

wide range of colour adjectives in Latin, *hepatizon* 'liverish' is an apt description of black bronze.

The elements of dark colour and sheen may also be present in the related Latin term *hepatites*. At *NH* 36.144 Pliny applies this word to a mineral of the type haematite 'blood-stone'. The latter term implies a reddish-brown or deeper hue (another variety of haematite is even said to be *colore nigrum*), though no sheen is mentioned. Conversely, at *NH* 37.186 *hepatites* is used of a precious stone, implying a sheen, though the hue is not apparent from the context.

In contrast to the dark *hepatizon* bronze, the golden hue which all the sources ascribe to Corinthian bronze required a far higher gold content. As the other author of this article, (DMJ), has learned through experimental investigation, the surface depletion gilding that was used for colouring the original golden version of Corinthian Bronze is only achieved easily if the gold content is higher than 15 wt%. It is true that examples have been reported from among the *tumbaga* artefacts of pre-Columbian Peru that contain as little as 12%.¹⁶ However, the gold content of the alloys adduced by Giumlia-Mair and Craddock and of the 'black Corinthian metal' of the Syriac manuscript falls well below this level. This is because these alloys are all of the same basic type as Pliny's *hepatizon*, rather than the more noble and brilliantly coloured Corinthian bronze which the ancients valued 'before silver and almost before gold'.

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ROUGE AND CROCODILE DUNG: NOTES ON OVID, *ARS* 3.199–200 AND 269–70

In *Ars Amatoria* 3.267–72, part of a longer sequence which begins in 261, Ovid advises his female readers on how to conceal various physical shortcomings. Text and apparatus are quoted from Kenney's revised *OCT*.¹

quae nimium gracilis, pleno uelamina filo
sumat, et ex umeris latus amictus eat;
pallida purpureis tangat sua corpora uirgis,
nigrior ad Pharij confuge piscis opem; 270
pes malus in niuea semper celetur aluta,
arida nec uinclis crura resolue suis;...

269 tangat *RYA*ω: tingat *s*: cingat *a*: pingat *Watt*: spargat *Merkel*
272 suis *s*: tuis *RYA*ω

The second couplet quoted contains, besides the textual problem in the hexameter, two interpretive cruces, one for each line. It appears that Kenney has become more worried about the first and less about the second in the twenty-nine years that

¹⁶ H. Lechtman, 'Tradition and Styles in Central Andean Metalworking', in Maddin R. (ed.), *The Beginning of the Use of Metals and Alloys: Papers from the Second International Conference on the Beginnings of the Use of Metals and Alloys, Zhengzhou, China, 21–26 October, 1986* (Cambridge, MA, 1988) pp. 344–78, esp. 373.

¹ E. J. Kenney (ed.), *P. Ovidi Nasonis Amores, Medicamina Faciei Femineae, Ars Amatoria, Remedia Amoris* (Oxford, 1994²). References to 'Brandt' are to P. Brandt (ed.), *P. Ovidi Nasonis de arte amatoria libri tres* (Leipzig, 1902, reprinted Hildesheim, 1991), and are ad loc. unless otherwise specified.

separate his editions, since his revised apparatus makes room for Watt and Merkel (and the reports of Y) by omitting his earlier remark on the pentameter:

270 piscis *codd.*, *sensu incertissimo*: (Phariae...) uestis Blümner

Although I see serious difficulties in both lines, we may as well begin with the less conspicuous problem in the pentameter. As Brandt puts it, 'was unter dem pharischem... Fisch zu verstehen wäre, lässt sich nicht sicher sagen', a fact which Kenney's note puts in two words. Two solutions have so far been proposed, neither of them particularly convincing: we may either take *Pharii piscis* as a very odd and obscure reference to the crocodile or emend to *Phariae uestis* (Blümner).² It is well-known that the ancients used crocodile dung as a cosmetic skin-lightener,³ and that would certainly be an appropriate treatment for a dark complexion, but the problem remains: can a crocodile be referred to as if it were a fish? It seems highly unlikely to me, though others may differ: more on this point below. Blümner's *Phariae... uestis* redirects the reference to Egyptian (= white) clothing. One small but distinct advantage of this change is that it makes both lines refer to sartorial rather than cosmetic remedies, as do the preceding and following couplets. On the other hand, it seems a rather unlikely error: who ever would have thought of introducing a fish into this context? It's not as if *uestis* were particularly rare, or *piscis* appreciably more frequent. A more important, and in my view insuperable, objection applies both to Blümner's text of 270 and to the transmitted text of 269: the advice given will not work. Wearing purple or scarlet stripes will not make a pale woman look any less pale, nor will white clothing make a dark woman appear less dark: rather the reverse in each case, since the contrasting shades will tend to emphasize each other. The apparently parallel passage a little earlier (3.189–92) is in fact quite different, what we might call a perpendicular passage:

pulla decent niueas: Briseida pulla decebant;
cum rapta est, pulla tum quoque ueste fuit. 190
alba decent fuscas: albis, Cephei, placebas;
sic tibi uestitae pressa Seriphos erat.

That is good advice for women who are pale or dark and wish to look more strikingly so, not for those who wish to look less pale or dark than nature has made them.

Other peculiarities of the text of 269 suggest that it is corrupt and originally contained a reference to rouge, which is just what Ovid's *pallida* would have needed and used. If such a sense could be read into the line or imported into it by conjecture,

² We will see that each of these possibilities is half right: the reference is indeed to the crocodile, but the text should probably be emended (though not to *uestis*), since a crocodile is not a fish.

³ Brandt (Anhang, 237–8) refers to 'das Krokodil..., das allerdings in der Kosmetik eine ebenso wenig appetitliche, wie nicht unwichtige Rolle spielte'. As sources, he quotes Pliny (*N.H.* 28.108), Clement of Alexandria (*Paed.* 3.2.7.3), and Horace (*Epod.* 12.11, *stercore fucatus crocodili*). Galen's chapter *Περὶ κόπρου τῶν χερσαίων κροκοδείλων καὶ ψάρων* is more detailed than any of these: *Τὴν δὲ τῶν χερσαίων κροκοδείλων τούτων τῶν μικρῶν τε καὶ χαμαιρεπῶν κόπρον ἐντιμὴν αἰ τρυφῶσαι πεποιθήκασιν γυναῖκες αἷς οὐκ ἀρκέσει τοῖς ἄλλοις φαρμάκοις τοσοῦτοις οὖσαν λαμπρὸν τε καὶ τετανὸν ἐργάσασθαι τὸ περὶ τὸ πρόσωπον δέρμα προστιθέασιν δ' αὐτοῖς καὶ τὴν τῶν κροκοδείλων κόπρον* (*De simplicium medicamentorum temperamentis ac facultatibus* 10.29 = 12.307.8–308.6 Kühn). I owe this reference to Poliziano's *Miscellaneorum Centuria Secunda* (Branca, V., Pastore Stocchi, M. (eds.), Florence, 1978), in which chapter 37, 'Crocodylus', is essentially a cosmetological commentary on *A.A.* 3.270: he does not consider the question whether a crocodile can be referred to as a fish. Poliziano wonders whether Ovid knew that the crocodile from which cosmetics were procured was not the crocodile *κατ' ἐξοχήν*: I would say that if he did, he did not care.

we would have an entire couplet of cosmetic remedies—assuming for the moment that crocodile dung is indeed the subject of the pentameter. In 197–200, Ovid mentions rouge along with chalk as beauty-aids every woman already knows:

quid, si praecipiam ne fuscet inertia dentes
 oraque suscepta mane laentur aqua?
 scitis et inducta candorem quaerere creta;
 sanguine quae uero non rubet, arte rubet.

200

I suspect that *inducta* in 199 should be emended to *indoctae*: ‘you know *even without being taught*’. This makes better sense of the *et* and fits particularly well in this context, where it continues from Ovid’s reminder that there are things his readers need not be told (193–6) and anticipates the plug for his *Medicamina Faciei Femineae* (205–8).

Turning back to line 269, the adjective *purpureis*, which can of course mean ‘scarlet’ or ‘pink’ as well as ‘purple’, is far more appropriate for rouge than for dark clothing,⁴ while the verb, whether *tangat* or *tingat*, much better describes the application of cosmetics than the wearing of clothes.⁵ The rest of the line is more problematic. Though difficult, it might just be possible to defend *uirgis* as a reference to patches of rouge on each cheek. On the other hand, we would expect round spots rather than oblong patches or stripes, though *uirgis* might just do, if we think of the rouge as being applied primarily horizontally, along the line of the cheekbones. However, it seems better to suppose that these *uirgae* are not the result of the application of rouge but the instrument used to apply it. The editor has suggested that ancient rouge may have come in solid sticks, rather like modern lipstick and applied in much the same way, and we might also imagine that a small wooden stick or brush would have been used to apply rouge from a jar, so as to keep the fingers clean. Either of these ideas would need a parallel to be totally convincing, but they are certainly far more plausible than the alternatives. This leaves only *corpora* to explain or emend. Since modern women generally apply rouge to their cheeks, it looks as if we would have to emend *corpora* to some word meaning ‘cheeks’ or ‘cheekbones’, and I have been unable to find any word of the appropriate meaning and metrical shape. However, although it might seem that the pale woman’s *tempora* are too high, as her *pectora* are surely too low, there is some ancient evidence for rouging of foreheads, and *tempora* may in fact be the word we want. In a satirical passage, Propertius writes (2.18.31–2):

an si caeruleo quaedam sua tempora fuco
 tinxerit, idcirco caerulea forma bona est?

This is clear enough, but some doubt remains, since it might be objected that Propertius is intentionally mingling two ideas, British blue-dyed faces and German (or Roman) yellow-dyed hair, and using the former to make the latter more ridiculous. The word *tempora* would then be used not because Roman women applied cosmetics to their foreheads, but because the *tempora* are the part of the face closest to the hair.⁶

⁴ The clothing in the perpendicular passage is *pulla*, which would be considerably darker. Ovid uses *purpureus pudor* to allude to a blush in *Am.* 1.3.14, and we would expect rouge to produce roughly the same shade.

⁵ The meaning ‘touch (with a substance) so as to leave a trace, film, or sim.’ (*OLD* s.v. *tangere* 3 a) seems perfect for the application of most cosmetics, whether powder, liquid, or paste. On the other hand, Propertius (quoted just below) uses *tingere*, and Ovid may well be imitating him here. (The other conjectures, particularly *cingat*, seem to be designed to clarify the line as a reference to striped clothing, which is the point at issue.)

⁶ It may also be significant that Plautus (*Men.* 829) gives the *tempora* as the locus of a sickly green coloration, though no cosmetic remedy is mentioned.

As we have seen, difficulties remain, and it is certainly possible that the truth is still to be found. I hope I have at least convinced the reader that my diagnosis is correct, that line 269 must refer to rouge rather than purple-striped clothing, and that, if some of the details of the solution proposed (the conjecture *tempora* and the understanding of *uirgis* as sticks of rouge) are found unconvincing, it is time to draw our daggers and obelize.⁷

However that may be, we are left with the problem of making the crocodile more at home in the pentameter. It is possible to argue that the text of 270 is sound, that Ovid calls the crocodile an 'Egyptian fish' because both creatures are scaly and both aquatic (though the crocodile only partly so), and that his readers' greater familiarity with crocodile-dung cosmetics would have helped them to make the connection. This would be an unusually bold instance of what we might call 'zoological catachresis', like calling a hippopotamus a 'river-horse' or an ostrich a 'sparrow-camel': more examples are listed in my final paragraph. However, since a *piscis* is not necessarily saw-toothed, or huge, or predatory, I find the leap from fish to crocodile too great. The most economical way to remove the problem by conjecture is to emend *Pharii...piscis* to *Phariae...pristis*, 'Egyptian sawfish'. My proposal may seem absurd on the face of it, since a crocodile, not being any kind of fish, is certainly not a sawfish, and if it were, there would be no need to emend *piscis*. However, there is more to be said for the conjecture than may at first appear. Ichthyologically, the *pristis* is a relatively rare and commercially insignificant saltwater fish related to the skates and rays, and, more distantly, to the sharks. Broader and flatter than a shark, the *pristis* is longer, rounder in cross-section, and generally much more fish-shaped than a skate or ray. It is quite large (25 or even 30 feet long) and has a prominent snout (up to 5 feet long) shaped rather like a double-edged saw, hence its name (Greek *πρίστis* from *πρίω*), and even more like an electric hedge-trimmer. The fish is known as *pristis*, *pistris*, or *pistris* in Latin, *πρίστis* or *πρήστis* in Greek, and the scientific name of the common Mediterranean sawfish is *Pristis antiquorum*, which, with five quite similar species, forms the genus *Pristis* and family *Pristidae*.⁸

If Ovid referred to the crocodile as a sawfish, it is possible that he used the metathesized form *pistris* rather than *pristis*.⁹ However, I prefer *pristis*, which is the only form found in both Greek and Latin, and so presumably the earliest Latin form, as well as the etymologically correct Greek form (assuming derivation from *πρίω*). The reference to a saw should be as explicit as possible, if Ovid is using the word to refer to a saw-toothed but non-piscine crocodile. In our manuscripts, forms of *pristis* and *pistris* are frequently confused with each other and with the corresponding forms of *piscis* and *pestis*.¹⁰ Confusion is encouraged not only by the variable spelling of our

⁷ Since the couplet is obscure and difficult rather than inane or repetitious, I take it that it is corrupt, not interpolated.

⁸ Although D'Arcy W. Thomson, *A Glossary of Greek Fishes* (Oxford, 1947), discusses the identification (s.v. *πρίστis*, 219), he unfortunately provides no picture or detailed description, though these can be found in most modern encyclopedias. Doubts about the identification are possible. As Thomson notes, 'a derivation from *πρήθω*, to blow or spout, is also possible. In its Latin form *pistris* (in which word Volksetymologie plays its part), the *pristis* was exaggerated into a fabulous sea-monster, and in no case, either in Greek or in Latin, is it clearly recognizable as the sawfish. It is likely enough that it means that fish in many cases, but, strictly speaking, the identification rests only on its name.'

⁹ The third Latin form, *pistris*, can at least be ruled out for our passage, since the genitive is *pistris*, and *πρήστis* is found only in Greek.

¹⁰ In his edition of Manilius (London, 5 vols., 1903–30), A. E. Housman notes confusion of *pristis/pistris* with *piscis* at 1.356. He also refers to Germanicus 721, where all MSS. read *piscis*

word but by uncertainty about its meaning.¹¹ It is clear from their descriptions that few if any of the authors who mention the *pristis* (however spelled) had ever seen one, dead or alive. The alternative Greek spelling *πρήστις*, 'spouter' (from *πρήθω*, n. 8 above), implies confusion with the whale, as do Pliny's assertions (*N.H.* 9.4, 41) that the *pristis* is 200 cubits long and viviparous. Seneca's beast is, if anything, even more fabulous, though, like Pliny, he has the decency not to pretend that creatures so remarkable are to be seen in Roman waters: in describing the monster which kills Hippolytus, he says *talis extremo mari / pistris citatas sorbit et frangit rates* (*Pha.* 1048–9). It appears, then, that *pristis* and its synonyms are used in Latin with the same lack of precision which characterizes 'Leviathan' in English. The author of Job 40.25–41.26 (= 41.1–34 in English translations) may have meant his Leviathan for a crocodile or a whale or a hippopotamus or a mythical seven-headed serpent,¹² but in most English authors, a Leviathan is simply a huge aquatic creature of indeterminate shape and unpleasant character, the marine equivalent of the equally monstrous but terrestrial Behemoth of Job 40.15–24. The main difference is that a *pristis*, unlike a Leviathan, must be specifically saw-snouted or saw-toothed.

As I have said, my proposal may seem absurd, since a crocodile, not being any kind of fish, is certainly not a sawfish. However, there are more striking instances of what I have called zoological catachresis in ancient literature. A *ἵπποπόταμος* is not a *ἵππος*, though it does inhabit rivers. A *στρουθοκάμηλος* is certainly nothing like a *στρουθός* or a *κάμηλος*. A *χαμαιλέον* is entirely unlike a lion in appearance and is predominantly arboreal: it is ordinary *λέοντες* which live *χαμαί*.¹³ The phenomenon is also found in Latin: a *Luca bos* is neither Lucanian nor bovine. This sort of riddling and whimsical periphrasis is sometimes used in an *ad hoc* way: the *κάνθων Σκυθικός* of an anonymous Greek epigrammatist is neither Scythian nor an ass, rather an Indian rhinoceros.¹⁴ Though all of these except the *Luca bos* are Greek rather than Latin, I do not think that is a major objection in a poet so Greek as Ovid.¹⁵ In view

and *pistris* is Grotius' conjecture (improved to *pristis* by Schwartz), and to *Ciris* 451, where MSS. are divided among *pistres*, *pestes*, and *piscis*, and Barth conjectured *pristes*. Of course, confusion of *pristis/pistris* with *piscis* is particularly easy in astronomical contexts, where the constellation *Pristis* (= *Cetus*, 'the Whale', identified with Andromeda's monster) keeps company with the zodiacal *Pisces* and the *Piscis Notius* (or *Austrinus*). An interesting case is Albinovanus Pedo 6 (apud Sen. Mai. *Suas.* 1.15, ed. Håkanson, Leipzig, 1989), where two of the three principal MSS. corrupt *pristis* (acc. pl.) to *pristinas*. Though suppressed as unmetrical by most editors of the fragmentary poets, this points to *pristis* against *pistris* as Pedo's preferred form: the scribe has substituted the only common native Latin word beginning with *prist-* for the unfamiliar Greek term.

¹¹ Another complication is that the meanings of the words overlap, since a *pristis* or *pistris* is a species of *piscis*, and may well be a *pestis*, too.

¹² Or even a tunny fish: cf. John Day, *God's conflict with the dragon and the sea: Echoes of a Canaanite myth in the Old Testament* (University of Cambridge Oriental Publications 35, Cambridge, 1985), particularly Chapter 2, 'The alleged naturalization of Leviathan and Behemoth' (62–87).

¹³ The *καμηλοπάρδαλις* does not seem quite so outrageous as the others, in that it combines the long neck (and then some) of the *κάμηλος* with the spots of the *πάρδαλις*. However, even this name would give a very imprecise idea of the giraffe to someone who had never seen one.

¹⁴ Anonymous CXXVIII in D. L. Page, *Further Greek Epigrams* (Cambridge, 1981), quoted from Aelian *N.A.* 10.40. As Page says, it is 'presumably inscriptional', and datable to the 320s, since it describes Alexander the Great's dedication of a rhinoceros horn at Delphi.

¹⁵ English seems to reserve similar whimsy for culinary terms such as Welsh rabbit, toad-in-the-hole, and pigs-in-blankets. The fact that Latin *pristis*, unlike English 'sawfish', does not have its fishness implied in its name would make the usage that much easier, though even in English 'shellfish' are not fish.

of these parallels, it seems to me that a *Pharia pristis* need not be a literal *pristis*, even if we assume that Ovid had any clear idea what the ichthyologists' *pristis* looked like. The crocodile is monstrous, predatory, scaly, predominantly aquatic, and conspicuously sawtoothed, as well as Egyptian, and that should be enough to permit Ovid to call it a *Pharia pristis*.¹⁶ Readers who combine textual conservatism with a high tolerance for bold catachresis may wish to hold on to the *Pharius piscis* of the manuscripts.¹⁷

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PLINY THE ELDER ON THE MAKING OF PAPYRUS PAPER

Pliny the Elder in *Natural History*, xiii, 74–82,¹ described in detail specifications for the manufacturing of papyrus. However, there was a spurious omission pertaining to the height (the term *length* was also used by some authors) of the manufactured sheet in sentence 78. Johnson² has listed the different theories explaining this as an oversight or that a standard height-to-width ratio existed, thus making the specification of the height redundant. The latter is not substantiated by the measurement of the dimensions of extant papyrus rolls.² Johnson proposed a more rational theory, that it was most important to specify the width but this does not explain the absence of any specification of height, even as a measurement of secondary importance.

Because the resulting height was not exactly known in advance, Pliny clearly stated that the longitudinal layer ought to have *vertical* (longitudinal) *strips as long as possible* (sentence 74). Obviously, it was necessary to trim the excess height of the longitudinal strips after the lateral strips were laid. Close observation of the heights and widths listed in the Johnson paper reveals that the different sheets comprising a roll had nearly equal width but a great variety of rolls of different heights has been found (widespread, nearly Gaussian, statistical distribution with standard deviation 3.4 cm), corresponding to different field of application and the random width of the strips used. The sheet widths appear to have more consistent values (narrow statistical distribution, standard deviation 1.8 cm). The manufacturer could control closely either the height or the width. The latter was most important to be standardised to

¹⁶ At first gland, *Phariae . . . pestis* might seem attractive. We have seen (n. 8 above) that *pestis* is often confused with *pristis/pistris* and *piscis*. However, the word is much commoner than *pristis*, and so much less likely to be corrupted. More important, the description of a crocodile as a *Pharia pestis* would be accurate but insufficiently precise: although the crocodile is undoubtedly Egyptian and a *pestis*, the reference of the nouns is not specifically aquatic or sawtoothed, and *Pharia pestis* might just as easily describe the hippopotamus or the asp—perhaps even the ibis, if revolting habits count for anything. Ovid's reference to crocodilian cosmetics is already obscure enough with *pristis*. No doubt one reason for the obscurity of the expression is to help disguise the fundamental unpleasantness of the subject of crocodile dung.

¹⁷ I wish to thank the editors for their help, particularly Stephen Heyworth for his suggestion about the meaning of *uirgis* and for convincing me that *tempora* was more likely than I had at first thought, among much other advice, welcome even when not heeded. I also wish to thank Spurgeon Baldwin, Kirk Summers, and Tatiana Summers for editorial advice, and Herbert Boschung, Jr. for help on the ichthyological side.

¹ Pliny, *Natural History*. Translated by H. Rackham (Heinemann/Loeb, 1938).

² Johnson, W. A., 'Pliny the Elder and Standardized Roll Lengths in the Manufacture of Papyrus,' CA, (1993), 46–50.