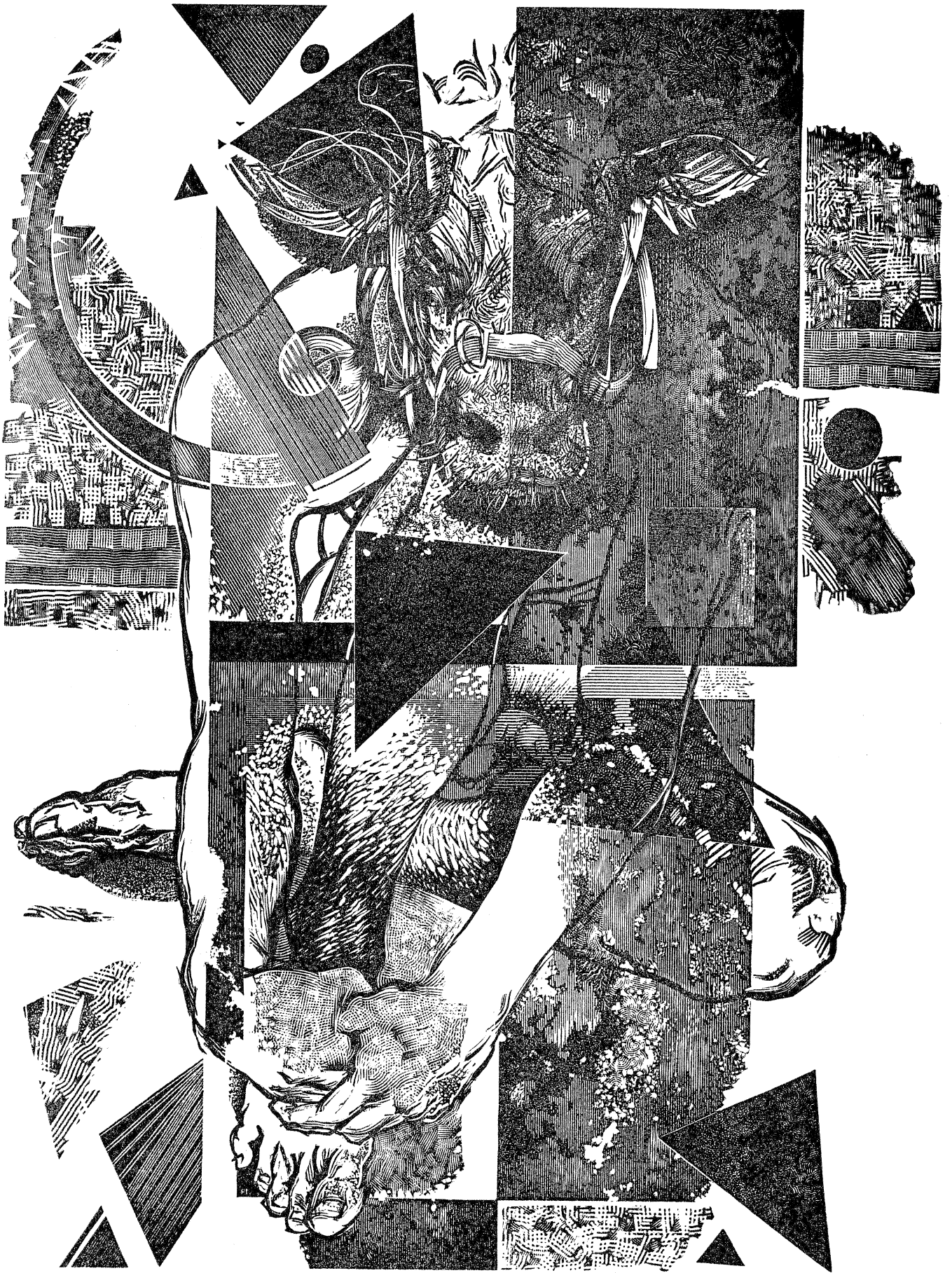


ἀριθμὸν ἔξοχον σοφισμάτων

*Aeschylus, Prometheus Bound 459*

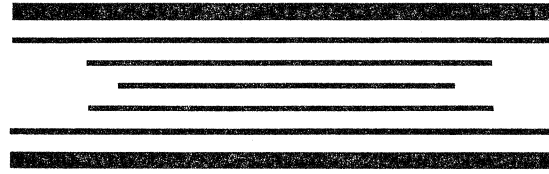
Thence to Trinacria's shore you bend your way,  
Where graze thy herds, illustrious Source of day!  
Sev'n herds, sev'n flocks enrich the sacred plains,  
Each herd, each flock full fifty heads contains:  
The wond'rous kind a length of age survey,  
By breed increase not, nor by death decay.

*Pope's translation of Homer, Odyssey XII 127-131*



# ARCHIMEDES

## The Cattle Problem

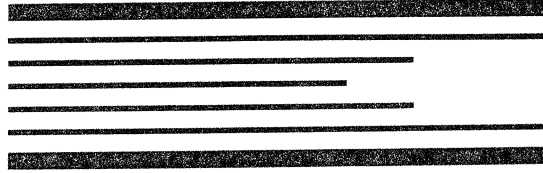


in English verse  
by  
S. J. P. Hillion  
&  
H. W. Lenstra jr

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# ARCHIMEDES

## THE CATTLE PROBLEM

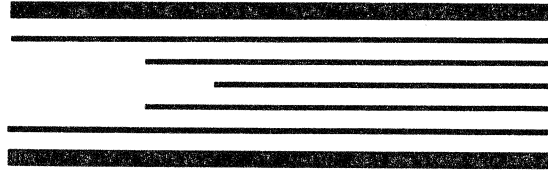


a problem

that Archimedes conceived in verse and  
posed to the specialists at Alexandria  
in a letter to Eratosthenes of Cyrene

# ΑΡΧΙΜΗΔΟΥΣ

ΠΡΟΒΛΗΜΑ ΒΟΕΙΚΟΝ



πρόβλημα

ὅπερ Ἀρχιμήδης ἐν ἐπιγράμμασιν εὐρών  
τοῖς ἐν Ἀλεξανδρείᾳ περὶ ταῦτα πραγμα-  
τευομένοις ζητεῖν ἀπέστειλεν ἐν τῇ πρὸς  
Ἐρατοσθένην τὸν Κυρηναῖον ἐπιστολῇ

Πληθύν Ἡελίοιο βῶων, ὦ ξεῖνε, μέτρησον  
Φροντίδ' ἐπιστήσας, εἰ μετέχεις σοφίης,  
πόσση ἄρ' ἐν πεδίοις Σικελῆς ποτ' ἐβόσκειτο νήσου  
Θρινακίης τετραχῆ στίφεια δασσαμένη  
χροιοῖν ἀλλάσσοντα· τὸ μὲν λευκοῖο γάλακτος,  
κυανέω δ' ἕτερον χρώματι λαμπόμενον,  
ἄλλο γε μὲν ξανθόν, τὸ δὲ ποικίλον. Ἐν δὲ ἐκάστῳ  
στίφει ἔσαν ταῦροι πλήθεσι βριθόμενοι  
συμμετρίας τοιῆσδε τετευχότες· ἀργότριχας μὲν  
κυανέων ταύρων ἡμίσει ἠδὲ τρίτῳ  
καὶ ξανθοῖς σύμπασιν ἴσους, ὦ ξεῖνε, νόησον,  
αὐτὰρ κυανέους τῷ τετράτῳ τε μέρει  
μικτοχρόων καὶ πέμπτῳ, ἔτι ξανθοῖσί τε πᾶσιν.  
Τοὺς δ' ὑπολειπομένους ποικιλόχρωτας ἄθρει  
ἀργεννῶν ταύρων ἕκτῳ μέρει ἐβδομάτῳ τε  
καὶ ξανθοῖς αὐτοὺς πᾶσιν ἰσαζομένους.  
Θηλείαισι δὲ βουσί τὰδ' ἔπλετο· λευκότριχες μὲν  
ἦσαν συμπάσης κυανέης ἀγέλης  
τῷ τριτάτῳ τε μέρει καὶ τετράτῳ ἀτρεκέες ἴσαι·  
αὐτὰρ κυανεαὶ τῷ τετράτῳ τε πάλιν  
μικτοχρόων καὶ πέμπτῳ ὁμοῦ μέρει ἰσάζοντο  
σὺν ταύροις πάσαις εἰς νομὸν ἐρχομέναις.  
Ξανθοτρίχων δ' ἀγέλης πέμπτῳ μέρει ἠδὲ καὶ ἕκτῳ  
ποικίλαι ἰσάριθμον πλήθος ἔχον τετραχῆ.  
Ξανθαὶ δ' ἠριθμεῦντο μέρους τρίτου ἡμίσει ἴσαι  
ἀργεννῆς ἀγέλης ἐβδομάτῳ τε μέρει.  
Ξεῖνε, σὺ δ', Ἡελίοιο βῶες πόσαι, ἀτρεκέες εἰπών,  
χωρὶς μὲν ταύρων ζατρεφῶν ἀριθμόν,  
χωρὶς δ' αὖ, θήλειαι ὅσαι κατὰ χροιοῖν ἕκασται,  
οὐκ αἰδρίς κε λέγοι' οὐδ' ἀριθμῶν ἀδαής,  
οὐ μὴν πῶ γε σοφοῖς ἐναριθμῖος. Ἄλλ' ἴθι φράζευ  
καὶ τὰδε πάντα βῶων Ἡελίοιο πάθη.  
Ἄργότριχες ταῦροι μὲν ἐπεὶ μιξαῖατο πληθύν  
κυανέοις, ἴσταντ' ἔμπεδον ἰσόμετροι  
εἰς βάθος εἰς εὐρύς τε, τὰ δ' αὖ περιμήκεα πάντα  
πίμπλαντο πλίνθου Θρινακίης πεδία.  
Ξανθοὶ δ' αὖτ' εἰς ἓν καὶ ποικίλοι ἀθροισθέντες  
ἴσταντ' ἀμβολάδην ἐξ ἐνὸς ἀρχόμενοι  
σχῆμα τελειοῦντες τὸ τρικράσπεδον οὔτε προσόντων  
ἀλλοχρόων ταύρων οὔτ' ἐπιλειπομένων.  
Ταῦτα συνεξευρὼν καὶ ἐνὶ πραπίδεςσιν ἀθροίσσας  
καὶ πληθέων ἀποδοῦς, ξεῖνε, τὰ πάντα μέτρα  
ἔρχεο κυδίοων νικηφόρος ἴσθι τε πάντως  
κεκριμένος ταύτῃ γ' ὄμπνιος ἐν σοφίῃ.

The Sun god's cattle, friend, apply thy care  
to count their number, hast thou wisdom's share.  
They grazed of old on the Thrinacian floor  
of Sic'ly's island, herded into four,  
colour by colour: one herd white as cream,  
the next in coats glowing with ebon gleam,  
brown-skinned the third, and stained with spots the last.  
Each herd saw bulls in power unsurpassed,  
in ratios these: count half the ebon-hued,  
add one third more, then all the brown include;  
thus, friend, canst thou the white bulls' number tell.  
The ebon did the brown exceed as well,  
now by a fourth and fifth part of the stained.  
To know the spotted—all bulls that remained—  
reckon again the brown bulls, and unite  
these with a sixth and seventh of the white.  
Among the cows, the tale of silver-haired  
was, when with bulls and cows of black compared,  
exactly one in three plus one in four.  
The black cows counted one in four once more,  
plus now a fifth, of the bespeckled breed  
when, bulls withal, they wandered out to feed.  
The speckled cows tallied a fifth and sixth  
of all the brown-haired, males and females mixed.  
Lastly, the brown cows numbered half a third  
and one in seven of the silver herd.  
Tell'st thou unfailingly how many head  
the Sun possessed, o friend, both bulls well-fed  
and cows of ev'ry colour—no-one will  
deny that thou hast numbers' art and skill,  
though not yet dost thou rank among the wise.  
But come! also the foll'wing recognise.  
Whene'er the Sun god's white bulls joined the black,  
their multitude would gather in a pack  
of equal length and breadth, and squarely throng  
Thrinacia's territory broad and long.  
But when the brown bulls mingled with the flecked,  
in rows growing from one would they collect,  
forming a perfect triangle, with ne'er  
a diff'rent-coloured bull, and none to spare.  
Friend, canst thou analyse this in thy mind,  
and of these masses all the measures find,  
go forth in glory! be assured all deem  
thy wisdom in this discipline supreme!



The Greek text of *The Cattle Problem* was taken from  
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It was hand-set in Augustyn Grieksch No. 1,  
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