

THE ANIMAL HISTORY OF ALBERTUS MAGNUS AND THOMAS OF CANTIMPRÉ

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THE problem of the relationship between the last five books of Albertus Magnus' *De Animalibus* and the corresponding books of the *De Natura Rerum* of Thomas of Cantimpré was first raised nearly a century ago and has not yet been conclusively solved.

In 1852, M. Bormans, a member of the Royal Academy of Belgium, published an article affirming that the *De Natura Rerum* is the main source for Albertus' work on specific animals. His principal arguments are as follows:

I. Thomas scrupulously acknowledges his sources, including contemporary ones. If he had used the work of Albertus, he would surely have cited it.¹ Albertus, on the other hand, shows no scruples about inserting in his works extensive passages from other writers, *not* acknowledging his borrowings, and concealing them as far as possible, first by cutting them up and adding interpolations, then by putting upon them the seal of that barbarous Latin by which he distinguishes himself even among the other writers of his epoch (*'en y mettant le cachet de cette latinité barbare par laquelle il se distingue même parmi les autres écrivains de son époque'*). He cites none of his contemporaries or immediate predecessors.²

II. Thomas' work on animals precedes Albertus'. Albertus did not complete his works on natural history, of which the section on animals is the last, before 1256. Thomas' work must have been completed by 1250. [As a matter of fact, it was completed by 1240.]³ Vincent of Beauvais in his *Speculum Naturale* (completed in 1250) frequently cites the *De Natura Rerum*. He cites Albertus also, *but not on animals*. 'Can one have clearer proof that Vincent did not know these writings of Albertus — in other words, that they were not yet in existence?'⁴

J. Victor Carus, in 1872, summarizes Bormans' arguments with approval and concludes that the main source of Albertus' books on specific animals is Thomas, whose chapters he has sometimes merely copied, sometimes abridged and interpolated.⁵ A few later scholars have echoed this opinion,⁶ but no one, so far as I know, has presented any new evidence.

In 1906, H. Stadler, later editor of Albertus' *De Animalibus*, published an article sharply contradicting the conclusions of Bormans and Carus. He denies not only that Thomas' work was used by Albertus, but that it is the *De Natura*

¹ M. Bormans, 'Thomas de Cantimpré indiqué comme une des sources où Albert le Grand et surtout Maerlant ont puisé les matériaux de leurs écrits sur l'histoire naturelle,' *Bulletins de l'Académie Royale des Sciences, des Lettres, et des Beaux-Arts de Belgique*, xix (1852), p. 140.

² *Ibid.*, p. 145.

³ This date is established by Thomas' reference to Jacobus de Vitriaco as 'nunc Tusculanum presulem.' Jacobus died in 1240.

⁴ Bormans, *op. cit.*, pp. 143-145.

⁵ J. Victor Carus, *Geschichte der Zoologie* (Munich, 1872), p. 235.

⁶ See, for example, Alexander Kaufmann, *Thomas von Cantimpré* (Cologne, 1899), pp. 33-34.

[or *Naturis*] *Rerum* cited by Vincent of Beauvais. That it is not the work used by Vincent he asserts that he can show by a single illustration. Vincent ascribes part of his description of the *eale* (the two-horned African rhinoceros) to *Liber de Naturis Rerum*. Uninterpolated manuscripts of Thomas' work, Stadler asserts, do not include the *eale*.⁷

Stadler's conclusions are entirely negative. Albertus, he insists, did not borrow from Thomas, nor did Thomas borrow from Albertus, nor did Vincent draw upon either Thomas or Albertus. All the coincidences and frequent verbal correspondences indicate merely common source material.⁸

This article is a tissue of errors. With an air of considerable authority it affirms one mistaken conclusion after another. I have not seen the Munich manuscripts of the *De Natura Rerum*, on which Stadler based his conclusions, but the British Museum manuscripts *Royal 12 E xvi* (thirteenth century) and *Royal 12 F vi* (fourteenth century) both describe the *eale*, and Vincent's account is a summary of Thomas'.⁹ Since I am engaged in preparing an edition of Thomas' encyclopedia, I have collated all relevant passages in Vincent with Thomas' work, and find that Vincent's citations of both *De Natura Rerum* and *De Naturis Rerum* are excerpts from Thomas, sometimes copied verbatim, sometimes condensed but preserving much of Thomas' phrasing. In fact, I estimate that Vincent has reproduced roughly three fourths of the complete work, exclusive of the moralizing 'significations' appended by Thomas to many of his chapters.

Although it is now generally acknowledged that Thomas' work on animals precedes Albertus', the leading contemporary historians of science lean toward Stadler's scepticism on the subject of direct borrowings. Professor Thorndike's valuable work on magic and experimental science, though it makes no definite statement on the subject, implies that Albertus did not borrow from Thomas. 'Bormans and Rose after him,' Professor Thorndike writes, 'have dwelt on the use of Thomas' compilation by his fellow Dominicans, Vincent of Beauvais and Albertus Magnus, but I have little doubt that most of his sources were known to them directly.'¹⁰ Elsewhere Professor Thorndike contrasts Albertus' 'sceptical estimate of Solinus' with Thomas' admiring references to him, and comments: 'And yet there are modern scholars who contend that Albert took much of his natural science ready-made and without acknowledgment from the *De Natura Rerum* of his pupil Thomas.'¹¹

George Sarton notes Albertus' use of Thomas' chapters on minerals, but says

⁷ H. Stadler, 'Albertus Magnus, Thomas von Cantimpré, und Vinzenz von Beauvais,' *Natur und Kultur*, iv (1906), p. 88. Stadler says that he examined four manuscripts at Munich: one of the thirteenth century, two of the fourteenth, and one of the fifteenth. He found the *eale* in none of these, but only in codex 27006, an interpolated fifteenth century manuscript.

⁸ *Ibid.*, p. 89.

⁹ Vincent, it is true, does not in this chapter quote Thomas verbatim. The source of the first part of Vincent's description is Solinus, whose exact phrasing is preserved. Thomas' chapter also follows Solinus closely. It seems probable that to avoid duplication of phrasing Vincent chose to summarize this chapter of Thomas, instead of quoting it according to his usual practice.

¹⁰ Lynn Thorndike, *A History of Magic and Experimental Science* (New York, 1929), II, p. 373.

¹¹ *Ibid.*, p. 377.

nothing about borrowings on animals. He states that the first nineteen books of Albertus' *De Animalibus* are a paraphrase of Aristotle's three treatises on animals, and that books xx and xxi deal with generalities. Books xxii through xxvi (those on which Albertus' reputation as a naturalist chiefly rests) he characterizes as 'a sort of appendix to the *De Natura Rerum* of Thomas of Cantimpré.'¹² These books 'were more original and contained the results of observations made by himself or communicated to him by the observers. Many animals were here described for the first time.'¹³

The present paper attempts to show that Albertus borrowed extensively from Thomas. Certain restrictions as to the kinds of evidence valid for such an argument are immediately obvious. Since Thomas' statements are nearly all taken from earlier writings, which were also available to Albertus, material common to the *De Natura Rerum* and the *De Animalibus* does not necessarily constitute evidence of influence. Moreover, since Albertus usually rephrases borrowed material, it is difficult to establish conclusively by parallel phrasing alone the sources upon which he drew. It is necessary, therefore, to find in Thomas' work statements not included in his sources and to show that Albertus reproduced these passages. The obvious approach to such a purpose is a study of Thomas' errors. If it can be shown that Albertus consistently reproduces errors original with Thomas, we have, it seems to me, unmistakable evidence of borrowing.

Thomas' errors are most numerous in his books on fishes and *monstra marina* — as might be expected, since these creatures are not so well known as land animals. In fact, Thomas does not even know what to call these *monstra*, and, either through misunderstanding of his sources or through the use of corrupt manuscripts, he unintentionally invents several new terms for them. As a result, natural history is enriched by a group of creatures never known on sea or land.

The most startling example is a composite of four of Pliny's sea creatures. Its genesis is clear. Pliny attributes to Trebius Niger, one of his favorite authorities on fish, certain statements about a kind of murex: It is a foot long and five fingers in thickness; it can delay ships [by clinging to them]; preserved in salt, it has the property of drawing up from the deepest wells any gold that may have fallen into them. Without transition Pliny goes on to say that the *mena*, which is usually white, grows dark-colored in summer, and that the lamprey also changes color and is the only fish to make a nest of sea-weed and lay eggs in it. I quote the passage in full. (The italicized phrases are those reproduced by Thomas but not by Albertus.)

Trebius Niger pedalem esse et crassitudine quinque digitorum, navis morari; praeterea hanc esse vim eius adservati in sale ut aurum quod deciderit in altissimos puteos admotus extrahat.

*Mutant colorem candidum menae et fiunt aestate nigriores, mutat et phycis, reliquo tempore candida, vere varia; eadem piscium sola nidificat ex alga atque in nido parit.*¹⁴

¹² George Sarton, *Introduction to the History of Science* (Baltimore, cp. 1931), II, Part II, p. 939.

¹³ *Ibid.*, p. 778.

¹⁴ C. Plini Secundi *Naturalis Historica*, ed. Sillig, 6 vols. (Hamburg, 1851-1855), IX, cap. 41-42 (vol. II, p. 164).

Pliny does not introduce his indirect discourse by *dicit* or any similar verb; *niger* means 'black.' Misled by these two facts, Thomas announces that the *trebius* is a black fish. The manuscript of Pliny that he was using probably had the variant reading *candidum in hieme* for *candidum menae*. (The Sillig edition of Pliny lists this variant.) Thomas therefore applies the entire passage to the *trebius*.

Having espoused the theory that the *trebius* is a fish, he remains faithful to it to the end of the chapter. He finds in Pliny another reference to Trebius Niger:

Lolligo quotiens cernatur extra aquam volitans, tempestates mutari Trebius Niger auctor est; xiphian, id est gladium, rostro mucronato esse, ab hoc navis perrossas mergi in oceano.¹⁵

The manuscript of Pliny used by Thomas lacked the clarity afforded by modern punctuation, and Thomas is inclined to overlook fine points of grammatical construction. Still clinging to his *trebius*-fish theory, he seems to have read the latter part of Pliny's sentence thus: 'Trebius niger (auctor est Xiphian) — id est, gladium — rostro mucronato esse,' etc. His translation, if he had made one, would have run: 'According to Xiphian, the black *trebius* — that is, the swordfish — is armed with a sharp beak with which it can pierce ships and sink them in the ocean.'

The accumulated results of Thomas' misreadings are embodied in his chapter 'De Trebio.' I quote it in full. (The italicized passages are taken from Pliny and do not appear in Albertus; those in capitals are *not* in Pliny, but are reproduced by Albertus.)

TREBIUS NIGER PISCIS EST, ut dicit Plinius. Pedalis est in longitudine, et cum ita parvus est, tamen piscis iste quinque digitorum *crassitudinem* habet. Hanc ei inesse vim Plinius recitat ut pars eius *asservata in sale aurum quod deciderat in altissimos puteos admota extrahit et facit fluctuare*. *Mutant colorem candidum in hieme et fiunt estate nigriores*. Inter omnes pisces trebius quidem *solus ex alga nidificat et in nido ova parit*. Trebius in oceano est qui diro rostro quem habet NAVES PERFORAT, sed illi permaximi sunt qui in oceano sunt.¹⁶

Albertus accepts this composite fish without question. He varies only the phrasing and the order of details. His chapter is quoted in full.

TREBIUS EST PISCIS NIGER estate, candidus in hyeme, ut dicit Plinius, sed in Oceano efficitur maior: et cum pedalis est, pinguedinem habet quinque digitorum quae sale condita aurum ex aquis quamvis in profundissimos puteos deciderit extrahit et de fundo FACIT FLUCTUARE. Hic piscis ex alga nidum construit et in nido ova parit. Et cum magnus est in Oceano, acutissimo rostro NAVES PERFORAT.¹⁷

(Note that the phrases italicized in Thomas' chapter are borrowed unchanged from Pliny, and that the whole chapter follows Pliny's order of details. It is impossible, then, for Thomas to have taken this material from Albertus. The

¹⁵ Pliny, *Hist. Nat.*, xxxii, cap. 6 (vol. v, p. 6).

¹⁶ *De Natura Rerum*, vii, cap. 81, "De Trebio."

¹⁷ Alberti Magni *De Animalibus* libri xxvi, nach der Kölner Urschrift, ed. Hermann Stadler (Münster, Westphalia, 1920), Liber xxiv, section 128 (vol. ii, p. 1548), in *Beiträge zur Geschichte der Philosophie des Mittelalters*, vol. xvi.

phrases capitalized in Albertus' chapter, on the other hand, do not appear in Pliny but are borrowed from Thomas. There are no phrases common to Pliny and Albertus that are not also found in Thomas.)

In addition to Trebius Niger, another of Pliny's authorities, Statius Sebosus, suffers a sea-change. In the Ganges, according to Pliny, lives the *platanista*, a creature sixteen cubits long, with the tail and snout of a dolphin. Statius Sebosus, Pliny adds, affirms that in the same river are found gigantic blue worms called *caerulei*. Their gills measure sixty cubits, and they are so strong that they can seize elephants by the trunk and drag them away.

In Gange Indie *platanistas* vocant rostro delphini et cauda, magnitudine autem xvi cubitorum; in eodem esse Statius Sebosus haud modico miraculo adfert vermis branchiis binis, lx cubitorum, caeruleos, qui nomen a facie traxerunt; *his tantas esse vires* ut elephantos *ad potus venientis* mordicus comprehensa manu *abstrahant*.¹⁸

In Thomas' chapter the *platanista* remains unchanged, but the *caerulei* appear with a difference. They have become 'stacios,' and their gills have been displaced by arms. Moreover, they now pull off the elephants' trunks.

PLATANISTE MARINE BELUE SUNT, teste Plinio, que in Gange fluvio Indie nascuntur. Rostrum habent delphini et caudam, xvi cubitorum in longitudinem habentes. HII SOCIE SUNT BELUE QUAS 'STACIOS' VOCANT, BRACHIIS BINIS. *Hii vires tantas inesse* dicunt ut elephantos *ad potum venientes* morsibus INFESTENT ET EORUM PROMUSCIDES *abstrahant*.¹⁹

Albertus admits the 'stacios' into his aquarium, but their gender is changed, probably by a scribal error.

PLATANISTAE, ut dicit Plinius, BELUAE SUNT MARINAE, quae Gange fluvio Indiae nascuntur et in mare veniunt, et rostrum habent delfini, et caudam habent sedecim cubitorum longitudinis. HII SOCIAE SUNT BELUAE QUAS 'STACIAS' VOCANT, BRACHIA bina habentes, quibus tanta inest fortitudo ut elephantos in aquam intrantes INFESTENT ET EIS PROMUSCIDES abrumpant.²⁰

Thomas' more than Circean powers of transformation are next exercised on a whole people, the Gedrosi, inhabitants of territory that now forms part of Iran and the coast of Baluchistan. According to Pliny, the captains of the fleet of Alexander the Great reported that these people made the doorways of their homes from the jaws of gigantic sea-creatures and their roof-beams from the monsters' bones — many of the beams being forty cubits long.

Gedrosos, qui Arabim amnem adcolunt, Alexandri Magni classium praefecti prodiderunt *in domibus* fores maxillis beluarum facere, ossibus tecta contignare, ex quibus multa quadragenum cubitorum longitudinis *reperita*.²¹

Thomas records the name of this people as the 'Zedrosi,' defines them as sea-monsters, and changes their habitat from the Arabis river to Arabia:

ZEDROSI similiter BELUE MARINE SUNT, testante Plinio, que Abrabiam incolunt. Harum beluarum ossa ita magna sunt ut fores *in domibus* et in PALACIIS TIGNAQUE vel alia struc-

¹⁸ Pliny, *Hist. Nat.*, ix, cap. 17 (vol. II, p. 154).

¹⁹ *De Natura Rerum*, vi, cap. 38, 'De Platanistis.'

²⁰ *De Animalibus*, xxiv, section 99 (vol. II, p. 1542).

²¹ Pliny, *Hist. Nat.*, ix, cap. 2 (vol. II, p. 142).

ture necessaria de illis commode secantur. Quadraginta enim cubitorum longitudinis reperiuntur.²²

Albertus takes over Thomas' account, but, apparently holding that sea-monsters should live in the sea, changes Arabia to the Arabian Sea. He also adds, as he usually does whenever he describes a *large* sea-creature, that the *monstrum* is a species of whale.²³

ZEDROSUS BELLUA EST MARIS de genere cetorum in Mare Arabico, ex quorum ossibus fores in PALATIIS et TIGNA fiunt. Ossa enim ejus quadraginta cubitorum longitudinis inveniuntur.²⁴

A fourth addition made by Thomas to marine fauna is the *exposita*. Pliny, after giving the dimensions of a monster cast ashore at Cadiz, relates that Marcus Scaurus, during his aedileship, exhibited at Rome the bones of the monster to which, according to report, Andromeda was exposed:

Turranius prodidit expulsam beluam in Gaditano litore, cuius inter duas pinnas ultimae caudae cubita sedecim fuissent, dentes eiusdem cxx, maximi dodrantium mensura, minumi semipedum. Beluae cui dicebatur exposita fuisse Andromeda ossa Romae adportata ex oppido Iudaeae Ioppe ostendit inter reliqua miracula in aedilitate sua M. Scaurus, longitudine pedum xl, altitudine costarum Indicos elephantos excedente, spinae crassitudine sesquipedali.²⁵

Thomas apparently reads *cui*, in the second sentence of the passage, as *qui*. The resulting clause, 'Beluae *qui* dicebatur exposita fuisse Andromeda ossa Romae adportata,' he interprets: 'Andromeda [reports that] the bones of the monster called the *exposita* were brought to Rome,' etc.

EXPOSITA BELUA EST IN ILLA PARTE MARIS que Iudeam preterfluens oppido Ioppen alliditur. Harum beluarum una, ut scribit Plinius, Rome allata est inter reliqua mundi miracula quam [sic!] Scaurus, Romanorum maior, in edilitate sua copiosissime preparavit. Inventique sunt in ea belua DENTES MAXIMI ATQUE LONGISSIMI, PINGUEDO QUOQUE CUBITORUM v.²⁶

Albertus takes over the *exposita* unchanged, except that he adds that it [like the *zedrosus*] is a species of whale:

EXPOSITA, ut dicit Plinius, BESTIA EST IN MARIS ILLA PARTE quae in Iudaea Joppe attingit aliquando inventa, quae MULTOS ET LONGISSIMOS HABET DENTES ET PINGUEDINEM QUINQUE CUBITORUM, et est de genere cetorum.²⁷

Another fish presented to the world by Thomas is derived from Pliny's account of the *glanis*. The dogfish (*vulpes marina*), Pliny says, gobbles down a fish-line until it finds a weak point and then gnaws off the line; the *glanis* (catfish?), however, more cautiously nibbles at the hook from the rear, and thus steals the bait:

²² *De Natura Rerum*, vi, cap. 52, 'De Zedrosi.'

²³ For another example of this impressive practice, see Albertus' account of the *exposita*, below.

²⁴ *De Animalibus*, xxiv, section 136 (vol. II, p. 1549).

²⁵ Pliny, *Hist. Nat.*, ix, cap. 4 (vol. II, p. 144).

²⁶ *De Natura Rerum*, vi, cap. 18, 'De Exposita.'

²⁷ *De Animalibus*, xxiv, section 46 (vol. II, p. 1532).

Cautius qui glanis vocatur *aversos mordet hamos nec devorat sed esca spoliatur*.²⁸

Thomas misreads the first word of this sentence. The result is the *claucius*:

CLAUCIUS, qui glanis vocatur, sicut dicit Plinius, *aversus mordet inescatos hamos nec devorat eos sed DESPOLIANDO grassatur*.²⁹

Albertus' account of this fish is equally brief:

CLAUCIUS,³⁰ qui et glanis vocatur, piscis est astutus qui, non hamum glutiens, *aversis morsibus DESPOLIAT eum*.³¹

Other, though perhaps less startling, errors are included in Thomas' books on sea-creatures, and, since Albertus work on this subject is largely a paraphrase of Thomas', all the errors naturally reappear in Albertus' chapters. One example concerns the crocodile, the *trochilos*, and the ichneumon. Aristotle, Pliny, and Solinus all mention the *trochilos* — the bird that picks food from the crocodile's jaws. All agree that the reptile does not harm the bird.³² Pliny (Thomas' main source) includes in one sentence the ministrations of the *trochilos* and the attack of the ichneumon. The ichneumon watches until the crocodile, jaws gaping wide, is lulled asleep by the pleasure it enjoys in having its teeth cleaned by the bird; then the ichneumon rushes like a javelin down the crocodile's throat and gnaws its way out through the reptile's belly.

Hunc [crocodilum] saturum cibo piscium et *semper esculento ore in litore somno datum parva avis quae trochilos ibi vocatur, rex avium in Italia, invitat ad hianum pabuli sui gratia, os primum eius adsultim repurgans, mox dentes et intus fauces quoque ad hanc scabendi dulcedinem quam maxime hiantes, in qua voluptate somno pressum conspicatus ichneumon per easdem fauces ut telum aliquod inmissus erodit alvom*.³³

A line or two may have been omitted from the manuscript of Pliny used by Thomas, and he misreads *alvom* as *avem*. As a result, he telescopes the bird and the ichneumon and changes the disaster of the crocodile into that of the *trochilos*, or, as he spells the word, *crochilos*.

Oculis autem clausis, [cocodrillus] se dormire simulat, os patulum et apertum habens. Aves autem quasi ad escam descendentes, eas perimit et TRANSLUTIT. . . . Hanc beluam, ut dicit Plinius, *saciatam piscibus et semper esculento ore in litore sompno datam parva avis quae CROCHILLOS ibi vocatur (in Italia vero rex avium) invitat ad hiatum, pabuli sui gratia. Os primum scalpit, mox dentes et intus fauces. Demum ut telum aliquod inmissam erodit AVE*.³⁴

Albertus accepts this revised version of the story without question.

²⁸ Pliny, *Hist. Nat.*, ix, cap. 67 (vol. II, p. 182).

²⁹ *De Natura Rerum*, vii, cap. 21, 'De Claucio.'

³⁰ Stadler reads the two minims of the *u* as *n*, and therefore transcribes the word as *clancius*. Borgnet's text has *claucius*. See B. Alberti Magni *Opera Omnia*, ed. Borgnet (Paris, 1891), vol. xii, p. 517.

³¹ *De Animalibus*, xxiv, section 24 (vol. II, p. 1525).

³² See Aristotle, *Historia Animalium*, trans. d'Arcy W. Thompson (Oxford, 1910), ix, cap. 6, 612a; Pliny, *Hist. Nat.*, viii, cap. 37 (vol. II, pp. 96-97); Solinus, *Collectanea Rerum Memorabilium*, ed. Mommsen (Berlin, 1864), p. 160.

³³ Pliny, *Hist. Nat.*, viii, cap. 37 (vol. II, pp. 96-97).

³⁴ *De Natura Rerum*, vi, cap. 5, 'De Cocodrillo.'

Adeo jacet immobile ad solem quod videtur esse mortuum, et tunc magno hyatu os aperit, et aviculae venientes purgant ei dentes, quas etiam aliquando os concludens DEGLUTIT. . . . Avis autem quae sibi dentes purgat et quam glutit CROCHIOS Graece, Latine regulus dicitur.²⁵

Another of Thomas' errors maligns the dolphin. Solinus says that dolphins, wherever they go, swim in pairs. They are viviparous. Their gestation period is nine months. They carry their young about in their mouths and follow their weak cubs for some time [to protect them].

Quoquo eant, coniuges evaguntur. Catulos edunt. Decimus mensis maturum facit partum. . . . Teneros in faucibus receptant; invalidos aliquantisper prosequuntur.²⁶

Thomas reads *edunt* as part of the verb *ēdo* (to devour), instead of *ēdo* (to bring forth). He also reads *prosequuntur* as *persecuntur*. Hence he asserts that male dolphins *devour* their young.

*Mensis decimus partum liberat. Mares autem, feminis parientibus, catulos DEVORANT, SED OCCULTANT SE MATRES CUM FETIBUS. Diligunt enim eos tenerrime et longo tempore ducunt post se, et sub aqua sequuntur matrem. At ubi ad robur estatis fetus provenerint, nisi validi sint, eos etiam matres persequuntur.*²⁷

Albertus, as usual, follows Thomas:

Hoc genus odit pullos suos, ita quod masculus DEVORARET eos nisi FEMINA EOS OCCULTARET: MATER ENIM OCCULTAT PULLOS et secum ducit usque ad completionem, et postquam completi sunt ita eos odire incipit quod cum mare DEVORARET eos si se viribus propriis non defenderent.²⁸

Thomas is responsible for some surprising details about the sea urchin (*echinus*). He confuses *echinus* with *echeneis* (the *remora*, or delaying-fish) and attributes to the former the characteristics of both. Pliny's description of the urchin is as follows:

Ex eodem genere [i.e., cancerorum] sunt echini quibus *spinæ* pro pedibus; ingredi est his in orbem volvi; itaque detritis saepe aculeis inveniuntur. . . . Nec omnibus idem vitreus color; circa Toronen candidi nascuntur spina parva. Ova omnium amara, quina numero; ora in medio corpore in terram vertunt. Tradunt saevitiam maris praesagire eos, conreptisque opperiri lapillis, mobilitatem pondere stabilientis; nolunt volutatione spinas atterere. Quod ubi videre nautici, statim pluribus ancoris navigia infrenant.²⁹

Thomas reads *detritis* as *dentibus*; he therefore asserts that the urchin has spines in place of teeth. He also misreads *Toronen* (a town in Macedonia) as *coronam*; hence he states that urchins are white around the crown. His account follows. The first paragraph applies to the *echeneis*, not to the *echinus*.

Echinus piscis est, ut dicunt Ysidorus et Iacobus, semipedalis. Tante virtutis est ut navem adherendo detineat. . . . Mirum quidem et super estimationem mirabile est quod semipedalis pisciculus, non ulla violencia sed adhesionem tantum, navem ducentorum

²⁵ *De Animalibus*, xxiv, section 32 (vol. II, p. 1528).

²⁶ Solinus, *Memorabilia*, p. 87.

²⁷ *De Natura Rerum*, VI, cap. 13, 'De Delphinis Maioribus.'

²⁸ *De Animalibus*, xxiv, section 40 (vol. II, p. 1531).

²⁹ Pliny, *Hist. Nat.*, IX, cap. 51 (vol. II, p. 170).

pedum cum suis intus ponderibus retinet ut nec ad punctum moveri possit. . . .

Ex cancrorum genere echini sunt, ut dicit Plinius, qui *spinas* simili modo pro pedibus habent. Circa CORONAM candidi nascuntur. Ova eorum amara sunt, quinque numero. Ora in medio corpore habent, colore vitreo, pene effigie scorpionis. LOCO DENTIUM GRAVES ACULEOS IN ORE HABENT. . . . Comedi non potest piscis iste, quia comestus mortem infert a statu sue dispositionis dissolvendo. . . .

Sicut Ambrosius et Plinius et Magnus Basilius scriverunt, echinus plerumque index future tempestatis aut tranquillitatis, et in hiis nuncius solet esse navigantiibus. Denique cum procellam venturam senserit, calculum validum arripit eumque velud saburram vehit et tanquam anchoram trahit ne fluctibus excutiat, itaque non suis se librat viribus, sed alieno se stabilet et regit pondere. Quod videntes, naute muniunt se et exemplo echini, iactatis anchoris, naves stabiliunt.⁴⁰

Albertus' account includes all three of Thomas' errors: the telescoping of *echeneis* and *echinus*, the statement that the urchin's spines take the place of teeth, and the substitution of *coronam* for *Toronen*.

Escynus de genere est cancrorum semipedalis. Circa CORONAM sunt candidi, aculeos quosdam pro pedibus habentes, et ora in medio corpore, et sunt colore quasi vitrei, et paene in scorpionis effigie: LOCO DENTIUM GRAVES IN ORE HABENTES ACULEOS, ova faciunt quinque numero, et sunt amarissima. Est autem venenosus, nec comedi potest nisi totum dissolvat comedentem.

Hic piscis praenuntiat tempestates: sentiens enim materiam ventorum elevari de fundo, rapit lapidem stabiliens se ad ipsum sicut ad anchoram: et cum hunc lapidem escynum trahere vident nautae, etiam ipsi anchoris figunt naves.

Hic piscis escynus est de quo in praecedentibus diximus quod detinet navim: subtus enim adherens navi ducentorum vel amplius pedum cum omnibus armamentis suis detinet escynus contra quemlibet ventorum impulsu ita quod moveri nequit arte aliqua vel violentia.⁴¹

Another startling innovation appears in Thomas' account of the *pastinaca*, which is included in his chapter on the sea-hare. The source is again Pliny. In his chapter on poisonous fishes Pliny, after commenting on the sea-hare and the *araneus*, says that nothing is more to be shunned than the weapon of the sting-ray, or *pastinaca*. This sting kills trees if it is driven into their roots; it pierces armor like a dart, with the force of iron and the dire effect of poison.

Sed nullum usquam execrabilius quam radius super caudam eminens trygonis quam nostri pastinacam appellant. . . . Arborea infixus radici necat, arma ut telum perforat vi ferri et veneni malo.⁴²

Thomas, following Pliny, describes the sea-hare. Then, seeking unity in a paragraph where none exists, he interprets *nullum execrabilius* as 'nothing is more execrable to the sea-hare,' and therefore assumes that the *pastinaca* is the enemy of that creature and pierces it like a dart. Following this notion (or perhaps confused by an error in his manuscript of Pliny), he reads *arborea infixus radici necat* as *arboris infixus radici necatur*; he takes the clause to mean that the fleeing victims of the *pastinaca* dash into the roots of trees and are caught there.

⁴⁰ De Natura Rerum, vii, cap. 31, 'De Echino.'

⁴¹ De Animalibus, xxiv, section 48 (vol. II, pp. 1532-1533).

⁴² Pliny, Hist. Nat., ix, cap. 72 (vol. II, p. 186).

Huic pisci [i.e., lepori marino] et aliis ADVERSARIUS est pastinaca, pestilentissimus piscis qui illos perforat ut ferro veneni malo. Quam PISCES FUGIENTES ne ab illa feriantur ARBORUM RADICIBUS INFIGUNTUR.⁴³

Albertus makes exactly the same statement:

Huic pisci simulque et aliis ADVERSATUR piscis venenosissimus qui pastinaca vocatur; perforat enim hic piscis alios ut ferro malo veneni, et in tantum FUGIUNT eum PISCES quod RADICIBUS ARBORUM INFIGUNTUR.⁴⁴

Pliny's juxtaposition of two related species in a single sentence is responsible for Thomas' next error. Speaking of thin-shelled species, Pliny first mentions scallops, which hide during great heat or cold, and then finger-mussels (*ungues*), which have a phosphorescent glow in the dark:

Pectines in mari ex eodem genere habentur, reconditi et ipsi magnis frigoribus ac magnis aestibus, unguisque velut igne lucentes in tenebris.⁴⁵

To Thomas, *ungues* means nails or claws. His surprise at scallops' having such appendages is shown by his parenthesis:

Pectines in mari, sicut dicit Plinius, reconduntur magnis frigoribus ac magnis aestibus. TEMPERATUM enim aerem hunc piscem habere ut vivat oportet, cum excessum PASSIONUM in elementis pati non possit. UNGUES HUIUSMODI PISCIS (unguibus enim armatur) LUCENT in tenebris ignium more.⁴⁶

Albertus shows no hesitation in ascribing *ungues* to scallops:

Pecten in mari est piscis rotundus. Hic piscis TEMPERATUM diligit, et excellentes PASSIONES in aestu vel frigore non sustinet: et, ut dicit Plinius, UNGUES EIUS sicut ossa LUCENT de nocte.⁴⁷

A rather amusing error results from Thomas' telescoping a statement of Pliny's about the purple (the shell-fish from which the famous Tyrian dye was produced) with Pliny's apology for including in his account details on the manufacture of the dye. Pliny ends one chapter with the statement that purples attain their full growth within a year. Without transition, he begins the following chapter: 'But if having reached this point my exposition should hasten on, luxury would certainly consider itself cheated and would condemn me for lack of diligence. Therefore I shall include also the processes of manufacturing.'

Anno magnitudinem implent. Quod si hactenus transcurrat expositio, fraudatam profecto se luxuria credat nosque indigentiae damnet; quamobrem persequemur etiam officinas.⁴⁸

Earlier in his account Pliny has stated that the dye-manufacturers strip off the shells of the larger purples to obtain the dye-fluid, but crush the smaller ones alive in the shell:

⁴³ *De Natura Rerum*, vii, cap. 44, 'De Lepore Marino.'

⁴⁴ *De Animalibus*, xxiv, section 72 (vol. II, p. 1537).

⁴⁵ Pliny, *Hist. Nat.*, ix, cap. 51 (vol. II, p. 170).

⁴⁶ *De Natura Rerum*, vii, cap. 61, 'De Pectine.'

⁴⁷ *De Animalibus*, xxiv, section 94 (vol. II, p. 1541).

⁴⁸ Pliny, *Hist. Nat.*, ix, cap. 60-61 (vol. II, p. 178).

Et maioribus quidem purpuris detracta concha auferunt, minores cum testa vivas frangunt.⁴⁹

Thomas, effecting a synthesis by violence, interprets the passage thus: 'Purples attain their full size within a year; but if by rapid growth they reach full development too early, they lose, it is believed, their sexual potency⁵⁰ (*fraudatam . . . se luxuria credat*), and thereby convict us of negligence [in not having extracted the purple secretion at the proper time]. He concludes: 'Great care should therefore be taken to strip the purples of their shells, or to crush them whole, within their first year, before they grow too much.'

Purple conche infra annum magnitudinem implent; quod si ante transcurrant crescendo, conche vim libidinis auferunt, nec ultra coire possunt ut in tempore liquorem preciosum pariant. Unde cum summa diligencia fit ut primo anno purpuris conche detrahantur vel confringantur, NE CRESCANT.⁵¹

Albertus follows Thomas closely:

Hae conchae infra annum debitam implent quantitatem: et si ante annum ad debitum crescant, humor quem concipiunt non valet: et ideo purpurarum leguli confringunt eis conchas, impediendo NE CRESCANT subito.⁵²

In the same chapter Thomas attributes to the purples a trait of the shellfish used as a bait to catch them. Pliny says that the purples are caught in small traps which are thrown into deep water. The traps contain as bait shellfish that close their valves very hard. These are half-dead but revive and open their shells when thrown into the water, and the purples seek them eagerly.

Capiuntur autem purpurae parvolis rarisque textu veluti nassis in alto iactis; inest iis esca clusiles mordacesque conchae, ceu mitulos videmus; has *seminecis* sed *redditas mari* avido hiatu *reviviscentis* adpetunt purpurae.⁵³

Thomas reads *seminecis* as applying to the purples: 'Purpure cum *semineces* fuerint, *mari reddite reviviscunt*.⁵⁴ Albertus repeats the error: 'Purpura semiviva reddita mari convalescit et vivit.⁵⁵

A final example of thorough-going confusion in this section of Thomas' work is his chapter on the tunny. The unfortunate fish is yoked with an Ethiopian monkey. Once again Thomas' source is Pliny, whose account of the tunny includes parts of three chapters. The relevant portions are quoted below.

Præcipua magnitudine thynni; invenimus talenta quindecim pependisse, eiusdem caudae latitudinem duo⁵⁶ cubita et palmum.⁵⁷ Intran e magno mari pontum verno tem-

⁴⁹ *Ibid.*, cap. 60 (vol. II, p. 177).

⁵⁰ Thomas later states that without coition the shellfish do not produce their purple secretion.

⁵¹ *De Natura Rerum*, VII, cap. 58, 'De Purpuris.'

⁵² *De Animalibus*, XXIV, section 91 (vol. II, p. 1541).

⁵³ Pliny, *Hist. Nat.*, IX, cap. 61 (vol. II, p. 179).

⁵⁴ *De Natura Rerum*, VII, cap. 58, 'De Purpuris.'

⁵⁵ *De Animalibus*, XXIV, section 91 (vol. II, p. 1541).

⁵⁶ The Sillig edition of Pliny used in this paper has *quinque cubita et palmum* as the breadth of the tunny's tail. The manuscript of Pliny used by Thomas clearly had *duo* instead of *quinque*. The Loeb

pore gregatim, nec alibi fetificant. Cordyla appellatur partus qui fetus redeuntis in mare autumnio comitatur.⁵⁸ Thynni dextera ripa intrant [pontum], exeunt laeva; id accidere existimatur quia dextro oculo plus cernant, utroque natura hebeti. . . . Opperiuntur autem aquilonis flatum ut secundo fluctu exeant e ponto. . . . Idem saepe navigia velis euntia comitantes mira quadam dulcedine . . . a gubernaculis spectantur, ne tridente quidem in eos saepius iacto territi. . . . Thynnorum captura est a vergiliarum exortu ad arcturi occasum; reliquo tempore hiberno latent in gurgitibus. . . . Pinguescunt et in tantum ut dehiscant. Vita longissima his bienni.⁵⁹

Through some error — presumably one in spelling — Thomas includes among his notes on the tunny a sentence of Pliny's about the Ethiopian sphinx, which seems to be a kind of monkey: *Sphingas fusco pilo, mammis in pectore geminis, Aethiopia generat*.⁶⁰ From this unlikely combination of materials, plus a passage from Solinus, Thomas produces the *tignus*. His account of the creature's habits gains further variety from the fact that he interprets *redeuntis in mare* as 'returning to the sea from the land.'

TIGNUS MONSTRUM MARINUM EST, ut Plinius dicit. Caudam habet duorum cubitorum latitudinis. In mari fetificat, nec unquam alibi. IN TERRAM EXIT AD PASTUM. Dextera ripa intrant; laeva exeunt. Et hoc accidere putatur quia dextro oculo plus cernunt, utroque tamen oculo hebeti. FLANTE AQUILONE ripas LIBENCIUS EXEUNT.

Plinius: Naves persequuntur ob CURIOSITATEM VIDENDI VELA vento agitari, et hoc STUPORE in tantum afficiuntur ut tridente quidem in eos iacto terrore non moveantur. Hiberno tempore latent in gurgitibus. Pinguescunt in tantum ut vita longissima sit per triennium.

IN ETHIOPIA TIGNI BESTIE SUNT COLORE FUSCO, ET GEMINIS MAMMIS IN PECTORE FETUS LACTANT, ut dicit Plinius.

De Tigno Ponti. Tignus in Ponto nascitur, ut dicit Solinus, neque enim alibi facit fetum, et hoc propter aquas dulciores. Intrat flumina dextro latere; levo autem exit. Hoc propterea creditur quia dextris oculis cernant acutius quam sinistris.⁶¹

Albertus experiences no 'obstinate questionings.' He takes over the *tignus* complete, even including the Ethiopian variety — tawny color, twin udders, and all.

TYGNUS ANIMAL MARINUM EST. Haec bestia caudam habet latitudinis duorum cubitorum: fetum facit in mari et numquam in terra: IN TERRAM TAMEN EXIT AD PASTUM: dextra ripam intrat et exit ad sinistram, et hoc contingit quia oculo dextro melius videt quam sinistro. FLANTE AQUILONE LIBENTUS EXEUNT quam alio tempore.

Plinius dicit quod navem insequuntur CURIOSITATE VIDENDI VELA, et hoc STUPORE tantum detinentur quod tridente in eos iacto vix fugiant. In hieme latent: ultra modum impinguntur, ita quod tertio anno vel quarto plerumque moriantur. IN ETHIOPIA TYGNI BESTIAE SUNT COLORE FUSCO, ET DUABUS MAMMIS A PECTORE DEPENDENTIBUS FETUS LACTANTES, ut dicit Solinus. Dicit etiam quod tygnus quidam in Ponto nascitur, eo quod aquas ceteris maribus habet dulciores: et si flumina intrat, dextro latere intrando sinistro exit.⁶²

Classical Library edition of Pliny also has *duo*. That *duo* is the correct reading is indicated by Pliny's source, the *Historia Animalium* of Aristotle, viii, cap. 30, 607b, 33.

⁵⁷ Pliny, *Hist. Nat.*, ix, cap. 17 (vol. II, p. 153).

⁵⁸ *Ibid.*, ix, cap. 18 (vol. II, p. 154).

⁵⁹ *Ibid.*, ix, cap. 20 (vol. II, pp. 155-156).

⁶⁰ *Ibid.*, viii, cap. 30 (vol. II, p. 91).

⁶¹ *De Natura Rerum*, vi, cap. 46, 'De Tigno.'

⁶² *De Animalibus*, xxiv, section 124 (vol. II, p. 1547).

Thomas' book on animals contains fewer errors, since the author usually knows something about the creature he is describing. On unfamiliar animals, however, he does make mistakes, and these duly reappear in Albertus.

The first concerns the *Aloy*, an unidentified animal called by Pliny the *achlis* and described as not unlike the elk but having no joints in its legs. Since it cannot lie down, it sleeps leaning against a tree. It is captured by cutting down the tree.

Septentrio fert . . . alcen . . . ; item natam in Scandinavia insula nec umquam visam in hac urbe, multis tamen narratam achlim haut dissimilem illi sed nullo suffraginum flexu ideoque non cubantem sed adclinem arbori in somno; eaque incisa ad insidias capi, alias velocitatis memoratae.⁶³

Thomas' account is somewhat fuller and draws on Solinus as well as Pliny. Thomas apparently misreads Pliny's *multis* as *mulis*. He therefore interprets the passage thus: 'The North produces the elk and also the *achlis*, a creature born on the island of Scandinavia and never seen in this city [Rome], said, however, to be not unlike the *mule*, but having no joints in its legs,' etc.

Aloy est animal MULIS PROPE CONSIMILE, cuius genua flecti nequeunt, UT ELEPHANTIS. Propterea non cubat dum dormiendum est, sed innititur arbori, que arbor prope casura secatur A VENATORIBUS, et dum assuetis fulcimentis innititur, ruinam cum arbore facit. Ita capitur. Alioquin difficile esset eam mancipari, nam in illo rigore poplitum incomprehensibili fuga pollet.⁶⁴

Albertus follows Thomas in describing the animal as similar to a mule:

Aloy a Plinio dicitur esse animal MULO PROPEMODUM SIMILE, CARENS flexura poplitum in anterioribus cruribus, in quo CONVENIT CUM ELEPHANTE: et ideo non cubat dormiendum, sed innititur arbori, qua secta in una parte fere ad ruinam A VENATORE, cadit ruente arbore: et tunc vix resurgit propter rigorem crurium; et capitur. Aliter autem vix capi potest propter nimiam suae fugae velocitatem.⁶⁵

Thomas, as he tells us, spent fifteen years on his encyclopedia. His notes for it apparently consisted of an accumulation of excerpts, each on a separate sheet. By the time he was ready to organize his material, he naturally did not retain a clear memory of his earlier notes, but relied on their headings. This practice sometimes led to peculiar combinations. For example, Thomas found in Pliny the following statement:

Iynx sola utrimque binos [digitos] habet; eadem linguam serpentium similem in magnam longitudinem porrigit, collum circumagat in adversam se; ungues ei grandes.⁶⁶

The *iynx* is a bird, the wryneck; and in the sentence preceding the passage I have quoted Pliny states clearly that he is dealing with the feet of *birds*. Thomas apparently either misspelled the word on his note or misread it when he was arranging his excerpts. At any rate, he confuses the *iynx* with the *linx*.

Linx, ut dicunt Plinius et Iacobus et 'Lapidarius,' bestia est que ita perspicaces habet oculos quod solida corpora subtilitate visus penetrare dicitur. Ut Plinius dicit, nisi tantum

⁶³ Pliny, *Hist. Nat.*, viii, cap. 16 (vol. ii, p. 81).

⁶⁴ *De Natura Rerum*, iv, cap. 5, 'De Aloy.'

⁶⁵ *De Animalibus*, xxii, Tractatus 2, section 3 (vol. ii, p. 1356).

⁶⁶ Pliny, *Hist. Nat.*, xi, cap. 107 (vol. ii, p. 320).

unum fetum facit. Linx linguam habet serpentium similem, licet maiorem, quam in magnam longitudinem porrigit. Collum circumagit, unguisque grandes habet.⁶⁷

Albertus, as usual, reproduces the error:

Linx est animal notum, perspicax oculis ita ut secundum poeticas fabulas corpora solida penetret: LINGUAM HABET SERPENTINAM QUAM ULTRA MODUM EXTENDIT, COLLUM CIRCUMAGIT et oculos habet prominentes, ungues magnos.⁶⁸

The *trogodita* is one of Thomas' more diverting creations. The source is Pliny's chapter on horned animals. Pliny remarks that in no branch of creation is Nature more playful than in the creation of horns. He then enumerates, in a very long and elliptical sentence, the types of horns she has given to various animals: she has given branching horns to the goat, . . . movable horns to the cattle of Phrygia, and to those of the Cave-dwellers (*Trogoditae*) horns bent toward the ground; hence these cattle feed with their necks turned to one side.

Nec alibi maior naturae lascivia. . . Dedit ramosa capreis sed parva, . . . mobilia eadem, ut auris, Phrygiae armentis, Trogodytarum in terram directa, qua de causa obliqua cervice pascuntur.⁶⁹

Thomas gets lost in Pliny's grammatical maze. As a consequence, he turns the Cave-dwellers into cattle.

TROGODITE, ut dicit Plinius, BESTIE SUNT que CONTRA OMNIA GENERA QUADRUPENDUM BESTIARUM in terra repencium, deiectis cornibus, obliqua cervice pascuntur.⁷⁰

Albertus accepts the *Trogoditae* as cattle — and improves upon them. His description is so detailed that a trusting reader might assume that Albertus every day saw herds of wry-necked Cave-dwellers eating tall grass.

TROGODYTAE SUNT ANIMALIA quaedam longissima habentia cornua a capite ante maxillas usque ad terram descendentia. Cervices autem habent longissimas et ideo incurvata et deflexa cervice longitudine capitis et cornuum in terra positis, ita quod frons tota in terra iacet, pastum CONTRA OMNEM MOREM ANIMALIUM sumentia, quia aliter pasci non possunt propter suorum longitudinem cornuum: et ideo pasci non possunt nisi longis herbis, quas potius secare videntur quam a radicibus mordere sicut alia faciunt animalia.⁷¹

In his book on birds Thomas makes comparatively few errors, but those he does make reappear in Albertus. The first telescopes two birds: Pliny's *aesalon* and *acanthis* (goldfinch). According to Pliny, the *aesalon* breaks the raven's eggs. The young of the *aesalon* are the prey of foxes. In turn, the mother bird attacks the fox cubs and their mother. When the raven sees such an attack, it joins forces with the fox against the common enemy. Without transition Pliny continues: the goldfinch lives in thorny shrubs; therefore it hates asses, which eat the flowers of the thorn bushes.

Aesalon vocatur parva avis ova corvi frangens, cuius pulli infestantur a volpibus; invicem haec catulos eius ipsamque vellit; quod ubi viderunt corvi, contra auxiliantur velut adversus

⁶⁷ *De Natura Rerum*, iv, cap. 53, 'De Linxe.'

⁶⁸ *De Animalibus*, xxii, Tr. 2, section 66 (vol. ii, p. 1409).

⁶⁹ Pliny, *Hist. Nat.*, xi, cap. 45 (vol. ii, p. 285).

⁷⁰ *De Natura Rerum*, iv, cap. 102, 'De Trogoditis.'

⁷¹ *De Animalibus*, xxii, Tr. 2, section 104 (vol. ii, p. 1425).

communem hostem. Et acanthis in spinis vivit; idcirco asinos et ipsa odit flores spinæ devorantis.⁷²

Thomas reads *acanthis* as *hec avis*.

*Aesalon vocatur, ut dicit Plinius, parva avis ova corvi frangens, cuius pulli infestantur a vulpibus. Illa vero catulos vulpis ipsamque vulpem avellit. Quod ubi viderint corvi, auxiliantur vulpibus velud contra communem hostem. HEC AVIS in spinis vitit, et idcirco asinos odit, flores et spine folia devorantes.*⁷³

Albertus, like Thomas, combines the two birds:

Assalon parva avis est, quantitatis passeris, quæ infesta est corvis et frangit ova corvorum, et est etiam infesta vulpibus, et depilat eas, quod videns corvus auxiliatur vulpi contra communem hostem. HÆC AUTEM AVIS floribus spinarum et granis pascitur, et ideo odit asinum hanc spinam sive carduum comedentem, et insidet dorso asini pungens ipsum quantum potest.⁷⁴

Another of Thomas' errors concerns the hen. As evidence that bugs are an antidote for snake-bite, Pliny cites the belief that on a day when a hen has eaten a bug (*cimicum*) she is not killed by the bite of an asp, and her flesh is remedial to a person bitten by this serpent:

Cimicum . . . contra serpentium morsus et præcipue aspidum valere dicitur . . . argumento, quod dicant gallinas quo die ederint non interfici ab aspide carnisque earum percussis plurimum prodesse.⁷⁵

Thomas takes *ederint* to be a form of *edo* (to bring forth), not of *edo* (to eat). Hence he states that on a day when a hen has laid an egg she cannot be killed by an asp.

Auctor est Plinius quod gallina illo die quo OVUM ediderit aspidis ictu non moritur, immo MEDICINA EST PERCUSSIS.⁷⁶

Albertus repeats this error exactly:

Dicitur autem quod illa die cum OVUM fecerit a serpente percuti non potest, et caro PERCUSSIS EST MEDICINA.⁷⁷

Another misreading occurs in Thomas' chapter on the *lagepus* (Pliny's *lagopus* — the hare's foot grouse). Pliny says that the flesh of this bird is especially delicious. Then, having explained the name and indicated the size and color of the bird, he adds that outside its native region it is not easily procured as food, since it cannot be tamed and its flesh cannot be preserved.

Præcipuo sapore lagopus; pedes leporino villo nomen ei hoc dedere, cetero candidæ, columbarum magnitudine. Non extra terram eam vesci facile, quando nec vita mansuescit et corpus occisi emarcescit.⁷⁸

⁷² Pliny, *Hist. Nat.*, x, cap. 95 (vol. II, p. 250).

⁷³ *De Natura Rerum*, v, cap. 13, 'De Asalon.'

⁷⁴ *De Animalibus*, xxiii, section 9 (vol. II, p. 1443).

⁷⁵ Pliny, *Hist. Nat.*, xxix, cap. 17 (vol. IV, pp. 351-352).

⁷⁶ *De Natura Rerum*, v, cap. 58, 'De Gallina.'

⁷⁷ *De Animalibus*, xxiii, section 52 (vol. II, p. 1497).

⁷⁸ Pliny, *Hist. Nat.*, x, cap. 68 (vol. II, pp. 231-232).

Thomas misinterprets *Non extra terram eam vesci facile*. He takes it to mean that the bird does not eat in the open air (*extra terram*). He interpolates the explanation that it carries its food into a cave and there consumes it.

Lagepus avis est, ut dicit Plinius, que pedes habet ut lepus villumque plumarum con-similem, unde et nomen accepit. In ventre candide sunt. *Magnitudinem habent columbarum*. EXTRA TERRAM NON vescuntur FACILE, sed quæsito cibo rapine modo, REGREDIUNTUR AD SPECUS, et sic vivunt spoliis in occulto. Hec avis nunquam in vita manescit, sed occisum vel naturali morte defunctum corpus eius citissime marcescit, et hoc forte quia in terra marcida assidue vivens fuit.⁷⁹

Albertus follows Thomas closely. Characteristically, he explains the (non-existent) cave-dwelling habit of the bird. '*Male volat*,' he announces — it has little power of flight.

Lagepus avis est secundum suum nomen leporinos habens pedes, et villum habet pro plumis, et male volat: et ideo IN SPECUBUS sub terra vivit. Quæ quando pro præda aliquando prosilit, statim CAPTA PRAEDA AD ANTRUM REDIT et comedit. Haec avis non domesticatur, et capta moritur et citissime putrescit propter suæ complexionis malitia.⁸⁰

A final error on birds concerns the *merops*, or bee-eater. Pliny states that the *merops* feeds its parents. Its wings are pale-colored on the inside, the upper part of its body is blue, and the forepart is reddish. It nests in a pit six feet deep.

Merops vocatur genitores suos *reconditos pascens*, pallido intus colore pinnarum, superne cyaneo, primori subrutilo; nidificant in specu sex pedum defossa altitudine.⁸¹

Thomas either misunderstands *genitores* or deliberately 'corrects' it. He says the *merops* feeds its young. He apparently reads *pallido intus* as *pallido ventre*.

Merops avis est, ut dicit Plinius, que NATURALI CALORE habundat. Antra fodit in terra pedum sex in altitudine. In hiis antris nidum struit, ova pōnit, FETUS PULLORUM EDUCAT USQUE AD ROBUR DEBITUM, in terra *absconditos pascit* et NUTRIT. Hec avis in dorso habet colorem cyaneum, in pectore subrutilum, IN VENTRE PALLIDUM.⁸²

Albertus agrees with Thomas both on the feeding of the young and on the coloring of the bird.

Merops . . . habet tamen in dorso aliquantulum coloris kyani, in pectore subrutilus est, et IN VENTRE PALLET CALIDITATE NATURALI. Fodit autem in terra ad altitudinem sex pedum, et ibi nidum construit et PULLOS AD PERFECTIONEM NUTRIT.⁸³

Albertus' treatise on serpents is only about half as long as any one of the books discussed above; it is also the one book in which Albertus supplements his borrowings from Thomas with a considerable amount of material from other sources. It therefore offers fewer opportunities than the preceding books for repeating the mistakes of *De Natura Rerum*. Thomas, however, is the main source, and Albertus repeats at least one error from Thomas' book on serpents: the attribution of the traits of the *scytales* to the *situla*. Thomas' sources are Solinus and Jacobus de Vitriaco. Of the *scytales* Solinus writes:

⁷⁹ *De Natura Rerum*, v, cap. 76, 'De Lagepo.'

⁸⁰ *De Animalibus*, XXIII, section 70 (vol. II, p. 1501).

⁸¹ Pliny, *Hist. Nat.*, x, cap. 51 (vol. II, p. 222).

⁸² *De Natura Rerum*, v, cap. 85, 'De Metopi.'

⁸³ *De Animalibus*, XXIII, section 79 (vol. II, p. 1503).

*Scytale tanta praeſulget terga varietate ut notarum gratia videntes retardet, et quoniam reptando pigrior est, quos adsequi nequit, miraculo sui capiat stupentes. In hoc tamen squamarum nitore hiemales exuvias prima ponit.*⁸⁴

Jacobus gives a similar description:

*Scytalis tanta praeſulget tergi varietate ut notarum gratia videntes retardet; est autem tanti fervoris ut hyeme pellem deponat. Huius morsu si quis tangitur, velut ardore igneo consumitur.*⁸⁵

On the *situla* Jacobus has only a single sentence: *Situla quos inficit siti perimat.*⁸⁶ Thomas' *situla* has all the traits of the *scytale*:

*Situla, ut dicunt Iacobus et Solinus, serpens est maliciosus et PARVUS qui hominem siti interficit. Hic igitur serpens tanta reſulget varietate ut pulcritudine sua retardet INTUENTES. Et quoniam natura dedit reptando pigriorem, miraculo stupentes DETINET quos assequi non valet. Est autem tanti fervoris ut hyeme deponat pellem. Morsu huius si quis tangitur, ardore igneo correptus succenditur.*⁸⁷

Albertus' *situla*, likewise, has the traits of the *scytale*:

*Situla serpens habet duas species: unus est dipsas, de quo iam ante diximus; alius autem est ex varietate miro modo pulcher, ita quod admiratione DETINET INTUENTES: sed est piger et PARVUS, et ita ignei veneni quod ille quem percutit totus exurit. Hic serpens in hieme pellem deponit.*⁸⁸

Albertus' final book on the animal kingdom deals with insects and other creeping things, and, like the earlier books, repeats several of Thomas' misreadings.

The first concerns the remedial virtues of the ashes of the *rubeta* (bramble-frog) and the sea-hare. Thomas states that the antidote for the poison of these two creatures is their own ashes drunk in water. The source of the entire chapter is Pliny, but Pliny does not make the statement just cited. It is possible, however, to see how Thomas came to make it. Pliny says that river crabs, either fresh or reduced to ash and mixed with water, are an antidote for all kinds of poisons. They have the same virtue against the bites of all poisonous creatures, especially the *scytale*, serpents, the sea-hare, and the *rubeta*. Their ashes, preserved and drunk, are good for persons in danger of hydrophobia from the bite of a mad dog. Some people add gentian and administer the remedy in wine.

*Cancris fluviales triti potique ex aqua, recentes seu cinere adservato, contra venena omnia prosunt. . . . Eadem vis contra venenatorum omnium morsus, privatim scytalen et anguis et contra leporem marinum ac ranam rubetam. Cinis eorum servatus prodest pavore potus periclitantibus ex canis rabiosi morsu; quidam adiciunt gentianam et dant in vino.*⁸⁹

In the manuscript of Pliny used by Thomas the division of these sentences was apparently not clear. Thomas seems to have read them thus:

⁸⁴ Solinus, *Memorabilia*, p. 137.

⁸⁵ Jacobus de Vitriaco, *Historia Iherosolimitana Abbreviata*, cap. 87, in Jacques Bongars, ed., *Gesta Dei per Francos*, 2 vols. (Hanover, 1611), vol. II, p. 1104.

⁸⁶ *Ibid.*, p. 1105.

⁸⁷ *De Natura Rerum*, VIII, cap. 32, 'De Situla.'

⁸⁸ *De Animalibus*, XXV, section 50 (vol. II, pp. 1572-1573).

⁸⁹ Pliny, *Hist. Nat.*, XXXII, cap. 19 (vol. V, p. 20).

Eadem vis contra venenatorum omnium morsus, privatim scytalen et anguis. *Et contra leporem marinum ac ranam rubetam cinis eorum servatus prodest pavore potus.* Periclitantibus ex canis rabiosi morsu quidam adiciunt gentianam et dant in vino.

His interpretation of the italicized sentence was presumably: 'And for [the poison of] the sea-hare and the bramble-frog, their own ash, preserved and drunk, is a remedy.' Thomas' phrasing of the statement is much like Pliny's: '*Contra VENENA leporis marini et rubete cinis eorum remedio est in aqua potatus.*'⁹⁰ Albertus repeats the statement but varies the phrasing: 'Cinis eius [i.e., rubetae] sicut et cinis leporis marini medicamen est contra VENENUM ipsorum.'⁹¹

With his account of the *stelle figura* Thomas makes one of his more outstanding contributions to unnatural natural history. This chapter is a garbled version of Pliny's description of the salamander. The salamander, Pliny affirms, is a creature shaped like a lizard and marked by star-shaped spots; it appears only during heavy rains and is never seen in clear weather. The creature is so cold that it extinguishes fire at contact, as ice does. If any part of the human body is touched by the milky saliva that it spews from its mouth, all hair on that part of the body falls out, and the flesh changes color and breaks out in a pustular eruption. Salamanders are sterile, being neither male nor female.

Pleraque enim occulta et caeca origine proveniunt, etiam in quadripedum genere, sicut salamandrae, animal lacertae figura, stellatum, numquam nisi magnis imbribus proveniens et serenitate desinens. Huic tantus rigor ut ignem tactu extinguat non alio modo quam glacies. Eiusdem sanie, quae lactea ore vomitur, quacumque parte corporis humani contacta, toti defluunt pili, idque quod contactum est, colorem in vitiliginem mutat. . . . Quaedam nihil gignunt, ut salamandrae, neque est in his genus masculinum femininumve.⁹²

Thomas' misinterpretation of this passage is unusually thoroughgoing. Faulty division of sentences is probably responsible for his initial error. I suggest that he read the first two sentences of Pliny's account thus: 'Pleraque enim occulta et caeca origine proveniunt, etiam in quadripedum genere. Sicut salamandrae animal lacertae, figura stellatum,' etc. He interprets *stellatum* as 'shining like a star,' and apparently takes the two sentences to mean: 'Even among four-footed creatures there are several that spring from a hidden and obscure origin; [among these and] similar to the salamander is an animal of the lizard type, shining in body like a star.' He reads *imbribus*, a little further on in Pliny's chapter, as *nubibus*, and *serenitate desinens* (ceasing to appear in clear weather) as *serenitatem designat* (is an indication of clear weather). Finally, he reads *vitiliginem* (an eruption of the skin) as *virorem* (a greenish color). The result of these accumulated misreadings is the following chapter:

STELLE FIGURA VERMIS EST, UT DICIT PLINIUS, QUI NOCTE UT STELLA LUCET, nunquam nisi magnis NUBIBUS proveniens, et SERENITATEM DESIGNAT. Huic tantus rigor inest ut ignem tangens extinguat non alio modo quam glacies. Eiusdem sanie si caro hominis contacta fuerit, toti defluunt capilli. Id quodcumque contactum fuerit colorem in VIROREM mutat. Hii vermes nihil gignunt, neque est in his masculus vel femina.⁹³

⁹⁰ *De Natura Rerum*, ix, cap. 36, 'De Rana que et Rubeta dicitur.'

⁹¹ *De Animalibus*, xxvi, section 32 (vol. II, p. 1591).

⁹² Pliny, *Hist. Nat.*, x, cap. 86-87 (vol. II, pp. 245-246).

⁹³ *De Natura Rerum*, ix, cap. 39, 'De Stelle Figura.'

With fidelity worthy of a better cause, Albertus reproduces every error in the passage:

STELLAE FIGURA VERMIS EST, UT DICIT PLINIUS, QUI NOCTE UT STELLA LUCET: sed numquam apparet nisi quando post magnas NUBES PRAEDICIT SERENITATEM. Huic vermi tantum dicit rigidum frigus inesse quod extinguit ignem sicut glacies. Eiusdem etiam sanie si caro hominis contacta fuerit, toti defluunt capilli: et quod tactum fuerit mutatur in VIROREM: et de his etiam dicit quod nihil gignunt, nec est in eis mas vel femina. Ergo ex putrefactione generantur.⁹⁴

Before closing this paper I shall attempt to give by a simple mathematical computation some idea of the extent to which Albertus borrowed from Thomas. Albertus' work on specific mammals (*De Animalibus*, Liber XXII, Tractatus 2) describes one hundred thirteen animals. Of these, seven do not appear in Thomas' work: the *alfec*, the *analopos*, the *asinus silvestris*, the *alzabo*, the *bos*, the *cathus*, and the *martarus*. (Only two of the seven, however, are genuine additions: the *alfec* and the *alzabo*. The others are all described, under another name, elsewhere in the book, and the accounts under the alternative names are all derived largely from Thomas.)⁹⁵ Albertus' account of four other animals — the *bubalus*, the *capreolus*, the *glis*, and the *pirolus* — differ considerably from the corresponding chapters of Thomas' work. Moreover, Albertus adds a large body of material to Thomas' chapters on the dog and the horse. There are, then, in all, thirteen animals the descriptions of which Albertus derived largely or wholly from sources other than Thomas.

For the accounts of the remaining one hundred animals Thomas is the main source; for more than half of them he is the only source. Analysis shows that sixteen of Albertus' descriptions add to Thomas' account a paragraph or two on medical lore or charms. Three are based on Thomas but contradict one or more of his statements. Twenty-six have slighter additions, which range from a single phrase to three or four sentences. The remaining fifty-five sections add nothing whatever to Thomas' chapters.

It seems useless to include in this paper cumbersome notes listing the titles and numbers of several hundreds of Albertus' sections, since, until a text of Thomas' encyclopedia is printed, his work will not be easily accessible for comparison with Albertus'. In order, however, to give some idea of the value, or lack of value, of Albertus' interpolations, I shall indicate briefly the content of his supplementary material in each of the twenty-six sections I have listed as having *slight* additions.

5. *Anabula* — During our era Frederick II had one in this country. In Arabic called *seraph*. [Albertus does not identify the *anabula* with the *orafus* or *camelopardulus* described in later sections, though the three are one animal — the giraffe.]

⁹⁴ *De Animalibus*, xxvi, section 34 (vol. II, p. 1594).

⁹⁵ The *analopos* is the same animal as the *calopus*, described in section 18. The *asinus silvestris* is the *onager* of section 33. The *bos*, here disposed of in two sentences, is fully treated in section 101 as the *taurus*. The *cathus* (common cat) is the *murilegus* of section 78. The *martarus* is identified as the *putorius* of section 96. The corresponding chapters of Thomas are: Liber IV, cap. 16, 'De Calopo'; cap. 80, 'de Onagro'; cap. 98, 'De Tauro'; cap. 76, 'De Murilego'; and cap. 93, 'De Putorio.'

9. *Aper* — Boars fighting each other will join forces against a wolf.
 25. *Cefusa* — A kind of monkey. Albertus has seen a pair, which were captured in Russia.
 29. *Cuniculus* — Stronger than *lepus*; has white meat.
 30. *Cricetus* — Called *hamster* in German; fur like cony's; no ears — only openings.
 39. *Equicervus* — One species is the *elent*.
 42. *Emptra* — Also called *mus montanus*.
 45. *Falena* — 'Lybiae in desertis agens.' [Thomas has 'in remotis orbis partibus nascens.']
 54. *Ibez* — Common in mountains of Germany; sometimes attacks hunters.
 57. *Iena* — Jorach says, 'In cauda virus colligit.'
 69. *Luter* — Broader than cat; has shorter legs. [Thomas says it is about the size of a cat and has much the same shape, except for the head.]
 76. *Mamonetus* — Called *spinga* by Italians; commonly seen.
 78. *Murilegus* — Plays with its image in a mirror.
 83. *Onager* — Its dung attracts dogs so much that they stop at a pile of it and cease pursuing the animal.
 86. *Orix* — Its hair grows pointed towards its head.
 87. *Oraflus* — In Arabic called *seraf*; often seen in our times. [Not identified with *anabula* or *camelopardulus*.]
 89. *Pardus* — Sometimes produced by union of panther and dog.
 91. *Pirader* — Hermes says it is like the basilisk in changing color. [This animal is the reindeer.]
 96. *Putorius* — Genus, not species; same as *martarus*; *mustela* is one species.
 99. *Symia* — Description of a species which seems to be a hybrid of monkey and wild cat.
 101. *Taurus* — One kind of cow is so large that milker has to stand. It gives much milk.
 105. *Talpa* — Albertus has seen one seize a large toad. Comments on their ability [mentioned by Thomas] to hear under ground.
 107. *Ursus* — A few remarks on tame bears.
 109. *Urni* — Called in German *wisent*.
 110. *Vulpis* — Jorach's explanation of how the fox rids itself of fleas.
 113. *Zilius* — A hybrid of hyena and the monkey called *maritonmorion*. [The *maritonmorion* is not a monkey, but the Bengal tiger.]

Albertus' book on birds (Liber xxiii) contains one hundred fourteen sections. Of these, two have no parallel in Thomas' work. Ten others are derived largely from sources other than Thomas. Four others add considerable material, though Thomas is the main source. In fourteen sections Albertus adds few or no details, but questions or contradicts a part or all of Thomas' account. In thirty-five sections he makes slight additions, which range from a single phrase to three or four sentences. Forty-nine sections have no supplementary material whatever.

Albertus' book on sea creatures (Liber xxiv) combines the material of two of Thomas' books: Liber vi, *De Monstris Marinis*, and Liber vii, *De Piscibus*. Albertus has one hundred thirty-nine sections. Three of these have no parallel in Thomas; a fourth (on the *canis marinus*) differs entirely from Thomas' account, and eight others are derived mainly from sources other than Thomas. Three sections have considerable supplementary material, though Thomas is the main source. Thirty-eight have additions ranging from a phrase to a few sentences. Eighty-six have no additional material.

In his book on serpents (Liber xxv) Albertus adds to his borrowings from Thomas a much greater proportion of material than he does in any other book. Thomas, however, remains the chief source. The supplementary material is attributed mainly to Avicenna, Semerion, and Hermes. The book describes sixty-one specific serpents. Of these, twenty-six are not described by Thomas. Of the remaining thirty-five sections, seven add considerable material to Thomas' account, sixteen have slight additions, and twelve have no additions at all.

In the final book of *De Animalibus* (Liber xxvi, *De Vermibus*) material borrowed from Thomas constitutes the bulk of the work. The book has forty-nine sections. In six, Thomas is not the main source. Twenty-eight have slight additions. The remaining fifteen are drawn wholly from Thomas.

Throughout the books of Albertus considered in this paper, most of the citations of authors are simply taken over from Thomas. These include all references to Ambrosius, Lucan, Mucianus, Platearius, Pliny, Solinus, and Isidore of Seville. Albertus omits all Thomas' references to contemporary works, though he frequently borrows Thomas' quotations from the *Historia Iherosolimitana* of Jacobus de Vitriaco⁹⁶ and from the anonymous *Experimentator*⁹⁷ and *Liber Rerum*.⁹⁸

To summarize in a few words: Albertus describes four hundred seventy-six specific creatures. For four hundred of these (more than five sixths of the total number) Thomas is the main source. In three hundred seventy-four of these descriptions (nearly four fifths of the total) there is either no supplementary material or not more than a few sentences per section.

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⁹⁶ For example, Thomas attributes his chapter on the *eale* and that on the *lauzani* to Solinus and Jacobus de Vitriaco. Albertus takes his entire account of these animals from Thomas, but in both his sections he omits the reference to Jacobus, though he cites Solinus. See *De Animalibus*, xxii, Tr. 2, section 40 (vol. II, p. 1400) and section 65 (vol. II, p. 1409).

⁹⁷ Examples are Albertus' statements on the donkey's susceptibility to rheum [xxii, Tr. 2, section 7 (vol. II, p. 1357)] and on the beaver's method of transporting logs [xxii, Tr. 2, section 22 (vol. II, p. 1370)].

⁹⁸ Examples are: the statement that if one camel does not eat, its stablemates, through sympathy, also abstain from food [xxii, Tr. 2, section 15 (vol. II, p. 1362)]; also the entire section on the *crinetus* [xxii, Tr. 2, section 30 (vol. II, pp. 1374-1375)].