

The history of the Dodo *Raphus cucullatus* and the penguin of Mauritius

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Abstract

More has been written about the dodo *Raphus cucullatus* of Mauritius than any other bird. However, much of the information has been derived from few genuine but inadequate contemporary accounts and illustrations, yet a wealth of assumptions and over zealous mis-interpretation about dodos' ecology and morphology has taken place. Here all aspects of the dodo's ecological history, contemporary accounts and illustrations, importation of specimens and fossil record are examined, and evidence is provided to suggest that many conclusions based on the available data are problematic.

Keywords: *Raphus cucullatus*, *Mauritius*, *Dodo*, *penguin*

Introduction

Many spectacular island terrestrial vertebrates have disappeared over the past few centuries—a minutia in terms of geological time—yet the pitiful epitaphs of these vanished species comprise frequently just a few bones and a handful of inadequate historical accounts. Prior to the discovery of sufficient skeletal material, Strickland and Melville (1848) presented a most fitting summary in their now classic monograph on the Dodo *Raphus cucullatus*, highlighting the complications that study of a species so recently lost to the world could entail.

In the case of the didinae, it is unfortunately no easy matter to collect satisfactory information as to their structure, habits, and affinities. We possess only the rude descriptions of unscientific voyagers, three or four oil paintings, and a few scattered osseous fragments, which have survived the neglect of two hundred years. The paleontologist has, in many cases, far better data for determining the zoological characters of a species which perished myriads of years ago, than those presented by a group of birds, which were living in the reign of Charles the First (Strickland and Melville 1848).

Based on almost no evidence at all, such has been the enthusiasm by scientists, historians and ornithologists alike to place credence on any available source,

the Dodo *Raphus cucullatus* of Mauritius has become one of the most famous birds in the world; probably more has been written about it than any other species. In the early years of the 19th century, scientific interest in the Dodo intensified culminating in the discovery of the first fossil material in 1865 (Clark 1866). This resulted in a number of publications; however, many were founded on speculation, an unfortunate practice that continues to the present day. Too much emphasis has been placed on discrepancies in contemporary accounts and illustrations and all too often these sources are not properly analysed. To further confuse the issue, unfounded claims for large numbers of imported Dodos have given illustrative variation substance, supposedly providing supporting evidence for morphological attributes (Oudemans 1917; Rothschild 1919; Hachisuka 1953).

The aim of this paper is to examine the Dodo illustrations both from an artistic and scientific viewpoint, thereby highlighting the subsequent erroneous literature. Certain facts about the Dodo are questioned, in particular their supposed inedibility, morphology and ecology. The human occupation of Mauritius is also reviewed and evidence provided here indicates that anthropogenic activity was extremely limited during the time Dodos

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were still extant, thus, the disappearance of the Dodo can be correlated with the introduction of specific exotic animals. Some of the early accounts have been plagiarised on numerous occasions and only few paintings are credible works from live birds; these will be discussed in some detail. The transportation of live Dodos is also re-examined and contrary to reports (Hachisuka 1953), perhaps as few as 3–4 specimens, dead or alive, survived the journey to Europe. A chronology of the genuine accounts and events is also given and an early example of misinterpretation, which occurred contemporarily with the existence of the Dodo, is presented resulting in a depiction of a penguin on Mauritius.

Mauritius; geography and discovery

The volcanic and isolated Mascarene Islands, comprising Mauritius, Réunion and Rodrigues, are situated in the western Indian Ocean (Figure 1). Mauritius (20.25° S, 57.5° E), lies 829 km east of Madagascar and was once home to a variety of endemic and unusual species. Early Arab traders probably discovered the Mascarene Islands as early as the 13th century, followed by the Portuguese in the early 16th century (North-Coombes 1971), but neither the Arabs nor Portuguese, as far as it is known, settled there (North-Coombes 1971). Following the “rediscovery” and acquisition of Mauritius by the Dutch in 1598, tales of the idyllic paradise soon spread around the maritime powers of Europe (Moree 1998). For a short period thereafter, the Dutch under the VOC (Dutch East India Company) recorded in ships’ logs and journals vague and inadequate references to the

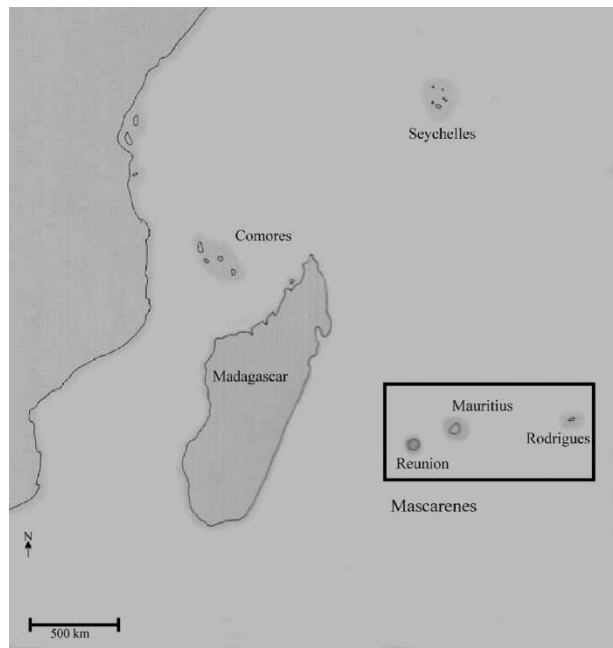


Figure 1. Map of the Indian ocean and Mascarenes (inset right).

original fauna and flora. Nevertheless, these early accounts are invaluable in determining the island’s original ecological composition, since by the end of the seventeenth century Mauritius had been altered beyond recognition due to the ravages of man and his commensal animals.

Chronology of historical accounts

It was standard practice for VOC fleets to record all details concerning their voyages and this also included

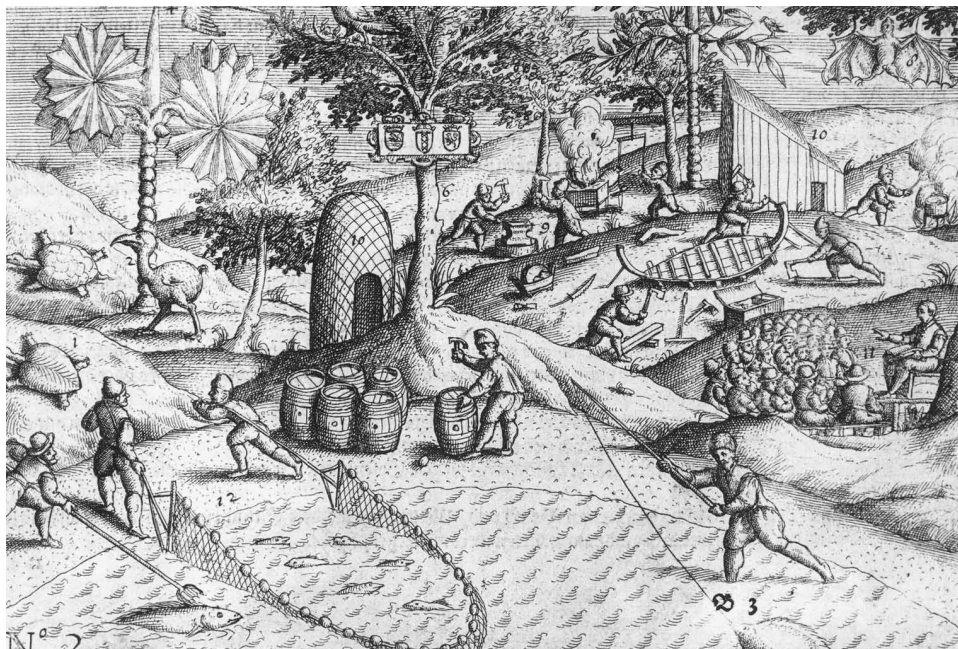


Figure 2a. *Het Tweede Boeck* (1601).

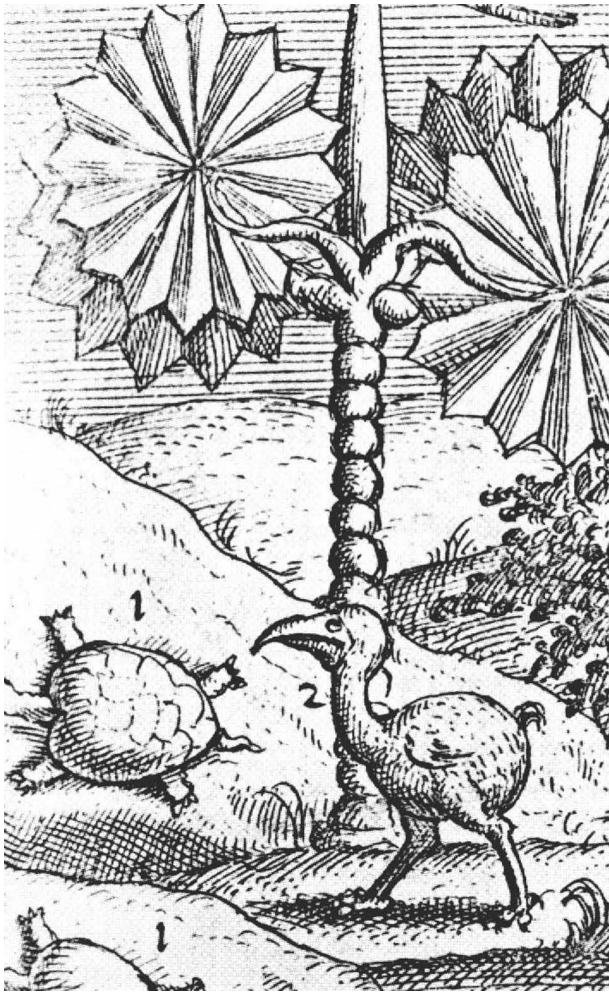


Figure 2b. *Het Tweede Boeck* 1601. Detail of Dodo (inset).

often post-dated verbal accounts, but in particular shipping routes, safe harbours, topographical details of landfall and suitability of ports for ship refurbishment were recorded (Moree 1998, 2001). In some cases, e.g. onboard the ship *Gelderland*, a fully trained artist accompanied the voyage (Moree 2001; Hume 2003). Upon the return of the fleets, the journals became important source material for future VOC voyages, artists, scientists and book publishers. It was these publications, often expanded and illustrated long after the voyage itself, that have become the source material for scientific study. Subsequent historians and scientists interested in Mauritian ecology have used the early drawings and accounts as a basis for determining the morphologies of species now extinct, notably Dodo, and as a result, a continuous series of misinterpretations have been made.

Despite the wealth of material that has been written, very few accounts are reliable and based on actual observation. All of the accounts that can be considered genuine are presented here, but even some probable observers of the Dodo incorporated previous documentation into their own descriptions.

Reliable written evidence

Cornelis Jacob Van Neck 1598

It was during the voyage of Admiral Jacob Cornelis van Neck that Mauritius was claimed for the Netherlands (Barnwell 1948; Wissen 1995; Moree 1998), although van Neck never actually visited the island. It was Vice-Admiral Wybrandt Warwijck who discovered Mauritius and after bringing the sick ashore, Warwijck organised three expeditions to explore inland. Heyndrick Dircksz Jolinck led one of these explorations (Moree 1998, 2001), and it was probably his account that described the Dodo for the first time:

we also found large birds, with wings as large as of a pigeon, so that they could not fly and were named penguins* by the Portuguese. These particular birds have a stomach so large that it could provide two men with a tasty meal and was actually the most delicious part of the bird (Moree 1998, p. 12).

* The use of the name penguin is interesting. The Portuguese used the name *fotilicaos* for Cape Penguins *Spheniscus demersus* in the 16th century (Ley 1960), a species they encountered before reaching Mauritius, so the meaning of the name is probably not derived from the birds that we call “penguins” today, but may be in reference to Portuguese “pinion” (clipped wings), in reference to the small inadequate wings of the Dodo.

Upon the return of the van Neck fleet to the Netherlands in 1599, the Dodo was mentioned for the first time in a small publication entitled “A True Report” (1599), which also gave an account of the voyage. Enlarged and expanded editions were published in 1600 and 1601 (Moree 1998), as by this time, all of the original fleet had returned to the Netherlands and new information could then be added. These accounts were accompanied by a copper engraving, illustrating not only Dutch activities on shore but also, for the first time, the Dodo and other birds (Moree 1998) (Figure 2a & 2b). It is the Dodo accounts from van Neck’s voyage, which have been plagiarised more than any other.

Wolphert Harmenzoon 1601–03

Admiral Wolphert Harmenzoon set sail for the East Indies in April 1601 with VOC instructions to stop off at Mauritius on the return leg (Moree 1998, 2001). His fleet anchored off Black River Bay, southwest Mauritius (Hume 2003), and stayed for one month (Wissen 1995; Moree 1998, 2001). Harmenzoon’s comment that Dodos were common on an islet within in the bay (almost certainly *I’île aux Benitiers* (Hume 2003), is the only account that specifically states where Dodos were found on Mauritius.

Willem Van West Zanen 1602

In June 1602, five ships under Admiral Hans Schuurmans, anchored off Mauritius, remaining for two and a half months before returning to the Netherlands (Soete Boom [West-Zanen, Willem van] 1648; Wissen 1995; Moree 1998, 2001). Willem van West-Zanen, having already been to Mauritius with van Neck's fleet, captained one of these ships, the yacht *Enkhuizen*. West-Zanen kept a journal of his voyage describing, among other things, the capturing and eating of Dodos and that he and his crew took a number on board for salting.

His account of the voyage, although extremely reliable, was finally published 46 years later, the finished book illustrated and expanded by H. Soete Boom in 1648. An engraving was produced to accompany the text, which resulted in the wrong bird being placed into the scene (see Discussion).

Cornelis Matelieff De Jonge 1606

On 1st January, 1606 Admiral Cornelis Matelieff de Jonge anchored at Mauritius with nine ships (*Begin ende voortgangh*, 1646; Barnwell 1948; Moree 1998). His instructions were to set up a refreshment station and instigate the planting of fruit trees and crops and the releasing of pigs and goats (Moree 1998). His Dodo description is clearly derived of the van Neck and West-Zanen accounts. De Jonge also mentions the large numbers of rats, devastating predators of ground nesting birds and serious competitors for food, as well as the scourge of the Dutch when trying to establish food crops.

Steven Van Der Hagen 1607

Admiral Steven van der Hagen visited Mauritius in 1606 (meeting de Matelieff during his visit) and in 1607 (*Begin en de voortgangh* 1646; Barnwell 1948). Der Hagen again appears to have based part of his account on that of Willem van West-Zanen.

Pieter Willem Verhoeven (or Verhuffen) 1611

This account is attributed to Pieter Verhoeven, but Barnwell (1948) has very good grounds for disputing this and suggests that the account writer is anonymous. Verhoeven supposedly arrived at Mauritius on 7 November 1611, after landing at Rodrigues 5 days earlier (Barnwell 1948). This account is also clearly derived from that of van Neck and West-Zanen.

Anonymous 1631

In 1631, an anonymous Dutch sailor wrote a travel journal mentioning a severe famine in Surat and a visit to Mauritius, with descriptions of some of the endemic

and introduced fauna (Servaas 1887; Wissen 1995). The manuscript was discovered by the Dutch archivist A.J. Servaas and includes the only known reference to Dodo diet, i.e. raw fruit. The manuscript not only describes Dodos, the red rail *Aphanapteryx bonasia* and the then abundant endemic giant tortoise *Cylindraspis* sp., but also introduced deer and pigs (Servaas 1887).

Peter Mundy 1628–1634

Peter Mundy was an adept and important observer of island faunas. Although he first visited Mauritius in either March 1633 or 1634 on the ship *Royall Mary*, homeward bound to England, he never actually landed but sailed passed. He recalls first seeing Dodos in Surat in 1628 (Ali 1968). He had worked there for the East India Company from 1628–1633 (Ali 1968; Wissen 1995) and his first account recalls two captive birds housed in the menagerie of the Mogul emperor Jahangir in Surat. The lack of Dodo sightings on Mauritius may imply that they were already scarce at the time of his visit or at least in inhabited areas. He recalls another trip to Mauritius in March 1633 or 1634 but his eyewitness account again stems from a previous visit to Surat.

Mundy not only described the species he saw but also had incredible foresight. In reference to the Dodo and the similarly extinct, flightless Mauritian Red Rail *Aphanapteryx bonasia* (Mundy (1628–1634) 1914), he raises the issue of origins, evolution and natural selection some 230 years before Darwin. He writes:

Of these 2 sorts off fowl afforementioned, For oughtt wee yett know, Not any to bee Found out of this Iland, which lyeth aboutt 100 leagues From St. Lawrence*.

A question may bee demaunded how they should bee here and Not elcewhere, beeing soe Farer From other land and can Neither fly or swymme; whither by Mixture off kindes producing straunge and Monstrous formes, or the Nature of the Climate, ayer and earth in alltring the First shapes in long tyme, or how (Mundy (1628–1634) 1914, p. 353).

* St Lawrence was a mythical island, thought to have been situated north of Mauritius (Newton and Gadow 1896).

Emanuell Altham 1628

In June 1628, one Emanuell Altham sent two letters to his brother, Sir Edward Altham, residing in Essex, England (Newton 1874)—Altham had sailed in the same fleet as Sir Thomas Herbert (see below). Each

letter describes a number of gifts awaiting shipment from Mauritius to England—whether or not they actually arrived at their destination is not known. Each letter is dated the same and thus written to be sent by different hands (Newton 1874) and, therefore, they are not referring to different items. Included amongst the gifts is a Dodo and one that is implied to be alive.

These interesting letters suggest that a live Dodo had been captured and made ready for exportation. Contra Newton (1874), there is no evidence at all to suggest this specimen arrived alive or dead. Altham, as early as 1628, also mentions the large numbers of introduced cows, pigs and goats, and the rareness of the Dodo. These exotic introductions must surely have played a part in the Dodo's demise.

Thomas Herbert 1629

Thomas Herbert was a diplomat, historian, writer and learned traveller, having sailed as the first English ambassador to the court of Persia (Herbert 1634; Wissen 1995). He visited Mauritius in 1629 and wrote a book about his adventures, which included an encounter with and illustration of the Dodo (Figure 17). His beautiful mastery of prose is undeniable when describing the Dodo, but his writings have a tendency towards exaggeration. Herbert wrote a further two editions of his travels in 1638 and 1677, each more expanded than the last.

Sir Hamon L'Estrange 1638

The English theologian and historian Sir Hamon L'Estrange encountered a living Dodo in London with some friends whilst walking the streets (Strickland and Melville 1848) and this account is the only irrefutable evidence that a Dodo reached Europe alive.

Francois Cauche 1638

The Frenchman Francois Cauche visited Mauritius and Madagascar in 1638 (Cauche 1651, 1710; Wissen 1995) but did not publish his account until 1651. Furthermore, his account is untrustworthy (Newton and Gadow 1910) and it is more than likely that Cauche had taken his account from fellow mariners and never actually landed on Mauritius (Hume and Cheke 2004). He also visited Rodrigues in 1638 (Strickland and Melville 1848) and may have been referring to the Rodrigues Solitaire *Pezophaps solitaria*, the closest relative of the Dodo. He is the only observer to record the call, nest and egg of the Dodo but appears to have mingled these descriptions with that of the cassowary. Cauche had also been to Indonesia and had seen a living cassowary, for his mention of no tongue (this was a myth based on the ability of ratite birds to swallow anything) and long legs with three toes, are certainly referable to it.

Volkert Evertszen (Folquart Iversen) 1662

It has been assumed (Cheke 1987) that the last authentic mention of Dodos on Mauritius stems from the account of Evertszen, a survivor of the shipwreck of the *Arnhem* on 11 February 1662 (Olearius 1670; Wissen 1995). Evertszen and his band of survivors wandered around Mauritius until eventually wading across to an islet, possibly *I'île aux Benitiers* on the west coast (Hume 2003) or *I'île d'Ambre* (Cheke, in prep). Here they discovered a supposed population of Dodos and were able to catch some of them after a chase. However, this account had been written in 1669 some 7 years after the event when Evertszen returned to Europe and his description may not be totally reliant.

Pictorial evidence

Journals were kept describing and sometimes illustrating the voyage, and images were either directly lifted from this source or derived from the seamen's verbal accounts. The artist would be employed to reproduce, via the crewmembers' description, an appropriate picture to accompany the text (Anker 1974). As each member of the crew discussed his part of the journey, the artist would gradually complete an illustration "something" akin to the actual event (Dance 1978). Some of these accounts were not published until many years after the event and so it is inevitable that mistakes were made.

Cornelis Jacob Van Neck 1598

With the publication of van Neck's voyage in 1601 (*Het Tweede Boeck* 1601), the accounts concerning Mauritius were accompanied by a copper engraving,



Figure 3. Dodo head study drawn by Joris Joostensz Laerle in 1601.

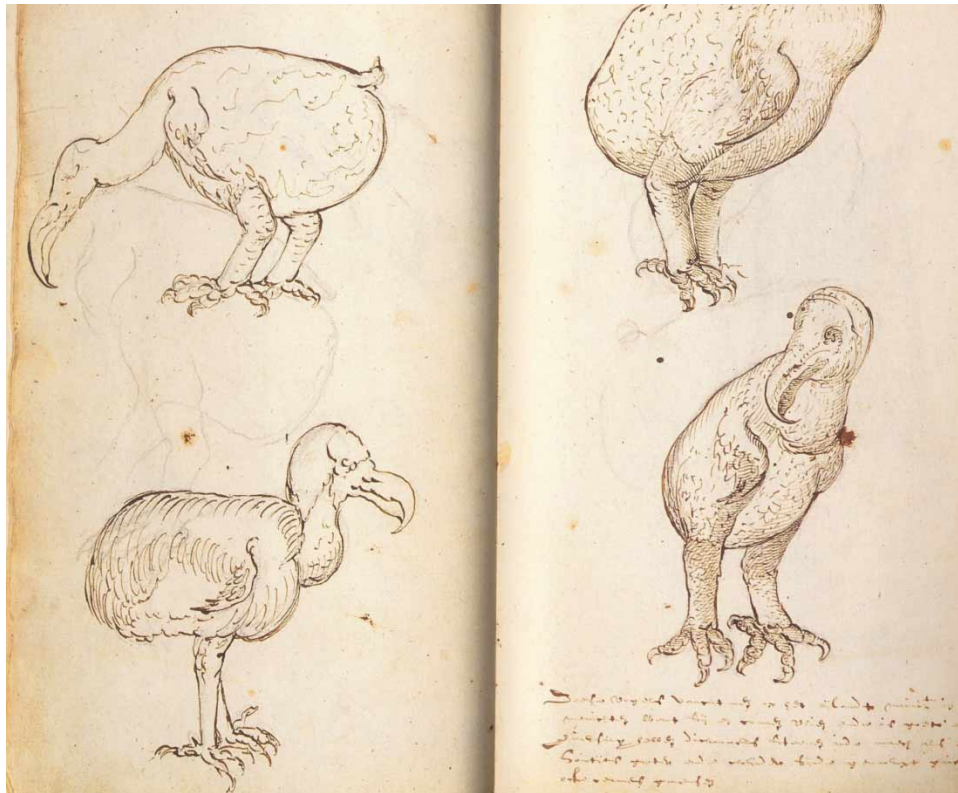


Figure 4. Dodos drawn by Laerle and others in 1601.

illustrating not only Dutch activities on shore but also, for the first time, the Dodo and other birds (Moree 1998) (Figure 2).

Wolphert Harmens Zoon/Joris Joostensz Laerle 1601

During the visit of Admiral Wolphert Harmenszoon to Mauritius (see Chronology of Accounts), on board was a professionally trained and skilled artist, Joris Joostensz Laerle, who produced the most accurate and beautiful drawings of the Dodo and other now extinct Mauritian birds (Hume 2003). Laerle's drawings are the only illustrations unequivocally drawn from live or recently killed birds on Mauritian soil (Hume 2003) (Figures 3 and 4). In particular, his rendition of a dead Dodo (Figure 3) is extremely evocative.

Theodore; John Theodore and John Isreal De Bry 1601

The De Brys' were prolific publishers and engravers and the famous plate illustrating the first Dutch landing on Mauritius (De Bry 1601) (Figure 2) has been attributed to them (Besselink 1995). This illustration was executed in the Netherlands, not on Mauritius, and was partly compiled using hearsay evidence. The Dodo (center, far left) is very reminiscent of the Clusius figure (see Pictorial Evidence) and either the De Brys' copied Clusius or they, like Clusius, had access to the original van Neck Journal. They also gained access to

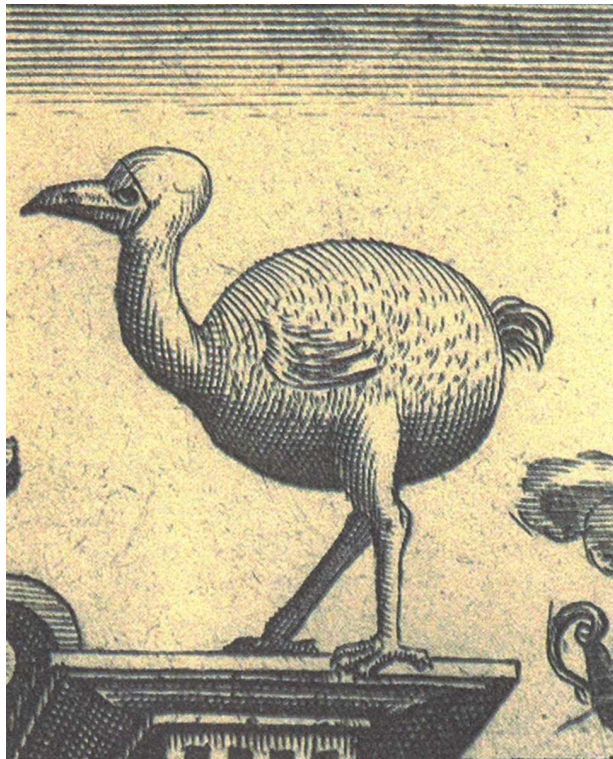


Figure 5. Dodo from De Bry's *Variorum Navigatiornis*, 1601.



Figure 6. (top) From De Bry's *Variorum Navigationis*, 1601. Note that a cassowary (center background) and not a dodo has been placed in the scene. Figure 6a (bottom) From Hulsius, 1605. Here a combination of Figures 2 and 5 was used for the Dutch on-shore Mauritius scene.

the various journals, including van Neck's voyage, as well as to the ships' captains and crew and produced a large series of engravings that were initially used for their own collection of travellers' stories entitled "*Variorum Navigationis*" (1601, 1613). Another Dodo illustration (Figure 4), clearly derived from *Het Tweede Boeck* (Figure 2), was also used in this publication (Figure 5).

The De Brys' produced a second plate for *Variorum Navigationis* (Figure 6) which again illustrated Dutch activities on a Mauritian shore. However, instead of Dodos, cassowaries *Casuaris* sp. are inserted and an

exaggerated scene of 10 men sitting in an upturned giant tortoise shell testifies to their reliance on hearsay evidence. These illustrations were repeatedly used in future works (see Huth 1880 for details); in particular, Hulsius (1605) (Figure 6a) used a combination of Figures 2 and 5 for his Dutch on-shore Mauritian scene.

So convincing and professionally produced was the De Brys' work, that it is not common knowledge they were only publishers and engravers and that their voyages around the world were merely tales extracted from the available sources. The wonderfully produced



Figure 7. Dodo attributed to Joris Hoefnagel, c. 1602.

engravings are the De Brys' illustrative legacy and the van Neck voyage illustration in particular has become a classic.

Jakob Hoefnagel c. 1602

From 1602 until at least 1610, Emperor Rudolph II at Prague employed Jakob Hoefnagel to illustrate animals housed in his zoological menageries (Anker 1974; Jackson 1999). Rudolf II maintained the menageries established by Emperor Maximilian II at Ebersdorf, Naugebau near Vienna, and at Prague (Anker 1974). It was Jacob Hoefnagel (and not his father Georg or Joris Hoefnagel) who, after becoming court painter in 1602, illustrated a Dodo (Figure 7) and Red Rail (Anker 1974; Jackson 1999). Jacob Hoefnagel produced rather bizarre renditions that portray what appear to be badly stuffed individuals—the similarities in stance and legs indicate that certain illustrative aspects were derived from each other. It is impossible to determine with certainty if they were once live exhibits in the menagerie although the illustrations suggest that they were not. The blackish facial skin and withered head of the Dodo indicate partial decomposition and mummification and the twisted wing feathers indicate drying distortion and/or bad taxidermy techniques. This is not surprising as any material would have been used for stuffing, e.g. straw, tobacco, spices etc (Wissen 1995) because at that time the long term preservation of

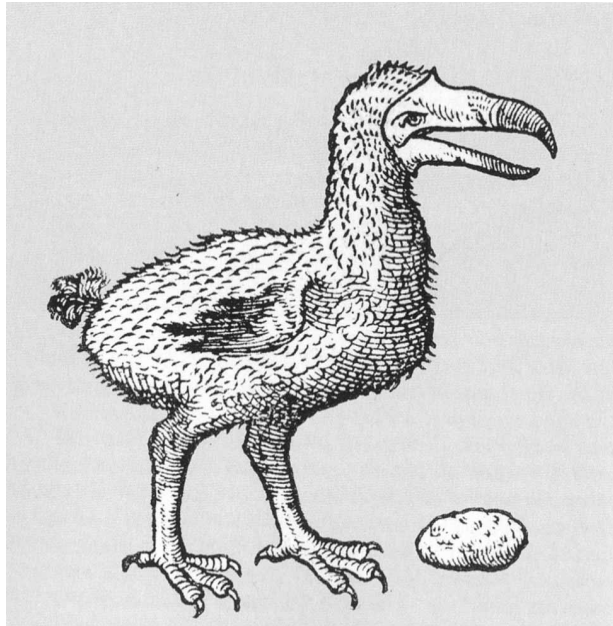


Figure 8. Dodo copied from the journal of van Neck in Clusius, 1605.

specimens was not appreciated. It is possible that this Dodo specimen may have been the first example bought back from Mauritius as van Neck was reputed to have returned with a Dodo in 1599 (Strickland and Melville 1848; Rothschild 1907; Killermann 1915). The specimen may have been in a bad state of decay and Hoefnagel may have painted the legs from another source.

A white Dodo specimen painted by Roelandt Savery was derived from the same collection but at a later date (Hume and Cheke 2004).



Figure 9. Orpheus by Roelandt Savery c. 1626. Detail of dodo (inset).

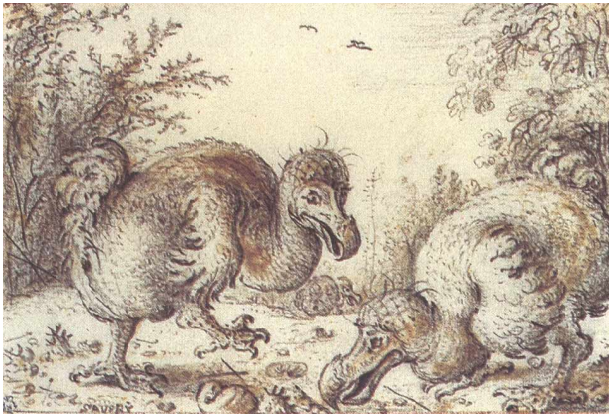


Figure 10. Dodo sketch by Roelandt Savery c. 1626.

Carolius Clusius 1605

The French naturalist Carolius Clusius, who was eventually to become professor of botany in Leiden, produced his monumental work *Exoticorum Libri decem* in 1605 and did much to bring a knowledge of faunas and floras from distant lands to Europe (Anker 1974). He had access to the exotic species brought back to the Netherlands as well as access to the journals. He copied his Dodo illustration (Figure 8) directly from the journal of van Neck and included a gizzard stone, so often mentioned by early mariners particularly because of their usefulness in sharpening knives (Strickland and Melville 1848). Unfortunately, the original journal of van Neck is missing and Clusius’s illustration, albeit simplistic,

is of extreme importance in determining Dodo morphology (assuming of course, that his copy is an accurate one).

Roelandt Savery 1611–1626

Pre-1626. An accomplished Flemish painter and the most prolific illustrator of Dodos, Savery was one of the first artists in Holland to donate an entire canvas to individual animals (Jackson 1999) and, like Hoefnagel, was employed by emperor Rudolph II (Anker 1974; Wissen 1995; Ziswiler 1995; Jackson 1999). This position provided privileged access to the emperor’s zoological collection and to all the new “exotics” arriving into Dutch ports. From 1605 until the emperor’s death in 1612, Savery was employed by Rudolph II, and after a period of commissioned work in Prague, Salzburg and Munich and a brief stay in Holland, returned to Amsterdam in 1616 (Mullenmeister 1985). Up to 1626, Savery executed at least 6 Dodos, all more or less in the right hand corner of each painting (Figure 9) and in the same stance. An overlooked work by him, dated 1611, includes a white Dodo with yellow wings (Hume and Cheke 2004). This specimen correlates with Rudolph II’s inventory of species written by Daniel Froschl. It was probably this white or albinistic individual, perhaps collected for its unusual colouration, which gave rise to all of the subsequent written and illustrative documentation for a supposed White Dodo inhabiting Réunion, the neighbouring island to Mauritius (Hume and Cheke 2004).



Figure 11. George Edward’s dodo by Roelandt Savery c.1626. This image was used by Richard Owen to create his dodo reconstruction.

1626 and post 1626—Crocker Art Gallery sketch

Savery's most influential work was executed in 1626. The first, termed "Edward's Dodo" (see next section) and the second, often termed "the Crocker Art Gallery sketch" (Figure 10), resides in the E. B. Crocker Art Museum, Sacramento, California. The latter illustration was first reproduced in the Ghent Catalogue (Eeckout 1954), a publication dedicated to Roelandt Savery, and introduced to the scientific community by Herbert Friedman (1956). The lively portrayal of three Dodos is one of the most memorable of all Dodo illustrations. Each Dodo has been subsequently plagiarised on numerous occasions, most famously in the account of Bontekoe (1650) and copied by Gilles Claesz d'Hondecoeter in his 1627 painting entitled "Perseus and Andromeda with a Dodo and seashells".

George Edwards's Dodo

"Edward's Dodo" (Figure 11), a painting once belonging to the ornithological writer and painter George Edwards and now housed in The Natural History Museum, London, is perhaps the most famous



Figure 12. Landscape with birds by Roelandt Savery 1628.

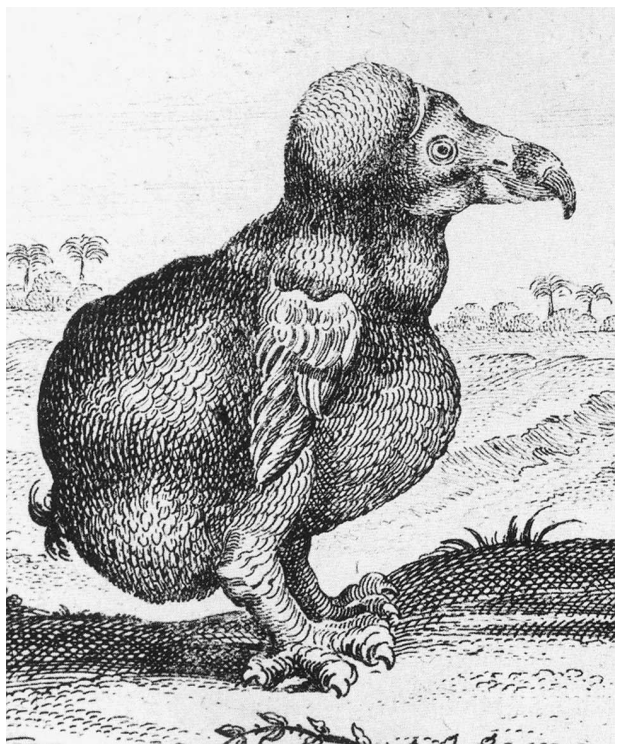


Figure 13. Dodo by Pieter van den Broecke?, c.1617.

Dodo painting and one that conjures up a universally accepted image of the Dodo in life. It is from this Dodo painting that most post 1638 Dodo illustrations are derived, most famously, forming the basis for the Dodo drawing by Sir John Tenniel, illustrating Carroll's *Alice's Adventures in Wonderland* (1865).

1628. The last Dodo painting attributed to Savery was produced in 1628 and entitled "Landscape with Birds" (Figure 12). This illustration is in some way reminiscent of the right hand Dodo (Figure 10), from the Crocker Art Gallery sketch, similarly depicting a snake-like neck (see Affinities and Morphology).

Roelandt Savery, the most famous illustrator of the Dodo, was to sink into poverty and finally insanity, dying in 1639 just 11 years after his last Dodo illustration (Mullenmeister 1985).

Peter Van Den Broecke 1617

Van Broecke called at Mauritius on April 19, 1617 and stayed until 23 May (Broecke 1646; Moree 1998). His journal, entitled "Zie Begin ende Voortganh," was published in 1646 and included a rather simplistic Dodo illustration executed a number of years after the original observation (Figure 13). He added nothing to our knowledge of the Dodo from his account, but the Dodo illustration has been subsequently used in



Figure 14. Dodo attributed to Mansur c.1625, a specimen that was kept in the menagerie of Emperor Jahangir.

a number of bizarre renditions (Wissen 1995; Ziswiler 1996; Fuller 2002).

Emperor Jahangir 1625

It was considered a necessary courtesy for emissaries visiting Surat and the palace of the Great Mogul Empire to provide a suitable gift for emperor Jahangir's menagerie (Ali 1968). At least two Dodos were donated to the collection, and an illustration discovered by Ivanov (1958) has now been attributed to the court artist Ustad Mansur, who depicted one living bird in c.1625 (Ali 1968; Wissen 1995) (Figure 14). Its accuracy cannot be doubted; the other birds in the illustration (immature Bar-headed Goose *Anser indicus*, Painted Sandpiper *Pterocles indicus*, Western Tragopan *Tragopan melanocephalus*, Chattering Lory *Lorius garrulus*) are easily recognisable. Although his illustration is rather unsophisticated, Mansur is technically adept (Dance 1978) and his Dodo includes morphological characteristics mentioned in contemporary accounts, e.g. downy plumage, colouration etc.

Vera effigies huius avis WALGH-VOGEL
(quæ & à nautis DODAERS propter
foedam posterioris partis crassitiem
nuncupatur) qualis viua Amsterodamum
perlata est ex Insula MAVRITII.
ANNO M.DC.XXVI.

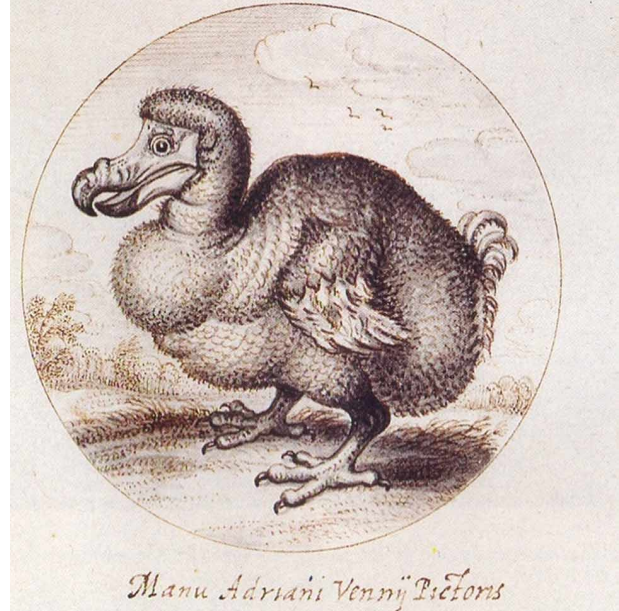


Figure 15. Dodo by Adrian van den Venne, 1626. The similarities between this illustration and 'Edward's dodo' (Figure 11) are striking.

Jahangir described all of the species in his collection but sadly died before such detail was applied to the Dodo—his memoirs ended in 1624, 3 years before his death (Ali 1968). It is probably the same bird seen and described by Peter Mundy (1628–34) 1914. This illustration is almost certainly the most accurate and reliable coloured rendition of the Dodo that has survived (see Conclusion).

Adrienne Pieterszoon Van De Venne 1626

Van de Venne executed a pen and ink aquarelle depicting a Dodo in 1626 (Figure 15). The Dodo is cognate with Roelandt Savery's Dodo illustrations dating from the same year, i.e. "Edward's Dodo," and one is clearly derived from the other. The caption



Figure 16. Dodo by Cornelis Saftleven c.1638.

accompanying this illustration (see Live Specimens below) mentions a live bird in Amsterdam. It is impossible to say who was copying whom during this period but as Savery had already illustrated six Dodos by 1626 (Mullenmeister 1985), it is more likely that van de Venne copied Savery.

Cornelis Saftleven c. 1638

The provenance of the Saftleven Dodo is unknown and the illustration forms a rather strange combination of Dodo and European hoopoe *Upupa epops* (Figure 16) and the posture is very different from the standard images of the day. There is no direct evidence that Saftleven had a live bird at his disposal but his rendition creates an image of realism (Fuller 2002). Curiously,

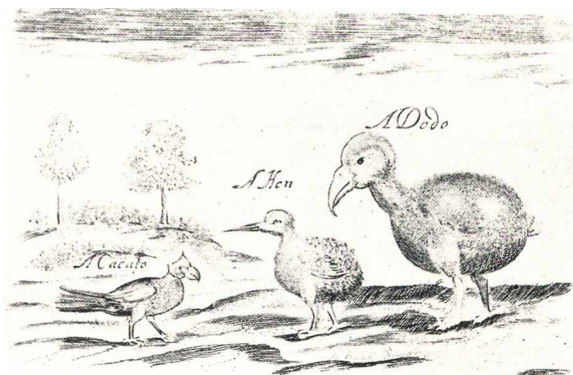


Figure 17. Dodo (right) from Thomas Herbert (1638).

Saftleven's illustration lacks the distinctive open nostrils (Figure 17), but in life, they would probably have been slits (Figures 3,4,8,10 and 14) as opposed to the gaping orifice depicted in most reconstructions, (e.g. Figure 18); this probably being an artifact of drying (Hume and Cheke 2004). Furthermore, this Dodo has been described as representing a white Dodo (Oudemans 1917; Hachisuka 1953) but this fact is based purely on the artist's "license" in leaving the body area uncoloured to emphasise the head (Hume and Cheke 2004).

Physical evidence

Prior to 1865 when the first Dodo fossil material was discovered on Mauritius, virtually no physical evidence existed. This led some authorities to doubt that the Dodo had ever existed. It was the discovery of the Copenhagen skull (Rheinhardt 1842) and subsequent re-examination of the remains of the Oxford Dodo (Strickland and Melville 1848) that the bird returned to the realms of reality, and the discovery of fossil material enabled the Dodo to be scientifically described for the first time (Owen 1866).

Copenhagen skull

The discovery of a skull in 1840, once belonging to Bernardus Paludanus of Enkhuizen a collector of rare

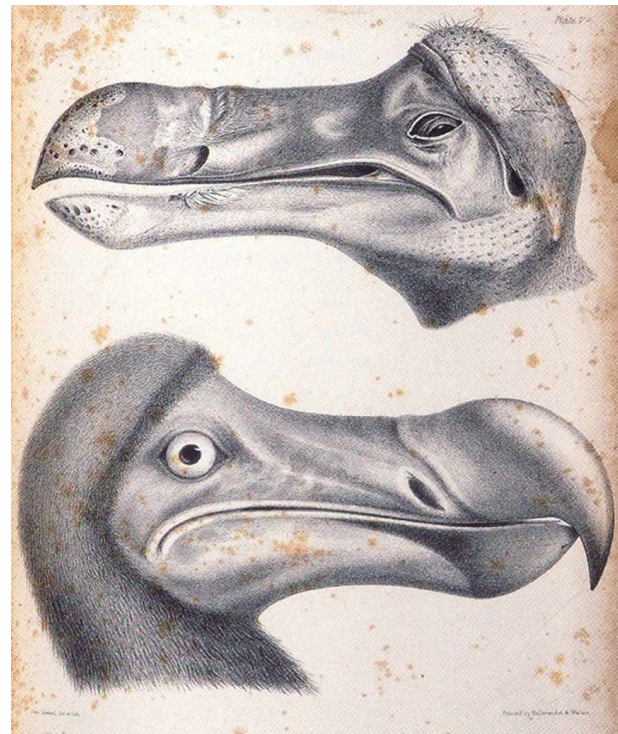


Figure 18. The Oxford head (below) and a head reconstruction from Strickland and Melville (1848).

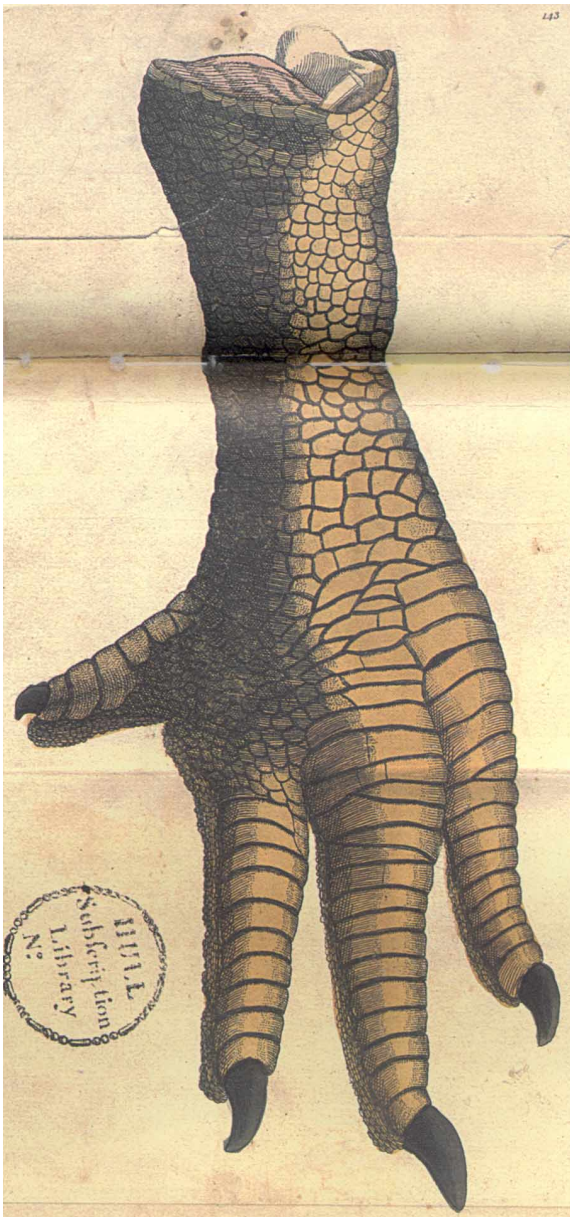


Figure 19. The London foot from Shaw (1793).

objects in the late 15th and early 16th centuries, led Rheinhardt (1842) (see Affinities and Morphology) to hypothesise that the Dodo was a giant flightless pigeon. The origins of this skull are unclear but Olearius (1670), who was cultural director to the Dukes of Schleswig described it. Olearius also mentions that the skull once belonged to Bernardus Paludanus, one of the great Dutch navigators. Jan Huyghen van Linschoten, who had also settled in Enkhuizen in 1592 after visiting the East Indies, enjoyed a close working relationship with Paludanus and Wissen (1995) speculates that as the Copenhagen skull had reached the Paludanus collection via Linschoten. If this is correct, it makes the Copenhagen skull becomes the oldest known Dodo

remnant and must have arrived with Linschoten before 1652 (Wissen 1995).

Carulius Clusius 1605

Clusius (1605) described a Dodo leg that was the property of Pieter Pawius or Paauw, Professor of Medicine at the University of Leiden, in Holland. Its provenance is unknown but it must have been an early arrival from Mauritius, perhaps a remnant of the van Neck specimen (Strickland and Melville 1848; Newton and Gadow 1910; Killermann 1915).

Oxford school of anatomy 1634

Two notes, although brief, refer to Dodos sent to the School of Anatomy in Oxford. In 1634, Thomas Crosfield wrote of the first in his diary as a “black Indian bird” (Boas 1935) and the second note, written in the Anatomy School catalogue of 1634, mentions a “Couple of Dodoes.”

Nothing more can be deduced from these notes except that a black Indian bird may not have been a Dodo at all or that melanistic (including the previously mentioned albinistic) individuals existed. Again, the black colouration may have been a result of partial decomposition.

Elias Ashmole 1656

It is probable, but not certain, that the Dodo seen by the English Theologian Sir Hamon L’Estrange in a London shop (see written accounts) was eventually exhibited in the museum of John Tradescant, naturalist and gardener to Charles II, in Lambeth, London. John Tradescant senior, a native of Holland, had originally established the museum collection in London, and it was his son, John Tradescant junior, who kept up the collection (Anker 1974). In 1659 the entire Tradescant collection, including the Dodo, passed to the Ashmolean Museum at Oxford founded by Elias Ashmole (Hachisuka 1953). This specimen was first registered in the catalogue of the collection in 1656 (Tradescant 1656) and exhibited until 1755 when the specimen was deemed unfit for further exhibition and removed. Contrary to popular belief, the specimens were not rescued from a fire but the removal of the head and foot acts of saving what could be saved (Ovenell 1992). Only the head (Figure 18) and one foot comprising only the bony core survive today and they now reside at the University Museum of Zoology, Oxford.

Royal Society c. 1665–1681

A second Dodo foot termed “the British Museum or London foot” was passed to the collections of the

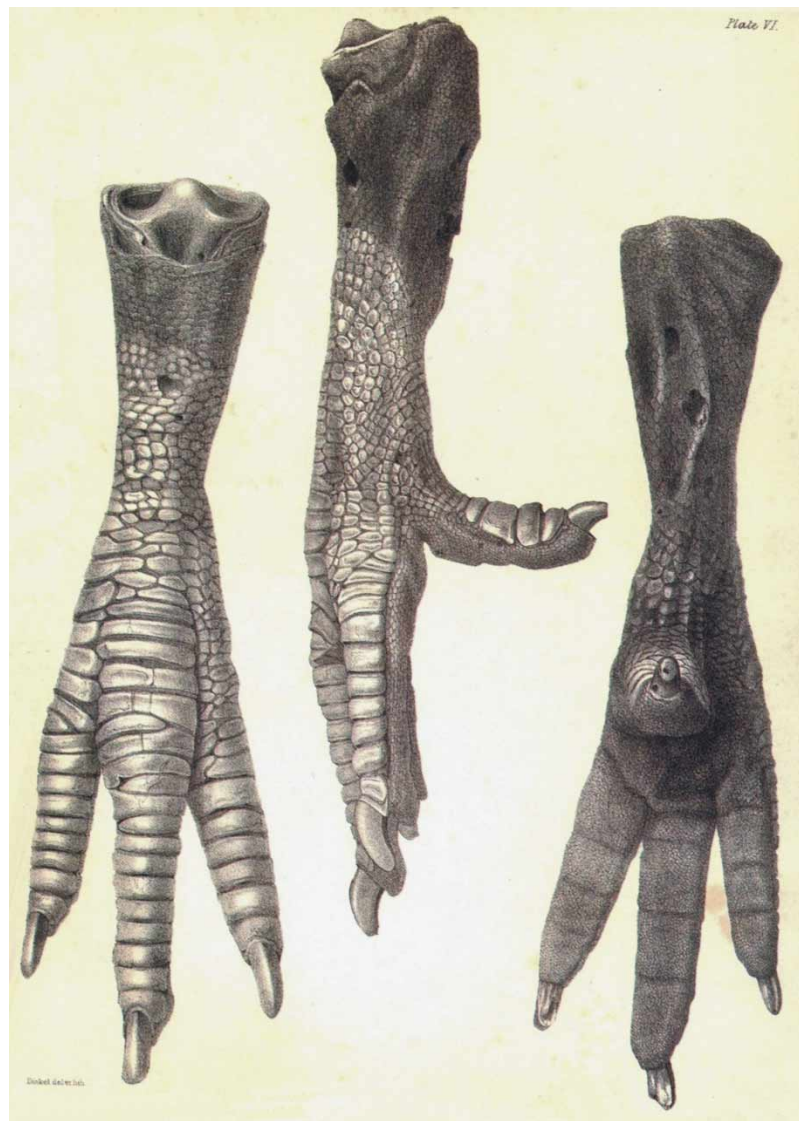


Figure 20. The London foot from Strickland and Melville (1848).

Royal Society early in the eighteenth century and later exhibited and deposited at the British Museum, (now the Natural History Museum) in London (Strickland and Melville 1848). The leg was first mentioned by Hubert alias Forges (1665) and the same specimen appears in a catalogue published by Grew (1681) and further illustrated in Shaw (1793) (Figure 19). It has been suggested (Hachisuka 1953) that the British Museum foot is one and the same as that described by Clusius (1605) (see above) but there is no direct evidence for this; Strickland and Melville (1848) indicate the size discrepancy between the two specimens. The foot is dried in a “cabinet” skin style, i.e. the hind toe is set at right angles to the foot and not in a standing position (Figure 20). This suggests that the foot had been severed fresh and brought back as a possible memento or that the foot was removed from a stuffed prostrate cabinet specimen and not a posed museum exhibit.

The “British Museum or London foot” was exhibited with the “Edwards Dodo” painting by Roelandt Savery (see Pictorial evidence) in the British Museum bird Gallery at least until the late 1840s (Strickland and Melville 1848), but the present location of the British Museum foot is unknown.

George Clark 1865

The scientific interest in procuring Dodo specimens intensified after the publication of the Dodo monograph by Hugh Strickland and Alexander Melville in 1848 and the present location of the foot was presumed unknown. However, the foot was mentioned again by Newton & Gadow (1996) as ‘still reposing’ in the British Museum, but without its integuments’. This suggests that similarly to the Oxford Specimen, the so-called missing London foot (e.g. Fuller 2002). Presently consists only of bone (after being cast), &

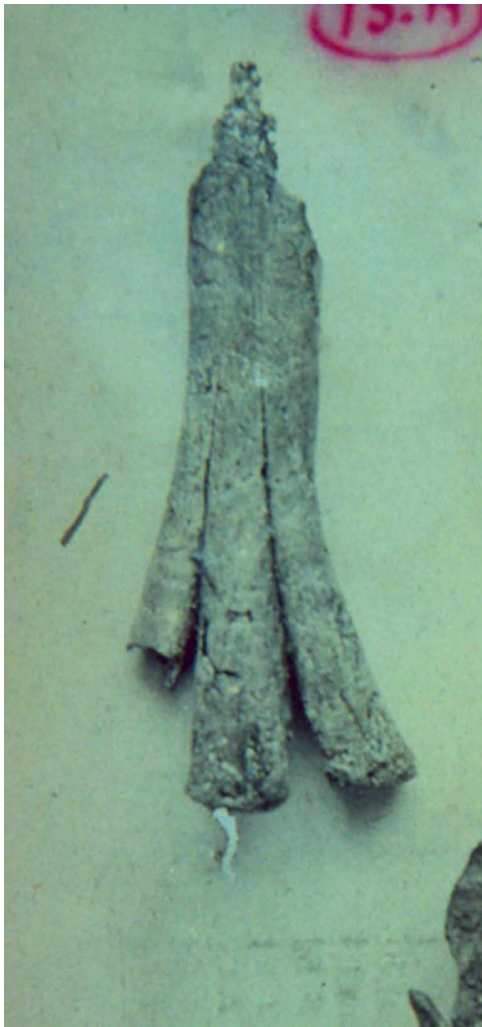


Figure 21. The only known fossil (tarsometatarsus) but now lost of a juvenile dodo. Photographed by Etienne Thirioux c. 1904.

researchers looking for the soft tissue specimen are in fact searching for the wrong thing (Hume et al. in press). George Clark, Master of the Diocesan School at Mahebourg, Mauritius and having read Strickland and Melville's monograph, spent some years searching the island hoping to discover Dodo skeletal material. His efforts were finally rewarded following the discovery by sugar cane workers in September 1865 of tortoise bones in the Mare aux Songes (Clark 1866). However, Clark may not have been the original discover of the marsh (Hume, unpublished). The Mare aux Songes, a depression lying between low hills and forming an extensive marsh, is situated in the estate of Mon Desert, southeast Mauritius. The marsh was considered destroyed and buried under the present day airport (Cowles 1987) but this is incorrect as the marsh lies approximately 0.5 km southwest of the airfield perimeter (Hume pers obs). Initially, excavations only produced tortoise bones but eventually, when the very deepest part of the marsh was

drained, the first Dodo bones were unearthed (Clark 1866).

The discovery of Dodo skeletal material caused a great amount of enthusiasm and interest. Within the year, almost complete skeletons of the Dodo from the Mare aux Songes had arrived in Great Britain. The British Museum (Natural History Museum) acquired 100 bones for a pound a piece (Owen 1866; Vinson 1968; Wissen 1995), and Alfred Newton obtained a large number for the University Museum of Zoology, Cambridge (Wissen 1995). The remaining skeletal material was auctioned off in London on 13 March 1866, just six months after discovery (Anon 1866).

Louis Etienne Thirioux 1890–1907

Thirioux was a hairdresser by trade working from a shop in the capital of Mauritius, Port Louis (Toussaint and Adolphe 1956). He was also an amateur naturalist, and collected the most diverse and important Mauritian skeletal material. This includes hundreds of elements of birds, including partially articulated specimens. Thirioux discovered a unique associated Dodo skeleton and this specimen still represents the only articulated Dodo and also the only one that was found in a fossil locality other than the Mare aux Songes. Included in a photograph of Dodo material that Thirioux had sent to Cambridge, is a juvenile Dodo tibiotarsus (Figure 21), the only juvenile material of this species so far discovered. Unfortunately, the whereabouts of the specimen is unknown.

Transportation of live birds

Many illustrations are supposedly based on imported specimens of Dodo and the transportation of live specimens of Dodo is probably the most debated aspect of Dodo literature. Evidence is at best meager with some authorities listing as many as 17 transported birds (Hachisuka 1953). There are, however, only three categorically documented accounts of live Dodos outside Mauritius and only two for Europe, all from the 1620s and 1630s. Peter Mundy saw two live birds in Surat between 1628–1634 and Sir Hamon L'Estrange chanced upon a Dodo in London in 1638 (see under Chronology of Historical Accounts). The only other account that states a live bird arrived in Europe captions an illustration (Figure 15) by Adriaen Pieterszoon van de Venne in 1626 (see under pictorial evidence). In terms of Dodos travelling east, apart from the above mentioned Surat Dodos, another living bird was made ready for transportation from Batavia (now Jakarta) to Japan in 1647 (Millies 1868), but it is now impossible to determine whether or not it made the journey.

There are four key dates in Dodo literature that resulted in a number of Dodo illustrations (Figure 22).








Possible dodo Import date	Resultant illustrations		
1599	 Van Neck 1601	 Hoefnagel c. 1602	 Clusius 1605
1611	 Savery 1611		
1626	 Savery 1626	 Van de Venne 1626	
1638	 Saftlaven c. 1638		

Figure 22. Transportation of live or dead birds to Europe. The years listed above correspond with credible dodo illustrations depicted on or near that date. The van Neck, Hoefnagel and Clusius appear to be derived from the same specimen or illustration. This specimen may have been brought back to the Netherlands with van Neck's fleet in 1599. Evidence for transportation elsewhere, e.g. Jahangir specimen(s) is not dealt with here as unequivocal supporting evidence exists.

It is not certain that the models for the illustrations were alive or dead or that the accounts refer to the illustrated birds, but the weight of evidence suggests that they probably were related. At least two stuffed Dodos or parts of also survived the journey, i.e. specimen(s) exhibited in Prince Rudolf II's menagerie and the British museum foot, but their transportation histories are not known.

Edibility

Of all the key "scientific" facts that have been erected about the Dodo, the most quoted concerns its inedibility. Almost all popular and scientific literature mentions early mariners' abhorrent taste for Dodo flesh, yet this belief stems from just a few observations. The account from van Neck's journal, the first to mention the culinary aspects of the Dodo, remarks "in this place great quantity of foules twice as bigge as swans, which they call Walghstocks or Wallowbirdes being very good meat." More importantly, the next sentence explains the reason why Dodos were less desirable as game "But finding an abundance of pigeons & popinnayes [parrots], they disdained any more to eat those great foules calling them (as before) Wallowbirds, that is to say lothsome or fulsome* birdes. This observation was further endorsed by two other important accounts, those of West-Zanen in 1602 and Matelieff de Jonge in 1607,

and these observations have founded the supposed Dodo inedibility myth which has been documented to the present day. In total contrast the accounts taken from Jolinck in 1598 and Harmenzoon in 1601 both stated that they relish Dodo meat, particularly the breast and stomach, and Pieter Verhoeven in 1611 mentions "the Dutch daily caught and ate many of them." All of these accounts were made during the period from 1598–1611. The next mention occurred in 1631, when an anonymous Dutch sailor (see reliable written evidence) described the excellence of the flesh "... [Dodos] were abundantly covered with fat, and so many of them were brought aboard, to the delight of us all." Only Thomas Herbert's (1638) account can be relied upon as a genuine description of Dodos' inedibility after this date. The Dutch did not mention Dodos again until 1680, when Lamotius mentioned them as part of hunting forays (Moree 1998; Sleight 1998; Hume et al. 2004); all post 1650 descriptions concerning the inedibility of Dodos were plagiarised from earlier sources.

Early maritime travel was fraught with danger, in particular from disease, malnutrition including the dreaded scurvy, and other dietary illnesses. Therefore, any large bird that was easy to catch would have been fair game and indeed many mariners captured and ate Dodos without exception, especially after having spent months at sea. The reliable contemporary accounts unequivocally state that because of the

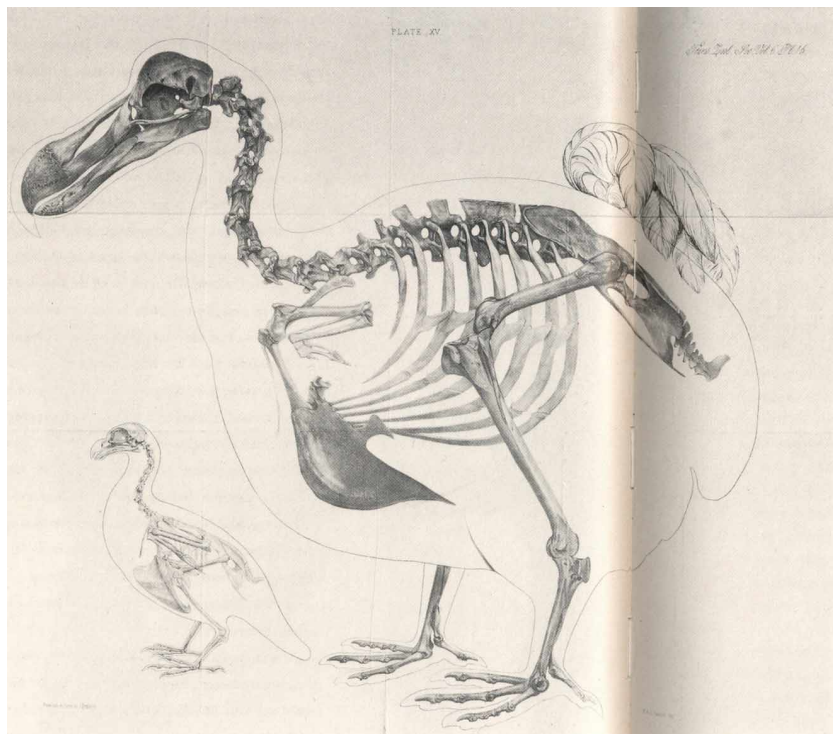


Figure 23. Owen's (1866) original reconstruction of the dodo based on Roelandt Savery's image (see Figure 11).

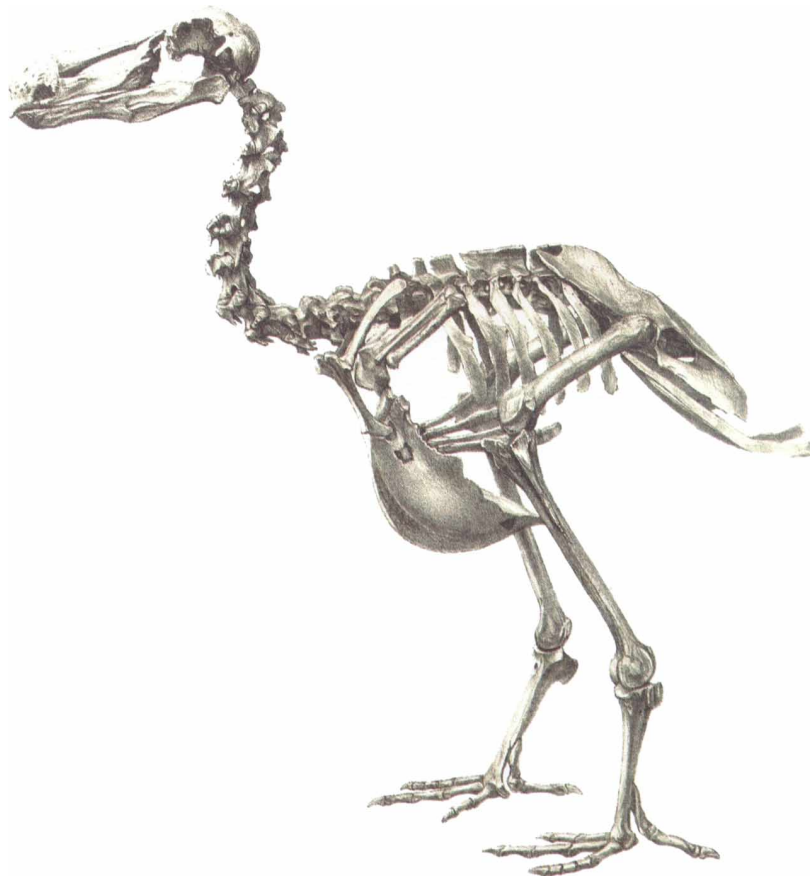


Figure 24. Owen's (1872) new more upright version of the dodo.

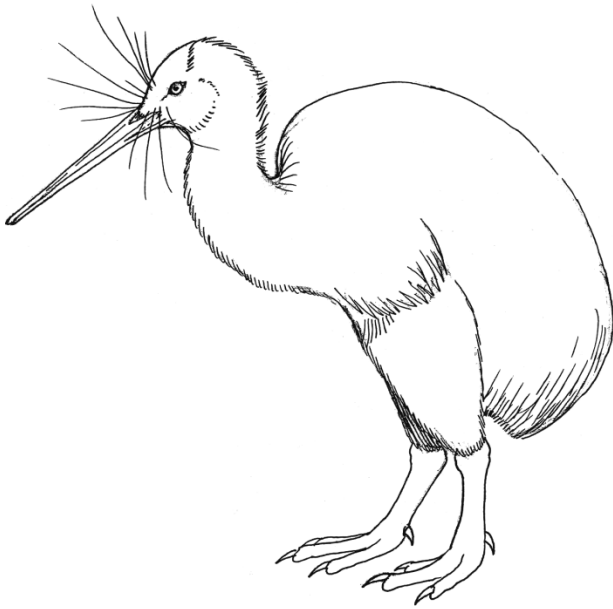


Figure 25. Kiwi *Apteryx* sp. Compare the posture of this flightless species with Savery's painting (Figure 12). Drawn from a live bird by Julian Pender Hume.

abundance of other more tasty game, e.g. pigeons and parrots, Dodos were less sought after and this is more than likely to have been the primary reason why Dodos were considered less edible. Such were the circumstances on Mauritius that the Dutch were actually blessed with a choice.

*Lothsome [despising] or fulsome [praising excessively or sickeningly] can be misinterpreted here.

Extinction

The following accounts refer to the rarity of the Dodo and possible reasons for its demise. The accounts describe a declining population of birds on the mainland concomitant with ever-increasing encroachment by man and his commensal animals. Despite the fact that most pre-1620 Dutch accounts mention Dodos, they were barely mentioned again afterwards. The most likely reason being the introduction of exotic animals and the abundance of other game. Direct human hunting would have been restricted to the coastal areas and extremely limited; during the entire Dutch occupation of Mauritius (1598–1710), the human population averaged less than 50 people at any one time, often much less (Sleigh 1998; Moree 1998). Most Dutch accounts noted the abundance of ship rats *Rattus rattus* and these animals are particularly devastating to nesting birds, however, larger terrestrial birds can survive alongside them, e.g. the flightless Aldabra rail *Dryolimnas cuvieri aldabrensis* (Penny and Diamond 1971). The larger more terrestrial and predatory Norway or brown rat *Rattus norvegicus* probably did not arrive until 100 years later (Cheke 1987). More importantly, rats would have been serious competitors for food. This factor may have proved devastating during Dodo chick incubation/fledgling periods and also detrimental to adults during post cyclone periods when food became scarce. Further competition for food, forest destruction and direct predation of eggs and chicks followed the introduction of

100 CAROLI CLUSII

tem aquam in ea se reperit non confidebant: postmodum igitur aliquo nauis fœpiter impo-
sit ad eam ablegatum, qui obseruaret, an commodius aliquid portus illic reperiret, in
quem naues deducere possent, ut agros, qui iam frequentes in omnibus nauibus floma-
cæ laborabant, in insula exponerent, quo facilius postmodum sanitate restituerentur. Qui
missi fuerant, sub vesperam redeuntes, non modo portum valde commodum, & ab omni
vento tutum, sed multarum nauium capax, & adeo amplum, in quinquaginta naues
stationem in eo commodè habere possent, se referre, præterea limpide aque vivum et
mensuris profluentem obseruasse, retulerunt. Eam ob causam postmodum naues solus ar-
choris ei proficere, portum ingressæ sunt, illicque hæserunt usque ad vi. Nonas Odobris,
agros in terram exponentes, ut curarent, & reliqua ad finem nauigationem necessaria
peragentes. Interea autem, dum in insula hærent, vari generis aues obseruabant, quas
inter illas valde peregrinas, eorum iconem rudi arte delineatam in Diario totam illius nau-
igationis huiusmodi continere, quod reducere curabant, conscribere, ad cuius nomi-
nem illi expressis, quam hoc capite propono.

ILLA porò auis peregrina Cygnum quidem
magnitudine æquabat aut superabat, sed
forma longè diuersa: ejus escam capite ma-
gnam, rectam veluti quadam membrana ocu-
lum referente, rostrum præterea non planum,
sed crassum & oblongum, sublabi colorem
capiti proxima, cujus extimus musco nigri, lu-
pæque quidem eque pars fere prona aduersa &
eius, in inferiore vero fere supina, subcaerulea
macula mediam partem inter flavam & nigram
occupabat. Raris & breuib; penis teclam esse
sichant, & alis carere, sed eorum loco quatuor
aut quinque dumtaxat longiniquas nigras pennas
habere: pollicentem autem corporis partem
præpinguem & valde crassam, in qua pro cauda
quatuor aut quinque crispæ convolutæque pen-
nulis cineræ coloris: crura illi potius crassa esse quam longa, quorum superna pars genu
tenus nigra penalis tecta, inferior cum pedibus librav coloris: pedes vero in quatuor
digitos fuisse diuisos, tertios longissimos atteriturum, pedesque cum breviorum retro-
rum convertitur, omnemque nigra unguibus prædare.

Verumtamen vero, concinnata & descripta jam quò potui fide huius aui historiam, illius
eius genu tenuerit, apud Cl. V. Petrum Pavum, primarium artis Medicæ apud Aca-
demiam Lugdunæ Batava Professorem valere congerit recte: & Martini Isidori relationem.
Erat autem non valde longum, sed à genu usque ad pedis inflexionem, passillò plus quam
quatuor uncias dumtaxat superabat: ejus vero crassitudo magna, in cuius ambitus pene
quatuor uncias æquabat, crebriusque costibus ceu squamis teclum erat, pronè quidem
parte laterioribus & hæverentibus, supina vero minus & fissa: pedes enim digitorum
prona pars singularibus usque latis squamis prædita, supina autem tota callis: digiti fatis
breves pro tam crasso crure, nam maximè fere mediè ad unguem usque longitudo huius
uncias non admodum superabat: aliorum duorum illi proximorum via binas uncias aequa-
bat, posteriora fere quadrupla: digitorum vero unguis crassus, duri, nigri, minimè unciè longi,
sed pollicentis digiti longioræ squamis, & unguis superans.

Nauis huius vi nomen indidant, suo idiomate *Hæg-vigè*, hoc est, nauis inuents
aues, partem quòd post diuinitatem elationem, eque caro non fecit tenerè, fed dura per-
manere & difficilis concoctionis (excepto eque pedore & ventriculo, quæ non contem-
tendi sapore esse comprehendunt) partem quòd multos turtures nancisci poterant, quos
delicatas & cum magno gratos respiciant: nihil igitur mirum si præ illis hæc aues con-
uenienter, & ad se facile carere possit dicerent. In eius portu ventriculo quosdam lapillos
inuentos aiebant, quorum binos huc perlatis conscribam apud omniumdum vitium
Christiano Paracelsum, eoque diuersæ forme, unam planam & orbicularem, aliam
inæqualem & angulofam, aliam unciali magnitudinis, quæb; iuxta pedes aui, remem-
dum curabant, hunc majorem & grauiorem, utrumque cineræ coloris, eor; ab aue in
stans liore lectos, deinde deuotos fuisse verissime est, non in eque ventriculo natos.
Ceteram ea insula, ut in Diario legimus, uno & viginti gradibus ab Æquatore versus
austriacum polus distat, in qua neminem habitare, sed desertam esse quædam, quæ
licet aliquot nauis diuerso tempore emisit, fuisse ut obseruaret, totumque tralium hæc,
illa;



ILLæ, pervagantes insupplissent, neminem eorum repererunt, illam etiam opinionem ma-
gis confirmat omnino auium æquitas, que manus se apprehendi & sublabi credi line-
bant, tanquam nullum hominem ante se confpessent. Licet vero locus insulae, ubi
tum circiter quinquaginta milliarum dumtaxat esse, in Diario sic adscriptum, ex alia tamen
navigatione paucos post annos facta ab Hollandis in insulas Moluccas tendentibus, classis
Præfeco five Admirallio Iacobo van Neck, ejus vero Legato five Vice-Admirallio N.
Garnier, qui ad eam insulam forte appellerat, majorem illius ambitum esse conperit
esse. Et cum totam insulam circuire jubebat, & triginta milliarum five leucarum ambitum
habere apprehendebat, ut multiplicet afferbat Antile redam anno à Christi natiuitate
millesimo sexcentesimo tertio, illo ipso anno & Moluccæ & Taprobana rediit. Illam auem
tum insulam Batava appellabant Maurus vel Land à Principe Mauricio, forit ab à Lusitana
illa de Circe vel Cyra nauticatum (ut ante diximus) id est insulam Cygnam, forit ab eo
conspicuum in ipsa jam commemoratam auem, quam egyptum esse existimantur.
Præter multas porò vari generis aues in ea relictas, Elestem autem frequentissi-
mam & nigerrimam reperit intelligebat.

Anser Magellanicus.
C A P. V.

Q uo anno à Christi natiuitate nonagesimo octavo supra millefimum & quingentesi-
mum navigationem ad mare Australi five Pacificum appellatam intulituchant
Batavi, & anno demum in sequente ad Magellanicum fretum pervenierant, in
quibusdam insulis portui desiderato vicinis, quadragesimo octavo gradu supra Æquato-
rem verius polum Antarcticum, atque alia parvis insulis in iplo trecentis, magnam qua-
runtam marinarum avium copiam repererunt, quas illic accellerant, ut avia fua pone-
rent, deinde incubarent illas autem à pinguedine quæ erant præclat, *Pinguis* appella-
runt insulas vero, in quibus tantam avium abundantiam obseruabant, *Pinguis insularum*
nomen indiderunt: ego autem eas aues *Anseres Magellanicos* non ita cum de ille pedis
nomen indiderunt: ego autem eas aues *Anseres Magellanicos* non ita cum de ille pedis
ter Diaria ab his evulgata qui illo anno in Magellanico fretu aliquamdiu hæserant, & *Anser*
prioris sint peregrina, iconem ex Dianis illis pentam hic subnecte libus, & paucis ad ejus
librorum præsentia adscribere.

MARINA porò est lux avis, & ex *Anserum* generis, tæ
meti rostro diffusilis, in mari viditans, valde pinguis, præ-
genere obducat, trectum, quatuordecim, etiam fide
cum uncialibus libris pendentes, juniores vero, octo, decem,
& duodecim: pronè parte nigra penis teclæ erant, supina
& in ventre, albis collum, quod crassum & breve, habebant
nonnullis albis penis, tanquam coque, cinclum: carum
cursu crassa & densa insula fuisse: alarum enim expertes, fed
carum loco binas parvas contractas pinas habebant, in late-
ra, tanquam parva bacula, propendentes, pronè parte bre-
vioribus, aliquid & rigidis pedibus conferant redas, supina
autem, minoribus adhuc & rigidioribus, usque albis, quibus
nonnullis locis intermixtae nigrae, minime quidem aptas ad
volandum, sed quantum ad minime velociter ratarum: mar-
tima enim ex parte in aqua versari intelligebant, & terram
dumtaxat petere fortificationes vel pullationis tempore, & plerumque tenas aut quater-
decim in una (exco late: rostrum curvius majus habent, non adeo tamen elatum, & val-
de brevem caudam, pedes nigros, plantis, anteriorum pedum forma, non adeo tamen
laque erectas & sublimi capite cecidit, demissis in latera pinis, tanquam brachiis, sic ut
propal intentibus hominibus aut pygmaï apparere. Pileibus dumtaxat veli referre-
bant. Diaria, non ingratum tamen fuisse esse illarum carum, nec pilicum fipere ferebent
porò valde profundas in liore fodere: cuculionum insar, totum illarum adco cavum in-
terdum efficiens, ut per illud gradientes nauis, sepulcrale genu tenas in ear; feroces
inciderent.



Figure 26. Dodo and king penguin depicted on separate pages in Clusius, 1605.

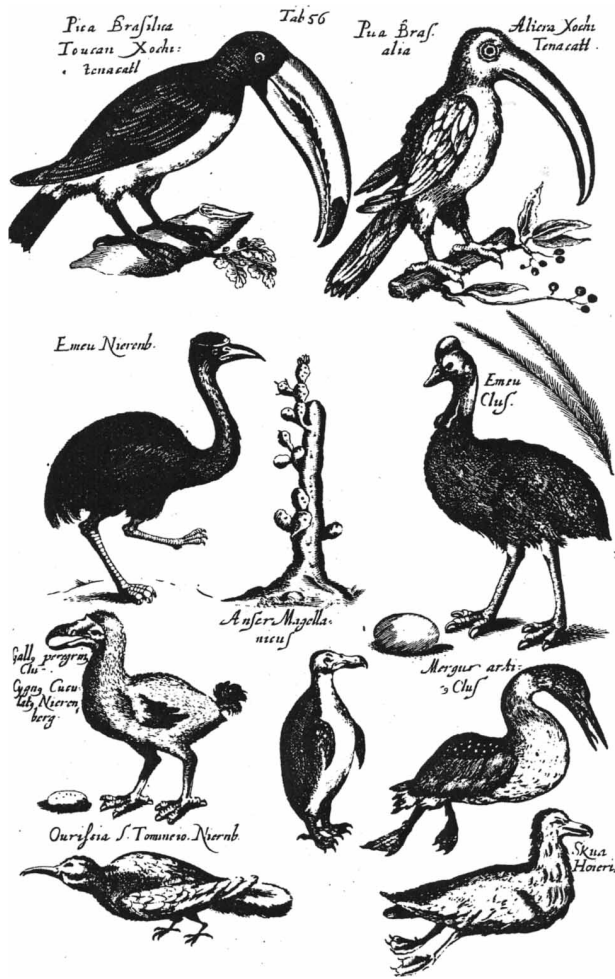


Figure 29. Dodo and king penguin on the same page in Jonstonus c.1650. Note the difficulty in telling which caption belongs to the dodo and king penguin.

well away from human habitation by this date. Interestingly however, other endemic species are still to be found at this time.

Commandeur Hubert Gerritsz Hugo 1673–77

Governor Hugo became Governor of Mauritius in 1673–77 (Barnwell 1948; Moree 1998) and under his supervision, built 10 miles of road and established a sawmill. He also instigated the setting up of the slave trade between the east coast of Africa and Indonesia, the center for the trade route being Mauritius (Moree 1998). Slaves escaped into the interior of Mauritius from the earliest years of Dutch occupation (Moree 1998). Sometimes, Dutch parties would try to recapture these escapees and Governor Hugo took particularly to this task. One recaptured slave called Simon had been surviving within the interior for 11 years. Hugo had questioned him about the Dodo and Simon asserted that only twice had he seen the bird in very secluded places (Pitot 1905, 1914). However, a



Figure 30. The Dutch catching king penguins in the Straits of Magellan (Begin en de Voortganch, 1646).

recently discovered account (Hume et al. 2004) mentions the capture of Dodos in 1674.

Opperhoofd Isaac Joan Lamotius 1677–1692

Lamotius was the longest serving commander of the VOC on Mauritius (Moree 1998). During his stay on Mauritius, he maintained a daily diary and mentions, as part of hunters’ quarry the capture of Dodos. These records, however, have been ignored and assumed to be references to Red Rails (see below), but evidence suggests to the contrary (Hume et al. 2004). Lamotius was a skilled draughtsman, inventor and natural historian (Moree 1998) and surely would have known the difference between a small rail and large Dodo (Hume et al. 2004). It was also during the period 1685–1688 that Lamotius and the other Dutch settlers relied heavily on local game having literally been abandoned by the VOC (Sleigh 1998). Although introduced species such as deer and pigs were the hunter’s mainstay, endemic species were infrequently taken as well (Hume et al. 2004), and it appears that Dodos still resided in the remotest areas of Mauritius.

Benjamin Harry 1681

The journal kept by Benjamin Harris on board the Berkley Castle, homeward bound on 11 July 1681, is the last definite mention of the bird on Mauritius and is cited by many authors mentioning the Dodo. It has been suggested that this account may or may not have been referring to a Dodo (Cheke 1987) or that it may have reference to a former occurrence (Fuller 2002). Lamotius’ record suggests that Dodos still occurred until at least 1688 (Hume et al. 2004), which may exonerate Benjamin Harris’s reliability. However, Albert Pitot, who wrote what is now an extremely rare book entitled “*T’Eylandt Mauritius*” (1905),

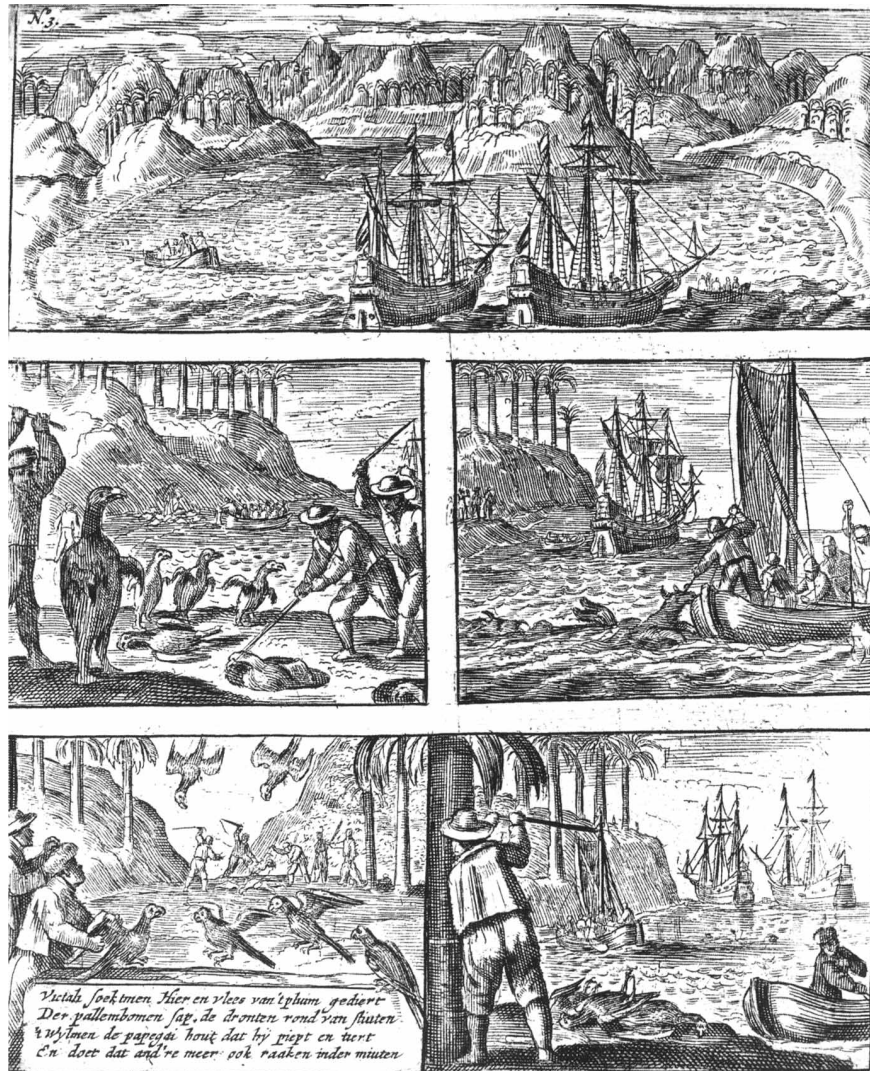


Figure 31. The killing of 'dodos' (center left) on Mauritius in 1602. (H. Soete Boom, 1648).

exhaustively covered the history of the island and found Harris's Dodo reference "most improbable." Cheke (1987) further maintains that by 1668 the name *Dodaersen* had already transferred to another flightless Mauritian bird, the red rail *Aphanapteryx bonasia* and that any reference to *dodaersen* after this date was referable to red rails. However, only two accounts, both of which were written by foreign visitors to the island, confuse the name and therefore, Cheke's suggestion cannot be relied upon with any certainty.

Affinities and morphology

The affinities of the Dodo were explored by numerous authors and often preposterously placed within a large assortment of bird orders (Strickland and Melville 1848). The proposal by Professor J. T. Rheinhardt that the Dodo was related to Columbiformes (pigeons and doves) was initially met with ridicule but after Strickland and Melville (1848) and others cham-

pioned his cause, the idea gained credibility and eventually became universally accepted. DNA studies have now concluded that the Dodo and closely related Solitaire *Pezophaps solitaria* are a sister clade nested within the family Columbidae and derived from the same ancestor as the south-east Asian Nicobar Pigeon *Coleonas nicobarica* (Shapiro et al. 2002).

It was Owen (1866) who first reconstructed the Dodo but was criticised by Newton and Gadow (1895). In particular, the posture of the Dodo as instructed by Owen enforced the classic image of a stout, squat, short-legged beast (Figure 23). Owen had laid out the skeletal elements of the Dodo against the "Edwards Dodo" painting by Savery (see pictorial evidence) and simply drawn a shape around them (Owen 1866). The earliest illustrations, e.g. van Neck (Figure 2), Harmenszoon (Figures 3, 4) and the account of Evertszon suggest the Dodo was anything but a squat, obese bird. However, Owen (1872), after obtaining more skeletal evidence, reworked his reconstruction of the Dodo and produced

a more upright and lifelike image (Figure 24). The solitary *Pezophaps solitaria* of Rodrigues Island, was an upright, graceful bird, quite able to out-run a man amongst the rocks (Leguat 1708) and the athleticism and posture of the Dodo of Mauritius was probably similar.

It has also been postulated that variation in Dodo morphology, i.e. the fat and thin phases, is a result of seasonal fluctuations in food supply (Oudemans 1917) and/or obesity due to incorrect diet whilst in captivity (Kitchener 1993). Sexual size dimorphism is particularly pronounced in the solitary *Pezophaps solitaria* (Livezey 1993) but less so in the Dodo (Hume, unpublished), and this may have resulted in contradictory descriptions and illustrations. Evidence is poor for such assumption, however, and any conceivable weight change in Dodos would probably have been hidden beneath the plumage in any case.

A clue as to the morphology of the Dodo can be gleaned by comparing both the dynamic image of the Dodo by Savery (Figure 10) and a painting entitled "Landscape with birds" (Figure 12) with a common posture illustrated by another flightless bird, the Kiwi *Apteryx sp.* of New Zealand (Figure 25). Both birds display analogous degeneration of flying apparatus, e.g. keel-less sternum, extreme reduction of the pectoral girdle, and subsequent increased robustness of the pelvic girdle, particularly the tarsi. These characters result in a rather snake-like neck—the loss of the sternal flight muscles and keel enhance the image—resulting in a rather peculiar posture. As Savery continued to use this pose in a number of illustrations, it seems reasonable to assume that this was a fairly accurate depiction of the bird in life. Images of gross birds were all executed after Savery's 1626 depiction, which was the same image used for Owen's (1866) reconstruction, and were exaggerated, inaccurate or artistically inadequate portrayals, derived from this source.

In terms of colouration, such was the variation in description and depiction by the various observers that it is extremely difficult to make any serious interpretation from them. The descriptive and comparative terms used in many of the Dodo accounts, quite understandably, refer to familiar species that a scientifically untrained observer could use for comparison, thus, like a swan, goose, turkey, etc. are indicative of large size. Unfortunately, colour descriptions are used more haphazardly and are more often than not contradictory. At least one albinistic specimen arrived in Europe (Hume and Cheke 2004) and perhaps a melanistic specimen arrived in Oxford (Boas 1935), which suggests the colours were variable. When examining all of the evidence, however, the depiction by Mansur (Figure 14) is probably the most reliable coloured rendition.

Conclusion

As can be determined from the inadequate accounts and illustrations, all provide little information about Dodo

morphology or ecology. More often than not, only the gastronomic value is mentioned. Conflicting and contrasting reports, heavily plagiarised from each other, help confuse rather than clarify the situation. Some of the rather dubious accounts were presented by observers who had probably not landed on Mauritius or seen a Dodo themselves but had procured the knowledge from fellow seamen, e.g. Francois Cauche. More importantly, even in the 16th and 17th centuries, the Dodo was considered an incredible and fantastical bird, features that ensured its mention by early mariners and explorers. Extreme caution must, therefore, be applied when trying to interpret any accounts and illustrations and consideration must be given to understanding exactly what the observer had meant to achieve, be it fanciful, artistic, or pure sensationalism. Unfortunately, scholars have taken much of this source material as the absolute truth and their propensity to produce bizarre and sometimes, ludicrous assumptions have now become ingrained in the literature.

In the case of Dodo art, science has failed to grasp the concept that there were and still are artists who produce poor inaccurate work. A Michelangelo or Rembrandt did not paint a single Dodo; therefore, artists' ability or lack of must also be taken into consideration. Furthermore, postulations about Dodo morphology, be it fat/thin wild birds or fat captive birds, colouration, feather composition and posture, are heavily reliant on these poor illustrations. The population may have been a variable one in terms of colouration, with age, sex, seasonal food supply all adding to the variation. As Dodo ecology is unknown, so few specimens made the journey alive to Europe and no records concerning longevity are available, such interpretation is meaningless. Any conclusion concerning Dodo external morphology is now impossible to ascertain, thus, any hypothesis that is derived from historical sources should be treated as such, i.e. a hypothesis.

The myth surrounding the Dodo has nurtured the obsession of ornithologists, historians and ornithologists, who have ultimately recreated their own reasoning as to the true nature of the bird. As can be deduced from the available evidence, the foundation for scientific examination is wholly inadequate.

The Dodo, one of the most documented and famous of birds and a leading contender as the "icon" of extinction, has endured more than its fare share of over zealous misinterpretation.

Discussion

The "penguin" of Mauritius—A contemporary case study in misinterpretation

Increasing maritime traffic from the East Indies also resulted in the importation of a number of exotic species to Dutch ports; the most important of these

collections was that of the pre-mentioned Emperor Rudolph II of Prague. The collection not only contained a menagerie but also a museum with stuffed and mounted natural history specimens and curiosities, including Dodo and the first Southern Cassowary *Casuarius casuarius*. Other Dutch expeditions, e.g. to South America, also brought back specimens and written accounts, in particular the first illustrative evidence of the King Penguin *Aptenodytes patagonicus*.

In 1605, the historian Clusius depicted a Dodo and King Penguin (Figure 26) on separate pages in his natural history book entitled *Exoticorum Libri decem* (Clusius 1605). The Dodo was based reputedly on an illustration from van Neck's journal, whilst the King Penguin is an exact copy based on a woodcut depicting the Dutch in the Straits of Magellan in 1599 (Figure 27). In 1635, Nieremberg reproduced the Clusius' Dodo and King Penguin for his own book *Historia Naturae* (Nieremberg 1635), but this time illustrating them on opposite pages (Figure 28). The same birds appeared in Joris Jonstonus' *Historiae Naturalis* (Jonstonus c.1650) (Figure 29), but the Dodo and King Penguin now appeared together on the same page and it is not clear which name belongs to which bird. Furthermore, a scene depicting the Dutch in the Straits of Magellan catching and killing King penguins (Figure 30) appeared in *Begin en de Voortgangh* (1646).

The book publisher H. Soete Boom, in 1648, published the journal of Willem West van Zanen (who had visited Mauritius with van Neck in 1598 and again, in 1602). A number of woodcuts were produced to accompany the text and an artist attempted to reconstruct the Dutch landings described by West-Zanen (Figure 31). The scenes variously depict the catching and killing of birds and the marine Dugong *Dugong dugong*, now extinct in the Mascarenes (North-Coombes 1971), and loading/unloading of supplies. Almost certainly using the Jonstonus' *Historiae Naturalis* and/or *Begin en de voortgangh* as a reference, it appears he either lifted the wrong bird, i.e. penguin and not Dodo from Jonstonus, or added the penguin scene from *Begin en de voortgangh* to his illustration. Ultimately, a King Penguin appears on a Mauritian shore—leaving science to ponder over the “Penguin of Mauritius”!

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