish dollars (Leyden 1814, p. 27). Ramman gathered Bugis, Chinese and Malay settlers to build the town. The Dutch established their factory there in 1786 (Hunt 1820, p. 15) or 1776. In 1786 (Leyden 1814, p. 27, 39–40) or 1787 (Hunt 1820, p. 52) they deposed the chief of Mempawah, entrusting his territory to Ramman. They installed rajas at Landak (now Ngabang) and Sanggau with an export monopoly through Pontianak (Hunt 1820, p. 15). In 1786 (Leyden 1814, p. 27, 32, 40) or 1795 (Hunt 1820, p. 26) they besieged, sacked and burnt the ancient city of Sukadana, transferring the inhabitants to Pontianak or dispersing them and their chief into the interior.

If Beeckman (1718) bought his orangutan on 17 July 1714, it would have died about three weeks into his voyage from Banyuwangi to Cape Town; if on 1 November, it would have died en route from Cape Town to St. Helena. Whatever the date of purchase, it did not die in China, thus discounting the tempting conjecture that Lockyer later acquired it. Beeckman's (1718) account is relevant because, if Lockyer obtained the holotype before 1711, it reduces his ready means of acquiring it by another five years. Lacking contrary evidence, it therefore seems safest to infer that Lockyer obtained the holotype in Guangzhou between about 15 August and 17 December 1704. Its most probable source would have been the East India Company's other trading station at Banjarmasin. Leyden (1814, p. 28) blamed Dutch antipathy towards the bustling trading port of Sukadana on irritation at it 'being the principal haunt of the English and French traders on the island of Borneo'. Sukadana is thus perhaps second favourite as type locality of *P. pygmaeus*. A third possibility is Mempawah, 'greatly resorted to by traders, especially English and Portuguese' (Leyden 1814, p. 30). However, only in the case of Banjarmasin is there firm evidence of British trade at the appropriate date. This consideration might be irrelevant if Lockyer bought the orangutan from a Chinese trader.

Delighted that Beeckman (1718, p. 67) trusted them sufficiently to venture further upriver than had his English predecessors, the Banjars welcomed his request to pay his respects to Sultan Pannomboang [p. 46; spelt Panambahan by Leyden (1814, p. 24)] at Caytongee (now Kayu Tangi). They revisited on 21 August, this time to meet the sultan

of Negarree (now presumably Negara, less than 100 km further north, although the sultan had allegedly travelled 200 miles to see them). On 22 August (p. 93) they visited Pangeran Purba (p. 136), prince of Negarree, at his home in Martapura (p. 93). Beeckman (1718) saw little more of the interior, but on 3 September the gunner from each ship assisted on an expedition to suppress rebels at Negarree (p. 80, 96–97).

If an Englishman at Banjarmasin personally collected the holotype of *Simia pygmaeus* before 1705, the reluctance to stray restricts its origin to near the estuary. If obtained from an inhabitant, as is more likely, it might have come from as far as Negara or farther. More than a century later, based on reconnaissance by Müller in 1836 while collecting natural history specimens, Schlegel and Müller (1841, p. 12) advised that seeking orangutans near Banjarmasin was generally futile and they were now sporadic farther north on the Doeson or Dusun River, the name Europeans then used for the Barito (Müller 1857, p. 152). Schlegel and Müller (1841) reported that orangutans were less rare some days' journey farther west, especially along the Rivers Kahajan (= Kahayan), Sampiet (= Sampit) and Kotaringin (= Kotawaringin, see Müller 1857, p. 141). The Dayaks of Tanjung-Jawa (1°36'S, 114°50'E) told Müller (1857, p. 200) that the otherwise absent orangutan, which they called *Keoe*, chiefly visited the forest on the opposite or western side of the Barito between their village and Kampong Mampon at the start of the eastern monsoon, i.e. from April to May when its preferred locally abundant figs are fruiting. However, on 17 September 1836, the same Dayaks told Müller (1857, p. 236) that an orangutan had called from the other bank two days earlier. He saw no orangutans, but found nests during his hours of intensive search there next morning in a partly swampy, primary forest habitat. The Ngaju Dayaks called the orangutan *Kahieo*; distinguishing males (*Salamping*) from females (*Buku*). Only the Muslims of Banjarmasin and other coastal towns with foreign residents used the Malay term *Orangutan* (Müller 1857, p. 201). Dayaks at Longwai confirmed to Bock (1882, p. 28) orangutan frequency in the Dusun district and also their presence on the Teweh River, an eastern tributary of the Barito.

### **The type specimens and type localities of *Pongo abelii* Lesson, 1827, *Pongo borneo* Lacépède, 1799 and *Simia wallichii* Gervais, 1838**

The adult male holotype of *Pongo abelii* Lesson, 1827 (p. 32) was collected fortuitously on almost treeless, cultivated shore land by a boat party from the brig *Mary Anne Sophia* landing for water at Ramboom (now Rambong, 2°59'N, 97°31'E), near Touraman (now Trumon, in Aceh province of Sumatra, Indonesia) (Abel 1825, 1826, 1827). *Simia gigantea* Pearson, 1841 is an objective junior synonym. The date of collection is unrecorded but on 13 February 1822 (returning within 10 days), the 'fast-sailing British barque ... the *Maryann Sophia*', recently arrived from Madras (now Chennai, India), captained by R. Cornfoot, was dispatched from Batavia to search for survivors from the *Tek Sing*, wrecked on the Belvidere Shoals, east of Bangka Island (Pickford and Hatcher 2000, p. 90). On 2 December 1822, the 'Bark *Mary Ann Sophia*', captained by R. Cornfoot, arrived in Calcutta (now Kolkata), having left Sumatra on 9 November (Anon 1823). That year Cornfoot donated most of the holotype to the museum of the Asiatic Society of Bengal (Anon 1825) where some of its skin still existed in 1861 (Pearson 1841; Blyth

1853, p. 370, 374, 1863, p. 3). Having hung on a room wall for years, its good condition surprised Blyth (1841), who had it cleaned and mounted. By 1865 only the mandible (ZSI.11726) persisted at the Indian Museum, Kolkata (E[ans] 1838, footnote; Prinsep 1838, p. 360, pl. 18; Blyth 1841; Anderson 1881, p. 24; Khajuria 1953, p. 138). The right (Pearson 1841; Blyth 1863) hand and foot were preserved in alcohol at the Linnean Society of London (Wilson 1831, p. 25–26, pls 33–34; Blyth 1847, p. 728). If still extant, they were probably sold in 1863 when most of its non-Linnean collection was disbanded (Wheeler 1995). Their subsequent fate is unknown.

A cheek-flanged adult male preserved in arrack, sent by Willem Adriaan Palm to the Batavian Society at Batavia for forwarding to the cabinet of the Prince of Orange (William V, the last stadtholder of the Dutch Republic), formed the sole basis for *Pongo wurmbii* Tiedemann, 1808 (p. 329). Dobson (1953, p. 8), Röhrer-Ertl (1988, p. 9), Groves et al. (1992, p. 337) and Groves (2001, p. 300) presumed Palm's posting to Sukadana (1°15'S, 109°57'E) (Van Wurmb 1780, p. 253) indicated the type locality, but Radermacher (1780, p. 141) specified that Palm shot the holotype on his return (c. 0° 10'N, 109°50'E) from Ngabang to Pontianak in late July 1779 (Radermacher 1780, p. 119).

Geoffroy and Cuvier (1795, p. 456) recorded that the skeleton Palm collected 'se trouve dans la collection stadhoudérienne' [is in the stadtholder's collection]. Virtually reprinting this paper in March 1798, Geoffroy and Cuvier (1798, p. 187) repeated this information in the past tense. Geoffroy (1798, p. 343) confirmed that 'Ce squelette du singe de Wurmb [sic], l'un des plus rares & des plus précieux de la collection nationale, va nous fournir des observations assez curieuses' [One of the rarest and most valuable in the national collection, the skeleton of Wurmb's ape allows some intriguing observations]. In late 1795 it was taken to Paris, where it still exists (Barsanti 1989, p. 70, 85). As Paris then led taxonomic research in zoology (Groves 2001, p. 41), the early presence there of this skeleton raises the odds that some names, previously considered mere junior synonyms of *Pongo pygmaeus*, may also be objective senior synonyms of *P. wurmbii*. We have detected two such names: *Simia pongo* Cuvier, 1797 (p. 99) and *Pongo borneo* Lacépède, 1799.

*Simia pongo* Cuvier, 1797 is a primary homonym of *Simia satyrus pongo* Kerr, 1792 whose description is largely a verbatim translation of de Buffon (1766, p. 71) and thus, according to Stiles and Orleman (1927, p. 23), a synonym of *Homo sapiens* Linnaeus, 1758. Even if partly based on the orangutan, it is not an objective senior synonym of *S. pongo* Cuvier, 1797. Stiles and Orleman (1927, p. 25) conjectured that as Lacépède (1799) gave a facial angle of 30° for *Pongo* when promoting it to generic rank, but 65° for *Simia*, the latter probably denotes the chimpanzee. Lacépède (1799), however, almost certainly employed the anthropoid classification of Geoffroy and Cuvier (1795, 1798) and Geoffroy (1798) who, from the facial angle of the skull, inferred that Van Wurmb's (1780) ape, together with mandrills and howler monkeys, is the most brutish of anthropoids (Geoffroy 1798, p. 343), while (immature) orangutans, chimpanzees, gibbons, capuchins and marmosets are the most refined (Geoffroy & Cuvier 1795, p. 461; 1798, p. 190). 'Pongo' acquired a derogatory connotation. Hence the general surprise (judging by the wide coverage of the event) on 9 February 1818 when Georges Cuvier announced that an orangutan skull sent from Kolkata by the botanist (Nathaniel) Wallich (1785–1854) bridged the age gap between the 'Pongo' and orangutans, implying they are merely age variants of one species (Cuvier 1818, p. 210; de Blainville 1818). Wallich's skull became

the holotype of *S[imias] wallichii* Gervais, 1838 (p. 379). Cuvier (1818, in de Blainville, 1818) gave no type locality, but Cécile Callou of the Muséum National d'Histoire Naturelle, Paris, kindly photographed the skull (Figure 4A) in four views which show it to be Bornean (CPG pers. obs.). It is a young juvenile with deciduous dentition, first permanent molars and erupting second ones. Malnutrition indicated by the fragile incisal and canine alveolus, and diastema before the erupting molars, suggests it was of captive origin.

*Pongo borneo* and *P. abelii* have the best documented type localities of the species-group names available for the orangutan other than the 10 coined by Selenka (1896). Even Selenka's (1896) 10 may be unreliable, as he shunned the interior, relying on local hunters for most of his specimens (Elliot 1913, p. 183–184). The type localities of other names can only be restricted with a good knowledge of the geographic distribution of the orangutan and insight into where orangutans would most likely have been collected at the appropriate date, or at least a reduction in the options.

### The geographic distribution of orangutans in Borneo and Sumatra

Extensive orangutan collections have been made in the Kapuas Valley, West Kalimantan, Indonesia (Selenka 1896; Jentink 1897; Hrdlička 1907; Lyon 1907; Elliot 1913, p. 183–186; Röhrer-Ertl 1984, tables 1–5). Brooke (1841, p. 56) reported that orangutans occur at Pontianak and Sambas 'in considerable numbers, and at Sadung' (the Sadong River), 'but are unknown in the intermediate country which includes the rivers of Sarawak and Samarahan ... which abound with fruit, and have forests similar and contiguous to the Sadung, Linga and other rivers. The distance from Samarahan to Sadung does not exceed twenty-five miles' (40 km). 'From Sadung, proceeding to the northward and eastward, they are found for about 100 miles, but beyond that distance do not inhabit the forests'. His journal specified Rejang and Sarebas as orangutan localities (Brooke 1848a, p. 228). If reliable, Brooke's (1848a, p. 195) assertion that the 'gigantic ape' is occasionally encountered between Santubong and Tanjong Po, i.e. at Bako (1°40'N 110°26'E) where it no longer occurs, suggests its absence near Kuching may be human mediated. Beccari (1904, p. 200) heard of an orangutan killed at Singhi (= Singai, 1°30'N 110°10'E) and of the constant presence of orangutans on Gunong Bungo (1°18'N 110°10'E). Brooke (1848a, p. 369) noted a difference in appearance and language between the peoples of the Sarawak River and the adjacent Samarahan. Tradition derived the former from Java, while the latter were originally 'Pegùans' (from Burma).

Alfred Russel Wallace (1823–1913) suspected no European had seen more free-living orangutans than he did as Brooke's guest in Sarawak. Shooting 16 from April to August 1855, he accumulated about 21 specimens (e.g. Figure 4B), most without precise localities, but probably from at or near the specified ones of Semabang (1°14'N, 110°53'E), Menyille (up another tributary of the Simunjan River) and Simunjan (1°23'N, 110°45'E) (Wallace 1869; Cranbrook et al. 2005). In October 1878 in the same vicinity, William Temple Hornaday (1885, p. 405) and his hunters killed 43 orangutans. These figures pale against the 300 orangutan skulls Selenka (1896) acquired in the region of northwest Kalimantan east of Pontianak, many of them immature (Jentink 1897, p. 28; Elliot 1913, p. 183). Both Wallace (1869) and Hornaday (1885) fancied they were collecting two species. In March–May 1867, Beccari (1904, p. 194–200) collected 24 specimens at Marup



**Figure 4.** Two significant orangutan specimens. (A) Facial view of a (Bornean ex-captive) juvenile orangutan skull (the holotype of *Simia wallichii* Gervais 1838), sent to Paris before 1818 by Nathaniel Wallich. MNHN-ZM-AC-A517 © MNHN – Cécile CALLOU – 2016, published with permission. (B) Mounted adult male orangutan skin, NHMUK 1856.11.8.1, collected in Sarawak, Malaysia by A.R. Wallace; probably the male from Semabang whose lack of cheek flanges convinced Wallace there are two species. © Trustees of the Natural History Museum, London, published with permission.

(1°08'N 111°39'E). None of his females had cheek flanges, but natives and a missionary assured him others did. He speculated that the two orangutan morphs, more distinct than a Bactrian camel is from a dromedary, are species merged naturally by hybridisation, the flanged one from a region more fertile than the other.

Charles Hose (1893) had ample opportunity and motive to collect orangutans in northern Sarawak, but recorded only those collected by G. D. Haviland in 'Sarawak'

B



Figure 4. (Continued)

(= Kuching, but probably collected elsewhere); by C. S. Pearse on the Sadong River; and by J. Revilliod at Simunjan. The annual report of the Sarawak Forest Department for 1959 (in Medway 1965, p. 88) stated,

Until recently there were considerable numbers in the upper Sadong, Undup, and the border range as far east as the Balui, and also in the Binatang District. It appears probable now that there are barely forty left in the border hills, and only scattered pairs elsewhere. The only remaining concentration . . . appears to be in the swamps between the Sadong and Batang Lupar (even here it is doubtful whether there are more than 200–300 left), and south of the Serian-Simmanggang Road in the Balai Ringin and Sabal Forest Reserve.

The estimated 350 orangutans in 1961 between the Sadong and Lupar rivers had declined by 1988 to only 20–100 in three separate, doubtfully viable populations, but at that time over 500 probably still occurred in the Lanjak-Entimau Wildlife Sanctuary and the contiguous Batang Ai NP (Bennett 1991).

Despite a Pleistocene subfossil presence at Niah (Harrisson 1959; Hooijer 1960; Medway 1965), Banks (1931) confirmed that Sarawak orangutans now occur only between the Sadong and Rejang rivers. Noting that ‘the early Sea Dayaks’ share this distribution, Banks (1931) inferred that orangutans colonised Sarawak from Indonesia. A single large male skull was reputedly collected in the Sungai Silat region (c. 2°56’N, 114°55’E)

two generations ago and it is difficult to see how it got there for Mias are unknown and always have been in the Baram district. Some Ulu Baram Punans, the nomad hunters, also had a story of how they once saw a big bundle of sticks in a tree from which a Mias emerged; the Punans ran helter-skelter dropping ‘parang’ and blow-pipe quivers in their terror, a fact which indicates the animals rareness to even the keenest hunters. (Banks 1931, p. 117)

Although ‘several were seen in July 1945’ in the Sembakung (River) area of ‘north-east Dutch Borneo’, Harrisson (1949) agreed that there are no orangutans

in northern-Sarawak or north-western Dutch Borneo, but numbers further south. Mr. Ian Urquhart reports from Binatang on the lower Rejang River, Sarawak, that the ape is said to have been present in the immediate vicinity until fairly recent times. Here again, the increase and expansion of the Sea Dayaks has driven them further back from the navigable rivers.

Urquhart (in Harrisson 1949) added: ‘The whole area was completely uninhabited, and it is the Chinese from 1870 onwards who started developing from the Rejang River towards the Second Division boundary and the Dayaks from the Second Division who came into the Julau River’ after 1861, ‘and from there into Binatang District who drove these animals into the only remaining areas of virgin jungle’. Harrisson (1949) feared orangutans were now ‘confined to the headwaters of the smaller streams, Darau, Narasit and Ilang’.

Although in 1993 still retaining about 80% of land under forest cover (Booth 1993), Brunei is evidently outside the Holocene range of the orangutan. St. John’s (1863, p. 240) implausible tale of a Murut hunter being abducted by a female orangutan is probably a reliable indicator of orangutan presence on the Padas River, Sabah, Malaysia. An isolated population occurs in the Crocker Range NP (Bennett 1991). Mt Kinabalu, where the species has apparently always been scarce, seems its western limit farther north. On 9 February 1888, Whitehead (1893, p. 169) related how ‘Tungal came back to

camp [at 2240 m] in a great fright one day – he had seen a devil looking at him out of a thick tree in the forest; for some time he sat quiet, but at last began to tell us about this “hantu” ( ... doubtless a large Orang-Utan or Mias). He had met with it close to the camp, but when I went in pursuit the devil had disappeared’. Dusun call Mias ‘Kāgeau’. Like Whitehead (1893), Griswold (in Allen & Coolidge 1940, p. 149) in 1937 saw none. Labuan saw one at 6000 ft (= 1800 m), just below Griswold’s camp.

As Pryer (1881) omitted to mention the orangutan, Jentink (1897, p. 27) was sceptical of its reported presence on the east coast of Sabah (Anon 1895, p. 31), but in a letter dated 27 October 1879 from Elapura, Sandakan Bay, Pryer (1880, p. 69) wrote, ‘Orang Utangs (young) would come if I offered a reward for them’. Medway’s (1965) report of ‘old records from the neighbourhood of Sandakan (BMNH)’ apparently refers to skulls ZD.1886.12.20.10 and ZD.1898.2.28.11. W.B. Pryer donated ZD.1886.12.20.10. Seven orangutans were collected in 1937 at Abai on the Kinabatangan River (Allen & Coolidge 1940, p. 142). Despite an excursion up the Telen tributary of the Mahakam as far as Longwai, and an overland trip from Samarinda to Banjarmasin, Bock (1882, p. 27–28) never saw a wild orangutan, but was probably the first to scientifically record the Kutai population near Samarinda in east Kalimantan, Indonesia. Abbott (in Lyon 1911, p. 57, 144) found no orangutans at Balikpapan Bay (1°15’S, 116°43’E), Klumpang Bay (3°00’S, 116°12’E) and Pemukan Bay (2°33’S, 116°25’E) where he collected mammals from 8 January 1908 to 19 April 1909: ‘They do not occur south of the Mahakam ... River, but are said to be common to the northward of it’. Zondag (1931) corroborated this absence in southeast Borneo.

The Sumatran orangutan is restricted to the northern provinces of Aceh and North Sumatra, Indonesia (Wallace 1869, p. 144; Hornaday 1885, p. 398; Brandon-Jones 1996, p. 333; Rijksen and Meijaard 1999, p. 55–60; Nater et al. 2011), to near Medan (3°35’N, 98°40’E) on the north coast (Jentink 1889, p. 18; Schneider 1905, p. 72) and Tapanuli Bay (1°38’N, 98°45’E) on the south coast (Miller 1903, p. 483). Subfossil teeth (on average, 16% larger than those of recent orangutans) from central Sumatran caves extend this distribution (Hooijer 1948), but probably represent a distinct taxon (Andrews in Jenkins 1990, p. 45).

## Pre-twentieth-century Borneo

Three kingdoms ruled Borneo from early times: Brunei, Sukadana and Banjarmasin (Hunt 1820, p. 7). The first Europeans, survivors of Ferdinand Magellan’s exploration, visited in 1521. The 25,000 dwellings of Brunei, the magnificent court and luxuriant, fertile country so impressed Antonio Pigafetta (Magellan’s chronicler and guest on the voyage) that, presuming it also belonged to the Raja, he mistakenly extended the city name (mispronounced Borneo) to the whole island, locally known as Kalimantan from an indigenous sour fruit (Hunt 1820, p. 2).

In return for the cession of north Borneo, the Sultan of Sulu assisted the Raja of Brunei in suppressing a Chinese and Murut insurrection. The Spanish subsequently conquered the Sulu Archipelago, imprisoning the Sultan and his court. On capturing Manila (during the Seven Years’ War), the British offered to reinstate him in exchange for the transfer to the East India Company of north Borneo, south Palawan and the intervening islands: terms the Sultan accepted in 1763 (Hunt 1820, p. 10–11). In 1775, Sulus expelled the

two-year-old British colony from the previously uninhabited island of Balambangan (off north Sabah), killing the garrison (Hunt 1820, p. 44).

As European trade grew with China, fixed prices undercut Chinese junks. Europeans forced Bornean ports to divert their produce to Jakarta and Melaka. The additional transport costs stifled trade in 'gruff goods' (cassia, ebony, pepper, rattan, sago and wax), creating unemployment (Hunt 1820, p. 9). Bornean ports consequently degenerated, their inhabitants resorting to piracy. By 1809 Brunei was a glimmer of its former glory, with fewer than 3000 homes and fewer than 6000 Chinese settlers (Hunt 1820, p. 8). Acts of piracy had for years deterred Chinese junks from visiting. The Portuguese at Macau (China) occasionally attempted to renew trade but their agent withdrew in 1808 after pirates attacked a large ship in 1807, killing its crew (Hunt 1820, p. 58).

Other than 'those of Lingin, Rhio, and Billiton' (now Lingga, Riau and Belitung, Indonesia), Hunt (1820, p. 44) listed the chief remaining Bornean pirate ports of 1812 as: '1st Pangeran Annam [= Anom] at Sambas – 2nd Port Borneo proper, and four hundred prows at Tampasuk [sic], both under the raja of Borneo proper – 3d The Pasir [now Tanahgrogot] pirates. – 4th The Sulo [= Sulu] pirates. – 5th the Illinois [= Illanun or Iranun] pirates on the isle of Magindanao' (= Mindanao, Philippines). Brooke (1848b, p. 13) agreed that Anom was 'the Host of numerous Illanun fleets which made Sambas their rendezvous. Sultan Annas [sic] was attacked, defeated, and deposed; the consequence of which has been, that Sambas has been a quiet place ever since'. The British attacked in June 1813 (Low 1877, p. 256). Piracy so dominated Tempasuk (now Kota Belud, Sabah) that its valuable gold mine was abandoned (Hunt 1820, p. 27). Resentful Iban had ousted Kota Belud pirates from their original base at Tuaran (Sabah). The British knew north Borneo as 'pirates' point' (Hunt 1820, p. 61).

James Brooke (1803–1868) first visited Borneo on 1 August 1839 (Brooke 1848a, p. 14), staying less than two months in Sarawak, as a Dayak rebellion made the interior inaccessible (Mundy 1848a, p. 28). In Singapore on 31 March 1843, after almost two years of uninterrupted stay in Sarawak (Brooke 1848a, p. 334), Brooke (1848a, p. 338) wrote, 'I have received long arrears of correspondence from England'. Although the Sultan of Brunei had confirmed Brooke as Rajah of Sarawak on 1 August 1842 (Mundy 1848a, p. 322), commerce between Singapore and Sarawak evidently remained minimal. The Sarawak coast was virtually 'blockaded by the fleets of Sulu Pirates' (Brooke 1848a, p. 196). Commencing an expedition against the Sarebas Dayaks on 10 June 1843, Keppel (in Mundy 1848a, p. 349) described them as 'a race of savage pirates, whose country no force had ever yet dared to invade, and who for more than a century had been inflicting, with impunity, every sort of cruelty on all whom they encountered'.

On 1 July 1844, Brooke (1848a, p. 365–366) wrote:

Sheriff Osman, an Arab, is the self-constituted ruler of the northern part of Borneo, and portions of Palawan ... . His town in Malludu [= Marudu] Bay is the stage of the Balanini [Sulu pirates], who are said, on their outset on a cruise, to receive food and arms from this worthy, repaying the advance in slaves or plunder ... a boat of the Sultana [a British ship destroyed by lightning in 1841; see Brooke (1848a, p. 247, 268)] was cast ashore at this sheriff's town ... and ... the crew were all sold as slaves. The Arab I met at Tampasuk was one of the number.

Osman or Usman died in the jungle of grape-shot wounds inflicted during the British destruction of his stronghold on 19 August 1845 (Mundy 1848b, p. 202, 205; St. John 1863, p. 192).

Concluding in 1848 that antimony deposits at Bintulu were too far inland to be extracted economically, Robert Burns, a huckster known for his quick temper, continued trading along the north-west coast of Borneo. In 1851, alert to the risk of pirate attack, he resolved to explore the trade options in camphor and edible bird-nests on the Kinabatangan River. Captain Robertson grounded their schooner near Marudu Bay. Their acquaintance, the Marudu chief, Sharif Hussein mediated in the ensuing row. On 11 September, Memadam, an Iranun, and Ibrahim, a Sulu, boarded the schooner, purportedly to display their wares. Hussein and several others later joined them. Ibrahim drew a kris from a rolled mat passed to Burns and beheaded him. Speared, Robertson fell into the sea. Hussein sustained minor injuries; several of the native crew were killed; the rest decamped. Memadam persuaded them to rejoin the ship, sailing for Tungku, an infamous pirates' nest east of Lahad Datu. Nine days later Memadam visited the chief, Sharif Yassin, at Bengaya in Labuk Bay. On learning the vessel's ownership, Yassin decided to apprehend the pirates and report the murders to Labuan. Memadam escaped into the jungle but two of his crew were killed. The acting Consul-General, St. John, arrived to recover the schooner. In 1852, Captain Massie with three steamers was sent to apprehend the culprits. Finding Tungku deserted, he razed it; the stronghold there being finally eradicated in 1879. Lack of evidence exonerated Hussein (King and Talib 1995) but, being Usman's son (St. John 1863, p. 215), he may well have engineered the crime.

Hunt (1820, p. 64) reported that although Sandakan was technically a British port, the Sulus distrusted and would attack any vessel entering it. St. John (1863, p. 244) recorded that the Bornean elephant had

not yet been seen by Europeans. When ascending the river Baram, in the north-west coast, one of the guides I had with me said he had frequently traded in the country where elephants abounded, and that was in the interior of the Kina Batañgan river, on the north-east coast. When we went round to look for that district we failed to find the entrance of the river.

The Müller mountain range in central Kalimantan is named after a major of the Royal Dutch Indian Army, said to have been its first European traverser. In reality he probably never set foot on it. Arriving at Samarinda in 1825 with 24 Javan soldiers, George Müller negotiated with Subahdar Abdullah an annual fee from the Dutch government for rights to the duty revenue of the Sultan of Kutai. The Sultan's family and other dignitaries lambasted this agreement, convinced that for permission to sell Kutai to the Dutch, Müller had bribed Abdullah. Müller announced that his expedition would proceed overland to Pontianak and Sambas. He had intended to travel to Berau (now Tanjungredeb) to make Dutch government contact with the Sultan there, but to increase the opportunity for an assault, Abdullah misrepresented Berau as impassable owing to Dayak unrest (Dalton 1831b).

Abdullah recommended Sa Jarring (Dalton 1831a, 1831c) as a guide. This notoriously dissolute and violent young man was widely acknowledged as Müller's killer, either while Müller was asleep or with a parang while walking behind him at the rear of the

party. The panicked soldiers were speared while trying to flee across the river. Dalton (1831b) learnt that this occurred near Muarakaman (at least 300 km east of the Müller Mountains) after six days' travel. Three days later, culprits returned to Tenggara with spoils, including European arms, navigational instruments and a drum. The excellent, rust-free condition of the London-made chronometer belied the Sultan's claim that it was recovered after days in the river. Sa Jarring owned Müller's French shotgun and had melted upcountry at the news of Dalton and his Danish companion, Mr Hecksher arriving in Kutai. Dalton (1831b) believed Abdullah, the Sultan and others premeditated the murder, foisting the blame on Dayaks within 160 km of Pontianak to avert punitive action. One of the death squad, Seredin, a freedom-seeking Javan slave the Sultan bought from pirates, named Abdullah as the ringleader.

Dalton (1830) further reported that off Pulau Laut in 1819 (Buckley 1902, p. 208), Raga, a brother of the Rajah of Pagatan, waylaid the English Captain Gravessome, apparently sailing under a Dutch flag after successfully trading at Sambas and Pontianak. Enthusing about trading prospects at Tenggara, Raga accompanied him to Samarinda where, in collusion with the Sultan of Kutai, he killed him and most of his crew, sharing the booty (Dalton 1829). Dalton (1831a) spent 11 months in Kutai, eight of them on starvation rations after the Sultan stole all his property including his jacket. Dalton escaped on 2 October 1828 only by pretending that on returning to Singapore he would advance the avaricious Sultan cash and goods for produce. Even then the crew of the proa planned to murder Dalton and Hecksher for what little they retained. They survived by sleeping in turns and because the increasingly waterlogged proa distracted the crew. On beaching on 11 October at Mamuju, Sulawesi, they escaped, the Bugis village chief supplying hospitality and protection (Dalton 1831c, d).

### The holotype of *Simia morio* Owen, 1837

Dr. W. Montgomerie of Singapore sent the holotype of *Simia morio* Owen, 1837 with another Bornean orangutan skull, and the skin and skull of a Sumatran juvenile that had died in his possession soon after erupting its second permanent molars. All three were exhibited at a meeting of the Zoological Society on 25 October 1836 (Owen 1837, 1838, pl. 30). Although in 1855 the British Museum purchased the mammal catalogues of the Zoological Society museum and much of its collection (Wheeler 1997), the fate of the holotype is unknown. Richard Owen was Hunterian professor at the Royal College of Surgeons, London. Of the orangutans in catalogues of its museum by Owen (1853, p. 762) and Flower and Garson (1884, p. 10), only a female 'Mias Rambai' skull (O.C.5056) donated by Owen might be the holotype. It probably is not, as Owen (1853) classified it, '*Pithecus Satyrus*', while still recognising '*Pithecus Morio*' as a distinct species (Owen 1858). Blyth's (1836) letter to G.R. Waterhouse, the newly appointed curator of the Zoological Society museum (Wheeler 1997, p. 91), concerning 'the age of the Orang whose skin I forwarded', corroborates Blyth's (1853, p. 369) claim to have drawn Owen's attention to the specimens. Blyth (1836) wrote, 'the lady to whom it belongs ... favoured me with the enclosed extract from her brother's letter' (now lost), adding that her brother 'had the animal for some years in his possession'. This indication that

Montgomerie's sister kept the specimens after their exhibition could explain their disappearance.

Dr. J. William Montgomerie (1797–1856) arrived at Singapore in its founding year, 1819, as Assistant Surgeon with the Bengal Native Infantry (Buckley 1902, p. 60), transferring in 1827 to a post in India (Bastin 1981, p. 51). He returned in 1832 as Senior Surgeon when Singapore became capital of the Straits Settlements (Lee 1973, p. 18). In 1843, he alerted the Bengal Medical Board to the surgical application of gutta-percha (Buckley 1902, p. 402), a tree sap and forerunner of rubber, used in cable insulation. He apparently never visited Borneo or Sumatra. Bugis traders informed him that gutta-percha grew at Coti (now Tenggara on the Mahakam River, then known as the Coti or Kutai River), and (James) Brooke told him of its occurrence in Sarawak (Buckley 1902, p. 404).

### Strangers from Borneo

In a letter of December 1822, Stamford Raffles mentioned sending home the skeleton of a 5.5-foot Bornean orangutan (Buckley 1902, p. 77). It may be the skeleton (O.C.5050) he donated to the museum of the Royal College of Surgeons ([Owen] 1853, p. 759), if it was shipped before 1824 when much of the rest of his scientific collection and historical archive was destroyed by fire with the ship *Fame* shortly after it left Bengkulu, Sumatra (Buckley 1902, p. 10–12). The only other reference to the orangutan in Buckley's (1902, p. 304) history of Singapore from 1819–1867 is his report that in March 1836 'two strangers arrived from Borneo, being a pair of *Orang Outans*, brought from the interior, which excited a good deal of curiosity'. His sources evidently were two articles in the weekly *Singapore Chronicle and Commercial Register*. The first, entitled 'Strangers from Borneo', in the 5 March 1836 issue, p. 3, reads:

During the week two *Orang Outangs* male and female, have been imported from the interior of Borneo. They are, in the words of the advertisement, *beautiful*, although in our optics rather in the ill favored [sic] sense of the term. We do not remember having ever seen a larger or a more hideous looking animal than the female one, which besides possessing a most loathsome physiognomy, has very many satanic propensities about it. In a recumbent position which she assumed to display her *unequalled charms*, we were much reminded of some, weatherbeaten, withered, old flat nosed hag which, among the poorer and lower description of Bugis and Malays may occasionally be seen crawling about, without however the pilosity of the ape species. To any one proceeding on a long voyage, and exceedingly fond of having something to do, an animal of this description just from the woods, would afford an inexhaustible source of amusement by breaking the almost uninterrupted monotony of a sea passage, in taming its present savage disposition, training it to some manners, and dispose it to acquire some habits of refinement and civility, so that its value on arrival in Europe might be materially enhanced. Under proper *tuition* such an animal would be accounted cheap at a couple of hundred pounds sterling. The male is still young and gentle, though somewhat sneakishly [sic] shy, but this by a moderate supply of *modest assurance*, which could well be spared to him by his Grand-dame, he would in all probability prove an animal of no small value and sagacity.

The advertisement on p. 1 of the same issue reads: 'FOR SALE. One small, and one very large and beautiful female *Orang Outang*, just imported from Borneo. Apply at the

Chronicle Office. Singapore, 5th March, 1836'. This advert was repeated verbatim in the issues for 12, 19, 26 March and 2 April 1836.

The second article, this one entitled 'The Borneo Strangers', in the 12 March 1836 issue, p. 3, reads:

The *Orang Outangs* of which we made mention last week have attracted considerable attention, for, we understand, the greater portion of the ladies and gentlemen of the settlement have been to visit them. The female *Orang Outang*, we have been told, impatient probably of confinement and by gnawing the stout bottom bars of her enclosure and afterwards cunningly contriving to upset the same from its perpendicular, effected a temporary escape. Perched upon some crates of earthenware next morning, contemplating possibly the felicities of freedom or the misery of the late invasion of it, she was discovered in that situation by some servants, who without bidding good morning to the self liberated dame, fled with the utmost precipitation from her presence and ran to awake their dormant master who learning the cause of alarm, collected a *posse* and after a great deal of trouble succeeded at length in securing the dame, and reconducted her to her abode to which she returned evidently with all the symptoms of chagrin and disappointment clearly impressed upon her physiognomy. We had hoped as there were two vessels lately for Europe when these animals arrived, that they would have been purchased at once on speculation, and, we think, had they lived home that the speculation would not have been unremunerative, but as the hazard of a long voyage might have deterred all from such a purchase, it may be an equally lucrative adventure, if not more so, to consign them to Bengal where any of the rich natives establishing, or in possession of, a menagerie, would consider it a fit opportunity of being lavish of his money to call himself master of a female of the magnitude, strength and beauty of the animal who is yet, at this settlement, but a comparative stranger, having been only recently imported from its native woods in the interior of Borneo.

The *Singapore Chronicle and Commercial Register* of 27 February 1836, p. 4, listed the Dutch ship *Fatal Salam*, (commander) Hadjee Ismail, departed Pontianak 8 February, as the only ship arriving from Borneo that week. The *Singapore Free Press and Mercantile Advertiser* for 3 March 1836, p. 4, named it the *Fattal Salam*, 312 tons, commander Hajee Smail. This ship arrived on 24 February, more than a week before 5 March. The *Free Press*, 10 March, p. 1, listed the D(utch) barque *Mas Jadul Bahar*, (commander) Inchy Omar, arrived 3 March, departed Pontianak 19 February, as the only ship arriving from Borneo that week. This barque probably brought the orangutans. The *Free Press*, 24 March, p. 1, recorded that the *Fattal Salam* returned to Pontianak on 17 March; the *Mas Jadul Bahar* on 22.

Evidently in 1836 the capture and successful sea transport from Borneo to Singapore of a live adult female orangutan were rare, if not unique, occurrences. Even today (if permissible) they would constitute quite a feat. Other than their simultaneous presence in Singapore, we have established no closer link between Montgomerie and this orangutan. The coincidence of events might seem too extraordinary for the adult not to be the holotype of *Simia morio* but, astonishingly, the Bornean strangers probably had a different fate.

In 1836, R.W.G. Frith donated to the museum of the Asiatic Society of Bengal an adult female skeleton (4A of Blyth 1863, p. 4; 3ww of Anderson 1881, p. 14) of 'the *Sumatran* Orang-otang which lately died in Calcutta' ([Prinsep] 1837, p. 833). Khajuria (1953, p. 139) reported that only its skull (ZSI.11713) then remained at the Indian Museum, Kolkata. The skin, including the hand and foot bones, was discarded before Frith secured the rest, rescuing a few 'digital bones'. Blyth (1853, p. 371–372, pls 7–8) clarified that, probably fully adult when caught, it was actually one of a pair purchased in Singapore by the

Society's joint-Secretary, (Arthur) Grote (1814–1886). As Grote arrived in Kolkata in 1833 (Prior 2004), his purchase opportunity was short. Grote told Blyth (1853, p. 371, footnote): 'They were not from Sumatra, but from Borneo. At least I am pretty sure that my memory does not deceive me on this point'.

That Montgomerie's juvenile orangutan derived from Sumatra (Owen 1837) could be attributed to a failure of memory or communication, but that two adult female orangutans were brought alive from Borneo in about 1836 is implausible. Grote therefore probably purchased the Bornean strangers. Montgomerie evidently sourced his orangutans elsewhere. He did acquire a live male orangutan Bugis traders brought from Pontianak to Singapore in July 1826. In July 1827 he gave it, still with no permanent teeth, to George Swinton in Kolkata. By then Montgomerie had seen 'at least ten or twelve' evidently live Bornean orangutans, the largest being 'about three feet in length from the crown to the heel', including a female he owned for 12 months which died before its first permanent molars had penetrated the gum (Grant 1828, p. 1–2, 12, 15). Montgomerie (in Grant 1828, p. 16–17) also described an adult (probably male, judging by his description of the canines) Bornean orangutan skull, collected for Raffles on his last visit to Singapore (in 1823), but believed lost in the destruction of the *Fame*. Its collector, 'a country-born Frenchman, (a native I believe of Chandernagore,)' was undoubtedly Pierre-Médard Diard (1794–1863, see Brandon-Jones 2004, p. 1567), who is known to have collected near Pontianak in about 1826 (Müller and Schlegel 1841, p. 71), sending the National Museum of Natural History (now Naturalis) at Leiden in the Netherlands four mounted orangutan specimens and two adult male skeletons (Temminck 1841, p. 135).

### **The type localities of *Simia morio* Owen, 1837; *Simia crossii* Wagner, 1839; *S. hendrikzii* Wagner, 1839; and *S. straussii* Wagner, 1839**

The holotype of *Simia crossii* Wagner, 1839, said to be Sumatran (Owen 1837, p. 91, 1838, p. 168) but in CPG's opinion unequivocally Bornean, is an adult orangutan skull owned by (Edward) Cross (1774–1854, proprietor) of the Surrey Zoological Gardens, Kennington, London. Owen's (1835, p. 377, pls 53–54, 56) description and figures supplied the basis for the name. Its male canine morphology precludes it from being the Sumatran adult female Temminck (1841, p. 136, 368–369) saw in the collections of the Zoological Society in London. The Natural History Museum, London, has an adult male orangutan skull, ZD.1844.3.30.18, also unequivocally Bornean (CPG), purchased from Cross. It strongly resembles Owen's (1835) figures, including having a centrally located suture on the zygomatic arch, but the match seems inexact, unless artistic licence has been exercised.

The holotype of *[Simia] hendrikzii* Wagner, 1839 is the plaster cast (no. 7197) at the Königliche anatomische Museum in Berlin of an (adult) orangutan skull owned by Professor Hendrikz. Its type locality is unrecorded, but its availability to Müller (1836, p. xlvii) establishes that it was collected before 1836.

The holotype of *Simia straussii* Wagner, 1839 is an adult skull with significant dental attrition, brought from Borneo by Dr. Strauss and sent by Professor Rudolph Wagner for Wagner (1839, cols 417–419) to examine.

The historical evidence indicates that, like the holotype of *Simia morio* Owen, 1837, these three holotypes probably came from the Bornean south or west coast, as other coasts were then dangerous destinations. If operational at all, Mempawah and Sukadana no longer functioned as major ports, but orangutans could have originated from Banjarmasin or Sambas. By then the Dutch had probably monopolised trade with Banjarmasin via Jakarta so, even if Pontianak did not export the holotypes, the most likely alternative is the not-too-distant Sambas.

### James Brooke's orangutan collection of 1840

James Brooke (1841) sent the Zoological Society five live orangutans: one from Sadong (Sarawak), three from Pontianak and one from Sambas, with instructions to Captain Swan that they were to be preserved in alcohol if they died on his ship, the *Martin Luther*. Brooke (1841) did not recount how he obtained his Pontianak and Sambas orangutans, but he knew the Kapuas River as the Pontiana or Kappawas and reported second-hand that a half-day or daylong mountain crossing from the headwaters of the Sadong or Sarawak rivers brought you within two days' river journey of Sanggau (Brooke 1848a, p. 255). The Sambas adult female may have been obtained from Chinese of the San Ti Qu kungsi (company) from Sambas who mined gold and antimony on the Sarawak River under licence from the Sultan of Brunei (Brooke 1848a, p. 289). However, Brooke (1848a, p. 304) reported that turtle eggs from the islands of Talang Talang were 'exported to Sambas and Pontiana, and all along the S.W. coast' and that a fish spawning in April attracted people from far afield, including Sambas (Brooke 1848a, p. 305). There was evidently ample intercourse between these areas.

Twenty-five orangutan skulls and 14 skeletons donated by Brooke (1842) were displayed at the Zoological Society's meeting of 11 January 1842. Most of this 'fine collection ... from the north-west coast of Borneo, either shot by myself or brought by the natives' (Brooke 1841, p. 55) is now preserved at the Natural History Museum, London. The accession numbers allocated to the series, ZD.1855.12.26.2–21, were never applied to the specimens. They are now registered as ZD.1986.1092, ZD.1986.1095–1109, ZD.1986.1112–1114 and ZD.1986.1118–1120 (Jenkins 1990, p. 50–52). Most skulls of this series are numbered from 1 to 25 in the mammal catalogues of the Zoological Society museum. Evidently this was Brooke's (1841, p. 59) sequence with which he specified the five orangutans he shot, and the two that 'died aboard', presumably en route from Sarawak to Singapore where Brooke (1841, p. 55) wrote his letter. Brooke (1848a, p. 241) left for Singapore on 14 February 1841. With the 18 specimens procured from natives (Brooke 1848a, p. 227), some of them at Sangi (= Kampong Ensegei Melayu, 1°25'N, 110°38'E) on 19 September 1840 (Brooke 1848a, p. 229), the total of 25 seems accurate. Most specimens retain their Zoological Society numbers in ink on the skull or skeleton. These accession numbers diverge from Brooke's sequence. Brooke apparently also instigated an uncorrelated numerical sequence from at least 29 to 43 expressly for skeletons. Two specimens without Brooke skull numbers, ZSL.1098 (ZD.1986.1100, probably the Sambas adult female) and ZSL.1131 (ZD.1986.1114) may be two of the five sent home alive.

Brooke (1848a, p. 224) shot his second adult female orangutan (probably ZSL.1096, ZD.1986.1119) near Kundah hill (= Bukit Punda, 1°11'N 110°51'E) by the Sadong River on

16 September 1840, less than three weeks into his second period in Sarawak after a six-month visit to Sulawesi (Brooke 1848a, p. 172, 176). Brooke (1841, p. 57) claimed he shot his first specimen, an adult male (ZSL.1087, specimen untraced) some days before, 'about thirty miles distant', but his journal records that he actually shot it very near the other ones, apparently (unless there is a hiatus in the journal extracts) on the previous day (Brooke 1848a, p. 218). The infant taken alive from the first adult female (probably ZSL.1089, ZD.1986.1102), shot on the same day as the male (Brooke 1848a, p. 222), is probably ZSL.1090 (ZD.1986.1106), which 'died aboard'.

Brooke (1841, p. 55) believed that, based on the presence or absence of cheek flanges and the development of the cranial sagittal ridge, his material and native reports could 'beyond a doubt, prove the existence of two, if not three distinct species in Borneo'. Brooke (1841, p. 56) recorded cheek flanges of 'nearly two inches in thickness' in the first male (seemingly qualifying it as a Mias Pappan) whilst he incongruously asserted its 'wide distinction from the pappan, or, as the Dyaks call it, chappin' (Brooke 1848a, p. 222) and that he had 'not seen the largest mias pappan' (p. 225).

Datu Maraja, of Simunjang, had often seen the female pappan in the woods about his residence, but the rembi was not found there. The females had the cheek callosities as well as the males. At Sangi a Dyak came to inform me he had killed a large mias, and wanted to know if I would buy it. I inquired what sort it was: he answered by putting his hands on each side of his face to intimate it was a pappan. I then asked was it a male or female. He replied, a female. How did he know? Because she had a young one in her arms. I promised to buy the head, but unfortunately he never returned. I may add, that in some places the rembi alone is found; at Linga the pappan is unknown. (Brooke 1848a, p. 227)

### **The type specimens and type localities of *Pithecus brookei* Blyth, 1853, *P. owenii* Blyth, 1853 and *P. curtus* Blyth, 1856b**

Concurring that there are at least three distinct species of orangutan, Blyth (1853, p. 375, footnote) proposed that the Mias Rambli should be named *Pithecus brookei* in honour of Brooke (1841), its first discriminator. One syntype is the skull of a Bornean adult male (Blyth 1853, p. 369, 383, pls 3–4; 3D of Blyth 1863, p. 3; 3nn of Anderson 1881, p. 13), donated to the museum of the Asiatic Society of Bengal in July 1838 by Major (William Michael) Gregory (1789–1842), and now apparently consisting only of a mandibular ramus (ZSI.11723) at the Indian Museum, Kolkata (Khajuria 1953, p. 139). The other syntype is the skull of a Sumatran adult male (Blyth 1853, p. 369, footnote, 383, pls 1–2) simultaneously loaned by Gregory to the museum. Both are cranially larger than the holotype of *Pongo abelii*. As the Society already owned that Sumatran specimen, Gregory retained possession of his (E[vans] 1838), but evidently he did not reclaim it, as it apparently still exists at the Indian Museum (3 C of Blyth 1863, p. 3; 4b of Anderson 1881, p. 25; ZSI.11727 of Khajuria 1953, p. 138).

Blyth (1853, p. 369) categorised the holotype of *Simia morio* as a Mias Kassar. He presumed it male as its alveolus is deeper, its maxillary premolar and molar row longer, and its zygomatic arch sturdier (Blyth 1853, p. 371) than in adult female ZSI.11713 (donated by Frith; see Strangers from Borneo, above). The canine morphology in Owen's (1838, pls 33–34) figures, however, unequivocally diagnoses the holotype as

female. The permanent canine of a female orangutan is spearhead-shaped and almost mesio-distally symmetrical. In the male it is more fang-like, often with a distal spur at the crown-root junction. Ironically, this (sexual) dimorphism was Owen's (1837, p. 95, 1838, p. 171) chief diagnostic feature of *S. morio*. Brooke (1841, p. 59) misdiagnosed his adult female no. 9 (ZSL.1099, ZD.1986.1098) as an adult male. Blyth (1853, p. 369, 383) mistakenly regarded the Bornean syntype of *Pithecus brookei* as female. Confusion between sexual dimorphism and speciation in the orangutan was thus inevitable.

The type locality of *Pithecus brookei* Blyth, 1853 depends on a lectotype designation. Since 2000, a lectotype designation is invalid unless its taxonomic purpose is specified (*International Code of Zoological Nomenclature*, Article 74.7.3). As the origin of the syntypes remains inexact, a designation here would achieve nothing. If a syntype proved to represent a taxonomically distinct unnamed Bornean population, then its designation as the lectotype would be appropriate. According to Helfer (1838, p. 858), however, Gregory brought both skulls from Sumatra. Should a second Sumatran subspecies be recognised, designation of the Sumatran syntype, depending on its precise locality, might be appropriate.

Being published before 1961, the conditionally proposed *P[ithecus] owenii* Blyth, 1853 (p. 375, footnote, 381–383, pls 9–10) is an available name (*International Code of Zoological Nomenclature*, Article 11.5.1). The holotype is the mounted skin and skeleton of a female that had lived for 12 years in captivity with J. Apcar in Kolkata; Apcar donated it in 1846 to the museum of the Asiatic Society of Bengal. Both Blyth (1853) and Anderson (1881, p. 12, specimen 3bb) attributed its abnormal morphology to captive conditions. Blyth (1853, p. 372) designated it as adolescent, specifying that its maxillary and mandibular third molars 'had just pierced the gums'. It was six months old when Apcar obtained it. Blyth (1847, p. 729, footnote) had often seen it alive, seemingly always mild and good-natured. Its age indicates that it was a subadult, probably with dietary deficiency causing retarded dental eruption. Blyth (1863, p. 4, specimens 4D and E) later referred it to *Simia morio*. It now remains at the Indian Museum, Kolkata, apparently as a skull only (ZSI.11805). Khajuria (1953, p. 142, mistakenly) credited W. Rutledge as its donor. This female, captured before 1835, probably originated from Pontianak or Sambas.

Writing to Charles Darwin for his opinion of Wallace's (1855) paper on speciation, Blyth (1855) famously referred to the author as 'friend Wallace'. Blyth (1856b, p. 526, footnote) cited an unnamed 'friend who has resided long in Borneo, and has examined numerous skulls of Orang-utans (including those which have passed through the hands of Sir J. Brooke)'. Wallace had been in Sarawak since 1 November 1854 (Wallace 1869, p. 46) and is probably this friend who conjectured that, '*P[ithecus] OWENII* represents, in the southern part of the great island, the *P. MORIO* of the northern part' (Blyth 1856b, p. 526, footnote). No evidence of a southern origin for *P. owenii* was specified, but this brings Banjarmasin into contention as the type locality.

The holotype of *Pithecus curtus* Blyth, 1856b (p. 520, 525–526) is the skeleton of an adult Bornean orangutan which James Brooke donated in 1855 to the museum of the Asiatic Society of Bengal. Khajuria (1953, p. 138) credited Brooke as donor to the Indian Museum, Kolkata, of only one orangutan skeleton (ZSI.11709). Whether it is the holotype or, if not, whether the holotype still exists there but with mislaid data, should be determinable by the limb brevity that prompted the name *P. curtus*. Blyth's (1856b,

p. 526, footnote) observations that the canines are eroded to incisor height and that especially the mandibular canines of most males and some females exceed its in circumference, discredits Blyth's (1856b, p. 520, 1863, p. 4, specimen 3Q) and Anderson's (1881, p. 14, specimen 3vv) diagnosis of the holotype as male.

The type locality of *Pithecus curtus* can be provisionally restricted to Sadong, the only more precise locality specified for any of the seven orangutan skeletons Brooke donated in 1855 (Blyth 1856b, p. 522–524; Anderson 1881, p. 14) in two consignments: two skeletons arriving before July (Blyth 1856a); the rest in July–September (Blyth 1856c). From unspecified characteristics (probably their colour or incompleteness), Blyth (1856b, p. 524) inferred that the three Sadong skeletons had been prepared by burial. Their donation in the year the Zoological Society museum disbanded may not be coincidental. Rather than collecting fresh skeletons, Brooke may only have redistributed his existing material. The presence of only seven of his orangutan skeletons at the Natural History Museum, London (Jenkins 1990), substantiates this possibility. ZSL numbers in ink on the bones would confirm it. The only two of the series (ZD.1986.1100 and ZD.1986.1114) which are possibly from Pontianak or Sambas (see Brooke's 1840 orangutan collection, above) are at the Natural History Museum, so the type locality is fairly secure. The details of the seven skeletons do not match records of Wallace's collection (Wallace 1869; Cranbrook et al. 2005).

### The holotype and type locality of *Pan vetus* Miller, 1915

Gerrit Smith Miller, Jr. (1869–1956) instigated the name *Pan vetus* Miller, 1915 for the Piltdown mandible, believing it a fossil chimpanzee contemporaneous with the more human cranial fragments allegedly found with it. The holotype (also that of *Boreopithecus dawsoni* Friederichs 1932) is an orangutan right mandibular ramus (accession number E.594) with first and second molars *in situ*. Despite protesting to Miller that the scientific name of Piltdown man 'was based solely on the mandible' (Spencer 1990, p. 134), Woodward (1913, p. 129) associated together the mandible and brain-case fragments 'without any hesitation'. His uncertainty was only that the cranial characters might not be diagnostic (Woodward 1913, p. 135). He specified no holotype. Miller (1915, p. 19) was therefore justified in designating the left temporal bone (E.591) as the lectotype of *Eoanthropus dawsoni* Woodward, 1913. As first reviser, his designation is definitive (International Code of Zoological Nomenclature, Article 74.1).

De Beer (1955) requested the International Commission on Zoological Nomenclature to reject all scientific names (including *Homo piltdownensis* Keith 1931) instigated for 'Piltdown Man', claiming that its hypothetical basis excludes such names from zoological nomenclature (International Code of Zoological Nomenclature, Article 1.3.1), but this contention is specious, as the authors treated the finds as authentic relics of real animals, and their type specimens are tangible skeletal parts. The Commission cannot force a zoologist to abandon a conviction, however improbable, that all or part of the assemblage was genuine and the described taxa recognisable. Now that the remains have been re-identified, the names attached to them are available should they prove to represent recognisable taxa, such as a subspecies of orangutan. The remains are preserved at the Natural History Museum, London (Oakley 1971, p. 35).

Edgar William Willett (1856–1928), an early-retired anaesthetist, was a friend of Charles Dawson (1864–1916), the solicitor and antiquarian who brought the Piltdown finds to public attention (Spencer 1990, p. 18–19, 23, 33, 87–88, 222). Willett or his father, the wealthy brewer and businessman Henry Willett (1823–1905), probably acquired the Piltdown mandible from Alfred Hart Everett (1848–1898) whose cave explorations in Sarawak they had sponsored (Sherratt 2002, fig. 1). This provenance is corroborated by the mandible not having been boiled (Oakley 1959, eliminating most research specimens), its radiocarbon date of  $90 \pm 120$  years BP (Hedges et al. 1989, p. 210), its undiminished nitrogen content and its finely crackled bone surface (not replicable by Oakley 1959) resembling that of an adult male orangutan skull ZD.1884.10.30.2 Everett collected. Everett (1879, nos. 100 and 111) doubted the cave origin of ZD.1884.10.30.2. It and the Piltdown mandible were probably trophy skulls (perhaps with surface altered by proximity to a fire). The subsequently announced first molar, apparently the left one from the same mandible (Clark 1955, p. 239; Hrdlička in Spencer 1990, p. 162; Oakley in Spencer 1990, p. 210–211; C. Stringer, I. De Groot and C. Dean, e-mail, 16 April 2013), indicates the fraudsters broke a complete mandible. Its small size, virtually unworn molars (before artificial abrasion), incompletely erupted missing third molar, and immature canine (Clark 1955) diagnose the mandible as from a subadult female. Miller (1915, p. 12) discussed the canine, but omitted it from his paradigm of *Pan vetus*.

Two of the 32 caves Everett (1880, p. 311) examined are in Gunong Subis on the Niah River. As discussed above, orangutans no longer occur there, so the Piltdown mandible probably came from one of the other 30 caves, all in 'Upper Sarawak Proper'. Fourteen are in the Bidi and Paku districts. The caves were assigned numbers but few were named in Everett's (1879, 1880) published reports: Ahup, on the Sambas-Sarawak frontier; Guah Kokan in the Kapoh hill at Bidi; Kawa cave near Bidi; a cave in the Eusunah gorge, near Paku; an old gold cave at Piat; cave No. 14 at the second milestone on the Tagora road; Gunong Jawang; and two on Jambusan hill. It being the only specified locality from which Everett (1879) recovered orangutan material, the type locality of *Pan vetus* is here provisionally restricted to (Gunong) Paku (1°26'N 110°11'E), Sarawak, Malaysia. For the approximate location of this site, 6 km along a tramway from Busau (= Buso), see Hornaday (1885, p. 477).

### Subspeciation in the orangutan

Warren et al. (2001) determined and analysed mitochondrial DNA (mtDNA) control region sequences from six Bornean orangutan populations, identifying four regional groups: an eastern one from Kutai NP; a southern one from Gunung Palung NP and Tanjung Puting NP; a western one from Danau Sentarum, Kalimantan, and Semongok Wildlife Rehabilitation Centre, Sarawak; and a northern one from Sepilok Orangutan Sanctuary, Sabah. The western and northern groups are indistinct at the more stringent 1% significance level. Pairwise group sequence divergence ranges from 2.1% within the southern group, to 6.5% between the southern and western groups, rising to 16.5% to 19.2% between Bornean and Sumatran populations. Four orangutans of uncertain origin falling within the Bornean clade but outside the regional groups imply more such

groups exist. Consistent western group mtDNA affiliation of hair samples from the nest of a wild Kutai NP individual indicates it was a released ex-captive.

Multivariate analysis by Groves et al. (1992) cranially pooled north and west Bornean adult female orangutans. Adult males from these regions are more distinct, especially when mandibular dimensions are included. Sumatran and south Bornean adult orangutan skulls are almost completely distinct from north Bornean ones (which had the smallest sample size), but partially overlap the west Bornean ones (with the largest sample size) and one another. Measurements of two adult male skulls confiscated in Samarinda and thought to be from Kutai NP assigned them to the northern group (Groves 2001). Uchida (1998) found south Bornean orangutans dentally resemble Sumatran ones more closely than do west Bornean orangutans, although in her canonical analysis the Bornean populations mutually overlap but not with the Sumatran population.

A spatial analysis of molecular variance (SAMOVA) corroborates the seven main star-like geographic clusters in the phylogenetic network Arora et al. (2010) generated from the mitochondrial haplotypes of 211 orangutans from 10 sites in Borneo. Except for Danum Valley clustering with south Kinabatangan about 90 km away, and Gunung Palung sharing its only haplotype with Sabangau, this indicates almost complete separation of all sampled sites. Their recent mean coalescence date of 176 ka (95% highest posterior density, 72–322 ka) is compatible with post-glacial Bornean orangutan dispersal from a rainforest refugium in north central Borneo, roughly midway between the sampling sites. If Brandon-Jones' (1996) inference is correct that a dry period provisionally dated at 190 ka eradicated all primates from Sumatra, the much earlier coalescence of Bornean and Sumatran haplotypes (mean, 3.6 Ma; 95% highest posterior density, 2.3–5.0 Ma; as calculated by Arora et al. 2010) perhaps would indicate that orangutans recolonised Sumatra from Indochina rather than from Borneo (Brandon-Jones 1998). This alternative might be testable if the late Pleistocene orangutan skeleton from Vietnam (Bacon and Vu 2001) can supply DNA. In all events, if both morphological and molecular evidence correctly indicate that *Pongo pygmaeus* and *P. abelii* are separate species, the affiliation of the Indochinese population requires clarification.

Concluding that currently recognised Bornean orangutan subspecies are (contrary to expectations, by definition) not reciprocally monophyletic, Arora et al. (2010) linked the north and south regional groups. Within this aggregation, the southern population west of the Kahayan River is most distinct. The east and west regional groups are interlinked on a separate branch, but otherwise are no more distinct than the trans-Kahayan population. This perhaps indicates that a latitudinal dispersal preceded a longitudinal one and that the most recent spread is across or round the Kahayan River, creating the illusion that the Kapuas River is a taxonomic boundary. Based on this analysis, if Banjarmasin is accepted as the type locality of *Pongo pygmaeus*, at least three Bornean orangutan subspecies might be recognised: a western one for which the name *P. borneo* seems the earliest, an eastern one (apparently unnamed, unless one of the *Pithecus brookei* syntypes came from east Borneo), and the nominotypical north-south one. The cranial evidence favours splitting the latter. The molecular evidence of Arora et al. (2010) and Nater et al. (2011) seems to preclude referring the trans-Kahayan population to *P. abelii*. Their evidence strengthens the case (discussed in depth by Steiper [2006]) for treating *P. abelii* as a separate species.

Nater et al. (2011) found Sumatran orangutans form four strong mtDNA geographic clusters, with the southernmost one at Batang Toru (1°40'N, 99°05'E) genetically closest to the Bornean sampled sites. The Sumatran orangutan Y-chromosomal haplotype network is much tighter, but subspecies may be recognisable.

## Discussion

A problem in orangutan nomenclature is that Pontianak is a probable port of export, rather than a collecting locality. At the time the holotypes of *Simia morio*, *Simia crossii*, *S. hendrikzii*, *S. straussii* and *P[ithecus] owenii* were collected, Pontianak was also a synonym for the Kapuas River, the main artery for trade with the interior (Brooke 1848a, p. 370). Skull and dental measurements seem insufficiently discriminatory to determine whether the holotypes were collected north or south of the Kapuas.

Even if it is assumed that the holotypes originated from the immediate vicinity of Pontianak, it remains unconfirmed that the Pontianak and Sadong River populations pertain to the same subspecies. If the populations did attain their recent distributions in the above-described manner, rainforest regeneration and orangutan dispersal probably hugged the mountains before descending into the lowlands. Pontianak is about midway between the two highland areas of west Borneo, so orangutan populations could have reached it from either direction. The intervening Kapuas River perhaps favours a northern route but, without unequivocal contrary evidence, *Pongo pygmaeus borneo* may include the trans-Kahayan population. The National Museum of Natural History, Smithsonian Institution, Washington, DC, has three orangutan skins with skulls from Sungai Sama (Lyon 1907, p. 548, 571), close enough to Pontianak to act as a proxy for this now possibly extinct population. DNA extracted from tissue samples might settle this issue.

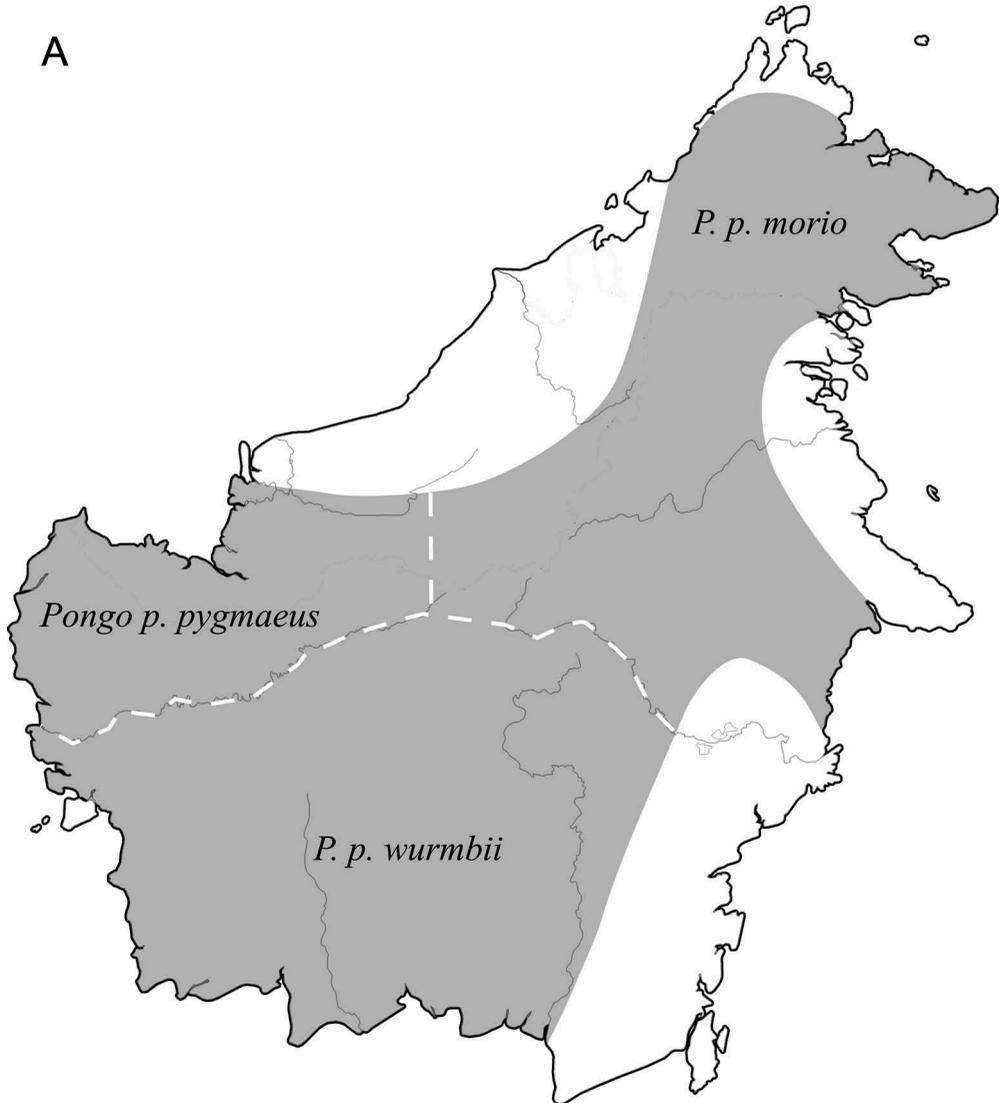
## Conclusions

We conclude that the holotype of *Pongo pygmaeus* (Linnaeus 1760) is a Bornean orangutan, almost certainly from the south or west coast, obtained in China by Charles Lockyer, probably at Guangzhou in late 1704. It probably originated from Banjarmasin, though possibly from Sukadana or Mempawah. In about 1740, Lockyer gave it to Hans Sloane who bequeathed it to the British Museum, London. Most of the holotype was destroyed there in about 1850, but its skull may be the one preserved at Uppsala, Sweden.

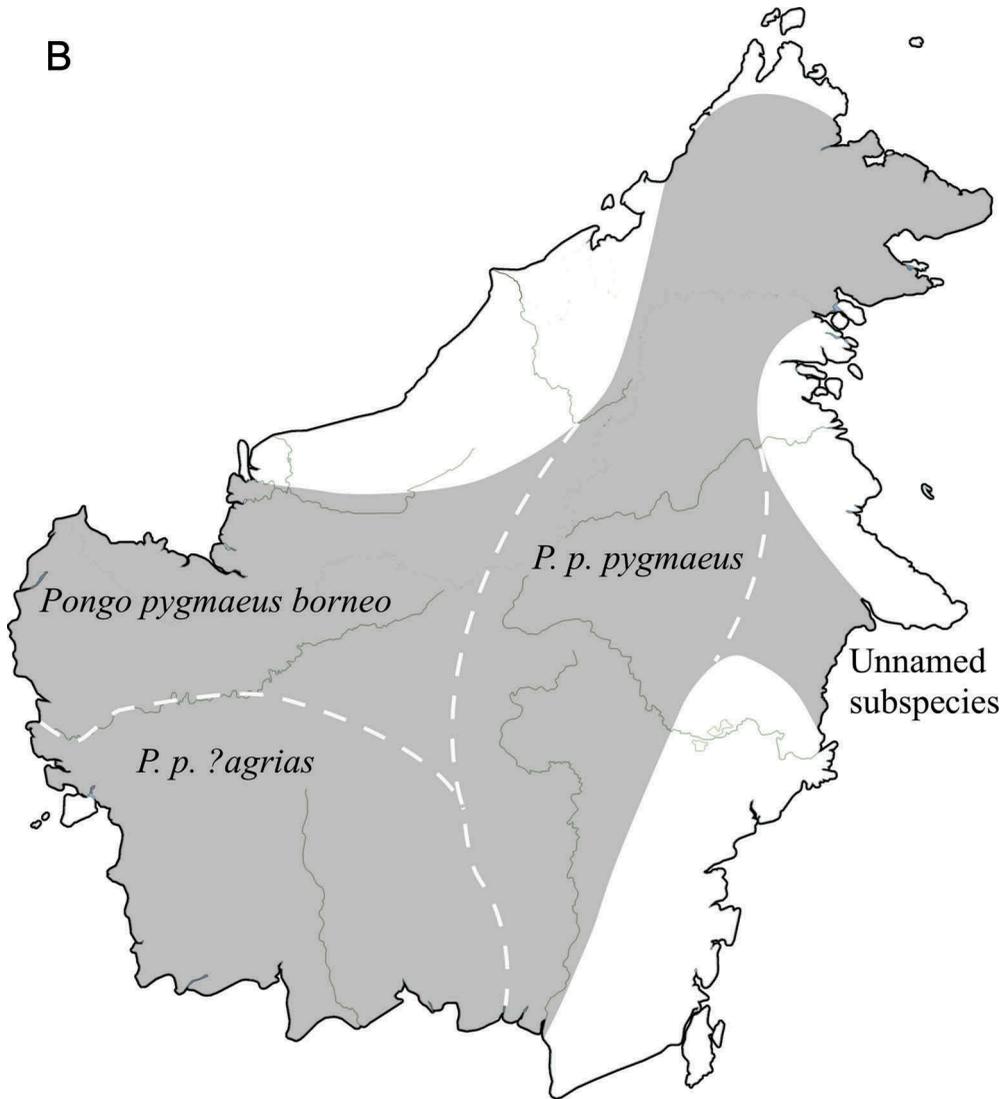
We consider Pontianak the most probable type locality for *Simia morio* Owen, 1837, *Simia crossii* Wagner, 1839, *S. hendrikzii* Wagner, 1839, *S. straussii* Wagner, 1839 and *P[ithecus] owenii* Blyth, 1853. *P. brookei* Blyth, 1853 has two syntypes, one from Sumatra, the other probably from Borneo. Unless more syntype history comes to light, attempting to settle its type locality with a lectotype designation would currently be pointless and therefore invalid. We provisionally restrict the type locality of *P. curtus* Blyth, 1856b to the Sadong River, and that of *Pan vetus* Miller, 1915 to Paku, Sarawak. The type localities of some species-group names available for the Bornean orangutan remain imprecise but, if Banjarmasin is accepted as the type locality of *Pongo pygmaeus*, then *Pongo borneo* Lacépède, 1799 is the earliest available name for the Pontianak population.

Regrettably, this reverses the subspecific nomenclature advocated by Groves (2001) but, as we here subsume both *P. wurmbii* Tiedemann, 1808 and *S. morio* into *P. borneo*, the new nomenclature is unlikely to be confused with the old (Figure 5A and B).

In recent times, most institutions housing captive specimens have scrupulously avoided interbreeding Bornean and Sumatran orangutans. If Borneo proves to hold several subspecies, then it is equally important to try to avoid interbreeding them, either in captivity or by reintroduction or translocation into the wrong area. We therefore advocate tentative recognition of the four subspecies outlined above. We baulk at instigating a new scientific name for the eastern subspecies until its credentials are more



**Figure 5.** The nomenclature and geographic distribution of the subspecies of *Pongo pygmaeus*, (A) following Groves (2001), and (B) as revised in this paper



**Figure 5.** (Continued)

firmly established and the availability of an existing name is more comprehensively excluded. We recommend that the name *Pongo pygmaeus borneo* is provisionally adopted for the western subspecies, but that an urgent attempt is made to confirm that it is a senior synonym of *Pithecus curtus*, which otherwise should replace it for that subspecies, releasing the name *Pongo borneo* for the trans-Kahayan population. If *P. borneo* is unavailable for the trans-Kahayan population, *Simia agrias* may be available. If orangutans were already scarce at Banjarmasin by 1770, the holotype may derive from the nearby trans-Kahayan population. Available evidence indicates that *Pongo borneo* predates *Simia agrias* Schreber, 1799 by at least a few weeks. If the two names prove to

have been published simultaneously and to represent the same subspecies, as first revisers we award priority to *Pongo borneo*, the one with an unequivocal type locality.

### Systematics

#### ***Pongo pygmaeus pygmaeus* (Linnaeus, 1760)**

[*Simia*] *Pygmaeus* Linnaeus, 1760

*Ourangus outangus* Zimmerman, 1777 (published in a work suppressed in 1954 for nomenclatural purposes by Opinion 257)

*Satyryus rufus* Lesson, 1840

*Satyryas* [sic] *Knekias* Mayer, 1856

*Satyryus sundaicus borneensis* Mayer, 1856

Central and eastern Sabah, Malaysia, through central Kalimantan, Indonesia, south to Sungai Lading (Arora et al. 2010), and formerly farther south to Banjarmasin (the type locality). If this is the most archaic Bornean subspecies, it is probably the closest living relative of the north Sarawak population, extinct throughout the Holocene, and known only from Niah subfossil cave material. Cranially resembles *Pongo pygmaeus borneo* but adult male skulls smaller, especially in mandibular dimensions. These cranial characters are unconfirmed in the southern population.

#### ***Pongo pygmaeus borneo* Lacépède, 1799**

*Simia pongo* Cuvier, 1797 (a primary homonym of *Simia satyryus pongo* Kerr, 1792 = *Homo sapiens* Linnaeus, 1758)

*Pongo borneo* Lacépède, 1799

*Pongo Wurbmii* Tiedemann, 1808

*Simia Morio* Owen, 1837

[?] *S[imia] Wallichii* Gervais, 1838

[?] *Simia Crossii* Wagner, 1839

[?] *S[imia] Hendrikzii* Wagner, 1839

[?] *Simia Straussii* Wagner, 1839

[?] *Pithecus Brookei* Blyth, 1853 (in part)

*P[ithecus] Owenii* Blyth, 1853

*Pithecus curtus* Blyth, 1856b

*P[ithecus] satyryus batangtuensis* Selenka, 1896

*P[ithecus] satyryus dadappensis* Selenka, 1896

*P[ithecus] satyryus genepaiensis* Selenka, 1896

*Pithecus satyryus landakkensis* Selenka, 1896

*P[ithecus] satyryus rantaiensis* Selenka, 1896

*P[ithecus] satyryus skalauensis* Selenka, 1896

*P[ithecus] satyryus tuakensis* Selenka, 1896

*Simia satyryus Wallacei* Selenka, 1898

*Troglodytes Dawsoni* Boule, 1915

*Pan vetus* Miller, 1915

*Boreopithecus dawsoni* Friederichs, 1932

*Pongo satyryus borneensis* Röhrer-Ertl, 1984

Southern Sarawak, Malaysia, and adjacent Indonesia, formerly possibly farther west to the Kapuas River. If its distribution excludes the Pontianak vicinity (the type locality of *Pongo borneo*) it will require renaming. Cranially resembles *Pongo p. pygmaeus* but adult male skulls larger, especially in mandibular dimensions.

### ***Pongo pygmaeus* possibly unnamed subspecies**

[?] *Simia Agrias* Schreber, 1799

Southern Kalimantan, Indonesia, between the Kahayan and Kapuas rivers and formerly possibly farther west to Pontianak (in which case it takes the name *Pongo pygmaeus borneo*). Resembles *Pongo pygmaeus borneo* in palate size but rest of skull much larger.

### ***Pongo pygmaeus* probably unnamed possible subspecies**

Known only from Kutai NP, Sangatta and Sungai Menganne (0°49'N 117°57'E, USNM) in East Kalimantan, Indonesia. Diagnosed only genetically; cranially resembles *Pongo p. pygmaeus*.

***Pongo abelii* Lesson, 1827**

*Pongo Abelii* Lesson, 1827

*Simia Gigantica* Pearson, 1841

*P[ithecus] bicolor* Geoffroy Saint-Hilaire, 1842

*Pithecus Brookei* Blyth, 1853 (in part)

[*Satyus*] *sundaicus sumatranus* Mayer, 1856

*P[ithecus] sumatranus abongensis* Selenka, 1896

*P[ithecus] sumatranus deliensis* Selenka, 1896

*P[ithecus] sumatranus langkatisensis* Selenka, 1896

(published in synonymy, therefore unavailable)

[?] *Pongo pygmaeus palaeosumatrensis* Hooijer, 1948

North Sumatra, Indonesia

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No potential conflict of interest was reported by the authors.

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