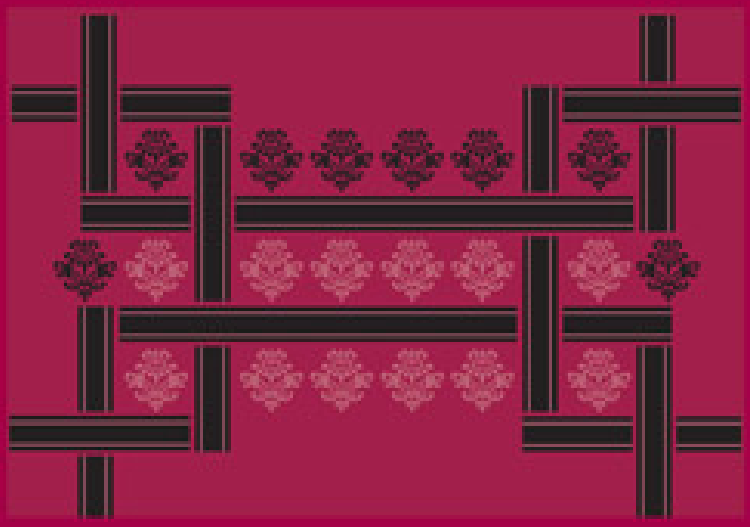
Theophrastus of Eresus

ON WEATHER SIGNS



EDITED BY

DAVID SIDER

& CARL WOLFRAM BRUNSCHÖN

BRILL PHILOSOPHIA ANTIQUA

Vienna, Cod.phil.gr. 1, fol. 481^{v}, an illustration from Dionysios *De Aucupio* of a *kepphos*. See *De Signis* 28.193, with commentary. The text below the image says Κέπφον δ' ἕτερον ὄρνεον ἐκ τῆς κουφότητος οἱ ἁλιεῖς ὀνομάζουσιν (2.11).
Used with kind permission of the Österreichische Nationalbibliothek/Bildarchiv.

THEOPHRASTUS OF ERESUS

ON WEATHER SIGNS

EDITED BY

DAVID SIDER

AND

CARL WOLFRAM BRUNSCHÖN

BRILL

LEIDEN · BOSTON
2007

This book is printed on acid-free paper.

Library of Congress Cataloging-in-Publication Data

A C.I.P. record for this book is available from the Library of Congress.

ISSN 0079-1687
ISBN-10: 90 04 15593 7
ISBN-13: 978 90 04 15593 0

© Copyright 2007 by Koninklijke Brill NV, Leiden, The Netherlands
Koninklijke Brill NV incorporates the imprints Brill,
Hotei Publishing, IDC Publishers, Martinus Nijhoff Publishers and VSP.

All rights reserved. No part of this publication may be reproduced, translated, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior written permission from the publisher.

Authorization to photocopy items for internal or personal use is granted by Brill provided that the appropriate fees are paid directly to The Copyright Clearance Center, 222 Rosewood Drive, Suite 910 Danvers MA 01923, USA.
Fees are subject to change.

PRINTED IN THE NETHERLANDS

to Sandra and Maria

TABLE OF CONTENTS

PREFACE

Work on this book began when Bill Fortenbaugh called David Sider out of the blue to ask whether he would be interested in editing both *De Signis* and the more indubitably Theophrastean *On Winds* for the latest addition to Project Theophrastus, a series of texts of and commentaries on the opuscula of Theophrastus; that is, all those works existing complete (or relatively so) in manuscripts other than his two big works on plants and the *Characters*. Sider, having recently finished his commentary on the epigrams of Philodemos and wondering what big task to engage in next, said yes (and was later happy to relinquish *On Winds* to others). Since *De Signis* has a manuscript tradition different from and more complicated than that shared by the other Theophrastean opuscula, it was soon clear that autopsy of all the manuscripts was called for. A census of Theophrastus' mss. had been prepared by Nigel Wilson, which saved much labor, but an appeal to Dieter Harlfinger seemed like a good idea, for he if anybody would know of any missed by Wilson. Indeed, the table of contents of a ms. in Turin failed to note that *De Signis* was present, since this work follows on the preceding work without any notice that a new one has begun. Harlfinger also informed Sider that one of his students, Carl Wolfram Brunschön, had recently prepared a seminar paper on the Überlieferungsgeschichte of *De Signis*, following up on an earlier paper by Harfinger and Dieter Reinsch. Soon after Harlfinger arranged a meeting between Sider and Brunschön, they agreed, with Fortenbaugh's blessing, to co-edit the text. For the most part, the initial writing was done by Sider, but there has been constant consultation between the two and there is a lot more to a book than the initial writing. Brunschön is chiefly responsible for the brief description of the mss., and in what may seem like an odd division of labor, while Sider prepared the Greek text itself, Brunschön took charge of the critical apparatus, making use of some sophisticated programs he had designed for use at the Corpus Medicorum Graecorum, where he is a Wissenschaftlicher Mitarbeiter. He also took on the task of preparing the pages of the book in pdf, the modern equivalent of camera-ready text, for our publisher. At a later stage of our work, it was decided to add an appendix containing a newly edited text of *De Ventorum Situ*, which supposedly formed part of Aristotle's *De Signis*, and which, as the introduction will try to make clear, may be related in form to the *De Signis* edited here. This task

has been undertaken by Victor D'Avella, who would like to thank Dieter Harlfinger for allowing him access to the microfilms of this work at the Aristoteles Archiv in Berlin.

At an early stage, the commentary greatly benefited from a critical reading by Marlein van Raalte. Toward the end, it was read by two of the Project Theophrastus editors, Bill Fortenbaugh and Bob Sharples, as well as by the editor of Brill's Philosophia Antiqua series, Keimpe Algra. To all we are grateful for their acute observations, although they cannot be held responsible for what failings remain.

Sider gives thanks to the National Endowment for the Humanities for aid in travelling to read the manuscripts, and to Fordham University and then to New York University for time off to work on the book. Brunschön thanks the Corpus Medicorum Graecorum for distinct discussions. We are also grateful to the kind reception we individually received at the manuscript reading rooms in Paris, Venice, Milan, Vatican City, Turin, and Florence. (And since Sider became deathly ill from food poisoning while working in the manuscript reading room of the Bibliotheque Nationale, he is especially thankful to les Pompiers de Paris stationed in the Richelieu Palace for their expert first aid.) Also helpful to Sider were the librarians of the New York Botanical Garden in the Bronx, the New York Academy of Medicine, the Morgan Library, the Museum of Natural History (the only library in New York City to own a set of Schneider's Theophrastus), and, at Yale, the Beinecke library and the Historical library of the Medical school (one of the very few places to own a copy of Bonaventura's commentary); as well the ever-reliable librarians at Fordham, Columbia, and New York Universities.

In addition to Dieter Harlfinger for the reasons outlined above, we also thank the following for answering queries on difficulties raised by the text: Elke Böhr and Kristin Olson Murtaugh (for help on birds), Maria Vasiloudi (for a convincing answer to a textual crux), John Scarborough (for sharing his knowledge of myriapods), Kenneth Lapatin (for guidance on rare stones), Douglas Hutchinson (for helping to make sense of the chronology of Eudoxos), Liba Taub (for guidance on meteorology), Daryn Lehoux (for discussion over beer about parapegmata), Regina Höschele (for transcribing the relevant parts of Camerarius' preface to the 1541 Theophrastus), and Colin King (for providing a place to sleep and a bike to ride when Sider was in Berlin). We also thank Silke Pirolt of the Austrian National Library/Bildarchiv for her help in providing our frontispiece. Nor do we forget our wives Sandra Sider and Maria Vasiloudi, who have supported our efforts during the long course of preparing this work.

INTRODUCTION

1) *Predicting the weather.*[1] Could there ever have been a farmer or sailor who would not want to know the weather of the next few minutes (especially the sailor) or days (the farmer)?[2] Weather over the long term—the year is the longest—is also knowable, even if only grosso modo: Winters will surely be cold, at least relatively so, and summers will be hot, and every region will have a rainy season or two. But within every season there will be a range the extremes of which will either encourage/allow or deter/prevent particular activities. Some of these deviations from the norm could be predicted, but not everybody could know (or be expected to remember) all the advance signs of these deviations from the norm. The ordinary person needed either a nearby expert (especially before the spread of literacy) or a handy source of reference.[3]

[1] Basic to what follows is R. Böker, "Wetterzeichen," *RE* Supplb. 9 (1962) 1609–92; cited throughout simply by name and column number.

[2] **Farmers** and **sailors** are typically the main audiences named or clearly assumed; note esp. Sext. Emp. *Adv. math*. 5.1 (quoted below, p. 14), but note also the following sorts named by Aratos: **millers** (1044–46) and **herdsmen** of various sorts—goats (1098), sheep (1104), cattle (1113)—as well as the luckless man (ἄνολβος ἀνήρ, 1073), who could be anybody. P. Bing, "Aratus and his audiences," *MD* 31 (1993) 99–109, reasonably connects Aratus' inclusivity with the fact that he keeps the addressee of his poem unspecified (many 2nd person singular verbs, but no vocatives). Lucan and Vegetius (see below, section 4) list signs of use to **military planners**. Poseidippos *Epigrams* 24–25 Austin-Bastianini contain weather signs said to be of interest to **fishermen**. Pliny *NH* 18.225 credits canny clothing **merchants** with the ability to foretell the next season's weather and thereby to price their clothing accordingly. Nobody in the technical weather literature specifies **physicians**, but note that they themselves are aware of weather's importance; cf. Hipp. *Aer.* 1–2, who urges the physician to "read" the topography upon arriving in a new location. This includes its disposition in respect to the sun and how the winds blow. "If someone think that these things are meteorological in nature, upon reflection he will learn that astronomy is of the greatest significance in medicine" (2.3). Other physicians mention the need to pay attention to weather; e.g., Galen 9.914, 17a.15 K and Aëtius Amidiensis *Iatr.* 3.164 (in a wider context making the same point) τῶν ὑγιαινόντων τὰ σώματα καὶ πολλῷ μᾶλλον τῶν νοσούντων ἀλλοιοῦται πρὸς τὴν τοῦ ἀέρος κατάστασιν. Note also [Arist.] *Probl.* 1.1–29, which offers many questions concerning the relationship between various ailments and winds and other seasonal changes; cf. Demokr. ap. *Geop.* 1.15.19, quoted below, p. 7. Cf. J. H. Phillips, "The Hippocratic physician and ἀστρονομίη," in F. Lasserre and P. Mudry (eds.), *Formes de pensée dans la Collection hippocratique* (Geneva 1983) 427–434; and, for a broader survey, V. Langholf, *Medical Theories in Hippocrates* (Berlin 1990) 164–179.

[3] An excellent episode illustrating the layman's recognition of his own ignorance appears at *Il.* 4.73–85, where an ordinary (τις) soldier, seeing a shooting star just before a battle, interprets it as cautiously as possible: ἦ ῥ' αὖτις πόλεμος ... ἔσσεται, ἢ φιλότητα

For the Greeks, all weather is due to Zeus, but although he may signal a successful battle or Odysseus' return with the visually impressive flight of an eagle,[4] he cannot be bothered to give such dramatic advance warning for every high wind or piddling rain. Other signs were sought. And although all were called Διοσημίαι,[5] these came to be understood, at least implicitly, in the more scientific literature as signs *of* Zeus (= sky), not *from* Zeus (the sky god).[6]

Thus arose a collection of observations of two main sorts. One was calendrical, reminders of the annual revolution of seasons and their associated normal weather. The best signs of this class are the risings and settings of particular stars or constellations,[7] although other annual occurrences, such as the regular passage of migrating birds, were also employed. Hesiod's *Works and Days* is the *fons et origo* of material of this sort for later Greek and Latin literature. Observations like these were put on a more scientific basis after Hesiod when the likely weather for every day of the year was written down on parapegmata (on which see below, p. 9 f.).

... τίθησι Ζεύς. Prometheus tells of a time of total ignorance even of the change in seasons: ἦν δ' οὐδὲν αὐτοῖς οὔτε χείματος τέκμαρ | οὔτ' ἀνθεμώδους ἦρος οὔτε καρπίμου | θέρους βέβαιον (Aisch. *PV* 454–6). (Although *DS* avoids the word, τέκμαρ occurs often in weather literature as a synonym for σῆμα). Sailors who have misread the signs will have to call upon the Dioscuri for aid: Theokr. 22.6 ἀνθρώπων σωτῆρας ἐπὶ ξυροῦ ἤδη ἐόντων.

[4] On which, see D. Collins, "Reading the birds: *Oiônomanteia* in early epic," *Colby Q.* 38 (2002) 17–41; P. Cronin, "Weather lore as a source of Homeric imagery," *Hellenica* 51 (2001) 7–24; P. Wathelet, "La météorologie dans les comparaisons homériques," in C. Cusset (ed.), *La Météorologie dans l'antiquité: entre science et croyance* (Saint-Étienne 2003) 203–216; W. Leszl, "I messaggi degli dei e i segni della natura," in G. Manetti (ed.), *Knowledge through Signs: Ancient Semiotic Theories and Practices* (Turnhout 1996) 43–81.

[5] First in Aristoph. *Ach.* 170 f. of a portent, when Dikaiopolis wants to adjourn the ekklesia because of (an imaginary) rain: λέγω δ' ὑμῖν ὅτι | διοσημία 'στὶ καὶ ῥανὶς βέβληκέ με. (The scansion of the word here guarantees that this, not the διοσημεία often found in mss., is the original form.) The scholion ad loc. defines the word as χειμὼν παρὰ καιρόν.

[6] The poets are an exception. Note how Hesiod introduces the *Days* section (765–769):

> ἤματα δ' ἐκ Διόθεν πεφυλαγμένος εὖ κατὰ μοῖραν
> πεφραδέμεν δμώεσσι· τριηκάδα μηνὸς ἀρίστην
> ἔργα τ' ἐποπτεύειν ἠδ' ἁρμαλιὴν δατέασθαι,
> εὖτ' ἂν ἀληθείην λαοὶ κρίνοντες ἄγωσιν.
> αἵδε γὰρ ἡμέραι εἰσὶ Διὸς παρὰ μητιόεντος.

Cf. also Aratos 5 f. (Zeus) ἀνθρώποισι | δεξιὰ σημαίνει and, at the beginning of the section on weather signs, 743 ἐκ Διὸς ἤδη πάντα πεφασμένα πάντοθι κεῖται. In general, see W. Leszl (above, n. 4) 43–81.

[7] Indeed, in the Bible, God gave stars etc. to men *as* signs (Gen. 1.14); cf. Philo *De Opif. Mundi* 58; E. Pfeiffer, *Gestirne und Wetter im griechischen Volksglauben und bei den Vorsokratikern* (Diss. Heidelberg 1914) 15 f.

The second class of observations gave warning of a more immediate sort, the equivalent of television weathermen telling us that there is a 50% chance of rain today. Even during winter one would benefit from a sign of *imminent* snow; and close to the beginning of a season one would like to know how it will compare with normal periods: Will the winter be more snowy than usual; the summer more dry? As with the annual (i.e., astronomical) signs, these too divide into meteorological and animal (and some botanic) observations. Clouds of a particular shape, as an example of the first; animals acting in a particular way, of the second.[8] In other words, the first class of weather writing (the Hesiodic) describes the normal; the second class (as in *DS*) treats deviations from the norm.

2) *Writing it down.* The two chief classes of weather prediction do not fit together very well on paper. Annual signs find their natural place in a chronological order that could begin at any point in the year and continue for a complete annual cycle, however this arbitrary point is determined. Hesiod, e.g., starts with the setting of the Pleiades (in our October), a good time for plowing, and he marks the rest of the year with other risings, settings, and the two solstices.[9] Greater refinement (but less poetry) comes when the year was divided into the twelve periods determined by zodiacal constellations, so that one could speak of the likely weather on "the fourth day of Scorpio" (stormy winds, cold temperatures, and frost; see *Geoponika* 218.1).

Within this scheme, however, there is no natural place for the various signs that portend imminent and less regular (παρὰ καιρόν) weather phenomena. Some of them (e.g., a sign of snow) would not belong in a summer month, but that still leaves too many days when snow is possible. Best, then, to segregate them, either in a separate section or in a separate work. Which indeed is what we find: There is, therefore, no duplication between the two chief extant works on weather signs, Hesiod's *Works and Days* and *De Signis*. Note how Hesiod records the *regular* migratory flight of cranes as an annual sign for plowing and rainy

[8] Epicurus *Ep. Pyth.* ap. D.L. 10.98 and 115 disbelieved in animal weather signs; see below, n. 99. On the other hand, cf. Cic. *Div.* 1.15 *inest in ranunculis vis et natura quaedam significans aliquid per se, ipsa satis certa, cognitioni autem hominum obscurior.* (This appears as a comment on a passage of Aratos, which had just been given in Cicero's translation.) For a defense of the validity of animal signs, cf. Pliny *NH* 8.102–104. For a survey, see J. Bouffartigue, "Les prévisions météorologiques tirées de l'observation des animaux: Études des sources antiques," in Cusset, *La Météorologie* (see above, n. 4) 397–414.

[9] Nicely laid out in West's edition of *Works and Days*, p. 253.

weather in general, whereas *DS* tells its readers how to intepret their *irregular* flight paths, which indicate a storm over the horizon.[10] Aratos (probably following Eudoxos; see below, pp. 13, 15), Vergil in the *Georgics*, and Pliny in book 18 of his *Natural History* present annual/parapegmatic material before passing on to the *para-kairon* signs.

3) *Origin of* De Signis *(preliminary considerations)*. The pertinent facts are these: (i) Theophrastos and Aristotle are each credited with a libellus on weather signs, Περὶ σημείων and Σημεῖα χειμώνων, respectively. (ii) All manuscript copies of *DS* are in Peripatetic collections; i.e., each copy appears along with works ascribed (rightly or wrongly) to either Aristotle or Theophrastos. In some of these mss. *DS* is explicitly credited to Aristotle, sometimes it is left anonymous, and once, in a late ms., it is credited to Theophrastos.

Beyond this, one can only conjecture on the basis of form, style, purpose, vocabulary. Since the mss. suggest a Peripatetic origin, three possibilities immediately suggest themselves: (i) *DS*, for the most part a collection of weather signs arranged in an impractical order (see below), was the collection of signs gathered at Aristotle's behest for him to mine while composing his own book on weather signs. (ii) It is the book written by Aristotle or (iii) Theophrastos. But if we further recognize that works of this sort (that is, practical handbook material, with no literary pretentions) regularly suffered alteration in the course of transmission (addition, subtraction, rearrangement—each of which is manifest in the extant mss. of *DS*), then another possibility is that what we possess is (iv) an abridgement of what either Aristotle or Theophrastos wrote.

And if this last is the case, since what we have is largely the signs, stripped of any philosophical underpinning or scientific framework that Aristotle or Theophrastos would surely have supplied, and since the latter would have felt free to make use of many of the same signs that his teacher did, then in a certain sense our *DS* can be thought of as (v) an abridgement of *both* Aristotle and Theophrastos. That is, an abridgement of one would look very much like an abridgement of the other. When does abridgement of a work by author *X* deservedly come to be thought of (when ancient standards of authorship are applied) as a new compi-

[10] *DS* 38.276–9 "If a flock of cranes flies in early morning, it will storm early; but if it flies late and over a long period of time, it will storm late. And if they turn about in flight they signal storm." 52.379–81 "When cranes fly without turning back, this signals fair weather; for they do not fly until they see a clear sky ahead of them as they fly."

lation by author *Y*?[11] That is, could we now begin to think of *DS* as the work of (say) Eudoxos, Euktemon, or Hipparchos, if we found evidence pointing their way? The reader will note how many "if"s have been used here.

Perhaps (but we should not be overoptimistic) a comparison between *DS* and Aratos' *Phainomena* will suggest an answer. If nothing else, Aratos could supply us with a *terminus ante quem* for its composition—on the assumption, which has not always been held, that *DS* antedates Aratos.[12] We return to the subject of authorship below.

4) *Survey of ancient weather literature.* We limit ourselves to Greek and Latin texts (extant or not) that contain a continuous section of more than minimal length expressly devoted to indications of forthcoming weather. Thus, excluded here are tales (with varying degrees of credibility) of various mythical, ordinary, and scientifically inclined individuals[13]

[11] Cf. M. L. West, *Textual Criticism and Editorial Technique* (Stuttgart 1973) 16: "Some kinds of text were always subject to alteration. Commentaries, lexica and other works of a grammatical nature were rightly regarded as collections of material to be pruned, adapted or added to, rather than as sacrosanct literary entities. When the rewriting becomes more than superficial, or when rearrangement is involved, one must speak of a new recension of the work, if not of a new work altogether." To his list, we should obviously add scientific and technical works, whose truth value would be more important than any desire to maintain the work in the form in which one found it. Any sort of work with practical application would be subject to this constant redaction; for medical works, cf., e.g., H. Grensemann, *Knidische Medizin*, vol. 1 (Berlin 1975) for a detailed analysis of how a medical work could suffer change as it passed through several editions (and from Knidos to Kos). Grensemann has been criticized for exaggerating the importance of these "schools"; cf. A. E. Hanson, "Fragmentation of the Greek medical writers," in G. W. Most (ed.), *Collecting Fragments / Fragmente sammeln* (Göttingen 1997) 295 f., but note her statement that "however strong the respect for authority and the desire to conserve older texts, these motives competed with ones that looked to current usefulness in day-to-day practice among patients. What was deemed no longer useful to the medicine being practiced might be tacitly discarded" (296). Students of the presocratics will of course immediately think of the great similarities among the works of Stobaios, Ps.-Plutarch, Ps.-Galen, and Theodoret. Also relevant to this subject is R. H. Robins, "The authenticity of the *Techne* [of Dionysios Thrax]: The *status quaestionis*," in V. Law and I. Sluiter (eds.), *Dionysius Thrax and the* Technē Grammatikē (Münster 1996) 13–26.

[12] Most notably, V. Rose, *Aristoteles Pseudepigraphus* (Leipzig 1863) 245 argued that "Arateum ordinem verbaque Aratea imitatus esse Pseudaristoteles iste [= *DS*] videatur." For a counterargument, see J. Böhme, *De Theophrasteis quae feruntur* Περὶ Σημείων *excerptis* (Hamburg 1884) 23 ff., who bases much of his argument on the fact that *DS*'s poetic words are not found in their equivalent passages in Aratos (27 f.). (That their order is different proves nothing.) Below, we shall argue that *DS* cannot be dependent on Aratos.

[13] **Mythical**: Atlas. Cf. Herakleitos *Incred.* 4 (Pfeiffer 16) Περὶ Ἄτλαντος. οὗτος παραδέδοται φέρων οὐρανὸν ἐπὶ τῶν ὤμων, ὃ ἀδύνατον ὑπὸ οὐρανὸν καὶ αὐτὸν ὄντα. ἀνὴρ δὲ σοφὸς ὢν τὰ κατὰ ἀστρολογίαν πρῶτος κατώπτευσε, προλέγων δὲ χειμῶνας καὶ

(they are cited when relevant in the commentary) and the many passages, from Homer onward, containing isolated weather signs. We also exclude Egyptian, Mesopotamian, and Biblical material,[14] to say nothing of the literature known from even farther afield, not because it is irrelevant but because it would overwhelm the classical authors, who are our main concern. Also excluded here is *DS* itself, unless, as may be the case, it turns out to equal one of them.

Hesiod's *Works and Days* 765 ff. (6th cent. BC), which provides a literary model, both as didactic poem in general and as a work of weather signs in particular, for all subsequent didactic poets: Aratos, Varro Atacinus, Vergil (see below). As we have noted, however, Hesiod's overall account of the year is distinct from the more immediate concerns of most of the weather literature surveyed here, although many signs in *DS* are season specific; e.g., 17.115 f. "during summer, when many island-dwelling birds show up in dense flocks, they signal rain." But signs of this sort are no different from those that specify the time of day; e.g., 19.126 f. "If a household finch sings at dawn it signals rain or storm." As a result of this division of heavenly signs, although our commentary cites Hesiod for various reasons, not one weather sign is common to Hesiod and *DS*. The setting of the Pleiades, for example, signals the end of the sailing season since storms are now likely; but the *day* of the setting is not in itself a sign that a storm is imminent. At only one place does Hesiod describe a sign of the type that is almost of the sort that regularly occurs in *DS*: Two days after the cuckoo is *first* heard *in spring* (486, κόκκυξ κοκκύζει), there will be a heavy rain. The italicized

μεταβολὰς ἀνέμων καὶ ἐπιτολὰς ἄστρων καὶ δύσεις ἐμυθεύθη φέρειν ἐν αὐτῷ τὸν κόσμον.

Ordinary people: A man in Byzantium (Arist. *HA* 612b4) or in Kyzikos (Plut. *Sollert. An*. 971a) observed hedgehogs' shifting entrances to infer which way wind would be blowing (cf. *DS* 30.211–14).

Philosophers: Thales, thanks to his studies of the heavens (ἐκ τῆς ἀστρολογίας), knew that the olive crop was going to be a good one (Arist. *Pol.* I,11 1259a6 ff. [DK 11 A 10], D.L. I.26 [A 1], Cic. *Div*. I.49.111); Empedokles could, he himself said, bring on or avert weather (31 B 111, with Satyros ap. D.L. 8.59); Anaxagoras simply shows up at a public event wearing rain gear on a sunny day; and sure enough it soon rains. Aelian tells a similar story about Hipparchos. According to Apollonios, *Mirabilia* 3, p. 122 Giannini, Hermotimos of Klazomenai could predict fair and foul weather (as well as plague and earthquakes). On the subject of this note, see further D. Sider, "Demokritos on the Weather," in A. Laks and C. Louguet (eds.), *Qu'est-ce que la philosophie présocratique* (Villeneuve d'Ascq 2002) 287–302.

[14] The ancient sources themselves occasionally credit Egyptian, Libyans, and Chaldaeans; cf., e.g., Ael. *NA* 7.8, *DS* 57.419 (with comm.).

words make this a sign that bridges the usual Hesiodic signs with those of *DS*.[15]

Demokritos (5th cent. BC). Ancient testimony is quite clear that the presocratic Demokritos was interested in and wrote on weather prediction: *ferunt Democritum, qui primum intellexit ostenditque caeli cum terris societatem*, ...[16] Modern scholarship, on the other hand, is almost as certain that all such testimony is either altogether mistaken or that these testimonia are to be assigned to Bolos of Mendes (Egypt) who supposedly went under the name Demokritos.[17] Bolos was said by Columella 7.5.17 to have produced a work, *Cheirokmeta*, under the name Demokritos.[18] Whatever the source of this confusion—intentional fraud on Bolos' part (Columella), Bolos Demokritos' double name being shortened to equal that of the presocratic (Wellmann), or Βῶλος Δημοκριτεῖος being misunderstood (Kroll)[19]—what may have been some few mistakes by ancients were taken by moderns to taint all ancient testimony connecting the presocratic Demokritos with weather. Most of the relevant testimony will be collected by W. Leszl (ch. 15 A, "Contributi all'astronomia descrittiva e di previsione"), to which the following can be added:

Geoponika 1.5.3 Δημόκριτος δὲ καὶ Ἀπουλήϊός φασι, τοιοῦτον χρὴ προσδοκᾶν ἔσεσθαι τὸν χειμῶνα, ὁποία ἔσται ἡ ἡμέρα τῆς ἑορτῆς ἣν οἱ Ῥωμαῖοι Βροῦμα καλοῦσι, τουτέστιν ἡ τετάρτη εἰκὰς τοῦ Δίου

[15] Note too that immediately before this passage there occurs the only place in Hesiod that actually suggest that weather is variable from day to day: ἄλλοτε δ' ἀλλοῖος Ζηνὸς νόος αἰγιόχοιο, | ἀργαλέος δ' ἄνδρεσσι καταθνητοῖσι νοῆσαι.

[16] Pliny *NH* 18.273 (DK 68 A 17).

[17] What follows is argued at greater length in Sider (see above, n. 13), who wrote in ignorance of R. Laurenti, "La questione Bolo-Democrito," in *L'Atomo fra scienza e letteratura*, Università di Genova, Facoltà di Lettere (1985) 55–74. See also Böker 1619 f., who argues for Demokritos having prepared a parapegma. Maass *GGA* (1893) 624–642 and Regenbogen, "Theophrastos," *RE* Supplb. 7 (1950) 1414 argue that Demokritos was an important source for *DS*; see below.

[18] Col. 7.5.12 (= Dem. DK 68 B 300.3) *Bolus ..., cuius ... Χειρόκμητα sub nomine Democriti falso produntur. Cheirokmeta* are "hand/man-made" medicines, as opposed to herbals. (For a defense of Demokritos' having written on medical matters, whether or not in a separate work dedicated to the subject, see Guthrie, *Hist. Gk. Philos.* 2.469). Souda calls him Βῶλος Δημόκριτος φιλόσοφος, and both Vitruvius (9 praef. 14) and Pliny (*NH* 24.160) mention the *Chirocmeta* as a work of (simply) Demokritos. It is worth pointing out that Columella, who knew of Bolos, thought that the Demokritos who wrote on rustic/georgic matters (which could include weather lore) was the presocratic: 1 praef. 32, 3.125, 6.2.8, 8.8.7, 9.14.6, 11.3.2–3, 11.3.61.

[19] M. Wellmann, "Bolos, *RE* 3 (1899) 676 f., W. Kroll, "Bolos und Demokritos," *Hermes* 69 (1934) 228–232.

μηνὸς ἤτοι Νοεμβρίου.[20] 1.12.5 ὁ δὲ Δ. λέγει τὸν οἶνον χρηστὸν καὶ παράμονον [21] εἶναι, εὔθετον δὲ εἶναι τὸ ἔτος [22] πρὸς μόνην ἀμπέλων φυτείαν. 11 ὁ δὲ Δ. φησιν ἐν τούτῳ τῷ ἔτει χάλαζαν πολλὴν γίνεσθαι καὶ χιόνας. 17 Δ. δέ φησι χαλάζης γίνεσθαι βλάβην [sc. περὶ τὸ φθινόπωρον]. 19 Δ. δέ φησιν, ἐν τῷ φθινοπώρῳ ἐκζέματα γίνεσθαι περὶ τὰ στόματα, διὸ χρὴ πρὸς τὸ ἔαρ λαχάνων ἅπτεσθαι, κοιλίαν τε λύειν, καὶ μάλιστα τοὺς νέους, ἀκράτῳ δὲ χρῆσθαι. 28 Δ. δέ φησιν ἐν τούτῳ τῷ ἔτει (sc. θέρει) μήτε ποταμοὺς ἔσεσθαι[23] μεγάλους μήτε χάλαζαν πολλήν· τὸ δὲ φθινόπωρον ἔνυδρον εἶναι. 29 Δ. δέ φησι ποταμοὺς μεγάλους ἔσεσθαι, καὶ νόσους περὶ τὸ φθινόπωρον. 40 Δ. δέ φησι τὴν ἄμπελον καὶ τὴν ἐλαίαν εὐφορήσειν.

Pliny *NH* 18.341 *tradunt eundem Democritum metente fratre eius Damaso ardentissimo aestu orasse ut reliquae segeti parceret raperetque desecta sub tectum, paucis mox horis saevo imbre vaticinatione adprobata*; Clem. *Strom.* 6.3.32 (2.446.28 St.) Δ. δὲ ἐκ τῆς τῶν μεταρσίων παρατηρήσεως πολλὰ προλέγων Σοφία ἐπωνομάσθη, ὑποδεξαμένου γοῦν αὐτὸν φιλοφρόνως Δαμάσου τοῦ ἀδελφοῦ τεκμηράμενος ἔκ τινων ἀστέρων πολὺν ἐσόμενον προεῖπεν ὄμβρον, οἱ μὲν οὖν πεισθέντες αὐτῷ συνεῖλον τοὺς καρποὺς (καὶ γὰρ ὥρᾳ θέρους ἐν ταῖς ἅλωσιν ἔτι ἦσαν), οἱ δὲ ἄλλοι πάντα ἀπώλεσαν ἀδοκήτου καὶ πολλοῦ καταρρήξαντος ὄμβρου. (And see the commentary on *DS* 16.106 κόραξ.)

Demokritos, it would seem, wrote on ways to predict weather (i) over the course of a typical year (in the manner of Hesiod), also attempting (ii) to assess the course of the current season or the next one and (iii) to predict the weather as it would develop in the next few hours and days.[24] It is with predictions of the second and third sort that later

[20] Cf. Pliny *NH* 18.231 *Democritus talem futuram hiemem arbitratur qualis fuerit brumae dies et circa eum terni, item solstitio aestatem*.

[21] I.e., it improves with age; cf. Athen. 1.30e οἶνον πρὸς παραμονὴν ἐπιτήδειον.

[22] In the literature on weather signs, ἔτος often seems to have the meaning "season," although this is not recognized by LSJ. Cf. Hipp. *Aer.* 10 ὁκοῖόν τι μέλλει ἔσεσθαι τὸ ἔτος, εἴτε νοσηρὸν εἴτε ὑγιηρόν, *DS* 25.179 f. καὶ ὅλως τὸ ἔτος τὸ βόρειον τοῦ νοτίου κρεῖττόν ἐστι καὶ ὑγιεινότερον, where in both passages it is clear from general context, as well as from the unstated awareness that it is impossible to predict the weather a year in advance, and that therefore seasons are meant. See further comm. ad 25.174 f. τὸ ἔτος—κρεῖττον.

[23] The future infinitives in 17, 29, and 40 no doubt reflect Demokritos' original tense. Probably the instances of εἶναι and γίνεσθαι elsewhere in these passages also reflect futures. The original formula may be such as is found in *Geoponika* 1.5.3 τοιοῦτον χρὴ προσδοκᾶν ἔσεσθαι ... (given in full above).

[24] See Sider, "Demokritos" (above, n. 13) 297–300, for the possible disposition of these weather observations in the works of Democritus.

weather literature was concerned; and far less with the second than with the third, the signs of immediate weather. For those of the second sort in *DS*, note, for example, 34.240–2 "If etesian winds blow for a long time and there is a windy autumn, the winter will be windless. But if the opposite occurs, the winter will turn out opposite as well," 40.293–5 "if many jelly fish appear in the sea this is a sign of a stormy season."[25]

Parapegmata.[26] Hesiod wrote for the farmer who would need but few seasonal markers. With the development of written calendars and then in the fifth century a scientific prose literature (and perhaps we should add with the rise of urban populations accustomed to reading public announcements),[27] it was natural that long-term predictions, extended to cover every day of the year, would be displayed in agorai throughout Greece. In brief, every day of the solar year was designated in an easily understood way and given a general indication of local weather and perhaps of heavenly activity (e.g., morning setting of Pleiades). *Alongside* (παρά) each day was a hole, with a peg (a good English word to use in this context) being *stuck* in that day's hole; hence παράπηγμα.[28] Attempts were made vastly to improve on Hesiod, in order to correlate, as in a modern farmer's almanac, every day of the year with its expected weather, its ἐπισημασίαι, where this term indicates weather *concurrent* with the day indicated (e.g., in modern terms, "April 15th, rain"; in *DS*, σημαίνει, ἐπισημαίνει, and προσημαίνει are all used to

[25] 34.240–2 ἐὰν ἐτησίαι πολὺν χρόνον πνεύσωσι καὶ μετόπωρον γένηται ἀνεμῶδες, ὁ χειμὼν νήνεμος γίνεται, ἐὰν δ' ἐναντίως καὶ ὁ χειμὼν ἐναντίος, 40.293–5 καὶ οἱ πλεύμονες οἱ θαλάττιοι ἐὰν πολλοὶ φαίνωνται ἐν τῷ πελάγει χειμερινοῦ ἔτους σημεῖον. Other examples at cc. 25, 26, 27, 41, 44, 48, 49, 55, 56.

[26] It will be useful to include a short paragraph on this material, although as with Hesiod, its weather signs are of the annual sort. The standard work on parapegmata, A. Rehm, *Parapegmastudien, mit einem Anhang, Euktemon und das Buch De Signis*. Abh. d. Bay. Ak. d. Wiss., Philos.-hist. Abt. NF 19 (München 1941), has now been replaced by D. R. Lehoux, *Astrology, Weather, and Calendars in the Ancient World*, Cambridge 2007. Cf. also O. Neugebauer, *A History of Ancient Mathematical Astronomy* (Berlin 1975) 1.587–589. For a comprehensive literary example, covering the entire year and citing earlier compilers, see Ptolemy's *Phaseis* (vol. 2.14–65 Heiberg). Cf. Rehm, "Episemasiai," *RE* Supplb. 7 (1940) 175–198; R. Hannah, "From orality to literacy: The case of the parapegma," in J. Watson (ed.), *Speaking Volumes: Orality and Literacy in the Greek and Roman World* (Leiden 2001), 139–159; id. "Euctemon's parapegma," in C. J. Tuplin and T. E. Rihll (eds.), *Science and Mathematics in Ancient Greek Culture* (Oxford 2002) 112–132.

[27] On the relationship between parapegmata and literacy, cf. R. Hannah, "From orality to literacy" (see above, n. 26).

[28] See further Geminus *Eisagoge* 17, which is the fullest ancient treatment. Geminus spends much of his chapter, however, arguing that the heavenly signs are not the actual causes of the weather that follows.

indicate *forthcoming* weather). Since, as was mentioned above, Hesiodic weather prediction is distinct from that found in *DS* and most weather literature; and since the parapegmata, although individually designed to fit their respective locales, were extensions of Hesiod, they need not be treated in detail here, although *DS* does contain one sentence of a parapegmatic sort; see comm. on 23.157 f. ἐὰν μὴ—ἢ ἄνεμος. Names associated with parapegmata, and frequently named in our literary exempla (e.g., Vitr. 9.6.3) were, from the fifth century, Demokritos (see previous section), Euktemon (see below), Meton (see comm. on *DS* 4.27 f. Μέτων); from the fourth century, Eudoxos (see below), Philippos of Opos, Kallippos (Böker 1621–23); from the third century, Konon, Dositheos, Metrodoros; and, from the second century, Hipparchos.[29] Remains of some inscriptional parapegmata are extant (cf. Rehm, *Parapegmastudien*) and literary versions (adapted to current, even Roman, calendars)[30] can be found in Geminus' *Parapegma*, Ptolemy's *Phaseis* and Columella 11.2.[31] Only one sign in *DS* may be said to be parapegmatic: 30.206 f. ἡ πέμπτη καὶ δεκάτη ἀπὸ τροπῶν τῶν χειμερινῶν ὡς τὰ πολλὰ νότιος, which Rehm *Parapegmastudien* 129 ff., perhaps rightly, thinks derives from Euktemon. This observation of *DS*, however, occurs in the middle of a passage concerned with the alternation between north and south winds, just as in [Arist.] *Probl.* 26, so that this may be reflecting a topic familiar to the Lyceum and hence only indirectly derived from parapegmata and/or Euktemon. Cf. *Probl.* 26.12 (941b13–14) ἔστι δὲ καὶ ἡ μετὰ τὰς χειμερινὰς τροπὰς πεντεκαιδεκάτη νότιος. Therefore, Böhme's theory that a parapegma was part of the original *DS* (7 f.), although it may in fact be true, is not compelling. Note that Rehm *Parapegmastudien* has argued that Euktemon is the author of *DS*; see further below, on authorship of *DS*.

[29] For a more detailed and more comprehensive survey of names associated with parapegmata, cf. Lehoux, *Parapegmata, or Astrology, Weather, and Calendars in the Ancient World*. Diss. Toronto 2000, 20–22.

[30] The essence of parapegmata is the association of particular weather to particular days of the solar year. How these days are identified changes in the course of time. At first, as noted above, it would be in the form of solstice/equinox + number of days; then Dionysian (see immediately below) month (derived from zodiacal sign) + number (the fifth day of Aries, say); next, in the Hellenistic period, Egyptian calendrical months were used; and then Roman months. And occasionally more than one system was given. (The division of the zodiac into signs is credited to Kleostratos in, probably, the late sixth century; cf. comm. ad *DS* 4.26 Κλεόστρατος; but the systematic use of them to identify the days of the year was developed by Dionysios in 285 BC; cf. A. E. Samuel, *Greek and Roman Chronology* [Munich 1972] 39 f., 50, 52).

[31] For an example of parapegmata, see Lehoux, *Parapegmata*.

Aristotle, Σημεῖα χειμώνων α′ (D.L. 5.26, title no. 112;[32] Σημασίαι χειμώνων, Hesysch.; for the designation Περὶ σημείων, see below). See further Gemin. *Eisagoge* 17.49, who after a summary of the short-term weather signs used by Aratos says τούτοις δὲ τοῖς σημείοις καὶ ’Αριστοτέλης ὁ φιλόσοφος κέχρηται καὶ Εὔδοξος καὶ ἕτεροι πλείονες τῶν ἀστρολόγων (Arist. fr. 364 Gigon = Eudoxos fr. 139 Lasserre).[33] Note also Seneca *QN* 7.28.1 *Aristoteles ait cometas significare tempestatem et ventorum intemperantiam atque imbrium* (a passage missed by Gigon).[34] Two sentences from this work are quoted by Schol. in Arat. 1095 (see comm. on *DS* 17 ὄρνιθες οἳ βιοτεύουσιν ἐν νήσῳ) = Arist. fr. 365 Gigon. An even longer (and for our purposes extremely valuable) passage is paraphrased by Aelian *NA* 7.7 = Arist. fr. 270.21, almost every clause of which is quoted as appropriate throughout the commentary (see below and the index locorum). Although Gigon keeps all of his selection from Aelian (fr. 270) among the fragments Περὶ ζῴων (pp. 420–492), we regard *NA* 7.7, beginning ’Αριστοτέλους ἀκούω λέγοντος ὅτι κτλ, as deriving from his work on signs, where they would have appeared within smaller compass and hence would have been easier for Aelian to mine. More specifically, Aristotle may, like some of the Byzantine collections described below, have arranged his work by sign rather than, like *DS*, by result. A section like this devoted entirely to bird signs could have been easily mined by Aelian. It is true that some of the signs in Aelian’s chapter portend events other than storms, and so would seem to go beyond the range indicated by D.L.’s title, but there is no evidence that any compiler of weather signs limited himself to only one outcome (excluding, that is, wind, rain, fair weather, etc.; even the more fully titled *DS* manages to get in signs for snow and hurricanes, which are not part of the title). There is no reason, furthermore, to believe that Aelian stuck close to Aristotle’s actual words;[35] in particular, there is good rea-

[32] P. Moraux, *Les listes anciennes des ouvrages d’Aristote* (Louvain 1951) 113, 186 thinks that this title was mistakenly listed with mathematical works, but Diogenes’ list at this point is not so neatly organized: items 109–115 are *Physiognomonikon, Iatrika, Monad, Signs of Storms, Astronomikon, Optikon, Kinesis*.

[33] Cronin “Authorship” 308 is right to raise the possibility that Geminus is here thinking only of isolated weather signs scattered through *Mete*. and *HA* (see below), but this seems unlikely.

[34] As noted by Cronin 309, the Senecan fragment is at variance with what Aristotle says at *Mete*. 344b19–20, that comets σημαίνουσι γιγνόμενοι πλείους πνεύματα καὶ αὐχμούς. And since Seneca’s statement agrees with *DS* 34.245–7, it is possible that Seneca took Aristotle to be the author of *DS*, or that Aristotle changed his mind from one work (Περὶ σημείων) to the next (*Mete*.).

[35] Cf. O. Gigon, *Aristotelis Opera*, vol. 3, *Librorum deperditorum fragmenta* (Berlin 1987)

son to believe that he stripped Aristotle's original of the scientific reasons for believing in each of the signs given. Nor is there much reason to believe that Aelian is here actually citing *DS* in the mistaken belief that he is reading a work of Aristotle.[36] Aelian 7.7 contains signs not in *DS* and he places signs that are found in *DS* in 7.8, which he seems to reserve for signs found elsewhere.

Another possible explanation for the testimony for Aristotle's having written such a work is that later sources were in fact referring to *DS*. Such is the view, e.g., of A. F. Schofield, the editor of the Loeb Aelian *On the Characteristics of Animals*, who, when Aelian says ὡς ἐκεῖνος λέγει (by which Aelian means Aristotle), glosses this in his facing translation with "[Thphr. *Sig.* 16]." It may well be the case that Aristotle never wrote such a work, but the fact that Aelian's chapter so often closely agrees with *DS* is not proof of this, as it is in the nature of ancient technical treatises to borrow freely from predecessors, so that, whatever the mutual affiliations among the many ancient works on weather, any work of Aristotle on this subject would almost certainly share signs with the others.

For Aristotle's interest in weather signs in his extant works (ignoring *Problemata*'s many examples; see below), cf., e.g., (i) *Mete.* 372b15–33: a complete halo is a sign of rain, broken it is a sign of wind, faded it is a sign of fair weather; for each sign a reason is given which in turn are embedded in a wider context of the nature of halos. See comm. on 22, where this passage is quoted at length. (ii) 372b23–28: mock suns as signs of rain (and the reason for this); cf. comm. ad 22. (iii) *HA* 575b17–19: cows coupling signal rain (no cause given); cf. comm. ad 40. (iv) 614b20–21: cranes descending signal a storm (because they can see over the horizon); cf. comm. ad 38.

The codd. of Ἀνέμων θέσεις καὶ προσηγορίαι identify it as having come ἐκ τῶν Ἀριστοτέλους Περὶ σημείων. The ἐκ is ambiguous; it could mean that *De Situ* formed a discrete unit within the larger work, or, more likely, that the mechanically presented information about the directions and (some) alternate names were abstracted from various places in Aristotle's *Peri semeion* and rewritten. The text, newly edited by

420, "Diejenigen Aelians nennen nur den Namen des Aristoteles und sind in der Regel stilistisch stark überarbeitet." Böhme 40 f., however, thinks that when Aelian says ὡς ὁ αὐτὸς Ἀριστοτέλης λέγει and ὡς ἐκεῖνος λέγει, "pro certo habeamus etiam illa paucis mutatis Aristotelis esse," but all this may mean is that he is here following closely his source, which may or may not be close to Aristotle's own language.

[36] So, e.g., A. F. Schofield, the editor of the Loeb Aelian, p. 103.

Victor D'Avella, is given below in the appendix. See comm. ad c. 35.249 στάσεις.

Book 26 of the Peripatetic Problemata contains a number of weather signs, some of them paralleled in *DS*, although they are not gathered in one place within the book. Note especially *Probl.* 26.19 with *DS* 35.254, 23 with 13.83, 26 with 20.135, 34 with 26.177, 61 with 29.199 f. There is, though, insufficient verbal parallel to maintain that *Problemata* derives directly from *DS*, as was argued by Rehm, *Parapegmastudien* 131, crediting C. von Prantl, "Über die Probleme des Aristoteles," *Bayerische Akademie der Wissenschaften (München)*, Philosophisch-philologische Klasse 6 (1852) 375. Nonetheless, the common Peripatetic origin of Aristotle, Theophrastos, *Problemata* and *DS* suggests that all explanations found in *Problemata* originated in Aristotle's and perhaps Theophrastos' Περὶ σημείων as well. They will accordingly be given in full in the commentary.

Theophrastos, Περὶ σημείων (D.L. 5.45); cf. Proklos *in Plat. Tim.* 40cd (=Theophrastos fr. 194 FHSG) θαυμασιωτάτην δὲ εἶναί φησιν ὁ Θεόφραστος ἐν τοῖς κατ' αὐτὸν χρόνοις τὴν τῶν Χαλδαίων περὶ ταῦτα θεωρίαν, τά τε ἄλλα προλέγουσαν καὶ τοὺς βίους ἑκάστων καὶ τοὺς θανάτους, καὶ οὐ τὰ κοινὰ μόνον, οἷον χειμῶνας καὶ εὐδίας, ὥσπερ καὶ τὸν ἀστέρα τοῦ Ἑρμοῦ χειμῶνος μὲν ἐκφανῆ γενόμενον ψύχη σημαίνειν, καύματα δὲ θέρους εἰς ἐκείνους ἀναπέμπειν· πάντα δ' οὖν αὐτοὺς καὶ τὰ ἴδια καὶ τὰ κοινὰ προγινώσκειν ἀπὸ τῶν οὐρανίων ἐν τῇ *Περὶ σημείων* βίβλῳ φησὶν ἐκεῖνος. There is nothing in *DS* on the Chaldaeans, nor on any astrological influence of the stars on men. The reference to stars, moreover, is more suggestive of parapegmatic material, which affect κοινά if not ἴδια. Note, though, *DS* 46.339 f. "If Mercury is visible in winter it signals cold, if in summer it signals heat," which strongly suggests that other passages (how many?) appeared in both works. It is noteworthy that, although Theophrastos in his extant (and lengthy) works on plants quite naturally refers occasionally to the causal relationship between weather and plants,[37] he nowhere looks to plants (or anything else) for signs of impending weather.[38]

[37] E.g., *HP* 3.8.5, the only oaks struck by lightning are scrub oak and sea-bark oak. Note also fr. 400a, mushrooms produced by thunderstorms. *CP* 5.12–14 discusses the deadly effect that weather can have on plants.

[38] See further R. Sharples, "Some observations on the secondary tradition of Theophrastus' *Opuscula*," in Fortenbaugh and Sharples (1988) 45–47. See also Sharples' commentary on fr. 194 in R. Sharples, *Theophrastus of Ephesus. Commentary*, 3.1, pp. 161–3.

Eudoxos of Knidos (4th cent. BC). Cf. Gemin. *Eisagoge* 17.47–49 (Eudoxos fr. 139 Lasserre) (Aratos) λαμβάνει γὰρ τὰς προγνώσεις ἀπὸ τῆς τοῦ ἡλίου ἀνατολῆς καὶ δύσεως, καὶ ἀπὸ τῶν τῆς σελήνης ἀνατολῶν καὶ δύσεων, καὶ ἀπὸ τῆς ἅλω τῆς γινομένης περὶ τὴν σελήνην, καὶ ἀπὸ τῶν διαϊσσόντων ἀστέρων, καὶ ἀπὸ τῶν ἀλόγων ζῴων. ... 49 τούτοις δὲ τοῖς σημείοις καὶ Ἀριστοτέλης ὁ φιλόσοφος [fr. 364 Gigon] κέχρηται καὶ Εὔδοξος. Similarly Joh. Diacon. *in Hes. Theog. alleg.* p. 571 Gaisford κατὰ διαφόρους ἐπιτολὰς καὶ δύσεις ἄλλων καὶ ἄλλων ἄστρων, καὶ ἐκ διαφόρων μερῶν τοῦ παντὸς οἱ ἄνεμοι πνέουσιν, ὡς Ἀριστοτέλης τε δηλοῖ ἐν τῷ δευτέρῳ τῶν Μετεώρων (351b30) καὶ Ἄρατος ὁ ποιητὴς καὶ Εὔδοξος (fr. 139). These are important testimonia, as they credit Eudoxos with προγνώσεις derived from sun, moon, halos, shooting stars, and animals, of wind and rain, i.e., all short-term weather signs, and all of which sort are found in *DS*. Almost as important is Sext. Emp. *Adv. math.* 5.2, where Eudoxos (fr. 141) and Hipparchos are credited with a προρρητικὴ δύναμις that derives from their study of astronomy, here defined as a τήρησις ... ἐπὶ φαινομένοις ὡς γεωργία καὶ κυβερνητική, ἀφ' ἧς ἔστιν αὐχμούς τε καὶ ἐπομβρίας λοιμούς τε καὶ σεισμοὺς καὶ ἄλλας τοιουτώδεις τοῦ περιέχοντος μεταβολὰς προθεσπίζειν.[39] If this is true, it could explain why Eudoxos alone is given as the source for Aratos by ancient authors:[40] Aratos would have found in Eudoxos his source for both parts of his poem, the description of the heavens and of the Diosemiai.[41] Indeed, *Vita Arati* 3 (pp. 16.28–17.21 Martin) makes it clear that Aratos did not go beyond Eudoxos in composing the *Phainomena*.[42] And since Aratos is close in

[39] Eudoxos fr. 141 Lasserre. Böker 1621 argues that, since Hipparchos is dependent on Eudoxos for his calendrical data, here too Sextus' comments should apply exclusively (*allein*) to Eudoxos. This may be an overstatement, but "primarily" can probably be substituted for "exclusively." Plagues and earthquakes may be predicted from animal signs more readily than from astronomy, which suggests that Sextus has misread an intermediate source as to the nature of Eudoxos' work. On the other hand, the earthquake experts mentioned by Pausanias 7.24.7–11 (οἱ φροντίσαντες and their students) read only meteorological signs in addition to distinguishing among different kinds of earth tremors; see Gilbert 319–321.

[40] For his content, that is; Kallimachos and others regard Aratos' *poetic* model as Hesiod. Cf. Kall. *Epigram* 27.1 Ἡσιόδου τό τ' ἄεισμα καὶ ὁ τρόπος, on which see W. Ludwig, "Die Phainomena Arats als hellenistische Dichtung," *Hermes* 91 (1963) 425–448; R. L. Hunter, "Written in the stars: Poetry and philosophy in the *Phainomena* of Aratus," *Arachnion* 2 (1995), http://www.cisi.unito.it/arachne/num2/hunter.html.

[41] This is in fact Böhme's argument for Eudoxan authorship of *DS* (cf., e.g., Böhme 81–83).

[42] Although it does so in an insulting way, quoting Hipparchos and some unnamed individuals who claimed that the unmathematical Aratos was incapable of going beyond

many instances to *DS*, Eudoxos either is its author or he drew very heavily from it or something very close to it. The common statement, therefore, that Aratos' section of weather signs derives from *DS* may falsely suggest that he had two major sources rather than, as seems likely, one work under Eudoxos' name. (See further below, on Aristotle.)

Bolos of Mendes (3rd cent. BC). Cf. Souda (s.v. Βῶλος Μενδήσιος Πυθαγόρειος): Περὶ σημείων τῶν ἐξ ἡλίου καὶ σελήνης καὶ Ἄρκτου καὶ λύχνου καὶ ἴριδος. All of which signs but Arktos (lg. Ἀρκτούρου?) are used as short-term weather signs in the extant *De Signis*. Bolos was confused with Demokritos (see above).[43]

P. Vindob. gr. 1 (3rd–2nd cent. BC). This fragmentary papyrus clearly contains, i.a., weather signs of the sort found in *DS*. Some are dependent on the phases of the moon, as in *DS* cc. 5–6. The arrangement is by sign: An entire section is given over to the Manger, [τὰ ἐκ το]ῦ Φατνίου σημ[εῖα]; cf. *DS* 23.156, 43.314 f., 51.370 f. Others are [διαττόντω]ν σημεῖα, [θαλάσση]ς σημεῖα, and [ἡλί]ου σημεῖα.

Cf. O. Neugebauer, "Astronomische Papyri aus Wiener Sammlungen. II. Über griechische Wetterzeichen und Schattentafeln. Institut für österr. Geschichtsforschung, Pap. graec. Nr. 1," *Sitzungsberichte der Österreichischen Akademie der Wissenschaften*, Philosophisch-historische Klasse 240, Abh. 2 (1962) Vienna, 29–44; Neugebauer rearranges and reedits C. Wessely, "Bruchstücke einer antiken Schrift über Wetterzeichen," *Sitzungsberichte der Wiener Akademie der Wissenschaften*, Philologisch-historische Klasse 142, Abh. 1 (1900).

Eudoxos. It is clear then that the point of this story is directed against the first part of Aratos' poem. None the less, the force of the anecdote would be seriously weakened if not destroyed had Aratos used any source other than Eudoxos. W. Kroll, "Lehrgedicht," *RE* 12 (1925) 1849, should be given credit for allowing for the possibility that Eudoxos was Aratos' source for his weather signs: "Es ist keineswegs ausgeschlossen, dass auch der zweite Teil, die sog. Diosemeia, eine Bearbeitung des Eudoxos sind."

[43] On Bolos, cf. Wellmann (see above, n. 19.) *RE* Supplb. 1 (1903) 255; "Die Georgika des Demokritos," *Abhandlungen der Preussischen Akademie der Wissenschaften*, Philosophisch-historische Klasse (1921.4) Berlin; "Die Φυσικά des Bolos Demokritos und der Magier Anaxilaos von Larissa," *Abhandlungen der Preussischen Akademie der Wissenschaften*, Philosophisch-historische Klasse, (1928.7) Berlin; J. Waszink, "Bolos," *Reallexikon für Antike und Christentum*, Stuttgart, 2 (1954) 502–508; P. M. Fraser, *Ptolemaic Alexandria* (Oxford 1972) 1, 440–444; J. P. Hershbell, "Democritus and the beginnings of Greek alchemy," *Ambix* 34 (1987) 5–20; J. Salem, *La légende de Démocrite* (Paris 1996) 118–128.

Aratos 733–1154. Only one source for Aratos was known by the ancients, i.e., Eudoxos: Hipparchos, e.g., *in Arati et Eudoxi Phaenomena Comment.* mentions only Eudoxos (see above, on Eudoxos). It is true that Hipparchos' commentary stops short of Aratos' weather signs, but his statement that Aratos based his poem on Eudoxos' *Phainomena* (1.2.2 πρὸς τὰ Φαινόμενα δὲ τὴν ποίησιν συνέταξεν) seems to exclude any other source for Aratos, unless one still holds to the view that the weather signs are not original to Aratos' poem.[44] Cf. *Vita Arati* 3 pp. 15.33–16.2 Martin, which has him as an intimate of Zeno Stoicus, but on the subject of the *Phainomena* the *Vita* says (16.24–17.6) τὴν δὲ τῶν Φαινομένων ὑπόθεσιν παρέβαλεν αὐτῷ ὁ Ἀντίγονος (sc. of Pella) δοὺς τὸ Εὐδόξου σύγγραμμα καὶ κελεύσας ἕπεσθαι αὐτῷ. ὅθεν τινὲς τῶν ἁπαλωτέρως προσερχομένων ταῖς ἐξηγήσεσιν ἔδοξαν μὴ μαθηματικὸν εἶναι τὸν Ἄρατον. ὑπέλαβον γὰρ μηδὲν ἕτερον τῶν Εὐδόξου Φαινομένων ποιήσαντα αὐτὸν εἰς τὸ σύγγραμμα θεῖναι. This anecdote all but explicitly excludes a second source. Cf. Cic. *De re publ.* 14. Since *DS* and Aratos agree in detail on many weather signs, it is impossible to exclude the possibility that Eudoxos' work on weather signs (whether or not a distinct work) contained signs very similar to when not exactly the same as *DS* and that he was the source for Aratos (as Aratos would himself have thought). That *DS* and Aratos are consistently close strongly suggests, but does not prove, either (i) that Eudoxos was not

[44] This seems most unlikely, though. The essential difference between the sections on star-lore and that on short-term weather statements (see above) is passed over as smoothly as possible, so that the transition at 758 from one to the other is barely noticed. Note that the section on the days of the month (733–739), which figures in *DS* and similar literature (cf., e.g., *DS* cc. 5, 6, 8), occurs before a resumptive section on the zodiac (740–757). Note too how the theme in this latter section of the need for sailors to recognize *all* signs (esp. 743 ἐκ Διὸς ἤδη πάντα πεφασμένα πάντοθι κεῖται) is continued in the beginning of the Diosemiai (esp. 758–760); and how 758 itself looks back as it begins the new section: τῷ κείνων πεπόνησο κτλ). Aratos' famous acrostic ΛΕΠΤΗ from 783 to 787 marks off a passage on the days of the month that hearken back to 733–739. Another argument for unity is the reference in the proem to farmers (7–9), who are barely mentioned in the first part of the poem (whereas sailors are often specified), but who are frequently named in the section on weather signs; cf. C. Fakas, *Der hellenistische Hesiod: Arats* Phainomena *und die Tradition der antiken Lehrepik* (Wiesbaden 2001) c. III 3.3, "Das Landwirtschaftsthema." There was, nonetheless, an ancient belief that the Diosemiai formed either a separate book or a separate poem. For a treatment of this question, cf. W. Ludwig (see above, n. 40), M. Erren, *Die Phainomena des Aratos von Soloi: Untersuchungen zum Sach- und Sinnverständnis* (Wiesbaden 1967) 227–233, and Martin's Budé 1.lxii f., all of whom argue for the Diosemiai's being an organic part of Aratos' original poem. P.Berol. 7503 + 7804 (*BKT* V i, p. 47), 1st–2nd cent. AD contained both astronomy and weather signs (vv. 642–55, 684–802, 855–83, 922–34), but of course one cannot rule out the possibility that at 758 it announced the end of one poem and the beginning of another.

interested in the causes that we assume to have been present in Aristotle's and Theophrastos' works on weather signs, or (ii) that his fuller text was stripped of its signs by Aratos.[45] (That Aratos does not follow the same order as *DS* where his signs are the same proves nothing; cf. Heeger 26.)[46]

Aratos was translated into Latin by Varro Atacinus (see below), Cicero, and Germanicus.

Although some scholars have argued that Aratos was the source for *DS*,[47] we think that a close look at two parallels between the two works rules out this line of descent:

(i) *DS* 12.80 f. (speaking of the moon) ἐὰν μὲν ᾖ ἀργυρώδης εὐδίαν, εἰ δὲ πυρώδης ἄνεμον, ἐὰν δὲ ζοφώδης ὕδωρ σημαίνει is an unusually periodic sentence for this work, but the anomalous εἰ-clause between two that begin with ἐάν suggests accretion over time, not one that was copied whole from any one source, let alone a poetic one. Aratos 802–804, on the other hand, reads like a poetic translation of the text of *DS*: πάντη γὰρ καθαρῇ κε μάλ' εὔδια τεκμήραιο, | πάντα δ' ἐρευθομένῃ δοκέειν ἀνέμοιο κελεύθους, | ἄλλοθι δ' ἄλλο μελαινομένῃ δοκέειν ὑετοῖο.

(ii) Both *DS* 17.110–12 ἐάν τε κόρακες ἐάν τε κολοιοὶ ἄνω πέτωνται καὶ ἱερακίζουσιν ... ὕδωρ σημαίνουσι and Arist. fr. 270.21 Gigon κολοιοὶ δὲ ἱερακίζοντες ... ὑετὸν δηλοῦσι describe the same sign with the same verb, ἱερακίζειν, which is very rare, appearing only in these two classical texts.[48] Its very meaning is obscure (see the comm. ad *DS* 17.111). Aratos 963–966, on the other hand, spells out the meaning (although he may only have guessed at it):

> δή ποτε καὶ γενεαὶ κοράκων καὶ φῦλα κολοιῶν
> ὕδατος ἐρχομένοιο Διὸς πάρα σῆμ' ἐγένοντο,
> φαινόμενοι ἀγεληδὰ καὶ ἰρήκεσσιν ὁμοῖον 965
> φθεγξάμενοι.

[45] As the commentary will amply demonstrate, there is much overlapping between *DS* and Aratos, but the latter has ca. 20 signs not found in the former; cf. Kidd 22 f. for a list.

[46] Aratos at first arranges by sign and then by result; cf. Erren, *Die Phainomena*, 266–300, for the fullest analysis of Aratos' arrangement.

[47] Rose (see above, n. 12) 23 f.; W. Gemoll, *Untersuchungen über die Quellen, den Verfasser und die Abfassungszeit der Geoponica*. Berliner Studien für classische Philologie und Archäologie, 1.1. Berlin 1883 [repr. Walluf bei Wiesbaden 1972.] 57. Böhme 25 f. easily destroys Rose's argument based on the supposed similar order of the two texts.

[48] It reappears in later (and derivative) weather literature: Anon. Laur. 11.22 and *CCAG* 8.1 p. 138.9.

This δὶς λεγόμενον forms a direct link between Aristotle and *DS*, even if there were intermediate texts. *DS* could never have come up with this verb from a reading of Aratos (although it still remains possible that *DS* postdates Aratos).

Poseidippos the epigrammatist (early 3rd cent. BC). The recently published papyrus of the late third century BC[49] contains four contiguous epigrams on weather signs at the beginning of the section entitled οἰωνοσκοπικά (21–24 Austin-Bastianini). Poseidippos seems to have taken pains to obtain his signs from other than the usual sources (as outlined in this section of the introduction); see D. Sider, "Poseidippos on Weather Signs and the Tradition of Didactic Poetry," in K. Gutzwiller (ed.), *The New Posidippus: A Hellenistic Poetry Book* (Oxford 2005), 164–182.

Nigidius Figulus (1st cent. BC).[50] Nigidius Figulus' writings on this subject may not have been part of a work dedicated to weather signs, at least not of the sort we see elsewhere. According to Aulus Gellius 7.6.10 (N.F. fr. 80 Swoboda) he wrote *De augurio privato*, which may have offered instruction in how to read the heavens not only for weather but also for omens of all sorts. Thus an elaborate βροντοσκοπία is credited to him by Joh. Lydus *De ostentis* pp. 57–83: a calendric arrangement, from June to May of what to expect on each day, ἐὰν βροντήσῃ. Some apodoses are weather conditions of various sorts (e.g., great heat, cloudiness, rain), but many more are outcomes not in themselves meteorologic but dependent upon weather at least to some extent (e.g., disease, a good harvest, small fish catches), and some have no connection with the weather (e.g., civil discord, πόλεμοι καὶ μυρία κακά). Elsewhere, in his Τῶν ὀνείρων ἐπίσκεψις, he said that while generally to dream of lightning is an unfavorable sign, for some it foretells good fortune.[51]

On the other hand, some other statements attributed to Nigidius conform to standard weather predictions. Cf. Schol. in Germanicum 112 *si rubet* [sc. *luna*] *quasi aurum, ventos ostendit* (~*DS* 12.80 f. εἰ δὲ πυρώ-

[49] G. Bastianini and C. Gallazzi, *Posidippo di Pella. Epigrammi* (*P.Mil.Vogl. VIII 309*). Milan 2000.

[50] Cf. Böhme 32 ff.; Heeger, 36 f. Fragments in A. Swoboda, *P. Nigidii Figuli operum rell.* (1889). Cf. F. Kroll, "Nigidius (2)," *RE* 17 (1936) 200–212 (205 on *De Ventis*), A. Roehrig, *De P. Nigidio Figulo capita duo* (Diss. Leipzig 1887) 56 ff.

[51] Lydus *De Ostent.* 45, pp. 95.15–96.3 Wachsmuth.

δης [sc. σελήνη] ἄνεμον); *fit enim ventus ex aeris densitate, densitate obducta sol et luna rubescunt. item si cornua eius obtecta fuerint nebula, tempestas futura est*. This causal explanation, however, is foreign to *DS*. Does it derive from an Aristotelian or Theophrastean original, or is it due to Nigidius Figulus himself? (See below on causation in *DS*.)

Varro Reatinus (1st cent. BC). As Heeger 35 f. shows, the fragments attesting to Varro's interest in weather signs are not entirely consistent with *DS* and Aratos. Pliny *NH* 18.348 f., the most extensive, contains an extensive passage from Varro on signs provided by the various phases and attendant colors, halos, etc. of the moon, many of which appear in *DS* (see index locorum). (These came from a source other than his *Res Rusticae*, which ignores weather signs.): *si quarto die luna erit directa, magnam tempestatem in mari praesagiet, nisi si coronam circa se habebit et eam sinceram, quoniam illo modo non ante plenam lunam hiematurum ostendit. si plenilunio per dimidium pura erit, dies serenos significabit; si rutila, ventos; nigrescens imbres;* 349 *si caligo orbisve nubium* [Mayhoff; *orbis nubem* codd.] *incluserit, ventos qua se ruperit; si gemini orbes cinxerint, maiorem tempestatem, et magis, si tres erunt aut nigri, interrupti atque distracti. nascens luna si cornu superiore obatrato surget, pluvias decrescens dabit, si inferiore, ante plenilunium, si in media nigritia illa fuerit, imbrem in plenilunio. si plena circa se habebit orbem, ex qua parte is maxime splendebit ex ea ventum ostendet, si in ortu cornua crassiora fuerint, horridam tempestatem. si ante quartam non apparuerit vento favonio flante, hiemalis toto mense erit, si xvi vehementius flammea apparuerit, asperas tempestates praesagiet*. This is far fuller than the (dispersed) lunar signs found in *DS* or Aratos. It also differs from them in such a way to suggest the independence of Varro or his source. Compare in particular *DS* 27.185 f. "when a north wind blows, westerlies are accustomed to follow and the month continues to be stormy" with Varro ap. Pliny *NH* 18.348 "If when there is a west wind blowing the moon does not make an appearance before her fouth day, she will be accompanied by wintry weather for the whole month," where what is sign in the latter is a result in the former (see the commentary).

Isid. *DNR* 38.2 is consistent with *DS* 21.140 f. and Aratos but (as cited at any rate) contains less detail (see comm. ad loc.): *item Varro dicit signum esse tempestatis dum de parte aquilonis fulget et dum de parte euri intonat*. Id. 38.4 is close to *DS* 26.179: *sol si exoriens concavus videtur* (ἐὰν κοῖλος φαίνηται ὁ ἥλιος[52]), *ita ut e medio fulgeat et radios faciat*

[52] Sc. ἀνατέλλων, as is clear from the preceding sentence.

partim ad aquilonem, partim ad austrum, tempestatem humidam et vernosam futuram innuit (ἐὰν αἱ ἀκτῖνες αἱ μὲν πρὸς βορρᾶν αἱ δὲ πρὸς νότον σχίζωνται τούτου μέσου ὄντος κατ' ὄρθρον κοινὸν ὕδατος καὶ ἀνέμου σημεῖόν ἐστιν). Nonius Marcellus 1.66 *ventique frigido se ab axe eruperant phrenetici, septentrionum filii, secum ferentes tegulas, ramos, syrus*. That Vergil read and used him is shown below.[53]

Cf. Vegetius 4.41.6 *aliquanta ab avibus, aliquanta significantur a piscibus, quae Vergilius in Georgicis divino paene comprehendit ingenio et Varro in libris navalibus diligenter excoluit*, which suggests that just as Hesiod dedicated his book to farmers Varro aimed his toward sailors. Although Vergil has no signs from fish, note that he, unusually, mentions sailors (along with *rura*) at *G.* 1.372 f. *omnis navita ponto | umida vela legit*, in a passage that also has a Varronian parallel; see comm. on *DS* 21.140 f. See further Böhme 30 ff., Heeger 35 f.

Varro Atacinus (1st cent. BC), *Ephemeris*.[54] Two fragments derive from this work: 21 Morel = 13 Courtney *nubes si ut vellera lanae | constabunt* (cf. ad *DS* 13.87); and 22 M. = 14 C.:

tum liceat pelagi volucres tardaeque paludis
cernere inexpletas studio certare lavandi
et velut insolitum pennis infundere rorem;
aut arguta lacus circumvolitavit hirundo [= V. *G.* 1.377][55]
* * * * * *
et bos suspiciens caelum (*mirabile visu*) 5
naribus aerium patulis decerpsit odorem,
nec tenuis formica cavis non evehit ova.

Cf. comm. ad *DS* 15.97. Varro translated Aratos, as is shown clearly in fr. 22, which contains signs from birds washing themselves, swallows flying over a lake, a cow looking up at and sniffing at the sky, and ants carrying out their pupae—the very signs in the very order found in Aratos 942–945 (birds washing and swallows) and 954–957 (cows and ants). That Varro was read and copied in turn by Vergil (who also read Aratos)

[53] For the fragments of Varro, along with commentary, cf. E. Courtney, *The Fragmentary Latin Poets* (Oxford 1993) 235–253. And for Varro in general, see F. Lenz, "P. Terentius (88) Varro," *RE* 5 (1934) 692–714.

[54] Cf. Brev. Expos. Verg. Georg. 1.397 *Varro in Ephemeride* [Bergk; *epimenide, epimedine* codd.], introducing fr. 21 Morel = fr. 13 Courtney.

[55] H. D. Jocelyn, "Ancient scholarship and Virgil's use of Republican Latin poetry," *CQ* 15 (1965) 140, unconvincingly argues that this line was originally Vergil's, which was then inserted into the text of Varro; cf. Courtney ad Varronis loc.

is shown by the overt imitation of Varro Atac. fr. 22.1–3 *cernere inexpletas studio certare lavandi* by Verg. *G.* 1.387 *et studio incassum videas gestire lavandi*.[56]

Vergil *Georgics* 1.351–463 (after 204–350, on the annual signs). Although it is impossible to read the *Georgics* without thinking of Hesiod's *Works and Days*, there are in fact very few direct borrowings, mostly in Book 1,[57] and hence much that is new, the passage on weather signs being but one such section. In this passage there are many weather signs exactly or very close to those found in *DS* and Aratos, but Vergil's source could conceivably be limited to Varro's and/or Cicero's translations. With Vergil, however, it is probably better to assume more rather than fewer sources.[58] We have already seen that Vergil read and borrowed from Varro Atacinus. The other Varro (Reatinus) was also read,[59] but it is not always possible to prove that a passage in Vergil for which there is a parallel in a prose fragment of Varro did not come from *DS* if not from Aratos; e.g., on the subject of winds as storm signs, *DS* 21.140 f. ~ Varro ap. Isid. *DNR* 38.2 ~ Arat. 933 f. ~ Verg. *G.* 1.370–373. As noted in the comm. ad 21.190 f. (where all are quoted in full), Vergil omits one wind from the four given by *DS* and Aratos, and Varro may be quoted only in part; thus we cannot know which sources Vergil had in mind when he wrote his verses. In this case, though, as Gillespie 51 notes, "Vergil is closer to Varro Reatinus than he is to Aratus, for Aratus speaks only of lightning, whereas Varro and Vergil specify that the significance of this weather-sign lies in lightning from the North in conjunction with thunder from the East (or West). One is tempted to see also in the similar conjunctions used (*dum ... et dum* : *cum ... et cum*) and in the repetition of the words *de parte* evidence of Vergil's direct use of Varro Reatinus." See also M. P. Cunningham, "A note on Latin poetic

[56] Cf. W. E. Gillespie, *Vergil, Aratus, and Others*: *The Weather Sign as a Literary Subject* (Diss. Princeton 1938) 43–51, who ably demonstrates Vergil's borrowings from Varro (against, e.g., Kroll *RM* 70 [1915] 603).

[57] Cf. A. La Penna, "Esiodo nella cultura e nella poesia di Virgilio," in *Hésiode et son influence* (*Entretiens Hardt* 7) (Vandœuvres-Genèvre 1962) 213–270 (repr. in G. Arrighetti [ed.] *Esiodo*: *Letture critiche* [Milan 1975] 215 ff.); id., "Esiodo," in *Enciclopedia Virgiliana* (Rome 1984) 1.386–388 (with bibliographical survey); D. Wender, "From Hesiod to Homer by Way of Rome," *Ramus* 8 (1979) 59–64; D. Sider, "Hesiod and Vergil," *Vergilius* 34 (1988) 15–24.

[58] Cf. L. A. S. Jermyn, "Weather-signs in Virgil," *Greece* and *Rome* 20 (1951) 26–37, 49–59.

[59] Cf. L. P. Wilkinson, *The Georgics of Virgil*: *A Critical Survey* (Cambridge 1969) 65–68.

imitation," *CB* 30 (1953/4) 41, 43 f., who tries (persuasively) to demonstrate how Verg. *G.* 1.375 f. draws from Aratos 954 f.; Cicero's translation of this passage (*Div.* 1.15); and Varro Atac. fr. 22 Morel = fr. 14 Courtney.[60] His description of *corvi* at 410 seems to bypass the inaccuracy of Aratos 1003–06 and go back directly to *DS* 52.384–6.[61] That Vergil's arrangement is his own proves nothing, as this particularly fine poet was capable of reordering the signs he found in any or all of his sources in his own idiosyncratic fashions.[62] Perhaps the surest sign (the appropriate word in this context) that Vergil read Aratos is the former's imitating the latter in the use of anagrams, which was Aratos' hidden sphragis/sign of authorship; cf. M. Haslam, "Hidden signs: Aratus *Diosemeiai* 46 ff., Vergil *Georgics* 1.424 ff.," *HSCP* 94 (1992) 199–204.

Note that Vergils' introduction to his weather sign section echoes *DS* in providing what seems to be a table of contents: *atque haec ut certis possemus discere signis*, | *aestusque pluviasque et agentis frigora ventos* (*G.* 1.351 f.). In fact, though, Vergil's list is only partially followed topic by topic in what follows, and the topics are wind, rain, and fair weather. In other words, Vergil's didactic table of contents misleads the reader. Vv. 354–373, signs of wind (sea, mountain sounds, waves, gulls' screaching, shooting stars, chaff, leaves, feathers); 373–392, signs of rain (cranes, heifers, swallows, frogs, ants, rainbow, rooks, sea birds, ravens, lamps), 393–423, signs of fair weather (stars, moon, clouds, halcyons, pigs, mist, owls, rooks). Then, by signifyer rather than by event, what the moon, winds, and sun may portend, 424–463.

Lucan 5.540–559. Amyclas tells Caesar, who has asked him to set sail, *multa quidem prohibent nocturno credere ponto*, and proceeds to list these *multa* [sc. *signa*], many of which are found also in *DS* (see index locorum) and other weather literature. For the most part, not wanting to bore Caesar with too much technical material, he merely lists bad signs

[60] See further Jocelyn (above, n. 55); A. Grilli, "Virgilio e Arato (a proposito di Georg. 1.187 ss)," *Acme* 23 (1970) 145–184. The most detailed array of parallels is in H. Morsch, *De Graecis auctoribus in Georgicis a Vergilio expressis*. (Diss. Halle 1878) 13–30, who argues that Vergil follows Aratos closely.

[61] Jermyn (see above, n. 58) 26–37, 49–59; Wilkinson (see above, n. 59) 237 f.

[62] They are first arranged in the manner of *DS*; i.e., by result rather than by sign: wind and storm together (356–369), rain (370–392), fair weather (393–423, and this, oddly, is in fact a description of fair weather itself rather than signs of its imminence, despite 394 *certis poteris cognoscere signis*). Then they are arranged by sign: moon (424–439) and sun (440–463). For a different ordering scheme, see M. Erren, *P. Vergilius Maro*: Georgica. Bd. 2, *Kommentar* (Heidelberg 2003) 197, 216, 234 f.

without specifying whether they portend wind, storm, or rain: "*nam sol non rutilas deduxit in aequora nubes | concordesque tulit radios*: *Noton altera Phoebi*, | *altera pars Borean diducta luce vocabat*. | *orbe quoque exhaustus medio languensque recessit | spectantes oculos infirmo lumine passus*. | *lunaque non gracili surrexit lucida cornu | aut orbis medii puros exesa recessus*, | *nec duxit recto tenuata cacumina cornu*, | *ventorumque notam rubuit*; *tum lurida pallens | ora tulit voltu sub nubem tristis ituro*. | *sed mihi nec motus nemorum nec litoris ictus | nec placet incertus qui provocat aequora delphin*, | *aut siccum quod mergus amat, quodque ausa volare | ardea sublimis pinnae confisa natanti*, | *quodque caput spargens undis, velut occupet imbrem*, | *instabili gressu metitur litora cornix*. | *sed si magnarum poscunt discrimina rerum*, | *haud dubitem praebere manus*: *vel litora tangam | iussa, vel hoc potius pelagus flatusque negabunt*." It is interesting to note that when Amyclas casts off, what follows are god-sent portents of the spooky unintelligible sort, which Caesar chooses to ignore.

Seneca does not devote a special section to weather signs but frequently mentions them when appropriate: *NQ* 1.1.12, 1.2.5, 1.2.8–10, 1.6.1, 1.11.1, 2.27.2, 7.28.1; cf. Böhme 35 f.

Suetonius wrote on weather signs, perhaps in his *Pratum*, quoted by Isidore of Seville *De Natura Rerum* 38. Cf. A. Reifferscheid, *Suetoni Tranquilli Praeter Caesarum libros reliquiae*, (Leipzig 1860) 233–237.

Geminus (1st cent. AD). Appended to his *Eisagoge* is a parapegma beginning in the summer that collects material from earlier, named, sources. Arrangement is by zodiacal sign. Here is the first, Cancer:

α′ ἡμέρᾳ Καλλίππῳ[63] Καρκίνος ἄρχεται ἀνατέλλειν· τροπαὶ θεριναί· καὶ ἐπισημαίνει.
θ′ ἡμέρᾳ Εὐδόξῳ νότος πνεῖ.
ια′ ἡμέρᾳ Εὐδόξῳ Ὠρίων ἐῷος ὅλος ἐπιτέλλει.
ιγ′ ἡμέρᾳ Εὐκτήμονι Ὠρίων ὅλος ἐπιτέλλει.
ις′ Δοσιθέῳ Στέφανος ἐῷος ἄρχεται δύνειν.
κγ′ Δοσιθέῳ ἐν Αἰγύπτῳ Κύων ἐκφανὴς γίνεται.
κε′ Μέτωνι Κύων ἐπιτέλλει ἐῷος.
κζ′ Εὐκτήμονι Κύων ἐπιτέλλει. Εὐδόξῳ Κύων ἐῷος ἐπιτέλλει· καὶ τὰς ἑπομένας ἡμέρας νε′ ἐτησίαι πνέουσιν· αἱ δὲ πέντε αἱ πρῶται

[63] This dative ("according to/as found in [a work of] *X*") is common in parapegmatic literature; cf. K-G 1.422 Anm. 21.

πρόδρομοι καλοῦνται. Καλλίππῳ Καρκίνος λήγει ἀνατέλλων πνευματώδης.
κη′ Εὐκτήμονι Ἀετὸς δύνει· χειμὼν κατὰ θάλασσαν ἐπιγίνεται.
λ′ Καλλίππῳ Λέων ἄρχεται ἀνατέλλειν· νότος πνεῖ· καὶ Κύων ἀνατέλλων φανερὸς γίνεται.
λα′ Εὐδόξῳ νότος πνεῖ.

Lehoux, *Parapegmata* 34 argues that this "parapegma probably antedates the late second century BC," and that it was probably added by Geminus himself.

Columella (1st cent. AD). *RR* 11.2.4–98 parapegmatically correlates the duties of the bailiff (*villicus*) with the changing weather of the year, beginning on January 13th. Cf. O. Wenskus, "Columellas Bauernkalender zwischen Mündlichkeit und Schriftlichkeit," in W. Kullmann et al. (eds.), *Gattungen wissenschaftlicher Literatur in der Antike* (Tübingen 1998) 253–262, who demonstrates Columella's debt to the literary tradition.

Pliny *NH* 18.340–365, ending the georgic book 18, which had earlier cited (i.a.) Hesiod, Demokritos, Xenophon, Cato, Varro, and Vergil (note in particular 321 *Vergilius ... Democriti secutus ostentationem*); the weather chapters name Demokritos and Vergil (340 f.) and quote Varro Reat. at length (348 f.). In his *summarium* of sources for Book 18 (given in Book 1), Pliny also names Aristotle, Eudoxos, Theophrastos, and Aratos, to mention only the most likely of his sources for weather signs; unfortunately Pliny does not tell us which authors supplied which facts.[64] Pliny mentions Vergil as someone also interested in the subject (see above); i.e., he (Pliny) will draw on the same sources as Vergil did—an inference that seems to be justified by the many instances where *DS*, Aratos, Vergil, and Pliny record the same signs (if not all four, then all but Vergil, who devotes the shortest space to the subject). Pliny's arrangement is orderly and more practical than that of

[64] Unfortunately, W. Schlottmann, *De Auctoribus quibusdam in Plini Naturalis Historiae libro xviii* (Diss. Rostock 1893) does not consider the weather section of this book. On Pliny's summary list of sources, now gathered in book 1 but which originally stood at the head of each respective papyrus book roll, cf. A. Doody, "Finding facts in Pliny's Encyclopaedia: The *summarium* of the *Natural History*," *Ramus* 30 (2001) 1–22. For some recent work on Pliny, cf. R. French, *Ancient Natural History* (London 1994), c. 5; J. F. Healy, *Pliny the Elder on Science and Technology*, Oxford 1999; T. Murphy, *Pliny the Elder's Natural History: The Empire in the Encyclopedia*, Oxford 2004.

DS: *prognostica a sole, a luna, stellis, tonitribus, nubibus*, *nebulis*, *ignibus terrestribus, aquis, ab ipsis tempestatibus, ab animalibus aquatilibus, a volucribus, a quadrupedibus*. This, from his table of contents in book 1, is rather accurate, except that where the summary has *ab ipsis tempestatibus*, book 18 has a miscellaneous section (360) containing miscellaneous signs derived from noises made by mountains, trees, other vegetations, and (if *campanis* is right) bells; and another miscellaneous section is tagged on containing signs from bees, ants, trefoil, and the smudges left by cooking vessels. Many of Pliny's signs duplicate those of *DS* (see the index locorum), but Pliny also incorporates many weather signs which had not appeared earlier in our extant literature.[65] Kroll reasonably argues that Pliny's source, perhaps Varro, had access to an earlier version of *DS* which had the signs ordered as they now appear in Pliny.[66]

Dionysios the Periegete (2nd cent. AD) was credited with a *Diosemiai* (a term also applied to the last section of Aratus); *Vit. Chis.* 81.14. Perhaps this is the same work as the *Meteorologoumena*, ascribed by Souda to Dionysios of Corinth; cf. Knaack, "Dionysius (94)," *RE* 5.1 (1903) 915–924, esp. 923.

Ptolemy, *Tetrabiblos* 2.12 f. (2nd cent. AD). Chapter 12 discusses in general terms the ways in which various stages of the moon in combination with various solstitial or equinoctal heavenly phenomena affect weather. This is similar to but far more sophisticated than what is found in *DS* cc. 5–8. c. 13 contains both general and specific observations Περὶ τῆς τῶν μετεώρων σημειώσεως, i.e., sun, moon, halos, parhelia, constellations (esp. the Manger; cf. *DS* 23.156, 43.314 f., 51.370 f.), comets, meteors, and clouds; excluded, therefore, are animal signs. See Heeger 43–46 and the index locorum.

[65] One in particular, hitherto unique, is now paralleled by the new Poseidippos epigram Austin-Bastianini 21.1 f. νηὶ καθελκομένῃ πάντα πλέον' ἰνὶ φανήτω | ἴρηξ, αἰθυίης οὐ καθαροπτέρυγος, with which compare Pliny *NH* 18.362 *mergi* (= αἴθυιαι) *anatesque pinnas rostro purgantes ventum*. Cf. Bastianini and Gallazzi, *Posidippo di Pella* (see above n. 47); Sider, "Poseidippos on weather signs" (see above, p. 18).

[66] W. Kroll, "Plinius (5) der Ältere," *RE* 21 (1951) 271–439, here at 335; cf. Böhme 36–40.

Aelian, *Natura animalium* 7.7–8 (2nd–3rd cent. AD). Chapter 7 (mentioned above, under Aristotle), a self-contained unit on avian weather signs, is introduced with the words Ἀριστοτέλους ἀκούω λέγοντος ὅτι κτλ. Chapter 8 begins by turning to other sources and nonavian (mostly animal) signs: Egyptians, who say that antelopes are the first to know when Sirius rises; and Libyans, who say that goats give signs of imminent rain when they rush (sc. faster than usual) toward their food; cf. *DS* 39.280, geese honking more than usual and fighting over their food as a sign of storm. Then follow anecdotes about the weather-predicting skills of Hipparchos and Anaxagoras (which have nothing to do with animals), followed in turn by animal weather signs, two of which appear in *DS* (25.175, 41.301; see index locorum). Chapter 9 goes on to cover other subjects. Cf. M. Wellmann, "Juba, eine Quelle des Aelian," *Hermes* 27 (1892) 389; id. "Pamphilos," ibid. 51 (1916) 1.

Almost all of Aelian's signs can be found in *DS*, but if it can be assumed that *DS* had reached essentially its final form by his time, the fact that Aelian 7.7 contains a few signs not in *DS* argues for Aelian's having direct access to Aristotle's original text rather than for his citing *DS* as though it were by Aristotle. One should note, however, that about half of the signs not in *DS* are for fair weather, the shortest section in *DS*, which might lead one to think that the assumption made just above is wrong; i.e., that *DS* did indeed suffer further abridgement after the second or third century—and that Aelian's source is *DS* rather than Aristotle, as Heeger 42 f. believes. It is also worth noting that *DS* and Aelian share some uncommon words:[67] πτερυγίζω (*DS* 18.120, 28.192), ἱερακίζω (see above, p. 17), ἐπιρροίζω (16.107), but both *DS* and Aelian could have drawn these independently (the former via Theophrastos) from Aristotle.

Vegetius *Epitoma Rei Militaris* 4.41 (4th–5th cent. AD). *De Prognosticis*. 1 *Multis quoque signis et de tranquillo procellae et de tempestatibus tranquilla produntur, quae velut in speculo lunae orbis ostendit*. 2 *Rubicundus color ventos, caeruleus indicat pluvias, ex utroque commixtus nimbos et furentes procellas*. 3 *Laetus orbis ac lucidus serenitatem navigiis repromittit, quam gestat in vultu, praecipue si quarto ortu neque obtusis cornibus mutila neque infuso fuerit humore fuscata*. 4 *Sol quoque exoriens vel diem condens interest utrum aequalibus gaudeat radiis an obiecta nube varietur, utrum solito splendore fulgidus an ventis urgentibus igneus nive*

[67] Cf. Martin's Budé comm. ad Arat. 918 f.

pallidus vel pluvia sit impendente maculosus. 5 *Aër vero et mare ipsum nubiumque magnitudo vel species sollicitos instruit nautas.* 6 *Aliquanta ab avibus, aliquanta significantur a piscibus, quae Vergilius in Georgicis divino paene comprehendit ingenio et Varro in libris navalibus diligenter excoluit.* 7 *Haec gubernatores sese scire profitentur, sed eatenus, quatenus eos peritiae usus instituit, non altior doctrina formavit.* (ed. M. D. Reeve; see index locorum). As noted above, Vegetius cites both Vergil and Varro.

Boethius *De Natura Rerum* c. 36.[68] *Signa Tempestatum vel Serenitatis. Sol in ortu suo maculosus vel sub nube latens pluvium diem praesagit. Si rubeat sincerum, si palleat tempestuosum*; *si concavus videtur, ita ut in medio fulgens radios ad austrum et aquilonem emittat, tempestatem humidam et ventosam*; *si pallidus in nigras nubes occidat, aquilonem ventum. Caelum si vespere rubet serenum diem*; *si mane tempestuosum significat. Ab aquilone fulgur et ab euro tonitrus tempestatem et ab austro flatus aestum portendit. Luna quarta si rubeat quasi aurum ventos ostendit. Si summo in corniculo maculis nigrescit, pluvium mensis exordium*; *si in medio, pleniluniun, serenum. Item cum aqua in nocturna, navigatione scintillat ad remos, tempestas erit. Et cum delphini undis saepius exiliunt quo illi feruntur, inde ventus exurget et unde nubes discussae caelum aperiunt.*

Geoponika 1.2–4. This is a tenth-century compilation of passages pertaining to agriculture; sources are given for each chapter.[69] These three chapters of the first book are headed as follows: 2. Προγνωστικὰ εὐδιεινοῦ ἀέρος. Ἄρατος.,[70] 3. Προγνωστικὰ χειμερινοῦ ἀέρος, καὶ ἐκ ποίων τεκμηρίων ὄμβρους χρὴ προσδοκᾶν. Τοῦ αὐτοῦ. 4. Προγνωστικὰ μακροτέρου χειμῶνος. Τοῦ αὐτοῦ. The following chapter, credited to Didymos, concerned with Προγνωστικὰ πότερον πρώϊμον ἢ ὄψιμον ἔσται τὸ ἔτος, is comparable to *DS* c. 44, but there are no

[68] Ed. C. W. Jones, in *Bedae Venerabilis Opera*, Pars I, *Opera Didascalica* = *Corpus Christianorum, Ser. Lat.* CXXIII A (Turnholti 1975) 173–234.

[69] Cf. Böhme 45–48; and for a brief review of the several controversies surrounding this work, A. Kazhdan, "Geoponika," in: *Oxford Dictionary of Byzantium* (eds. A. Kazhdan et al.), Oxford (1991) 2. 834. See also R. Rodgers, "Κηποποιΐα: Garden making and garden culture in the Geoponika," in A. Littlewood and H. Maguire, *Byzantine Garden Culture* (Washington D.C., 2002) 159–175. (Rodgers is preparing a commentary on the *Geoponika*.)

[70] W. Gemoll (see above, n. 47) 51–58 argues that in fact the source is the scholia to Aratos, but since these were probably not available apart from Aratos there is no doubt that the compiler read both but modelled (there is no exact copying) his prose summary on the scholia. This is a distinction without a difference. Cf. Böhme 46.

common signs. cc. 2–4, however, are cited frequently throughout the commentary. Cf. Heeger 46–52.

Michael Psellus περὶ ὠμοπλατοσκοπίας καὶ οἰωνοσκοπίας, ed. R. Hercher, *Philologus* 8 (1853) 166–168, identified only as coming *ex codice Vindobonensi*. ὠμοπλατοσκοπία is obviously divination through shoulder blades and not relevant to *DS*. οἰωνοσκοπία, on the other hand, begins with true bird signs of impending weather, but also includes signs from lizards, the sea, clouds, mountain tops, lamp snuff, animals, trees, and bees.

Cod. Mut. 85 (III C 6) fol. 91 (15th cent. AD), *CCAG* 4.4 (ed. F. Cumont, Brussels 1903) 110. Περὶ νεφελῶν ἐπίσκεψις. αἱ νεφέλαι ἀερῶδες (lg. ἀερώδεις?) πετόμεναι καθαρὰς τὰς ἄκρας τοῦ ὄρους δεικνύουσαι εὐδίαν σημαίνουσιν, καὶ ἐπὶ τῆς θαλάσσης χθαμαλαὶ φαινόμεναι κατάπαυσιν χειμῶνος δηλοῦσιν. ἐὰν ἐπὶ τὰς κορυφὰς τῶν ὀρέων ἐφεζόμεναι καὶ ὡς ἐν κύκλῳ ἐπαίρωνται ἕως κορυφῶν τῶν ὀρέων, ἐκεῖθεν ἐλεύσεται ὁ ἄνεμος. ἐὰν αἱ κορυφαὶ τῶν ὀρέων ὦσι καθαραί, τοῖς δὲ στέρνοις αὐτῶν προσπελάζει τὰ νέφη, δεικνύουσιν αὗται τὸν ἐπιόντα ἄνεμον (cf. *DS* 34.242 f.)· ὁμίχλη ἑωθινὴ ἐν μὲν τῇ γῇ καὶ τοῖς πεδίοις πίπτουσα εὐδίαν σημαίνει· πρὸς οὐρανὸν δὲ ἀνερχομένη νεφέλη γίνεται καὶ ὄμβρους καὶ ἀνέμους ἔχει συνεχεῖς· ὁμίχλη εἰ μὲν παχνώσῃ, βορρᾶν δηλοῖ, εἰ δὲ ὑγρὰ καὶ δροσώδης, εὖρον ἢ νότον· ὁμίχλη ⟨εἰ⟩ διαχυθῇ ἕως τρίτης ὥρας, εὐδίαν σημαίνει, εἰ δὲ περαιτέρω γένηται, αἰθρίαν καὶ εὐδίαν ἔξει τὸ πέλαγος καὶ ζέφυρον ἄνεμον. "On the observation of Clouds. Clouds floating filled with aer revealing clear mountain peaks signal clear weather; and appearing low lying on the sea they reveal a pause in a storm. If while sitting on the mountain peaks they form a raised ring up to the peaks, the wind will come from here. If the mountain peaks are clear while clouds approach their faces, these (clouds) point to the approaching wind. A morning mist falling on the ground and the plains signals fair weather; but if rising skyward it becomes a cloud it has both showers and winds. If a mist congeales it reveals a north wind; if it is moist and dewy, it reveals a south or south-east wind. If a mist is dispersed at the third hour it signals fair weather; but if it lasts beyond this the sea will have bright and fair weather and a western wind."

Cod. Laurent. 28.32, ff. 12–14 (15th cent. AD) ed. M. Heeger, *De Theophrasti qui fertur* περὶ σημείων *libro*. (Diss. Leipzig 1889) 66–72; introduced 60–65. This section is followed, as in the *Geoponika*, by a chapter περὶ τοῦ ἐρχομένου ἔτους εἰ πρώϊμον ἔσται ἢ ὄψιμον (not printed by Heeger). Arrangement is by signs provided by the sun, moon, days of the month, meteorological phenomena, animals, the last being ordered alphabetically. Following this is a section on signs derived from days of the month. Many of the signs are those found in *DS* and Aratos.

Cod. Paris. 2229, ff. 22, *CCAG* 8.1 (ed. F. Cumont, Brussels 1929) 137–40. Four paragraphs: 1. Περὶ τῆς ἐκ τῶν ζῴων σημασίας, ὅσα χειμῶνας καὶ εὐδίας καὶ ἀνέμων κινήσεις προσημαίνουσιν, arranged alphabetically by animal, eight under ὄρνιθες, some of which are specified only as "sea" or "land" birds; 2. Περὶ τῶν ἐξ ἡλίου σημείων; 3. Περὶ τῶν ἐκ σελήνης σημείων; 4. Περὶ ἴριδος.

Cod. Matrit. BN 4616, *CCAG* 11.2 (ed. C. O. Zuretti, Brussels 1934) 174–183. Zuretti reordered passages from this ms. to conform to the arrangement in cod. Laur. (see above): signs from sun (f. 163^{v}), parhelia (f. 157^{v}), moon (f. 158^{v}, but also containing signs from the sky [its color, meteors, clouds]), and animals (f. 160^{r}, arranged alphabetically). The compiler of these passages (assuming only one author) goes beyond the bare listing found in most prose weather literature, reshaping the standard material into a prose that goes beyond the merely serviceable. Note in particular how he likens aer occluding the sun to the shading employed by painters (p. 174 f. Zuretti): ὃν γὰρ τρόπον οἱ ζῳγράφοι ἀντρώδεις τόπους γράφοντες τῷ φωτὶ τραχύνουσι τὴν ὄψιν, ὥστε τῇ φύσει τοῦ μὲν λαμπροῦ προβάλλοντος ἔξω καὶ διωθοῦντος τὴν φαντασίαν, τοῦ δὲ μέλανος ὑποσκιάζοντος †μαθύνεσθαι[71] δοκεῖν, οὕτω καὶ περὶ τὸν ἥλιον τὸ μὴ φαινόμενον τῇ ὄψει κατὰ τὴν ἔμφραξιν τοῦ ἀέρος, οἱονεὶ ἐκκοπὴ τοῦ μέσου σαπροῦ διὰ τὴν σκιὰν ὑποφαίνεται. Although this codex is late, Böker 1613 f. argues that this text was Pliny's source and that it best represents the form of the *Grundschrift*.[72]

[71] μακρύνεσθαι Delatte βαθύνεσθαι Kroll, *Philol. Wochenschr.* (1935) 887, approb. Rehm, rev. of Zuretti, *Byz. Zeitschr.* 40 (1940) 223, coll. schol. Arat. 492.12.

[72] For surveys of weather literature just past this point, see L. Thorndike, *A History of Magic and Experimental Science* (New York 1934) passim (see the index, s.v. weather, predictions); S. K. Heninger, Jr., *A Handbook of Renaissance Meteorology* (Durham 1960) 217–224.

5) *Structure of* De Signis. A prologue (cc. 1–9) is followed by five sections (although modern editors merge the short fifth section into the preceding), each listing various signs for (i) rain (10–25), (ii) wind (26–37), (iii) storms (38– 49), and (iv) fair weather (50–55); followed by (v) a miscellany introduced under the rubric σημεῖα ὅλων τε τῶν ἐνιαυτῶν ... καὶ τῶν μορίων. Other types of weather are subsumed under one or another of these chapters; e.g., snow under storms (40, 42) and hurricanes under winds (30, 36, 37).

This is not an unreasonable arrangement, although the prologue suggests that an earlier redaction had suffered abridgement and the final section suggests augmentation. It is, however, impractical to arrange signs by results. A work designed to be a *helpful* weather guide would arrange things by signs, so that, for example, one could look up sweaty feet to see what this sign portends. As noted above, many collections of signs are so arranged. Since within the four major results there is a sort of arrangement by sign (see below), our author/compiler may have drawn from one or more sources so arranged.[73] The several duplicated signs can now be explained: what originally was stated in the form "*x* signals *m* or *n*" would show up in *DS* as "*x* is a sign of *m*" in one place and as "*x* is a sign of *n*" in another, perhaps with the addition in one or both places of the frequent modifying phrase "for the most part."[74]

Prologue The first sentence nicely identifies the work's aim and lays out the four main sections that follow: Σημεῖα ὑδάτων καὶ πνευμάτων καὶ χειμώνων καὶ εὐδιῶν ὧδε ἐγράψαμεν καθ' ὅσον ἦν ἐφικτόν, ἃ μὲν αὐτοὶ προσκοπήσαντες, ἃ δὲ παρ' ἑτέρων οὐκ ἀδοκίμων λαβόντες. τὰ μὲν οὖν ἐπὶ τοῖς ἄστροις δυομένοις καὶ ἀνατέλλουσιν ἐκ τῶν ἀστρονομικῶν δεῖ λαμβάνειν. Who, though, is claiming credit for authorship? No work of Aristotle begins this way,[75] although

[73] This has been argued by Böhme 20 and Heeger 15, and supported by Arrighetti 419. Cronin "Authorship" attempts what seems to be too detailed a taxonomy of the signs in order to distinguish among *DS*'s sources.

[74] On these double signs, see Arrighetti 424–428.

[75] The first-person plural that sometimes appears at the beginning of an Aristotelian work (and thereafter) is short for "we men in general" (in the indicative) or "I the author and you the reader/student" (often in the hortatory subjunctive). Cf. *Top.* 100a18 ἡ μὲν πρόθεσις τῆς πραγματείας μέθοδον εὑρεῖν, ἀφ' ἧς δυνησόμεθα συλλογίζεσθαι κτλ, *Soph. Elench.* 164a20–22 περὶ δὲ τῶν σοφιστικῶν ἐλέγχων καὶ τῶν φαινομένων μὲν ἐλέγχων ὄντων δὲ παραλογισμῶν ἀλλ' οὐκ ἐλέγχων λέγωμεν, *Pol.* 1252a1 ἐπειδὴ πᾶσαν πόλιν ὁρῶμεν κοινωνίαν τινὰ οὖσαν κτλ, *Anal. Pr.* 24a14, *Phys.* 402a1–4. Aristotle does, though, allude to his authorship often enough with an εἴρηται vel sim. to place a passage in

Pseudo-Aristotle offers the parallels of *De mundo* 391a1 πολλάκις μὲν ἔμοιγε θεῖόν τι ... ἡ φιλοσοφία ἔδοξεν εἶναι, *Magna Moralia* 1181a24 ἐπειδὴ προαιρούμεθα λέγειν ὑπὲρ ἠθικῶν κτλ, and *Rhet. ad Alex.* 1420a6 ἐπέστειλάς μοι κτλ. It is worth noting that *On the Locations and Names of the Winds*, which is described in the codd. as coming from Aristotle's Περὶ σημείων ends with ὑπογέγραφα δέ σοι καὶ τὰς θέσεις αὐτῶν, ὡς κεῖνται καὶ πνέουσιν, ὑπογράψας τὸν τῆς γῆς κύκλον, ἵνα πρὸ ὀφθαλμῶν σοι τεθῶσιν (i.e., he added a sketch of a windrose to his text).

After this first sentence, though, the prologue introduces several topics that are not noticeably present in *DS*.[76] c. 2 speaks of the significant meanings of the astronomical risings and settings of the stars (Arcturus, Sirius, and the Pleiades), but these annual signs are all but ignored in *DS*. c. 3 seems at first appropriate in speaking of the signs produced by mountains and their valleys, as these are indeed found in the work.[77] What is deceptive, however, is the causal (scientific) explanation that accompanies this statement: "*For*, as winds start up, the clouds crash into such places [mountains]; and as the winds reverse direction the clouds follow along in turn, and as they become more moisture-laden they gather and settle in the hollows," which leads one to believe that such explanations will be given as appropriate, although in fact this is just about the last time *DS* bothers to explain why a particular sign or type of sign works.

Another noteworthy feature of the prologue lies in its identifying four astromomers (or five, if Phaeinos is included; his name may have been interpolated), who are credited with providing (all? many of?) the signs and the locations from which they made their observation; also noteworthy is its declaring the need to employ such experts. This is distinct from Aristotle's occasionally naming (say) Plato or Eudoxos, with whom he will then disagree, at least in part;[78] and from Theophrastos' doxography in *De Sensibus*, where the views of Empedokles, Anaxagoras,

the broader context of his writings; cf. the beginning of *Mete.* ... καὶ περὶ γενέσεως καὶ φθορᾶς τῆς κοινῆς εἴρηται πρότερον (338a24).

[76] Cronin "Authorship" 307 outlines the sections as follows: 1. Subject and sources; 2. astral risings and settings; 3. "some signs are peculiar to mountains and can best be learned from a local expert"; 4. others use local features; 5. signs from animals, domestic observations, sun, and moon; 6.–9. the halfway divisions of year, month, and day.

[77] See cc. 20, 31, 34, 43, 45, 51.

[78] Note too the first sentence of Th. *De Lass.* ἐν τίνι ποθ' ὁ κόπος ἢ τίσιν ὡς πρώτῳ, πότερον ὡς Ἐπιγένης ὑπέλαβεν ἐν φλεβὶ καὶ νεύρῳ κτλ. Fabricius, "Epigenes (18)," *RE* 6 (1907) 66 suggests that this Epigenes is the same one mentioned by Pliny *NH* 31.34.

Plato, et al. are critically arrayed. Indeed, *DS*'s list is most like (to compare small with large) Pliny's list of sources in Book 1 of *NH*.

C. 5 makes mention of weather signs from animals and, even better, sun and moon, especially at the time of their rising and setting. This accurately describes much of *DS*, but what immediately follows does not: from here to the end of the prologue *DS* tells us to pay attention the days surrounding the new moon, to divisions of the year, the month, and the day. Although there will be some signs that call for reading the crescent moon, no further use is made of these last chapters.

In sum, cc. 1–9 read very much like the prologue to a larger, more comprehensive, work on weather signs. Which in turn raises the questions of when it—the prologue and the work it originally introduced—was written, and when, and perhaps in how many stages, it was abridged to become *DS*. (See below.) Is what we have simply a fragment having suffered careless and mechanical loss, or is it the result of (still somewhat careless) editorial curtailment?[79] Böhme 7 concludes that *DS*'s prologue was originally meant to be attached to a parapegma, but as we have seen, the prologue clearly looks forward to the kind of weather signs that are still found in the text, and these (such as signs from animals and clouds) do not belong to parapegmata.[80]

The chapters on rain, wind, storms, and fair weather. The first thing to note is that the signs are arranged by event, so that, e.g., a crow acting in one way to signal rain is separated from a crow acting another way so as to signal storm. To a farmer or sailor who had all his pertinent signs committed to memory (and hence not in need of a work like *DS*), this does not matter, but anybody wanting to learn weather signs at one go would probably prefer to have them arranged by sign rather than event, so that one could quickly look up "crow" and its various signifying actions. This direction, from sign to outcome, we do in fact find in later, Byzantine collections, which even more helpfully

[79] Cf. Böhme 5. Unfortunately, in examining the inconcinnity between the text proper and what the prologue promises, Böhme 6 depends in part on Schneider's conjecture τρόπων in c. 5; see our text and commentary.

[80] In part Böhme derives this conclusion from the last sentence of *DS*, τοῖς δὲ ἄστροις εἴωθεν ὡς ἐπὶ τὸ πολὺ σημαίνειν καὶ ταῖς ἰσημερίαις καὶ τροπαῖς, οὐκ ἐπ' αὐταῖς ἀλλ' ἢ πρὸ αὐτῶν ἢ ὕστερον μικρῷ, which he argues would fit a parapegma. This may well have been the origin of this sentence, but as we have noted, the very end of *DS* contains a number of disjointed sentences seemingly added on a some later stage, none of which accordingly can be used to argue for the original nature or purpose of the work.

Table 1: Signs as arranged in *De signis*

Rain	*Winds*	*Storm*	*Fair Weather*
10f. sun	26 sun	38 sun	50 sun
12 moon	27 moon	moon	51 moon
13 shooting stars	28 shearwaters, ducks	cranes	Manger
sun's rays	*kepphoi*	sparrows	halo
woolly clouds	sparrows	39 geese	clouds
river bubbles	heron	sparrows	Mt. Olympos
14 lamp snuff	29 dog	wrens	Mt. Athos
15 nonaquatic	tides	robin	52 mist
birds	spiderwebs	jackdaw	cranes
toads, frogs	mock suns	40 birds fleeing sea	owls
lizards	30 winds	chaffinch	raven
swallows	creaky furniture	raven	53 crow
ox	sweaty feet	jackdaw	wren
16 shearwaters	pain in foot	cuttlefish	clouds
raven	hedgehog	seal	54 cattle
jackdaw	31 mountain roar	jelly fish	ox
17 hawk	sea calm	cattle	dog
island birds	headlands	41 cattle	cicadas
chickens	land seen from sea	asses	55 mastic
18 duck	halos	animals fighting for food	
jackdaw	clouds	mice	
rooster	32 lightning	42 dog	
heron	thunder	tree frog	
19 finch	33 lightning	worms	
cooking pot	even/odd days	fire	
centipedes	sun, moon	lamps	
dolphin	day/night	43 Manger	
20 Mt. Hymettos	34 etesian winds	Pleiades	
Lips	clouds	mountains	
21 thunder	Mt. Athos	clouds	
lightning	comets	44 seasons	
Notos	snow	45 oaks	
Zephyros	frost	mtn. clouds	
22 Euboian mts.	snuff	46 sun	
Mt. Pelion	35–7 names & nature of winds	Mercury	
rainbows		bees	
ants		wolf	
mock suns	wind-borne thistles	47 wasps	
halos		white birds	
23 Manger		wild animals	
flies		Mt. Parnes	
24 Mt. Hymettos		48 heat	
Aigina		seasons	
winter rains		49 oaks	
snow		mole	
25 burning coal		mice	
sheep, goats			

arranges the signs in alphabetical order. (Aratos and Vergil are poets and so are free to arrange signs idiosyncratically.)[81]

Within each of four main chapters, however, a certain pattern is maintained: Each begins with signs derived from observations of the sun followed by signs from the moon. Thereafter, however, there is no particular order, not even by broad type. Instead we get a jumble of signs derived from comets, clouds, thunder and lightning, rainbows and other meteorological oddities, mountain tops, lamps, insects, birds, spiders, worms, frogs, and mammals. Only Fair Weather, the shortest, is neatly arranged:[82] (i) 50 f. heavens, (ii) 51 meteorologica (including clouds), (iii) 51 f. mountains clouded or not, mist, (iv) 52–54 animal (first birds, then cattle, dogs, insects),[83] (v) 55 mastic. The oddest signs in *DS* are bubbles on a river surface (13), sparks on a pot while cooking (19), the appearance of the land (dark or white) when seen from sea (31), and the mastic (55). Interspersed are further signs from the sun, and winds, the event signaled in c. 2, can themselves be taken as signs of other events. See Table 1, which is meant to be only a rough guide to the signs, as some are combined, some are broken down into subclasses, and others that are described differently in different passages are here given the same label.

Nonetheless, one can still see some grouping of like signs (e.g., 15–19, 28, 38–40, 52 f. birds; 31 signs from the earth's surface; 40–42, 54 domestic animals), but also that some signs can appear early or late in their sections; cf., e.g, the Manger is late in "Rain," in the middle in "Storm," and early in "Fair weather."[84]

For the most part, the predictions take the form "If sign *x*, then outcome *y*," where the sign is an instance of earthly or heavenly activity. The conditionality is usually expressed in the form of present general condition (ἐὰν ἀκτῖνες ἀνίσχοντος ἀποτείνωσι πρὶν ἀνατεῖλαι κοινὸν ὕδατος σημεῖον) or with a conditional circumstantial participle (ὄρνιθες λουόμενοι μὴ ἐν ὕδατι βιοῦντες ὕδωρ ἢ χειμῶνα σημαίνουσι).[85] The "sign" in Greek is either σημεῖον or σημαίνειν (see the two exam-

[81] See Kidd 439 for the arrangements of Aratos and Vergil. V. Rose, *Aristoteles Pseudepigraphus* (Leipzig 1863) 243 f. argued that Theophrastos' original Περὶ σημείων was arranged by weather sign, but this can only be conjecture.

[82] As noticed by Böhme 15 f.

[83] But two cloud signs in 53 disturbs the pattern.

[84] The Turin codex rearranges the signs. See below, section 9.

[85] Kaibel, "Aratea," *Hermes* 29 (1894) 116 compares similar statements in the Hippocratic corpus, where σημεῖον κτλ are "symptom," etc., but often of current states rather than as a prognosis of a future course of the disease.

ples just given),[86] although once the adjective σημαντικά (51) is used. Many sentences are elliptical, depending on a preceding clause or sentence, so that, e.g., with ὑδατικόν one has to understand σημεῖον, or σημαίνει/–ουσι must be supplied.[87] It is always assumed that a "sign" is not a guarantee, as is frequently made explicit with ὅλως (8 ×), ὡς ἐπὶ τὸ πολύ (9 ×), εἴωθε (3 ×), ὡς τὰ πολλά (14 ×), or (ἐπὶ) πολύ with the verb (2 ×).[88] *DS*, however, lacks the kind of general statement such as is found in that other Peripatetic work on signs, *Physiognomonika*, which says that it is silly (εὔηθες, 807a1) to trust in (only) one sign; and in Aratos, who, no doubt echoing his prose source, concludes with the admonition not only not to despise these weather signs, but also to observe as many as possible (σήματι σῆμα σκέπτεσθαι, 1142 f.), "and if two agree, it is more hopeful, while with a third you can be confident" (tr. Kidd).

Generally the outcome is predicted to occur shortly thereafter observation of the sign. Indeed, if no time frame is given, one seems free to assume there will be no long wait, perhaps a day at most. Only when the event deviates from this norm is a time given. Thus, we have predictions of events that will occur (i) "soon" (22.152, διὰ ταχέων), (ii) in a day or two (10.66, 21.143), (iii) on the "third" day, i.e, two days later (10.66, 11.70, 46.343), (iv) in a month (27.186, ὁ μὴν χειμερινὸς διατελεῖ), (v) over a season (24.166, 25.174, 41.298, 44.324, 48.352, 49.357, 54.397, 56.406 f.),[89] (vi) over six months (56.411), and (vii) "a long time" (26.181, ἀνέμους πολυχρονίους).

Addendum. Since the signs in this section are of hail (which had been included in the chapters on rain [25] and wind [35]), wind, rain, and cold (see cc. 44, 46, 48), they could all have fit easily in earlier sections. This and the one mention in this treatise of the Egyptians

[86] προσημαίνει appears thrice (25, 31, 52), in exactly the same sense as the simplex, and may have been copied directly from an earlier source without change (the προ- is clearly otiose); cf. comm. ad c. 25. ἐπισημαίνει appears twice (10, 11), but without an explicit object (which in the context is clearly ὕδωρ), so that the sense is more "is indicative/significant." See the comm. ad c. 10.

[87] Heeger 9 f. regards this frequent ellipsis as proof that *DS* could not have been written even by a student of Theophrastos, but the same thing can be found in Pliny's passages of weather signs. It is appropriate to the genre.

[88] Again, Heeger 9 uses the repetition of this kind of important and scientifically justifiable type of phrase as argument against Peripatetic authorship.

[89] This tally includes passage where we interpret ἔτος as "season"; see comm. on 25.174 τὸ ἔτος.

suggest that this last section was added to, rather than incorporated into, a text preceding, although that text may not have been in the form we now have. And if *DS* was written at the latest shortly after Theophrastos, this final section was almost certainly added by a later redactor rather than the one who gave *DS* its basic form. Note that no sign in the addendum reappears in Aratos. See comm. on *DS* 56.419 Αἰγύπτιοι, where it is suggested that Apion is the source for this section.

6) *The Nature of* De Signis.[90] Consistent with the straightforward structure outlined in the previous section, *DS* is a bare-bones technical treatise. After stating its purpose early and clearly and citing its sources, it lays out the facts with no literary flourishes. Allowing for some repetition of what was said earlier, we can characterize it by noting some of its positive and negative features. (i) *DS* is concerned with changes in the weather that are more variable and more specific than those found in Hesiod, i.e., the sort found in parapegmata. Some of these changes will occur within minutes, some within days, and others look forward to deviations from the norm over an entire season. (ii) Although some of its signs are the same as or very similar to those read by seers—such as the flight of birds—it seeks only meteorological outcomes rather than, say, victory in battle. (iii) *DS*[91] makes no attempt to be complete, the way, e.g., works that listed all Olympic victors or archons or priestesses of Hera tried to be. All that the author claims is ἐγράψαμεν καθ' ὅσον ἦν ἐφικτόν (1.2). Omitted are many signs known from other ancient sources. In particular, *DS* in general avoids stating the obvious, which hardly needs to be recorded; e.g., a black cloud approaching from the sea signaling rain (*Il.* 4.275–8). For an exception to this, note 22.137–9, where lightning is given as a sign of rain. None the less, even though a complete list would be a great chore to compose,[92] it would have been easy to add more.

(iv) Excluded also is any overt statement of practical use for these weather signs, although 54.396 f., τέττιγες πολλοὶ γινόμενοι νοσῶδες τὸ ἔτος σημαίνουσι, does provide an oblique health warning. This is par-

[90] This section quickly goes over the same ground as Sider, "On *On Signs*," in Fortenbaugh and Wöhrle (eds.), *On the Opuscula of Theophrastus* (Stuttgart 2002) 95-111.

[91] Throughout this section, we describe *DS* as we have it, not how it may once have looked.

[92] Note Aratos' cry of despair, τί τοι λέγω ὅσσα πέλονται | σήματ' ἐπ' ἀνθρώπους; (1036 f.), although here Aratos has the Homeric model in mind, which is designed to call attention to the difficulty of the poet's job and hence of his worth.

ticularly striking, as it seems clear that weather signs were first collected by and for farmers and sailors (see above, n. 2). This is explicit in Hesiod, Vergil, Aratos, and Columella, whose whole (purported) aim is to help the farmer be guided by the weather.[93] (v) And not only does *DS* not state any practical purpose for its collection of weather signs, its arrangement also bespeaks a certain impracticality.[94] As noted above, its arrangement by result runs counter to the idea of a *practical* handbook; i.e., one in which one could look up the sign one has just observed. Thus, if wolves appear in inhabited areas (where, that is, they are not expected), one should be able to look up λύκοι and discover that a storm is indicated. This same sign occurs in 46, but since in the scene we are painting one does not know what the wolf means, one therefore does not know that the entry for wolf in this work occurs between those on bees and wasps toward the end of the chapter on storm signs.[95] It is interesting to note that the *Physiognomonika*, which contains several layers of composition, arranges its signs first by sign in c. 2 (e.g., "movements, gestures, color, characteristic facial expressions, hair, skin, voice, flesh, body parts, and the body as a whole," 806a29) and then by character in c. 3 (e.g., sanguine temper, courage, irascibility), and then by sign again in c. 6. Thus, "soft hair indicates cowardice" in c. 2 (806a6), "signs of cowardice are soft hair ..." in c. 3 (807b4), and both stiff upright hair and very woolly hair signify cowardice in c. 6 (812b28).[96]

Another sign of the work's impracticality can be found in its section on the signs of winds, where very often one wind equals another and often not even the direction of the impending wind is indicated. Sailors can make use of most winds, it is true, but the rest of us would like to

[93] Comparison with the *Physiognomonika* will prove useful here and below, since this work, also Peripatetic and perhaps contemporary, is also concerned with σήματα, here those that indicate character. In almost every point of comparison, *Physiognomonika* comes off looking better, i.e., more "Aristotelian." Thus, on the matter of purpose of reading signs, it makes it clear that knowing how to spot the right signs will enable one to buy a better horse or dog (805a15). Cf. S. Vogt, *Aristoteles*: Physiognomonica (Berlin 1999) 108–112.

[94] It has also been said that stone parapegmata set up in an agora would have little practical value for farmers and (even less) sailors, but we are not convinced by R. Hannah, "Euctemon's parapegma" (see above, n. 26) 129–131, who is disposed to believe that they were meant to give guidance in planning the city's cults and festivals. These, however, were largely established long before the parapegmata; nor do the stones make any mention of anything but heavenly phenomena. See next note.

[95] Hannah "Euctemon's parapegma"(see above, n. 26) 129–131 also points out the inherent impracticality for farmers and sailors of a parapegma erected in the center of a city.

[96] See further Sider "On *On Signs*" (above, n. 90) 104 f.

know what temperature or precipitation a wind is likely to bring with it. Nor are winds referred to as signs in the prologue or made much use of as signs of rain, storm, or fair weather in these respective sections.[97] This occurs only in the final section, which was probably added later to *DS* as an appendix; see 57.416–19 "Also significant are the winds that accompany the descending mists: If, on the one hand, the winds arise from the east and south, they signal rain; but if they arise from the north, they signal winds and cold." In Th.'s *Winds*, on the other hand, it almost goes without saying that each wind is characterized by its own weather.[98]

DS, then, with no recourse to gods, its naming of its sources, and its impractical arrangement, bespeaks a certain scientific appearance. Lacking, however, is any attempt to understand why these signs work as they do, either in general or in particular, as we find in the *Physiognomonika* and in Aristotle himself in his work on weather signs; cf. Arist. fr. 365 Gigon (Schol. in Arat. 1095 ed. Martin), cited in comm. ad 17.116 ὄρνιθες οἳ βιοτεύουσιν ἐν νήσῳ. (There is only one γάρ in *DS*, on 41.304.)

7) *How accurate are the weather signs.* In general, it is easy to see that the more accurate of the signs are the meteorological ones, the less accurate those derived from animal behavior. For Epicurus, in fact, the division is absolute: ἐπισημασίαι derived from meteorological signs have physical causes, those from animals are due merely to chronological coincidence.[99] For the former we often refer the reader to R. Greenler, *Rainbows, Halos, and Glories* (Cambridge 1980), whose photographs and nontechnical explanations make much clear to the nonscientific classicist. Cf., e.g., on 71 ῥάβδοι, 22.147 f., 151 πολλαὶ ἴριδες and παρήλιοι, where we borrow wholesale from Greenler. Animals, on the other

[97] For exceptions, note 20 "If Lips blows at an equinox it signals rain"; 21, where winds together with other signs are portents; and 35–37, where the characteristics of various winds are listed.

[98] To limit ourselves to the second sentence of the prologue: ὅτι δ' ἑκάστοις [sc. τοῖς ἀνέμοις] αἱ δυνάμεις καὶ ὅλως τὰ παρακολουθοῦντα κατὰ λόγον ἀκολουθεῖ πειρᾶσθαι χρὴ λέγειν, οἷσπερ σχεδὸν διαφέρουσιν ἀλλήλων.

[99] *Ep.Pyth.* 98 ἐπισημασίαι δύνανται γίνεσθαι καὶ κατὰ συγκυρήσεις καιρῶν, καθάπερ ἐν τοῖς ἐμφανέσι παρ' ἡμῖν ζῴοις, καὶ παρ' ἑτεροιώσεις ἀέρος καὶ μεταβολάς. What follows (98–115) is a lengthy meteorological passage giving multiple "scientific" causes for earthquakes, halos, shooting stars, etc., followed by a dismissal of animal weather signs: αἱ δ' ἐπισημασίαι αἱ γινόμεναι ἐπί τισι ζῴοις κατὰ συγκύρημα γίνονται τοῦ καιροῦ· οὐ γὰρ τὰ ζῷα ἀνάγκην τινὰ προσφέρεται τοῦ ἀποτελεσθῆναι χειμῶνα, οὐδὲ κάθηταί τις θεία φύσις παρατηροῦσα τὰς τῶν ζῴων τούτων ἐξόδους κἄπειτα τὰς ἐπισημασίας ταύτας ἐπιτελεῖ.

hand, seem to us to offer less sure signs of upcoming weather, although there are some notable exceptions. Swallows, do, e.g., fly so low over the surface of a lake before a rain that they seem to strike the water with their breasts (see on 15.101 τύπτουσαι), and the flight of cranes can indeed be read for signs of impending rain (see on 38.276 γέρανοι). Generally, though, the animal signs put forward strike us as less reliable, if not outright false. Nor have we been able to find much interest on the part of scientists, let alone a comprehensive book equivalent to Greenler's, which would list and explain those instances where science can verify animal awareness of impending changes in the weather. It is all the more interesting, therefore, to observe that many of *DS*'s animal signs could easily be placed under the rubric "animal foreknowledge," although our author never takes the trouble to tell us so. Thus, cattle sniffing before rain (15.103) all but calls out for the paraphrase "cattle can smell rain in advance." Similar paraphrases come to mind elsewhere: centipedes creeping toward a wall before rain (19.128), kepphoi (gulls; see comm.) fly toward impending wind (28.193), a hedgehog closes off the entranceway facing impending wind (30.211 f.), geese honk louder than usual while feeding before a storm (39.280), birds flee from the sea before storm (41.288), cattle huddle before a storm (41.297 f.), a wolf comes closer than usual to farmland in winter before a storm (46.342), cranes flying straight indicate fair weather (52.380). This last observation was made also by Aristotle, who provides an explicit statement as to the cranes' foreknowledge; i.e., they are able to see storm clouds before an observer at ground level (see the comm. ad loc.).

Some few animal signs, perhaps fewer than one might have guessed, seem to work on the principle of like-to-like (*similia similibus*), which is a prominent notion in both magic and early Greek philosophy:[100] Non–aquatic birds bathing signal rain (15.97, but see the comm. on λουόμενοι), ravens imitating the sound of raindrops signal rain (16.110). See also cc. 17, 25, 31, 42. Other signs seem to be arbitrary and easily dismissable, but it is probably best to keep an open mind (and wish for more help from students of animal behavior).[101]

[100] For magic, cf. F. Graf, *Magic in the Ancient World*, tr. F. Philip (Cambridge, Mass. 1997), c. 7, "Words and acts"; and for philosophy C. W. Müller, *Gleiches zu Gleichem*: *Ein Prinzip frühgriechischen Denkens* (Wiesbaden 1965).

[101] For a negative report on the ability of plants to foretell rain, see N. L. Silvester, "Notes on the behaviour of certain plants in relation to the weather," *Q. J. Royal Meteorological Soc*. 52 (1926) 15–24, who carefully observed several English plants, each of which was (and perhaps still is) credited in scientific literature as well as in popular lore with certain behavior before rain.

8) *Authorship reconsidered.* This study of weather literature has demonstrated how easily one basic text can be taken over by another and appear under this person's name as author. Thus, even a text compiled over a millenium after Aristotle can easily be recognized as belonging to this same tradition. Additions, subtractions, and minor alterations would not save any one of these works from a modern-day charge of plagiarism, but ancient standards applied to scientific, or at any rate factual, material were far more forgiving. Thus, although many ancient authors have been credited with authorship of *DS*, none can be proved. Before we present our theory below, equally unprovable, a brief survey of modern views of authorship is in order.

Although the Aldine printed *DS* as anonymous, credit for assigning it to Theophrastos seems to belong to Simon Grynaeus, who not only omitted it from his 1531 edition of Aristotle (*Ἀριστοτέλους ἅπαντα. Aristotelis ... opera ... omnia*. 2 vols. Basel: Joh. Bebelius. With a preface by Erasmus), he included it in the first book to claim to include all of Theophrastos (*Theophrasti ... opera, quae ... adhuc restant, omnia*. Basel 1541; see the bibliography for details), although it must be admitted that this is only an inference, as Gemusaeus, the author of the first preface, accepts Theophrastos as author without question or argument and without mentioning Grynaeus on this point. Camerarius, who wrote a new preface after Grynaeus' death of the plague shortly after publication, praised him for his work on the text, but, again, says nothing about Grynaeus specific views on *DS*. See Kley 29. All subsequent editors of this text have attributed it to Theophrastos without question: Furlanus, Heinsius, Schneider, Wimmer, Wood, and Hort (although Schneider seems to have been the last editor actually to examine mss., all subsequent editors have been happy to take his word for the readings). Theophrastos was accepted as its author by V. Rose, *Aristoteles Pseudepigraphus* (Leipzig 1863) 244–246. In time, however, questions as to authorship were raised. Böhme argued that the common source for both *DS* and Aratos was Eudoxos; see especially 50–83, although too much of his argument rests on supposed similarities in vocabulary between *DS* and Eudoxos, which is risky since for the latter we are dependent on later sources, who are likely to paraphrase or substitute more familiar synonyms, and in any case many of these words and astronomical terms (like διχοτομία, ἀνατολή, ἀκρόνυχος) are too common to use as criteria. Although we shall ourselves argue for an important place in the history of this text for Eudoxos, it has to be admitted that Böhme's case, as argued, is "gar nichts weiter als ein frommer Wunsch."[102]

[102] Maass, in his review of Heeger, *GGA* (1893) 624.

Heeger sharply criticized Böhme for his elaborate stemma, but many of his arguments are equally weak. As we have already mentioned (see above, n. 12), he was willing to use any stylistic or scientific flaw as proof that *DS* could not be by Theophrastos, whose style was highly praised in antiquity; nor could it, in its present form, even be the work of a student of Theophrastos. This assumes that Theophrastos could not have had a student of whom he was not proud; Heeger's reasoning also ignores the ellipsis and stylistic flatness that comes with the prosaic catalogue form that one regularly finds in works from the Hippocratic corpus to Pliny and beyond. But since Heeger cannot deny the many links between *DS* and what we know of Aristotle's and Theophrastos' works on weather signs, he comes to conclude that some later person excerpted a Peripatetic work on the subject (22). Unknown he may be, but as just shown he may yet have himself been a Peripatetic, which would explain why the abridgement remained among in the Lyceum's library. Also arguing for Peripatetic authorship is Cronin "Authorship"; see below.

Heeger in turn was criticized by E. Maass in his review.[103] He bases his argument for Demokritos as ultimate author of *DS* in part on the basis of the combination of Ionian and poetic words found in both the presocratic and *DS*, but our knowledge of Demokritos' own language is severely limited and there can be no clear line drawn between ionian and poetic vocabulary. Others (including Sider) have already argued that Demokritos is an important figure in the history of weather treatises, but that does not necessarily make him a candidate for author of *DS*. The lack of uniformity in this treatise and its occasional use of a word that seems rather poetic for an (Athenian) treatise can be explained simply by its collective nature. Nonetheless, Maass is well aware that, however much he favors Demokritos, *DS* "will eine Materialsammlung aus älteren Quellen sein" (634).

A. Rehm later put forth Euktemon as author in *Parapegmastudien. Mit einem Anhang: Euktemon und das Buch De signis* (Munich 1941) 122–142 for the appendix. Since, however, there is little known about Euktemon's work, and what we do know points primarily to its being largely parapegmatic in form, Rehm has convinced nobody.[104] For the one passage in *DS* that reads like an entry in a parapegma, see 30.206 πέμπτη καὶ δεκάτη ἀπὸ τροπῶν τῶν χειμερινῶν.

[103] Op. cit. 624–642. Heeger was later criticized in detail by Arrighetti, who argues that *DS* was composed by a learned Alexandrian. Regenbogen 1414 too would credit its current form to an Alexandrian, but he would not agree with Arrighetti's rather favorable assessment.

[104] Cf. Hannah, "Euctemon's parapegma" (see above, n. 26).

With this in mind, a reasonable, if still not provable, transmission for the earlier part of the tradition is as follows:[105] (i) Aristotle, Περὶ σημείων, based on earlier works such as Demokritos', discusses (at least) short-term weather signs and suggests reasons for their validity, as well as discussing the nature of signs. The Aristotelian *Physiognomonika*, which is also concerned with signs, suggests the form that Aristotle's work on weather signs took: not a mere list but one concerned with the causes for each sign as well as with the varying nature of signs.[106] Aristotle's work on weather signs includes a section on the winds and an illustration of a wind-rose. (The extant *On the Locations and Names of the Winds* is either a selection or an abridgement of this; it is supplemented by *DS* cc. 35–6, which adds characteristic weather to, as the title indicates, location [= direction] and name.) Directly from Aristotle, and not long afterward, both (ii) Eudoxos and (iii) Theophrastos write their own works on weather signs,[107] the latter basing his work very much on Aristotle. The weather signs discussed by Eudoxos and Theophrastos would be largely the same, but each author would have put them in different context—Eudoxos in a work on the heavens that included a survey of the constellations (i.e., his *Phainomena*, whose plan Aratos followed), Theophrastos perhaps keeping closer to Aristotle. (iv) Aratos versifies Eudoxos' work (or sections) on the constellations and the weather signs (see above). (v) Someone strips Theophrastos work of its causes (just as, in this reconstruction, Aratos stripped Eudoxos' texts of any scientific context), leaving a carcass that is essentially *De Signis* as we have it in the mss. It probably still passed under the authorship of Theophrastos. Then, under a kind of Gresham's law, the bad (the abridged version) drives out the

[105] For the evidence for the existence and nature of each author given here, see above, section 4.

[106] It is worth noting that the *Physiognomonika* explicitly refers to the need by physiognomists to prepare a thorough collection of signs (ἐκλογὴν τῶν σημείων, 805a33; cf. 806a33) before writing one's work. The author of *Physiognomonika* acknowledges drawing upon such earlier collections (806a36).

[107] Aristotle names his older contemporary in the *Metaphysics* (991a17, 1073b17 = D 6 Lasserre and 1079b21 = D 1) and in the *Ethics* (1101b28 = D 4 and 1172b9 = D 3). (Eudoxos is named also in [Arist.] *Mir. Aus.*) There was sufficient overlap of their lives, however, for Eudoxos (born 392–84) to have read, learned, and borrowed from Aristotle (born 387); that is, say, from ca. 365 to Eudoxos' death ca. 339–31. For this date for Eudoxos' birth, which is later than that usually assigned, cf. H.-J. Waschkies, *Von Eudoxos zu Aristoteles* (Amsterdam 1977), ch. 2 "Die biographischen Daten des Eudoxos von Knidos," who makes a convincing case. In part his argument depends upon conjecturing for *Vita Arist. Latina* 11 *tempore Eudoxi*, which makes little sense, the archon year ἐπὶ Εὐβούλου (345/4). (We thank D. Hutchinson for the reference to Waschkies.)

good (the original, containing signs and causes), becoming the only version maintained in the Lyceum's library. How this could have happened is unfortunately all too easy to imagine, so many displacements, loss, and misattribution did the Lyceum's library experience.[108]

The one question remaining is how to consider the new work in relation to that of its Theophrastean model, as a new work with a separate author, even if only Anon.; or as largely an abridgement of Theophrastos and so still to be included in his corpus. If, however, modern scholarship is content to refer to the anonymous prosification of Dionysios Periegetes' poem *De Aucupio* as a work of Dionysios,[109] it should be equally willing to refer to a mere prose abridgement of Theophrastos' Περὶ σημείων as his work.

9) *Textual tradition.* In total there are thirteen Greek manuscripts extant from the second half of the thirteenth century till the second half of the sixteenth century containing the text of *De Signis*, all but one of which the two editors have autopsied.[110] A census of the Theophrastean manuscripts was prepared by N.G. Wilson, references to which will be given below.[111] There is, furthermore, a medieval Latin translation by Bartholomaeus of Messina (*Bart.*), the mss. of which we ourselves have not examined,[112] although this translation is of great interest for the recensio of *DS*. Made for King Manfred of Messina, who ruled from 1258 till 1266, *Bart.'s* Latin translation is with some probability older than the oldest extant Greek manuscript, Marc. IV.58 from the second half of the thirteenth century. As *Bart.* translated "verbum e verbo,"[113]

[108] Cf. F. Grayeff, *Aristotle and his School* (London 1974), c. 4, "The Library of the Peripatos and its history."

[109] The prose version cited here was most likely based on a didactic poem of unknown title by Dionysios the Periegete (1st–2nd cent. AD), as is briefly but convincingly argued by his Teubner editor A. Garzya, "Sull'autore e il titolo del perduto poema 'Sull'Aucupio' attribuito ad Oppiano," *GIF* 10 (1957) 156–160.

[110] The exception is Harv. 17, permission to view which was denied to D.S.

[111] N. G. Wilson, "The Manuscripts of Theophrastus," *Scriptorium* 16 (1962) 96-102.

[112] Edited by W. Kley, *Theophrasts Metaphysisches Bruchstück und die Schrift Περὶ σημείων in der lateinischen Übersetzung des Bartholomaeus von Messina*. Diss. Berlin 1936. *Bart.*'s translation of the *Physiognomonika* had earlier been edited by R. Foerster, *Scriptores Physiognomonici Graeci et Latini*, vol. I (Leipzig 1893) L-LII.

[113] For more details in general see B. Schneider, *Die mittelalterlichen griechisch-lateinischen Übersetzungen der Aristotelischen Rhetorik* (Berlin 1971) 15-29.

his Latin wordings should be considered for the *restitutio textus*.[114] We accordingly cite *Bart.* along with the two main Greek witnesses for the text of *DS* in the apparatus criticus.

M Venice. Marc. IV.58

2nd half 13th cent. parchment

DS: ff. 26-33 (περὶ σημείων ὑδάτων καὶ πνευμάτων)

Wilson: no. 54

Lit.: Mioni *Aristotelis Codices* 149 f.[115] Mioni *Cod. Gr.* 247[116] Harlfinger-Reinsch 46-49[117] Harlfinger *Mir.* 63 f.[118] Vogt 213

Codex M is the oldest extant Greek manuscript of *DS*, written in the second half of the 13th century by Gerasimos Monachos, as first identified by Elpidio Mioni.[119] *DS* along with *Physiog.* and *De Vent. Situ* form a distinct group in the manuscript tradition. A. Diller[120] assumed that the common textual tradition of *Physiog.* and *DS* on the one side and *De Vent. Situ* on the other side were joined for the first time in M. *De Vent. Situ* was taken from Par. Suppl. 443A (or a predecessor), a codex containing minor geographers. Harlfinger-Reinsch 44 n. 32, arguing against Diller's position, maintained that it is unlikely that the copyist of M would have found as small a work as *De Vent. Situ* in this large collection of geographers. Perhaps so – it should be noted, however, that there is some evidence for the linking of *Physiog.* and *DS* prior to M. The pinax (table of contents) of the 10th-century Par. 1741 lists these two titles, although the folios containing these works are now missing.

[114] For Arist. *Physiog.* see S. Vogt, *Aristoteles*: Physiognomonica (Berlin 1999) 218 f., hereafter cited Vogt; for [Arist.] Probl. see R. Seligsohn, *Die Übersetzung der ps.-aristotelischen Problemata durch Bartholomaeus von Messina*, Diss. Berlin 1934 and H. Flashar, *Aristoteles*: Problemata Physica (Berlin 1962, [4]1991) 373 f.

[115] E. Mioni, *Aristotelis Codices Graeci qui in Bibliothecis Venetiis adservantur*, Padua 1958.

[116] E. Mioni, *Bibliothecae Divi Marci Venetiarum. Codices Graeci Manuscripti*, vol. I.2, Rome 1972.

[117] D. Harlfinger and D. R. Reinsch, "Die Aristotelica des Parisinus Gr. 1741. Zur Überlieferung von Poetik, Rhetorik, Physiognomonik, De signis, De ventorum situ," *Philologus* 114 (1970) 28–50.

[118] D. Harlfinger, "Die handschriftliche Verbreitung der Mirabilien," in H. Flashar, *Aristoteles, Mirabilia*. (Berlin 1972) 62-66.

[119] Mioni *Aristotelis Codices* 149. Gerasimos Monachos copied ff. 1-194.

[120] A. Diller, *The Tradition of the Minor Greek Geographers* (New York 1952) 40 f.

M is an independent witness for *DS* and is a hyparchetype for many other manuscripts, which will be described below. This manuscript may have been brought to Italy by Giovanni Aurispa after his second stay in Constantinople in 1421-23.[121] In any case, among the 238 Greek codices imported in the year 1423, which Aurispa described in a letter as having been written by "very important authors,"[122] are included several Aristotle manuscripts, e.g., Laur. 81.15, Laur. 81.20, and Vat. 1580. We can not be certain, however, that M was included in this particular group.

Vatican City. Vat. gr. 2231 **V**

1st half 14th cent. paper

DS: ff. 269–274 (ἀριστοτέλους)

Not in Wilson

Lit.: S. Lilla, *Codices Vaticani Graeci. Codices 2162–2254 (Codices Columnenses)*, Vatican City 1958 Harlfinger-Reinsch 49 f.

V is a second independent witness, written in the first half of the 14th century. On the basis of the watermarks, the volume as a whole can be dated more specifically to the years between 1320 and 1340, although no watermark serves to date *DS* itself. Although Vat. 2231 has recently been described for another manuscript contained therein,[123] its value for the reconstitution of *DS* was first recognized by Harlfinger-Reinsch 49 f. Vat. 2231 also contains the text of the *Carmen aureum* with a commentary, both in a more diligent and comprehensive version than that written by the scribe Ioannes Grammaticus in the year 925, now Vind. phil. gr. 314.

The tradition of *DS* represented solely by V idiosyncratically often omits passages contained in the M tradition or contains passages omitted by M.[124] Furthermore, it concludes several chapters short of the end and

[121] See D. Harlfinger, *Die Textgeschichte der pseudo-aristotelischen Schrift ΠΕΡΙ ΑΤΟΜΩΝ ΓΡΑΜΜΩΝ. Ein kodikologisch-kulturgeschichtlicher Beitrag zur Klärung der Überlieferungsverhältnisse im Corpus Aristotelicum* (Amsterdam 1971); hereafter cited *Textgeschichte*.

[122] "... gentilium auctorum": see R. Sabbadini, *Carteggio di Giovanni Aurispa* (Rome 1931) xvii.

[123] F. W. Köhler, *Textgeschichte von Hierokles' Kommentar zum Carmen aureum der Pythagoreer.* Diss. Mainz 1965.

[124] The signs omitted have to do with mountains (cc. 20, 22, 24), stars and nebulae (cc. 23, 41, 43, 46, 51), mist (c. 52), clouds (c. 24), and a series of sea- and landbirds (cc. 28, 39, 40).

at the very bottom of its page, with the comment "καὶ ταῦτα μὲν παρὰ τῶν καθόλου παρατηρήσεων ἡμεῖς γεγράφαμεν ὧδε: +". These differences are in line with the general observation that technical treatises of all sorts are subject to revisions in order to make them more useful and beneficial.[125]

In several places V preserves the correct text in opposition to M and in general proves itself to be a superior witness for *DS*. Unlike M and many of its descendents, V does not contain *Physiog.* and *De Vent. Situ*.

There are hints that lead to the assumption that V or a now-lost manuscript of the V-tradition was used for a redaction of the Latin translation, as may indicate e.g. the omissions 41.299-300 ἐν δὲ τῷ Πόντῳ ... νέμεσθαι (together with *Bart.F*); 44.328-9 ἐὰν ... λιμός (together with *Bart.F*) and the readings 41.299 σημαίνουσιν V *Bart.* : σημαίνει M *Bart.GE*; 47.345 χειμώνων μεγάλων M *Bart.* : μεγάλων χειμώνων V *Bart.P*. But this is not the place to argue in depth for the transmission of the Latin translation.

The remaining manuscripts and the Aldine edition are all in the M family. The following three manuscripts descend directly from M.

S Venice. Marc. gr. 216

AD 1445 paper

DS: ff. 22-33 (περὶ σημείων ὑδάτων καὶ πνευμάτων· τοῦ ἀριστοτέλους)

Wilson: no. 50

Lit.: Mioni *Aristotelis Codices* 132 f. Harlfinger-Reinsch 47-9 Harlfinger *Textgeschichte* 283-4 Harlfinger *Mir.* 63 f. Mioni *Thes. Ant.* 330f.[126] Vogt 213

Marc. gr. 216 was transcribed, as was first described by Wilson 101, by Ioannes Skutariotes in the year 1445 at the request of Cardinal Bessarion, as Bessarion himself spelled out on the first free endpaper, along with the date November 4, 1445. Foerster[127] had already demonstrated that for *Physiog.*, S descends from M, which is also the case for *DS*.

[125] See Ann E. Hanson, "Fragmentation of the Greek medical writers," in G. W. Most (ed.), *Collecting Fragments / Fragmente sammeln* (Göttingen 1997 = Aporemata 1) 289-314.

[126] E. Mioni, *Thesaurus Antiquus*, vol. I: *Codices 1-299*, (Rome 1981).

[127] R. Foerster, *De Aristotelis quae ferunter physiognomonicis recensendis*, Kiel 1882, and id., *Scriptores Physiognomonici* (Leipzig 1893).

Paris. Par. gr. 2048 **B**

2nd half 15th cent. paper

DS: ff. 73-84v (ἀριστοτέλους φυσιουνωμονικά [sic] : περὶ σημείων ὑδάτων καὶ πνευμάτων)

Not in Wilson

Lit.: Omont II 184[128] Harlfinger-Reinsch 48 f.

It is noteworthy that in B *Physiog.* does not precede *DS* as is the case in M. It is likely that the copyist contaminated the *explicit* of *Physiog.* from M with the *incipit* of *DS*. Perhaps, therefore, considering *DS* as part of *Physiog.*, he chose this last title as the title for the two works together. The unidentified copyist reproduced the handwriting of his exemplar M as accurately as he could, but often, not understanding M's compendia and other peculiarities, was led into error. For example, note his version of the title, given above; he also misread M's minuscule beta as a mu. He was also prone to common errors of iotacism and other phonological errors, such as confusion of kappa and chi. A later hand corrected some of B's errors and noted omissions in the margin.

Paris. Par. gr. 1893 **P**

before 1497 paper

DS: ff. 145v-152v (περὶ σημείων ὑδάτων καὶ πνευμάτων)

Wilson: no. 28

Lit.: Omont II 159 f. Harlfinger-Reinsch 45-7 Harlfinger *Textgeschichte* 415 Hoffmann 79-82[129] Sicherl 76 f.[130] Vogt 216

DS in P was written and corrected by the same scribe who wrote *DS* in H (see below). The ductus of ff. 135-196 is close to that of a Paulos in Vat. gr. 1046, who might be Paolo Bombasio (see Harlfinger-Reinsch 45-47, 50). P and H were written in the same pale ink on the same paper, as is shown by the common watermarks,[131] and agree in almost every other detail, such as line numbers per page (see Sicherl 77).

[128] H. Omont, *Inventaire sommaire des manuscrits grecs de la Bibliothèque Nationale. Ancien fonds grec*, vol. II, codd. 1319-2541, Paris 1888.

[129] P. Hoffmann, *Un mystérieux collaborateur d'Alde Manuce: L'Anonymus Harvardiensis*, Rome 1985 = Mélanges de l'École Francaise de Rome, 97.

[130] M. Sicherl, *Griechische Erstausgaben des Aldus Manutius. Druckvorlagen, Stellenwert, kultureller Hintergrund*, Paderborn 1997.

[131] Ch. M. Briquet, *Les filigranes. Dictionnaire historique des marques du papier dès leur apparition vers 1282 jusqu'en 1600 avec 39 figures dans le texte et 16.112 facsimilés de*

P was corrected by the scribe himself, e.g. 1.3 (not in the apparatus criticus) παρ'] περὶ *in textu*, παρὰ *in marg.*; 2.8 οἵ] εἵ *in textu*, οἵ *in marg.*; 3.15 Κυνός] κ̆ϊνός; 4.27–8 Μέτων] μέν των *in textu*, μέτων *in marg.*; 8.53 νουμηνίας] ᵛδ̆ϋμηνίας. These corrections were mostly taken over by the copyist when he wrote H (see below).

Ff. 135-196 originally formed a book in itself, consisting of eight quaternions (α-η), which contained *Physiog., DS, De Vent. Situ*, and the Ἰατρικὰ ἀπορήματα ascribed to Alexander of Aphrodisias.

H Harvard. Harv. 17

before 1497 paper

DS: ff. 154^{rv} (περὶ σημείων ὑδάτων καὶ πνευμάτων)

Wilson: no. 9

Lit.: S. de Ricci and W. J. Wilson, *Census of Medieval and Renaissance Manuscripts in the United States and Canada*, vol. I. (New York 1935) 971 ff. J. M. Whitehead, "Fifth century manuscripts of Aristotle," *Harvard Library Notes* 28 (1938) 143 f. C. U. Faye and W. H. Bond, *Supplement to the Census of Medieval and Renaissance Manuscripts in the United States and Canada* (New York 1962) 233b-234a *AG* 110-117[132] Harlfinger-Reinsch 45-7 Harlfinger *Textgeschichte* 415 Hoffmann 76-9 Sicherl 74-8 Vogt 216

H is a direct copy of P by the same scribe, made soon afterwards (this can be concluded on codicological grounds, e.g. ink color and watermarks; see above) after the corrections in P were inserted, as may be obvious from 3.15 Κυνός]: κ̆ϊνός P *post corr.*, Κυνός H. Not all corrections in P were taken over by H, e.g. 4.27–8 Μέτων] μέν των *in textu* PH, μέτων *in marg.* P. In other words H is the "Reinschrift" of the "Arbeitsexemplar" P.

As H contains only one folio of *DS*, f. 154^{rv} (from the beginning, to 6.40 ληπτέον), *Physiog.* must be used to help determine its stemmatic relationship. For connective errors between H and P and their separative errors see Harlfinger-Reinsch 45 f.

H was the copytext for the Aldine of 1497 and contains many printers' marks as well as many ink smudges; see the apparatus criticus to

filigranes (Geneva 1907, Leipzig ^{2}1923) no. 2592. D. Harlfinger, "Zur Datierung von Handschriften mit Hilfe von Wasserzeichen," in D. Harlfinger (ed.), *Griechische Kodikologie und Textüberlieferung* (Darmstadt 1980) 144–169, has demonstrated it is rare for one watermark to be in use for more than eight years.

[132] P. Moraux et al. *Aristoteles Graecus: Die griechischen Manuskripte des Aristoteles*. Vol. 1. *Alexandrien-London*. Berlin 1976.

34.244 for Ἄθως and 46.338 Ἥλιος, where it would seem that ink had obliterated these words before the text was printed. Between the end of *Physiog.* and the beginning of *DS* the number I 13 appears, which was marked through by the Nuremberger Dominican Johannes Cuno (1463–Feb. 21, 1513), and over which he wrote „revisus et correctus a f(ratre) Jo Cuno patavii 1509." Sicherl 75 correctly reasoned that Cuno did not make his corrections and additions for the press, but rather that he took these from the Aldine and inserted them into H. According to Moraux,[133] Ioannes Gregoropulos, who acted as supervisor of Aldus' Greek texts, took home some gatherings of H, which otherwise would have been destroyed.[134] Gregoropulos, who also earned money as a teacher of Greek, evidently passed on these pages to Cuno, who was one of his students. Cuno had very likely arrived in Italy before September 29, 1504, in order to improve his Greek. He would have come into the possession of these detached folios of H no later than 1507, a date he wrote on a page of H containing Ps.-Galen, *De Philosophiae Historia* (ff. 155–173), which, like *DS*, also appeared in the second volume of the Aldine.

Milan. Ambr. P 34 sup. **C**

after 1497 paper

DS: ff. 200ᵛ-213 (ἀριστοτέλους περὶ σημείων ὑδάτων καὶ πνευμάτων)

Wilson: no. 18

Lit.: Martini-Bassi 2.704-5[135] Harlfinger-Reinsch 45, 49 n. 47 Harlfinger *Textgeschichte* 75 Sicherl 76 f. Vogt 217

C was written towards the end of the 15th or the very beginning of the 16th century (see above on H) by Raphael Regius as identified by Lobel.[136] The *terminus ante quem* can be determined on the basis of the connective errors of both C and *Ald.*, which, at least for *Physiog.*, since the one folio in H is insufficient to establish the filiation of *DS*, are

[133] See *AG* 114-5 with further references.

[134] As Aldus says in his preface to volume 2 of his Aristotle-edition (see below), there was no longer any need to keep the now ink-stained exemplars.

[135] A. Martini and D. Bassi, *Catalogus Codicum Graecorum Bibliothecae Ambrosianae*, Milan 1906.

[136] On Regius see E. Lobel, *The Greek Manuscripts of Aristotle's Poetics*, (Oxford 1933 = Transactions of the Bibliographical Society, Suppl. 9) 12 f.; E. Cosenza, *Biographical and Bibliographical Dictionary of the Italian Humanists and of the World of Classical Scholarship in Italy, 1300–1800* (Boston 1962) 4.3017-21.

peculiar errors of H (see Harlfinger-Reinsch 45 for examples). The separative errors between C and *Ald.* indicate that C was written before the corrections in *Ald.* were added to H by Cuno. Since he took H with him when he left for Basel in 1510, C must have been written before this date (maybe before H came into possession of Cuno, i.e. before 1507). Furthermore, this explains why C does not contain the changes made by Cuno. (We have no indication that anyone other than Cuno made changes in H.)

It is interesting to note that C is – along with, e.g., Par. gr. 1861 with 17 treatises or Lips. 24 with *EN*, *Pol.*, *Oec.*, and *Rhet.* – one of the few manuscripts at the end of the 15th and during the 16th century which, after the arrival of inexpensive printed books,[137] continued the practice of arranging its contents according to specific topics, such as logic, physics, zoology and biology, or ethics.

Ald. Aldus Manutius, with the aid of Alexander Bondinus. [Works of Aristotle, Theophrastus, and others.] 5 vols. Venice 1495-98: Aldus Manutius.

DS: Vol. 2 (1497) ff. 261r-267r.

The first great work that came from the press of Aldus Manutius in Venice was the five-volume editio princeps of Aristotle and Theophrastos, published 1495-98.[138] The *Poetics* and the *Rhetoric* were not included; the *Characters* of Theophrastos were not published until 1527 by Willibald Pirckheimer in Nuremberg and the first attempt to print all the works of Theophrastos was the edition of Symon Grynaeus in 1541; see the bibliography for details of this latter volume. With this publication, Aldus hoped to satisfy the growing need for the works of Aristotle, which resulted from the establishment of Europe's first chair for the study of Aristotle at the University of Padua in 1497.

Volume two of the Aldine contains, after some lives of Aristotle and Theophrastos, five works of Aristotle (including *De Mundo*) and the *De Mundo* of Philo. The volume concludes with three works indisputably by

[137] A printed book cost about 1/5 to 1/8 the price of a manuscript; see F. Milkau and G. Leyh, *Handbuch der Bibliothekswissenschaften*, 2nd edition, vol. 1: *Schrift und Buch* (Wiesbaden 1952) 876.

[138] On Aldus in general see, in addition to Sicherl, M. Lowry, *The World of Aldus Manutius: Business and Scholarship in Renaissance Venice*, Oxford 1979; G. Fletcher, *New Aldine Studies: Documentary Essays on the Life and Work of Aldus Manutius*, San Francisco 1988.

Theophrastos and with *DS*. In the table of contents, the order of the last four works are: Theophrasti de igne, liber unus / Eiusdem de Ventis liber unus / De signis aquarum & uentorum, incerti auctoris / Theophrasti de lapidibus, liber unus. In the volume itself, however, not only is the order of the last two reversed, but in addition *De Vent. Situ* has been added, without any separate title, to *DS* on ff. 267^{rv}, and without any other indication that it is a separate work. Furthermore, although generally throughout *DS* and *De Vent. Situ* the page headings refer to the various chapters of *DS*, exceptionally the heading on fol. 265^{v} is Θεοφράστου, which is the Aldine's heading throughout the three other Theophrastean works in this volume. Since, moreover, the heading Θεοφράστου also appears on the last page of *De Lapidibus*, a verso immediately facing the first page of *DS*, where the title alone introduces the new work, the reader who does not go back to the table of contents may be forgiven for thinking that *DS* is a work by Theophrastos, as in fact the scribe of L did (see below).

Vatican City. Vat. Reg. gr. 123 **L**

after 1497 paper

DS: ff. 330^{v}-339^{v} (no title)

Wilson: no. 42

Lit.: H. Stevenson, *Codices Manuscripti Graeci Reginae Suecorum et Pii PP. II* (Rome 1888) 87 f. Harlfinger-Reinsch 48 Harlfinger *Textgeschichte* 74

L was written some time after 1497, probably in the 16th century, copied from the Aldine (as were Vat. Reg. 124 und 125) by a copyist who was obviously not Greek. As noted by Harlfinger *Textgeschichte* 74, L reproduced the arrangement of the second volume of the Aldine (Reg. 124 and 125 reproduced the arrangement of the fourth and fifth volumes, respectively). Noteworthy are the scribe's many attempts to imitate Aldus' compendious sorts, such as παρά and καί. Even more interesting is the fact that this is the only manuscript to identify the author of *DS* as Theophrastos; see above, on *Ald.* In L, *DS* begins on the bottom third of fol. 330^{v}. Every verso of *DS* has as heading θεοφράστου δ, which suggests that the scribe of L considered *DS* to be the fourth work by Theophrastos in the second volume of the Aldine (see above). That this scribe had the Aldine in front of him is further indicated by the fact, that his headings of the recto pages repeat the subheadings of the Aldine (with one exception, that he has added περὶ βορροῦ on his own).

Q Venice. Marc. gr. 200

AD 1457 parchment

DS: ff. 293^{v}-296^{v} (Ἀριστοτέλους περὶ σημείων ὑδάτων καὶ πνευμάτων χειμῶνος καὶ εὐδίας)

Wilson: no. 47

Lit.: Mioni *Aristotelis Codices* 113-115 Harlfinger-Reinsch 48 f. Harlfinger *Textgeschichte* 71, 183-187 Harlfinger *Mir.* 63 Mioni *Thes. Ant.* 311-313 Vogt 214

Q was written in an elegant hand in 1457 (completed on July 15) by Ioannes Rhosos, who was commisioned to do so by Cardinal Bessarion, whose subscription appears on fol. 594. An impressive folio volume which, alone of Aristotle manuscripts, contains all of his works other than the *Organon*. The text of *DS* was copied from S, as were those of N and F (see below).

Rhosos copied a complete series of treatises out of S: *Physiog.*, *DS*, *De Vent. Situ*, *Mirabilia*, *De Mundo*, *MXG*, *Mechanika*.[139] This manuscript together with S and Marc. 212 belong to a group commissioned by Bessarion primarily intended merely to preserve and make available all the works of Aristotle. N on the other hand, belongs to a group of later manuscripts (Marc. 206, 207 and 213) in which Bessarion took the time to make editorial changes.[140] Although his skills as copyist were later to improve, here Rhosos shows a tendency to make some careless errors, cf. Harlfinger *Textgeschichte* 274.

N Venice. Marc. gr. 215

between 1465 and 1472 parchment

DS: ff. 193-198 (περὶ σημείων ὑδάτων καὶ πνευμάτων τοῦ ἀριστοτέλους)

Wilson: no. 49

Lit.: Mioni *Aristotelis Codices* 131 Harlfinger-Reinsch 47 f. Harlfinger *Textgeschichte* 72, 309-11 Harlfinger *Mir.* 63 f. Mioni *Thes. Ant.* 329 Vogt 215

N, written between 1465 and 1472, was also commissioned by Bessarion and remained in his possession, as an autograph exlibris shows.

[139] Cf. Harlfinger *Textgeschichte* 191.
[140] Cf. Harlfinger *Textgeschichte* 71 f.

Four copyists produced the volume, none of whom signed his name, although Harlfinger *Textgeschichte* 310 has identified the first as Demetrios Triboles (ff. 1-35^{v}) and the scribe of the following folios (36-185) as the so called Anonymus K(amariotes) B(essarion).

If we may assume, as seems obvious, that N was written in Rome, the span of time in which it was produced can be limited to that between 1465 and 1472, for Bessarion died on November 18, 1472, and Demetrios Triboles was in Greece at least until 1465.

On the basis of shared errors it can be shown that N and F are cognate, dependend on a now-lost predecessor.

Florence. Laur. 57.33 **F**

3rd quarter 15th cent. paper

DS: ff. 88^{v}-96^{v} (no title)

Not in Wilson

Lit.: Bandini II.385-7 Harlfinger-Reinsch 49 *AG* 203-205 Vogt 215

On the basis of watermarks in the shape of either a horn or the letter S with a cross,[141] F can be dated to the third quarter of the 15th century. Two different hands can be distinguished; the change from one to the other occurring, strangely enough, in the middle of a work, [Aristotle] *De Virtute* (fol. 151^{v}/152).

For the filiation (F and N depend upon a common predecessor now lost on M) see Harlfinger-Reinsch 49.

Milan. Ambr. A 174 sup. **A**

ca. 1470 paper

DS: ff. 21^{v}-27 (no title)

Wilson: no. 17

Lit.: Martini-Bassi 1.80[142] Harlfinger-Reinsch 47, 49 Harlfinger *Textgeschichte* 271-273, 414 Harlfinger *Mir.* 64 Vogt 215

[141] Horn, similar to Briquet 7693; letter S with cross, similar to Briquet 9056; see *AG* 203-4.

[142] A. Martini and D. Bassi, *Catalogus Codicum Graecorum Bibliothecae Ambrosianae* (Milan 1906).

A was written in the 15th century for the most part[143] by a copyist, whom Harlfinger, *Textgeschichte* 272 considers "unzweifelhaft identisch" with the scribe named elsewhere by Constantine Lascaris, in Matr. 4676, as a certain Manuel μαθητής.

This Manuel, who had written other Madrid manuscripts either for or together with Lascaris,[144] belonged to his circle at least as early as Lascaris' Milan period (1458–65). Manuel must also have spent some time in Rome, as a subscription in the hand of Lascaris in Matr. 4636 demonstrates: Μανουὴλ ἐν Ῥώμῃ ἐξέγραψε.[145]

Other parts of A were written by Ioannes Rhosos,[146] who copied *DS* in Q (see above). The most likely place of copying the manuscript was Rome, as has been demonstrated by Harlfinger *Textgeschichte* 273, on the basis of the watermark (horn with cross, very similar to Briquet 7834), which is also found in two manuscripts, written in Rome in 1471 by Rhosos (Par. 1910 and Laur. 55.9). It is possible that A was produced under the calligraphic supervision of Rhosos, who wrote the first pages of several of the works in A himself, probably to set the format for Manuel, and who participated in copying the rest only in brief passages, while Manuel copied the rest.

This manuscript at first glance seems to be a immediate copy of S, but collation of DS' sister texts *Physiog.* and *De Lineis* in A and in Vind. phil. 231[147] shows that there was an intermediary copy; Vind. phil. 231 originally contained *DS*, as can be seen from the table of contents, but *DS*, along with the conclusion of *Physiog.* and a significant part of *De Vent. Situ*, were lost when three quaternions and three folios went astray and were presumably destroyed.[148]

Moreover, since Emmanuel, the otherwise unknown scribe of Vind. phil. 231 dated the subscription to January 20, 1458, we now have a *terminus ante quem* for the lost exemplar. Its *terminus post quem* is November 4, 1445, the completion date of its exemplar S.

[143] These are ff. 3-8v, 17-99, 103-157v, 183-208v, 219-338; see Harlfinger *Textgeschichte* 414.

[144] „κόπος καὶ κτῆμα Κωνσταντίνου Λασκάρεως ... τὸ μὲν ἐξ αὐτοῦ, τὸ δὲ ἐκ Μανουήλου μαθητοῦ"; cf. Harlfinger *Textgeschichte* 272 with nn. 1-2.

[145] Cf. Harlfinger *Textgeschichte* 273.

[146] As Martini-Bassi 1.80 had correctly seen earlier, Rhosos copied ff. 1-2v, 9-16v, 99 (middle of the page)-102v, 158-182 and 209-218v.

[147] For a shortlist with further references see Vogt 214.

[148] See Harlfinger *Textgeschichte* 282 with n. 2; see further 274-282 on the cultural background of this interesting manuscript.

Turin. B.II.18 **T**

2nd half 16th cent. paper

DS: ff. 262-272v (περὶ σημείων ὑδάτων καὶ πνευμάτων, χειμώνων καὶ εὐδιῶν)

Not in Wilson

T was written in the second half of the 16th century by Nikolaos Choniates. In terms of the readings, T is in the M family, but either Choniates or a predecessor thoroughly rearranged the order of signs after c. 10 according to the bearer of signs (such as moon, sun, halo etc.), and omits, besides single words ot two-word phrases, these passages: 25.173-4 δεῖ ... γευομένοις; 26.176-178 ὕδατος ... τάδε (together with *Bart.Z*); 29.202-3 ἐὰν ... μεταβάλλει (together with *Bart.P*); 30.206-211 ἡ πέμπτη ... δεξιόν (together with *Bart.T*); 33.237-8 σελήνης ... πνεύματα (together with C *Ald.* L); 34.244-5 Ἄθως ... πολλά (together with V); 34.247–8 μετὰ χιόνα ... σημαίνουσιν; 40.289-90 καὶ σπίνος ... χειμῶνα (together with V); 41.299-300 ἐν δὲ τῷ Πόντῳ ... νέμεσθαι (together with V *Bart.F*); 42.307 καὶ ... χειμέριον; 42.909-10 λύχνος ... χειμέρια; 44.328-9 ἐὰν ... λιμός (together with V *Bart.F*); 49.358-60 καὶ ... εὐδίαν; 53.389-92 καὶ ... σημαίνει; c. 57 in total.

As T agrees with PC *Ald.* L in all omissions (for the bigger one see above 33.237-8)[149] and many other readings but goes together with *Ald.* L in errors and significant readings against PHC (e.g. 14.92 ὡς ἂν MV *Bart.*] ὡς ἐὰν PC : ἧς ἐὰν *Ald.* LT), it is obvious that T is in close relation to *Ald.* (and T) and that the omissions shared with V (and *Bart.*) must be somewhat a coincidence and are most probably due to the rearrangement of the signs. As is the fact that the last sentence of T is the same as the last sentence of V (54.397; see above), although virtually everything between this last sentence and c. 57 is contained in T somewhere or other.

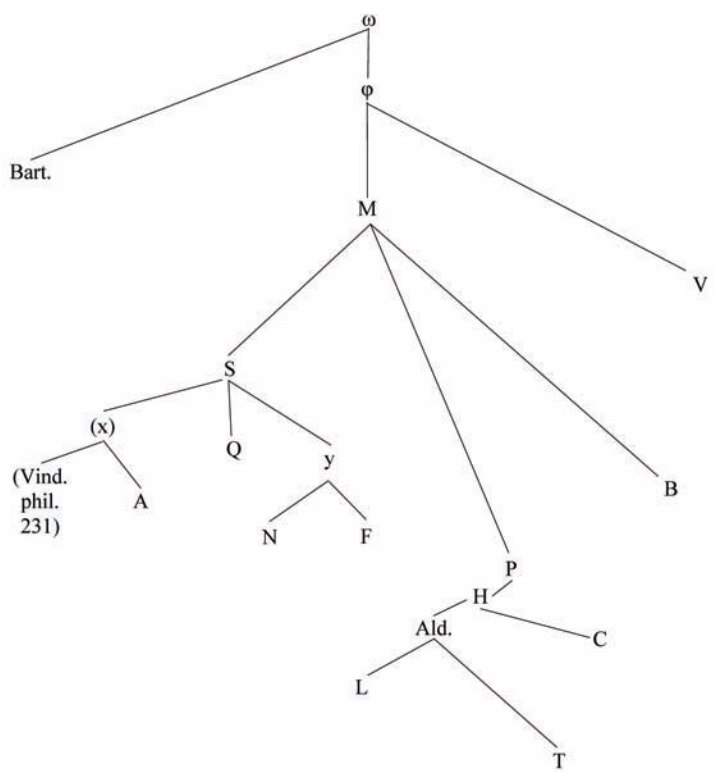
As a brief example of T's rearrangement, note the following ordering, in terms of the line numbers of our text, immediately after c. 10: 60-70, 158-9, 314-9, 153-8, 74-6, 129.

As T is an apographon (and most probably from a printed edition), in the apparatus criticus we do not indicate where in the manuscript the reading in fact occurs, nor do we record omissions or singular readings of T.

[149] That B also omits it means little or nothing as B is a direct copy of M and omits some other sentences we find in T in accordance with the rest of the M-filiation. This omission might be due to "Fehlerkoinzidenz", on which see Harlfinger *Textgeschichte* 18-25.

Filiation

The textual relationship among the manuscripts has been solidly established by Harlfinger-Reinsch. The stemma below is based on theirs for the M-tradition, omitting those mss. that do not contain *DS* and adding V, T and *Bart.* For detailed lists of readings of the Greek manuscripts that established the stemma we refer the reader to Harlfinger-Reinsch. In the case of "Überlieferungsgemeinschaft" with *Physiog.* the stemma was recently affirmed by Vogt 221-226.



TEXT AND TRANSLATION

CONSPECTUS SIGLORUM

M	=	Marcianus Gr. IV.58; s. 13
V	=	Vaticanus Gr. 2231; s. 14
Bart.	=	versio Latina Bartholomaei; s. 13

Raro citantur:

S	=	Marcianus Gr. 216; a. 1445
B	=	Parisinus Gr. 2048; s. 15
P	=	Parisinus Gr. 1893; s. 15
A	=	Ambrosianus A 174 sup.; s. 15
Q	=	Marcianus Gr. 200; a. 1457
N	=	Marcianus Gr. 215; s. 15
F	=	Laurentianus Gr. 57.33; s. 15
H	=	Harvardianus 17; s. 15
C	=	Ambrosianus P 34 sup.; s. 15
L	=	Vaticanus Reg. Gr. 123; s. 16
T	=	Taurinensis B.II.18; s. 16

Ald.	=	editio Aldina, Venice 1497
Bonav.	=	F. Bonaventura, *Anemologiae pars prior* ..., Urbino 1593
Bö.	=	J. Böhme, *De Theophrastis quae feruntur περὶ σημείων excerptis.* Diss. Halle (Hamburg) 1884
Furl.	=	D. Furlanus, *Theophrasti Eresii Peripaticorum post Aristotelem* ... Hanau 1605
Gryn.	=	S. Grynaeus, *Theophrasti ... Opera, quae ... adhuc restant, omnia*, Basel 1541
Heins.	=	D. Heinsius, *Theophrasti Eresii Graece et Latine opera omnia*, Leiden 1613
Ho.	=	A. Hort, *Theophrastus. Enquiry into Plants and ... Weather Signs*, vol. 2. Cambridge, Mass. and London 1926

Schn. = J. G. Schneider, *Theophrasti Eresii quae supersunt omnia*, Leipzig, 1 (1818); 2 (1818); 4 (1818); 5 (1821)

Wi. = F. Wimmer, *Theophrasti Eresii Opera quae supersunt omnia*, Vol. 3, Leipzig 1862

Wi. 1866 = F. Wimmer, *Theophrasti Eresii Opera quae supersunt omnia*, Paris 1866

Wood = J. G. Wood. *Theophrastus of Eresus on Winds and on Weather Signs*, London 1894

ΠΕΡΙ ΣΗΜΕΙΩΝ
ΥΔΑΤΩΝ ΚΑΙ ΠΝΕΥΜΑΤΩΝ
ΚΑΙ ΧΕΙΜΩΝΩΝ ΚΑΙ ΕΥΔΙΩΝ

1 Σημεῖα ὑδάτων καὶ πνευμάτων καὶ χειμώνων καὶ εὐδιῶν ὧδε ἐγράψαμεν καθ' ὅσον ἦν ἐφικτόν, ἃ μὲν αὐτοὶ προσκοπήσαντες, ἃ δὲ παρ' ἑτέρων οὐκ ἀδοκίμων λαβόντες. τὰ μὲν οὖν ἐπὶ τοῖς ἄστροις δυομένοις καὶ ἀνατέλλουσιν ἐκ τῶν ἀστρονομικῶν δεῖ
2 λαμβάνειν. εἰσὶ δὲ δύσεις διτταί· οἵ τε γὰρ ἀφανισμοὶ δύσεις εἰσί· τοῦτο δέ ἐστιν ὅταν ἅμα συνδύνῃ τῷ ἡλίῳ τὸ ἄστρον, καὶ ὅταν ἀνατέλλοντι δύνῃ. ὁμοίως δὲ καὶ ἀνατολαὶ διτταί, αἱ μὲν ἑῷοι ὅταν προανατέλλῃ τοῦ ἡλίου τὸ ἄστρον, αἱ δ' ἀκρόνυχοι ὅταν ἅμα δυομένῳ ἀνατέλλῃ. αἱ μὲν οὖν τοῦ Ἀρκτούρου λεγόμεναι ἀνατολαὶ ἀμφοτέρως συμβαίνουσιν· ἡ μὲν γὰρ τοῦ χειμῶνος ἀκρόνυχός ἐστιν, ἡ δὲ μετοπωρινὴ ἑῴα. τῶν δ' ἄλλων αἱ πλεῖσται τῶν ὀνομαζομένων ἑῷαι οἷον Πλειάδος καὶ Ὠρίωνος καὶ Κυνός.
3 τῶν δὲ λοιπῶν σημείων ἔνια μὲν ἴδια κατὰ πάσας χώρας ἐστὶν ἐν ὅσαις ὄρη ὑψηλὰ καὶ αὐλῶνές εἰσι, μάλιστα δὲ ὅσα πρὸς θάλασσαν καθήκει τῶν ὑψηλῶν· τῶν τε γὰρ πνευμάτων ἀρχομένων τὰ νέφη προσπίπτει πρὸς τοὺς τοιούτους τόπους καὶ μεθισταμένων εἰς τοὐναντίον ἀντιμεθίστανται καὶ ὑγρότερα γινόμενα διὰ βάρος εἰς τὰ κοῖλα συγκαθίζει. διὸ δεῖ προσέχειν οὗ ἄν τις ἱδρυμένος ᾖ. ἔστι γὰρ αἰεί τινα λαβεῖν τοιοῦτον γνώμονα καὶ ἔστι σαφέστατα τὰ σημεῖα τὰ ἀπὸ τούτων.
4 διὸ καὶ ἀγαθοὶ γεγένηνται κατὰ τόπους τινὰς ἀστρονόμοι ἔνιοι οἷον Ματρικέτας ἐν Μηθύμνῃ ἀπὸ τοῦ Λεπετύμνου, καὶ

1–3 περὶ σημείων ὑδάτων καὶ πνευμάτων MPH : ἀριστοτέλους V : ἀριστοτέλους φυσιουνωμονικά· περὶ σημείων ὑδάτων καὶ πνευμάτων B : περὶ σημείων ὑδάτων καὶ πνευμάτων· τοῦ ἀριστοτέλους SN : ἀριστοτέλους περὶ σημείων ὑδάτων καὶ πνευμάτων CQ : περὶ σημείων ὑδάτων καὶ πνευμάτων, χειμώνων καὶ εὐδιῶν T : *sine titulo* FAL 7 ἀνατέλουσιν M 8 οἵ VP$^{i.m.}$: εἵ M *non habet Bart.* 9 συνδύῃ V 10 ἀνατέλλοντι MV : ἅμα ἀ. *Gryn.* : [ἅμα] ἀ. *Schn.* : ἀνατέλλοντος *Schn.* (5.164) *ex* oriente sole *Bart.* 12 δυομένῳ M *Bart.* : δυόμενος V 13 ἀμφοτέρως VSNFQAP$^{p.c.}$: ἀμφιτερίως M *Ald. acc. varr.* 14sq. τῶν … ἑῷαι *om.* V 15 κυνός V *Bart.* P$^{p.c.}$ HC *Ald.* LT : κοινός M 17 ὅσαις M : ὅσαι VP$^{p.c.}$ 20 ἀντιμεθίστανται M *Bart.* : ἀντιμεθίσταται V *tent. Ho. in app. crit.* 22 ἀεί V 23 τὰ^{1} *om.* M

THEOPHRASTUS, *ON SIGNS*

Introduction

We wrote down the signs of rain, winds, storms, and fair weather as 1
follows to the extent that we were able, some of which we ourselves observed, others of which we took from men of no small repute. Those signs, then, that have to do with the stars as they set and rise must be learned from the astronomers: Settings are of two 2
sorts, since their disappearances are settings, and this occurs both when the star sets at the same time as the sun and when the star sets as the sun rises. Similarly, risings are also of two sorts, those in the morning when the star rises before the sun and those at nightfall (acronychal) when it rises while the sun is setting. The frequently-mentioned risings of Arktouros occur at both times: Its winter rising is acronychal, its fall rising occurs at dawn. But the majority of other risings of the named constellations occur at dawn, such as the Pleiades, Orion, and Sirius.

Of the remaining signs, some are peculiar to all places where 3
there are high mountains and narrow valleys, especially where the mountains drop sharply to the sea, for, as winds start up, the clouds crash into such places; and as the winds reverse direction the clouds follow along in turn, and as they become more moisture-laden they gather and settle in the hollows. It is therefore necessary to pay attention to where a person is situated. For it is always possible to find such a person to serve as expert witness, and the signs from these people are most accurate.

Thus some quite good astronomers have developed here and 4
there. For example, Matriketas in Methymna, looking from Mt.

Κλεόστρατος ἐν Τενέδῳ ἀπὸ τῆς Ἴδης, καὶ Φαεινὸς Ἀθήνῃσιν ἀπὸ τοῦ Λυκαβηττοῦ τὰ περὶ τὰς τροπὰς συνεῖδε, παρ' οὗ Μέτων ἀκούσας τὸν τοῦ ἐνὸς δέοντα εἴκοσιν ἐνιαυτὸν συνέταξεν. ἦν δὲ ὁ μὲν Φαεινὸς μέτοικος Ἀθήνῃσιν, ὁ δὲ Μέτων Ἀθηναῖος. καὶ ἄλλοι δὲ τοῦτον τὸν τρόπον ἠστρολόγησαν.

5 ἄλλα δέ ἐστι σημεῖα ἃ λαμβάνεται ἀπό τε ζῴων καὶ τῶν κατ' οἰκίαν καὶ ἑτέρων, τῶν τε τρόπων καὶ παθημάτων, μάλιστα δὲ κυριώτατα τὰ ἀπὸ τοῦ ἡλίου καὶ τῆς σελήνης· ἡ γὰρ σελήνη νυκτὸς οἷον ἥλιός ἐστι· διὸ καὶ αἱ σύνοδοι τῶν μηνῶν χειμέριοι εἰσιν ὅτι ἀπολείπει τὸ φῶς τῆς σελήνης ἀπὸ τετράδος φθίνοντος μέχρι τετράδος ἱσταμένου. ὥσπερ οὖν ἡλίου ἀπόλειψις γίνεται κατὰ τὸν ὅμοιον τρόπον καὶ τῆς σελήνης ἔκλειψις.

6 δεῖ οὖν προσέχειν μάλιστα ταῖς ἀνατολαῖς τούτων καὶ ταῖς δύσεσιν ὁποίας ἂν ποιῶνται τὸν βουλόμενον προγινώσκειν. πρῶτον μὲν οὖν ληπτέον ὅτι αἱ διχοτομίαι διορίζουσι τὰς ὥρας ὥστε ἐπὶ τούτων δεῖ ἀθρεῖν καὶ ἐνιαυτὸν καὶ μῆνα καὶ ἡμέραν. διχοτομεῖ δὲ τὸν μὲν ἐνιαυτὸν Πλειάς τε δυομένη καὶ ἀνατέλλουσα· ἀπὸ γὰρ δύσεως μέχρι ἀνατολῆς τὸ ἥμισυ τοῦ ἐνιαυτοῦ ἐστιν. ὥστε δίχα τέμνεται ὁ πᾶς χρόνος.

7 ὁμοίως δὲ καὶ αἱ τροπαὶ καὶ ἰσημερίαι ποιοῦσιν. οἵα τις οὖν ἂν ᾖ κατάστασις τοῦ ἀέρος Πλειάδος δυομένης οὕτως ἔχει ὡς ἐπὶ τὸ πολὺ μέχρι τροπῶν, κἂν μεταβάλλῃ, μετὰ τροπάς· ἐὰν δὲ μὴ μεταβάλλῃ διέχει οὕτως ἕως ἰσημερίας, κἀκεῖθεν ὡσαύτως μέχρι

27 Λυκαβηττοῦ *Heins.* : λυκάμβη τοῦ MV *acc. varr.* : λυκάμβητον HC *Ald.* LT *acc. varr.* 27sq. Μέτων V *Bart.* P$^{i.m.}$: μέν τῶν M *acc. varr.* 28 τοῦ HC *Ald.* LT : τῶν MV ἐνιαυτὸν MP$^{a.c.}$ *Bart. Schn.* (5,LVII) : ἐνιαυτῶν VP$^{p.c.}$ HC *Ald.* LT : ἐνιαυτῶν ⟨κύκλον⟩ *Ho.* 29 Μέτων MV *Bart.* P$^{i.m.}$: μέντων PHC *Ald.* LT 31 καὶ MV *Bart.* : *secl. Schn.* (5.164) 31sq. κατ' οἰκίαν καὶ *Schn.* (5.164) : κατ' οἰκίαν M *Bart.* : *om. spat. vac. ca. 7 litt.* V 32 τῶν τε *nos* : τινῶν M : κοινῶν V *Bart.* : τινῶν κοινῶν *Schn.* (5.164) τρόπων *Schn.* (4.721) : τόπων MV *Bart.* 33 κυριώτατα τὰ *Gryn., approb. Ho.* : κύρια τὰ *tent. Ho. in app. crit.* : καὶ κυριώτατα *Schn.* (4.721) : κυριώτατά ἐστι σημεῖα *Schn.* (5.164) *ex* principalissima sunt signa *Bart.Z* : κυριώτατα MV *Bart.* 36 ἀπόλειψις MV : ἔκλειψις *Bö.* 64 37 ἔκλειψις MV : ἀπόλειψις *Bö.* 64 38 τούτων V : ταῖς τ. M 40 *post* ληπτέον *des. mut.* H διχοτομίαι M : –μαὶ V 41 ἀθρεῖν M *Bart.* : ἀρθρεῖν V 45 αἱ *om.* V 45sq. οὖν ἂν V : ἂν M : pro ἂν lego οὖν *Bonavent.* : ἂν οὖν *Schn.* (5.LVII) 46 τοῦ ἀέρος *Schn.* (5.LVII) *ex* aeris *Bart.* : *om.* MV 47 μεταβάλλῃ μετὰ τροπάς M : μεταβάλλειν μέλλῃ τροπῶν V *Bart.* 48 διέχει *Schn.* (2.601) : διέχῃ T : δεῖ ἔχειν MV *Bart.* οὕτως *Schn.* (5.165) *e* sic *Bart.* : *om.* MV

Lepetymnos; Kleostratos in Tenedos, from Mt. Ida; Phaeinos in Athens observed the phenomena associated with solstices from Mt. Lykabettos; and his student Meton constructed his nineteen-year cycle. (Phaeinos was a metic in Athens, Meton was an Athenian.) And there were also others who studied astronomy in this way.

There are, however, other signs which are taken from animals 5
both domestic and otherwise, from their habits and reactions, but the best signs are from the sun and the moon (which is the night-time equivalent to the sun). This is the reason for wintry days at the time of the new moon, since the light of the moon is absent from the last four days at the end of the month until the first four of the next month. The loss of the moon, therefore, occurs just like the loss of the sun.

Anyone who wishes to predict the future must accordingly pay 6
the closest attention to the nature of the risings and settings of these two bodies. The first point to grasp is that time periods are defined by dichotomies, and so when dealing with these periods one must consider the year, the month, and the day. The rising and setting of the Pleiades divides the year in two, for there is half a year from setting until rising, and so the entire time is cut in two.

Solstices and equinoxes work the same way. Whatever the 7
general state of the atmosphere is at the time of the Pleiades' setting it remains this way in most cases until the next solstice; any change occurs after the solstice. And if there is no change, things remain the same until the equinox. From this point similarly until

Πλειάδος, καὶ ἀπὸ ταύτης μέχρι τροπῶν θερινῶν, καὶ ἐντεῦθεν μέχρι ἰσημερίας, καὶ ἀπὸ ἰσημερίας μέχρι Πλειάδος δύσεως.

8 ὡς δ' αὕτως ἔχει καὶ περὶ τὸν μῆνα ἕκαστον· διχοτομοῦσι γὰρ αἵ τε πανσέληνοι καὶ αἱ ὀγδόαι καὶ αἱ τετράδες, ὥστε ἀπὸ νουμηνίας ὡς ἀπ' ἀρχῆς δεῖ σκοπεῖν. μεταβάλλει γὰρ ὡς ἐπὶ τὸ πολὺ ἐν τῇ τετράδι, ἐὰν δὲ μὴ ἐν τῇ ὀγδόῃ, εἰ δὲ μὴ πανσελήνῳ· ἀπὸ δὲ πανσελήνου εἰς ὀγδόην φθίνοντος, καὶ ἀπὸ ταύτης εἰς τετράδα, ἀπὸ δὲ τετράδος εἰς τὴν νουμηνίαν.

9 ὡς δ' αὕτως καὶ ἐπὶ τῆς ἡμέρας ἔχουσιν αἱ μεταβολαὶ ὡς ἐπὶ τὸ πολύ. ἀνατολὴ γὰρ καὶ πρωῒ καὶ μεσημβρία καὶ δείλη καὶ δύσις καὶ τὰ τῆς νυκτὸς μέρη τὰ ἀνάλογα ταὐτὸ ποιεῖ τοῖς εἰρημένοις περὶ πνευμάτων καὶ χειμώνων καὶ εὐδίας. μάλιστα γὰρ ἐὰν μέλλῃ μεταβάλλειν ἐν ταῖς διχοτομίαις μεταβάλλει. καθόλου μὲν οὖν τὰς ὥρας οὕτω δεῖ παρατηρεῖν, καθ' ἕκαστα δὲ τῶν σημείων κατὰ τὸν ὑπογεγραμμένον τρόπον.

10 ὕδατος μὲν οὖν σημεῖα τὰ τοιαῦτα δοκεῖ εἶναι. ἐναργέστατον μὲν οὖν τὸ ἑωθινὸν ὅταν πρὸ ἡλίου ἀνατολῆς φαίνηται ἐπιφοινίσσον σημεῖον· ἢ γὰρ αὐθημερὸν ἐπισημαίνει ἢ τριῶν ἡμερῶν ὡς ἐπὶ τὸ πολύ. ἃ δηλοῖ δὲ καὶ τὰ ἄλλα σημεῖα· ἐὰν γὰρ δὴ πρότερον, τριταῖα μάλιστα σημαίνει τὸ ἐπιφοινίσσον καὶ δύνοντος, ἧττον δὲ ἢ τὸ ἑωθινοῦ.

11 καὶ ἐὰν δύνῃ χειμῶνος ἢ ἔαρος εἰς νεφέλιον τριῶν ἡμερῶν ὡς τὰ πολλὰ ἐπισημαίνει. καὶ ἐὰν ῥάβδοι νοτόθεν, ταὐτὰ δὲ ταῦτα βορρᾶθεν γινόμενα ἀσθενέστερα. καὶ ἐὰν ἀνίσχων μέλαν σημεῖον ἴσχῃ, καὶ ἐὰν ἐκ νεφελῶν ἀνέχῃ ὑδατικόν, καὶ ἐὰν ἀκτῖνες ἀνίσχοντος ἀποτείνωσι πρὶν ἀνατεῖλαι κοινὸν ὕδατος σημεῖον καὶ ἀνέμου. καὶ ἐὰν καταφερομένου τοῦ ἡλίου ὑφίστηται νέφος

49sq. καὶ[1] ... Πλειάδος *om.* V 50 Πλειάδος M *Bart.* : Πλειάδας *Wi.* 1866 53 νουμηνίας VAP$^{p.c.}$C *Ald.* LT *Bart.LR* (a nova luna) : οὐμηνίας M : coniunctione lunae cum sole *Bart.* 54 τῇ τετράδι V *Bart. Furl.* : τῇ γῇ τετράδι M 59 τὰ ἀνάλογα M *Bart.* : ἀνάλογον V 60 χειμώνων V *Bart.* : χειμῶνος M 61 μέλλῃ MV *Bart.* : μέλλει PC 65 φαίνηται *Schn.* : φαίνοιτο MV 66 αὐθημερὸν M *Bart.* : αὐθημερινὸν *Ald.* LT : αὐθημερῶν V 67 ἃ V *Bart.* : *om.* M δὴ MV *Bart.* : μὴ *Wi.* 68 σημαίνει M : σημαίνῃ V 70 ἔαρος MV *Bart.* : ἀέρος PC *Ald.* LT 72sq. σημεῖον MV : σῆμα *Wood* 56 n. 10 73 ἴσχῃ M : ἀνίσχῃ V ἀνέχῃ *Schn.* (4.723) : ἔχῃ VSNFQAPC *Ald.* LT : ἔχοι M ὑδατικόν M$^{a.c.}$V *Bart. Heins. Schn.* (5.LVII) : ὑδατικῶν M$^{p.c.}$ PC *Ald.* LT 74 ἀποτείνωσι V *Bart.* : ἀνατείνωσι M 75 ὑφίστηται MV : ὑφέστηται *Ald.* LT : ὑφέσταται C

the Pleiades rise, and from thence until the summer solstice, and thence until the next equinox, and from the equinox until the Pleiades set.

Likewise with each month: Full moons, eighth days, and fourth 8
days serve to divide the month into halves; hence one must regard the new moon as the beginning. A change ⟨in weather⟩ occurs most often on the fourth day; if not, on the eighth; if not then, at the time of the full moon. The next period is from full moon until the eighth day from month's end; from this to four days from the end; and from this to the new moon.

Even during the day (for the most part) changes occur in like 9
manner: There is sunrise, morning, mid-day, dusk, and sunset; the analogous parts of the night act in the same way in regard to winds, storms, and fair weather, for if the weather is going to change, it almost always does so at these midpoints. In general, therefore, one should observe the time periods carefully in the way described; but for each of the signs one must observe as indicated below.

Signs of Rain

The signs of rain seem to be as follows: That which appears at 10
dawn is the surest, when before sunrise there is a clear sign of reddening; for this is usually an indication ⟨of rain⟩ either that very day or within three days. The other signs also clearly indicate this, for surely even at sunset reddening is a sign of rain on the third day, if not before—but less so than at sunrise.

Moreover, the sun setting into a cloud in winter or spring is a 11
sign ⟨of rain⟩ usually within three days; and ⟨so too⟩ if there are streaks of light seen to the south ⟨of the sun⟩, but these same things occurring to the north are less secure signs. It is also a sign of rain if the sun has a black mark when it rises, and if it rises from clouds. And if at dawn rays extend before ⟨actual⟩ sunrise, this is a sign of both rain and wind. If there is a cloud in front of the setting sun

ὑφ' οὗ ἐὰν σχίζωνται αἱ ἀκτῖνες χειμερινὸν τὸ σημεῖον. καὶ ὅταν καυματίας δύηται καὶ ἀνατέλλῃ, ἐὰν μὴ ἄνεμος γένηται ὕδατος τὸ σημεῖον.

12 τὰ αὐτὰ δὲ σημαίνει καὶ σελήνη πανσελήνῳ ἀνίσχουσα, ἀσθενέστερα δὲ ὁ μείς. ἐὰν μὲν ᾖ ἀργυρώδης εὐδίαν, εἰ δὲ πυρώδης ἄνεμον, ἐὰν δὲ ζοφώδης ὕδωρ σημαίνει· σημαίνει δὲ ὅτι ἂν σημαίνῃ τριταῖος ὢν ὁ μείς.

13 ἀστέρες πολλοὶ διάττοντες ὕδατος ἢ πνεύματος, καὶ ὅθεν ἂν διάττωσιν ἐκεῖθεν τὸ πνεῦμα ἢ τὸ ὕδωρ. καὶ ἐὰν ἀκτῖνες ἀθρόαι ἀνίσχωσιν ἀνιόντος ἢ δύνοντος σημεῖον χειμῶνος. καὶ ὅταν ἀνίσχοντος τοῦ ἡλίου αἱ αὐγαὶ οἷον ἐκλείποντος χρῶμα ἴσχωσιν ὕδατος σημεῖον. καὶ ὅταν νεφέλαι πόκοις ἐρίων ὅμοιαι ὦσιν ὕδωρ σημαίνει. πομφόλυγες ἀνιστάμεναι πλείους ἐπὶ τῶν ποταμῶν ὕδωρ σημαίνουσι πολύ. ὡς δ' ἐπὶ τὸ πολὺ ἶρις περὶ λύχνον ἢ διὰ λύχνου διαφαινομένη νότια σημαίνει ὕδατα.

14 καὶ οἱ μύκητες ἐὰν νότια ᾖ ὕδωρ σημαίνουσι, σημαίνουσι δὲ καὶ ἄνεμον κατὰ λόγον ὡς ἂν ἔχωσι πλήθους καὶ μεγέθους, σμικροὶ δὲ καὶ κεγχρώδεις καὶ λαμπροὶ ὕδωρ καὶ ἄνεμον. καὶ ὅταν χειμῶνος τὴν φλόγα ⟨ὁ λύχνος⟩ ἀπωθῇ διαλιπὼν οἷον πομφόλυγας ὕδατος σημεῖον, καὶ ἐὰν πηδῶσιν αἱ ἀκτῖνες ἐπ' αὐτόν, καὶ ἐὰν χειμῶνος ὄντος μύκαι ἐπιγένωνται.

15 ὄρνιθες λουόμενοι μὴ ἐν ὕδατι βιοῦντες ὕδωρ ἢ χειμῶνα σημαίνουσι. καὶ φρῦνος λουόμενος καὶ βάτραχοι μᾶλλον ᾄδοντες

77 καυματίας MV *Bart.* : fortasse καυματίσας *Bonav.* δύηται M : δύνηται V : δέηται *Ald.* LT : δύνῃ *Bonav.* 78 τὸ *om.* V 80 ὁ μείς *om. Bart.* 80sq. ἀργυρώδης εὐδίαν, εἰ δὲ πυρώδης (εὐδίαν ... πυρώδης $V^{s.l.}$) ἄνεμον, εἰ δὲ ζοφώδης ὕδωρ σημαίνει V *Bart.* : γυρώδης σημαίνει τὸν μῆνα, ἐὰν δὲ ζοφώδες ὑδατώδη M : πυρώδης εὐδιεινὸν σημαίνει ... ὑδατώδη *Furl.* : *post* γυρώδης *inser.* πνευματώδη *Furl. in notis* 81sq. σημαίνει^{II} ... μείς *om.* V *Bart.P* 82 σημαίνῃ *Schn.* : –ει M 84 ἐκεῖθεν V : ἐντεῦθεν M καὶ *om.* V 85 δύνοντος σημεῖον MV *Bart. Furl.* : σ. δ. *Ald.* L : *om.* T χειμῶνος V : *om.* M *Bart.* : ὕδατος *Furl.* 86 ἴσχωσιν M : ἔχωσιν V 87 ὦσιν *Schn.* (4.724) : εἰσὶν MV 88 ὕδωρ σημαίνει MV *Bart.* : *om. Heins.* *ante* πομφόλυγες *secl. quam marg. gloss.* ὑετοῦ δὲ σημεῖα (MV *Bart.*) *Schn.* (4.724 f.) 88sq. τῶν ποταμῶν M *Bart.* : τὸν ποταμὸν V 89 ὕδωρ ... πολὺ *om.* V 90 διαφαινομένη M : φαινομένη VT 92 ὡς ἂν MV *Bart. Schn.* (4.725) : ὡς ἐὰν PC : ἢς ἐὰν *Ald.* LT 93–96 σμικροὶ ... ἐπιγένωνται *om.* V 93 δὲ *inser. Furl.* 94 ὁ λύχνος *inser. Furl.* 96 χειμῶνος ὄντος μύκαι *nos* : τρεῖς μύκαι M *Bart.* : τρεῖς νύκται P *Ald.* L : τρεῖς νύκτας C : τρεῖς νύκτες T *Gryn.* : σπινθῆρες *Furl.* 97 χειμῶνα MV *Bart.* : χειμῶνας PC *Ald.* LT 98 φρῦνος λουόμενος V : φρύνη λουομένη M *Bart.*

which splits up its rays, this is a sign of stormy weather. And if the sun sets or rises while burning hot and there is no wind, this is a sign of rain.

These same things [i.e., rain] are indicated by a rising full 12
moon; a crescent moon is less sure a sign. And if the moon is silvery, it signals fair weather; and if fiery, wind; and if cloudy, rain. The moon indicates what it indicates on the third day.

Shooting stars in great number are a sign of rain or wind that 13
will come from the same direction as the shooting stars. And if at sunrise or sunset the rays rise set close together, this is a sign of storm. And when at sunrise its rays have the same color they do during an eclipse, this is a sign of rain, as well as when clouds resemble woolen fleece. Bubbles rising to the surface of rivers more than is usual are a sign of much rain. Often, an iridescent halo shining either around or through a lamp is a sign of rain from the south.

If the winds are from the south, snuff on a lamp's wick signals 14
rain; and in proportion to its amount it also signals wind, and if it is finely granulated like millet seeds and shiny it signals both rain and wind. It is a sign of rain when during winter it ⟨the lamp⟩ intermittently casts off the flame like bubbles. Likewise if the rays ⟨of the flame⟩ leap upon it, and if during winter snuff builds up.

Nonaquatic birds bathing themselves are a sign of rain or 15
storm. And a toad washing itself and frogs croaking more than

ὕδωρ σημαίνουσι. καὶ ἡ σαύρα φαινομένη ἢν καλοῦσι σαλαμάνδραν, ἔτι δὲ καὶ χλωρὸς βάτραχος ἐπὶ δένδρου ᾄδων ὕδωρ σημαίνει. χελιδόνες τῇ γαστρὶ τύπτουσαι τὰς λίμνας ὕδωρ σημαίνουσι. βοὺς τὴν προσθίαν ὁπλὴν λείξας χειμῶνα ἢ ὕδωρ σημαίνει. ἐὰν δὲ εἰς τὸν οὐρανὸν ἀνακύπτων ὀσφραίνηται, ὕδωρ σημαίνει.

16 κορώνη ἐπὶ πέτρας κορυσσομένη ἢν κῦμα κατακλύζει ὕδωρ σημαίνει· καὶ κολυμβῶσα πολλάκις καὶ περιπετομένη ὕδωρ σημαίνει. κόραξ πολλὰς μεταβάλλων ἕωθεν φωνάς, τούτων ἐὰν δὶς ταχὺ φθέγξηται καὶ ἐπιρροιζήσῃ καὶ τινάξῃ τὰ πτερά, ὕδωρ σημαίνει. καὶ ἐὰν ὑετῶν ὄντων πολλὰς μεταβάλλῃ φωνὰς καὶ ἐὰν φθειρίζηται ἐπ' ἐλαίας. καὶ ἐάν τε εὐδίας ἐάν τε ὕδατος ὄντος μιμῆται τῇ φωνῇ οἷον σταλαγμοὺς ὕδωρ σημαίνει. ἐάν τε κόρακες ἐάν τε κολοιοὶ ἄνω πέτωνται καὶ ἱερακίζωσιν ὕδωρ σημαίνουσι. καὶ ἐὰν κόραξ εὐδίας οὔσης μὴ τὴν εἰωθυῖαν φωνὴν ἵῃ καὶ ἐπιρροιβδῇ ὕδωρ σημαίνει.

17 ἐὰν ἱέραξ ἐπὶ δένδρου καθεζόμενος καὶ εἴσω εἰσπετόμενος φθειρίζηται ὕδωρ σημαίνει. καὶ θέρους ὅταν πολλοὶ ἀθρόοι φανῶσιν ὄρνιθες οἳ βιοτεύουσιν ἐν νήσῳ ὕδωρ σημαίνουσιν· ἐὰν δὲ μέτριοι ἀγαθὸν αἰξὶ καὶ βουσίν, ἐὰν δὲ πολλοὶ ὑπερβολῇ αὐχμὸν ἰσχυρόν. ὅλως δὲ ὄρνιθες καὶ ἀλεκτρυόνες φθειριζόμενοι ὑδατικὸν σημεῖον καὶ ὅταν μιμῶνται ὕδωρ ὡς ὗον.

18 καὶ ἐὰν νῆττα ἥμερος ὑπιοῦσα ὑπὸ τὰ γεῖσα ἀποπτερυγίζηται ὕδωρ σημαίνει, ὁμοίως δὲ καὶ κολοιοὶ καὶ ἀλεκτρυόνες ἐάν τ'

99 ὕδωρ σημαίνουσι V : σημαίνουσιν ὕδωρ M *Bart.* ἡ *om.* V σαύρα M *Bart.* : σαλάμανδρα V$^{p.c.}$ 99sq. ἢν ... δὲ *om.* V 100 χλωρὸς MV *Bart. Gryn.* : χλωροῖς *Ald.* L : ἐν χλωροῖς T 101sq. σημαίνουσι M : σημαίνει V 102 ἢ ὕδωρ *om.* V 104–106 κορώνη ... σημαίνει *om.* V 104 κορυσσομένη M *Bart.* : λακερυζομένη *Bö.* 83 : πτερυσσομένη *Maass* 105 περιπετομένη M : πετομένη *Bonav.* 106 μεταβάλλων ἕωθεν *Schn.* (5.165) *e* permutans mane *Bart.FAB* : μεταβάλ(λ)ειν εἰωθὼς M : μεταβάλλειν εἰωθὸς V : permutare mane *Bart.PZ* : permutare consuetus *Bart.LR* τούτων ἐὰν MV *Bart.* : ταύτην ἢν *Turnebus Advers.* 25,13 106sq. δὶς ταχὺ V : ταχὺ δὶς M *Bart.* 107 *post* τινάξῃ (MV) *inser.* τὰ πτερὰ *Schn.* (5.LVII.165) *e* concutiat alas *Bart.* 108–110 καὶ^{I} ... σημαίνει *om.* V 111 ἱερακίζωσιν *Schn.* : ἱερακίζουσιν MV 112 καὶ^{I} *om.* V οὔσης *om.* M 114 καὶ εἴσω εἰσπετόμενος *om.* V 117 αἰξὶ MV : αἰξιὸν PC βουσί *Schn.* (5.166) *e* bobus *Bart.* : βοτοῖς MV 119–121 καὶ ... σημαίνει *om.* V 119 ὡς ὗον M *Bart.* : fortasse ὥστ' ὗειν *Bonav.* 120 ἐάν *nos* : *post* ἥμερος *inser.* ἐὰν N *Furl.* : εἰ M : ἡ C *Ald.* LT : *non habet Bart.* 121 ἀλεκτρυόνες M *Bart.* : ἀ. καὶ νῆττα ἥμερος V : ἀλκυόνες *Bö.* 83

usual signal rain. Likewise the appearance of the lizard which they call "salamander"; and furthermore a green frog singing in a tree signals rain. Swallows striking the surface of a lake with their bellies signal rain. An ox licking a forehoof signals storm or rain; if he arches his head up toward the sky and sniffs this signals rain.

A crow lifting its head while on a rock washed by a wave signals 16
rain; likewise, if it makes frequent dives and flies in circles it signals rain. If a raven in the morning producing many different sounds repeats one of these quickly twice over and shakes its wings to make a whirring sound, it signals rain. Likewise, if during wet weather it produces many different sounds and if it hunts for lice while in an olive tree. And whether during fair or foul weather it imitates the sound of raindrops, it signals rain. If ravens or jackdaws fly high screeching like hawks, they signal rain. And if a raven during fair weather emits a sound other than its customary one and whirrs its wings, it signals rain.

If a hawk sitting on a tree and flying directly into it hunts for 17
lice, it signals rain. And during summer, when many island-dwelling birds show up in dense flocks, they signal rain. But if there are not many of them it is good for goats and herds; but if they are too many there will be a severe drought. And generally, birds and chickens' ridding themselves of fleas signal rain; so too when they imitate the sound of rainwater falling.

Likewise, if a tame duck makes its way under the cornice of a 18
house and flaps its wings, this signals rain; so too if jackdaws and

ἐπὶ λίμνῃ ἢ θαλάττῃ ἀποπτερυγίζωνται ὡς νῆττα, ὕδωρ σημαίνουσι. καὶ ἐρωδιὸς ὄρθριον φθεγγόμενος ὕδωρ ἢ πνεῦμα σημαίνει· καὶ ἐὰν ἐπὶ θάλατταν πετόμενος βοᾷ μᾶλλον ὕδατος σημεῖον ἢ πνεύματος, καὶ ὅλως βοῶν ἀνεμῶδες.

19 καὶ ὁ σπίνος ἐν οἰκίᾳ οἰκουμένῃ ἐὰν φθέγξηται ἔωθεν ὕδωρ σημαίνει ἢ χειμῶνα. καὶ χύτρα σπινθηρίζουσα πᾶσα περίπλεως ὕδατος σημεῖον. καὶ ἴουλοι πολλοὶ πρὸς τοῖχον ἕρποντες ὑδατικόν. δελφὶς παρὰ γῆν κολυμβῶν καὶ ἀναδυόμενος πυκνὰ ὕδωρ ἢ χειμῶνα σημαίνει.

20 Ὕμηττος ὁ ἐλάττων, ἄνυδρος καλούμενος, ἐὰν ἐν τῷ κοίλῳ νεφέλιον ἔχῃ, ὕδατος σημεῖον. καὶ ἐὰν ὁ μέγας Ὕμηττος τοῦ θέρους λευκὰς ἔχῃ νεφέλας ἄνωθεν καὶ ἐκ πλαγίου ὕδατος σημεῖον, καὶ ἐὰν ὁ ἄνυδρος Ὕμηττος λευκὰς ἔχῃ ἄνωθεν καὶ ἐκ πλαγίου. καὶ ἐὰν περὶ ἰσημερίαν λίψ πνεύσῃ ὕδωρ σημαίνει.

21 αἱ δὲ βρονταὶ αἱ μὲν χειμεριναὶ καὶ ἑωθιναὶ μᾶλλον ὕδωρ σημαίνουσιν· αἱ δὲ θεριναὶ καὶ μεσημβριναὶ οὔ. ἑσπεριναὶ δὲ βρονταὶ ὑδατικὸν σημεῖον. ἀστραπαὶ δὲ ἐάν γε πανταχόθεν γίνωνται ὕδατος ἢ ἀνέμου σημεῖον, καὶ ἑσπεριναὶ ὡσαύτως. καὶ ἐὰν ἀκρωρείας νότου πνέοντος νοτόθεν ἀστράψῃ ὕδωρ ἢ ἄνεμον σημαίνει. καὶ ζέφυρος ἀστράπτων ἄνωθεν πρὸς βορείου ἢ χειμῶνα ἢ ὕδωρ σημαίνει. καὶ θέρους αἱ ἑσπέριαι ἀστραπαὶ ὕδωρ αὐτίκα σημαίνουσιν ἢ τριῶν ἡμερῶν. καὶ ὀπώρας βορρᾶθεν ἀστραπαὶ ὑδατικὸν σημεῖον.

122 θαλάττῃ M : θαλάσσῃ V 122sq. σημαίνουσιν V : σημαίνει M *Bart.* 123 καὶ *om.* V 124sq. καὶ ... ἀνεμῶδες *om.* V 126 σπίνος *Schn.* (4.729 f.) : πιλος MV *acc. varr. Bart.* : πελλὸς (*sc.* ἐρωδιὸς) *Furl. in notis* : πίπος *Bonav.* 127 σπινθηρίζουσα VP$^{s.l.}$C *Ald.* LT : σπινθήρων MP$^{i.m.}$: σπινθηρίζων P : scintillans *Bart.* 128 καὶ *om.* V 129 παρὰ γῆν MV : iuxta (super *Bart.Z*) mare *Bart.* ἀναδυόμενος πυκνὰ MV : superelevans se et occidens frequenter *Bart.* 131–135 Ὕμηττος ... καὶ *om.* V 131 ὁ M *Gryn.* : *om. Ald.* LT *edd. cett.* ἐν T *Bart. Schn.* (4.731) *tent. Ho. in app. crit.* : *om.* M 133 ἔχῃ P *Ald.* LT : ἔχοι M : ἔχει SNFQA 134 λευκὰς *om. Wi.* 135 *ante* περὶ *inser.* δὲ V *Bart.* 136 *ante* ὕδωρ *inser.* ἄνεμον ἢ *Furl.* 137 καὶ μεσημβριναὶ οὔ V : μεσημβρίας κ. M *Bart.* : μεσημβρίαν κ. *Furl.* δὲ^{II} *om. Ald.* LT 138sq. γίνωνται MV : γέν– *Schn.* 139 ὕδατος ἢ ἀνέμου V *Bart.* : ἢ ὕ. ἢ ἀ. T : ὕ. ἂν ἀ. M : ὕ. ἂν ἢ ἀ. *Ald.* L 140 ἀκρωρείας MV : ἀκρο– P *Ald.* : ἀκρωρίας *Schn.* 140sq. ἢ ἄνεμον σημαίνει V : σ. ἢ ἀ. M *Bart.* 141 ζέφυρος P *Ald.* LT : ζοφερός MV *Bart.* ἄνωθεν MV *Bart. Schn.* (5.166) : *om. Ald.* LT 143 *post* σημαίνουσιν (M *Bart.*) *inser.* καὶ μᾶλλον ἐὰν βόρραθεν V 143–148 ἢ ... ἴριδες *om.* V 144 ἀστραπαί *Schn.* (5.166) *e* coruscationes *Bart.* : ἀστράπτων M

roosters flap their wings like a duck, whether on a lake or the sea, this signals rain. And a heron uttering his cry early in the morning signals rain or wind; but if he cries out loudly while flying seaward, this is a sign more of rain than of wind. Generally, if he cries loudly it is a sign of wind.

If a finch sings at dawn in an inhabited house, it signals rain or 19
storm. If a cooking vessel filled to the brim emits sparks all over it is a sign of rain. Centipedes in large numbers creeping towards the wall are a sign of rain. A dolphin diving near land and coming up again over and over signals rain or storm.

If the Lesser Mt. Hymettos (called the Dry ⟨Hymettos⟩) has a 20
small cloud in its valley, this is a sign of rain; likewise if the Greater Mt. Hymettos has white clouds in the summer above and alongside, this too is a sign of rain, and if the Dry Hymettos has white clouds above and alongside. And if Lips blows at an equinox it signals rain.

Thunder in winter at dawn is a rather good sign of rain, where- 21
as thunder in summer at midday is not, but evening thunder *is* a sign of rain. And, further, if flashes of lightning occur on all sides, this is a sign of rain or wind; likewise if they occur at evening. And if, while Notos the south wind is blowing at dawn, lightning flashes in the south, this signals rain or wind. And Zephyros coming from the north flashing with lightning on high signals either storm or rain. Evening flashes of lightning during summer signal rain immediately or within three days. Lightning from the north in late summer is a sign of rain.

22 ἡ Εὔβοια ὅταν διαζωσθῇ μέση, ὕδωρ διὰ ταχέων. καὶ ἐὰν ἐπὶ τὸ Πήλιον νεφέλη προσίζῃ ὅθεν ἂν προσίζῃ ἐντεῦθεν ὕδωρ ἢ ἄνεμον σημαίνει. ὅταν ἶρις γένηται ἐπισημαίνει ἐάν τε πολλαὶ ἴριδες γίνωνται ὕδωρ σημαίνει ἐπὶ πολύ. ἀλλὰ πολλάκις καὶ οἱ ὀξεῖς ἥλιοι ὅταν ἐκ νεφῶν. μύρμηκες ἐν κοίλῳ χωρίῳ ἐὰν τὰ ᾠὰ ἐκφέρωσιν ἐκ τῆς μυρμηκιᾶς ἐπὶ τὸ ὑψηλὸν χωρίον ὕδωρ σημαίνουσιν, ἐὰν δὲ καταφέρωσιν εὐδίαν. ἐὰν παρήλιοι δύο γένωνται, ὁ μὲν νοτόθεν ὁ δὲ βορρᾶθεν, καὶ ἅλως ἅμα ὕδωρ διὰ ταχέων σημαίνουσι. καὶ ἅλως αἱ μέλαιναι ὑδατικὸν καὶ μᾶλλον αἱ δείλης.

23 ἐν τῷ Καρκίνῳ δύο ἀστέρες εἰσίν, οἱ καλούμενοι Ὄνοι, ὧν τὸ μεταξὺ τὸ νεφέλιον ἡ Φάτνη καλουμένη. τοῦτο δὲ ἐὰν ζοφῶδες γένηται, ὑδατικόν. ἐὰν μὴ ἐπὶ Κυνὶ ὕσῃ ἢ ἐπὶ Ἀρκτούρῳ ὡς ἐπὶ τὸ πολὺ πρὸς ἰσημερίαν ὕδωρ ἢ ἄνεμος. καὶ τὸ δημόσιον τὸ περὶ τὰς μυίας λεγόμενον ἀληθές· ὅταν γὰρ δάκνωσι σφόδρα, ὕδατος σημεῖον. σπίνος φθεγγόμενος ἔωθεν μὲν ὕδωρ σημαίνει ἢ χειμῶνα, δείλης δὲ ὕδωρ.

24 τῆς δὲ νυκτὸς ὅταν τὸν Ὕμηττον κάτωθεν τῶν ἄκρων νεφέλη διαζώσῃ λευκὴ καὶ μακρὰ ὕδωρ γίνεται ὡς τὰ πολλὰ μετρίων ἡμερῶν. καὶ ἐὰν ἐν Αἰγίνῃ ἐπὶ τοῦ Διὸς τοῦ Ἑλλανίου νεφέλη καθίζηται ὡς τὰ πολλὰ ὕδωρ γίνεται. ἐὰν ὕδατα πολλὰ γίνηται χειμερινά, τὸ ἔαρ ὡς τὰ πολλὰ γίνεται αὐχμηρόν· ἐὰν δ' αὐχμηρὸς ὁ χειμὼν τὸ ἔαρ ὑδατῶδες. ὅταν χιόνες πολλαὶ γίνωνται, ὡς τὰ πολλὰ εὐετηρία γίνεται.

145 διαζωσθῇ *Schn.* (4.732 f.) : διαζοφωθῇ *Schn.* (5.166) *e* offuscabitur *Bart.* : διαχωσθῇ M : διαχωρισθῇ T 146 προσίζῃ[I] M : προσίξῃ *Gryn.* 148 γίνωνται V : γένωνται M ὕδωρ σημαίνει MV *Bart.* : σ. ὗ. *Ald.* LT ἀλλὰ πολλάκις *om.* V 149 ἐκ νεφῶν V : ἐκ νεφέλης M *Bart.* 151sq. *post* γένωνται *inser.* καὶ M *Bart.* 152sq. ταχέων M : ταχέος V 153–158 καὶ[I] .... ἄνεμος *om.* V 156 ἡ Φάτνη *Furl.* : οὐ Φ. M : Φ. ὃν *Gryn.* (ὃν *typogr. in marg.*) : Φ. T : praesepe *Bart.* δὲ *om. Schn.* 158 τὸ[I] *om. Heins.* ἰσημερίαν *Ald.* LT *Bart.* : ἡμερίαν M 159 μυίας V *Ald.* LT : μύας M *Bart.* 160sq. χειμῶνα M *Bart.* : μᾶλλον ἄνεμον V 162–165 τῆς ... γίνεται *om.* V 162 τῆς δὲ PC *Ald.* LT : τῆς δὲ τῆς M νεφέλη M : νεφελῶν PC *Ald.* LT : nubes *Bart.* 163 διαζώσῃ *Furl.* : διασώζῃ M : cinxerit *Bart.* 164 *post* Αἰγίνῃ *inser.* καὶ C *Ald.* LT 165 γίνεται *Furl.* : γίνηται M : γίνωνται V 166 τὸ ἔαρ ὡς τὰ πολλὰ M *Bart.* : ὡς τὰ πολλὰ τὸ ἔαρ V

When Euboia is belted around the middle ⟨with clouds⟩, rain will 22
soon come. And if a cloud settles on Mt. Pelion, this is a sign that rain or wind will come from the place where it settles. Whenever a rainbow occurs, it signals ⟨rain⟩, and if many rainbows occur they signal a lot of rain, but often bright suns ⟨breaking⟩ out of a cloud also ⟨signal rain⟩. If ants ⟨living⟩ in a depression carry their eggs out of the anthill and move upwards, this is a sign of rain; but if they carry them downwards, it is a sign of fair weather. If two mock suns occur (both the one to the north ⟨of the sun⟩ and the one to the south) and a halo at the same time, these signal imminent rain. And black halos are a sign of rain, especially those occurring in the afternoon.

In Cancer there are two stars, the so-called Asses, between 23
whom is the nebula called the Manger. If this grows dark it is a sign of rain. If it is not rainy at ⟨the rising of⟩ Sirius or Arktouros, there will be, for the most part, rain or wind at the time of the ⟨autumnal⟩ equinox. And the popular expression about flies is true: When they bite frequently it is a sign of rain. A chaffinch singing at dawn signals rain or storm; in the afternoon it signals rain.

When at night a large white cloud girdles Mt. Hymettos below 24
its peaks, rain generally occurs in a reasonable number of days. And if a cloud settles on ⟨the temple of⟩ Zeus Hellanios in Aigina, rain generally occurs. If many rains occur in winter, the spring for the most part is dry; but the winter is dry, spring is usually rainy. Whenever many snowfalls occur, a fertile growing season follows.

φασὶ δέ τινες εἰ ἐν ἄνθρακι λαμπρῷ χάλαζα ἐπιφαίνηται χάλαζαν προσημαίνειν ὡς τὰ πολλά· ἐὰν δὲ ὥσπερ κέγχροι μικροὶ λαμπροὶ πολλοί, ἀνέμου μὲν ὄντος εὐδίαν, μὴ ἀνέμου δὲ ὕδωρ ἢ ἄνεμον. ἔστι δ' ἄμεινον πρῶτον γίνεσθαι βόρειον ὕδωρ νοτίου καὶ τοῖς φυομένοις καὶ τοῖς ζώοις· δεῖ δὲ γλυκὺ εἶναι καὶ μὴ ἁλμυρὸν τοῖς γευομένοις. καὶ ὅλως τὸ ἔτος τὸ βόρειον τοῦ νοτίου κρεῖττόν ἐστι καὶ ὑγιεινότερον. καὶ ὅταν ὀχεύωσι πρόβατα ἢ αἶγες χειμῶνος μακροῦ σημεῖον. ὕδατος μὲν οὖν ταῦτα λέγεται σημεῖα·

ἀνέμων δὲ τάδε. ἀνατέλλων ὁ ἥλιος καυματίας καὶ μὴ ἀποστίλβων ἀνεμῶδες τὸ σημεῖον· καὶ ἐὰν κοῖλος φαίνηται ὁ ἥλιος ἀνέμου ἢ ὕδατος τὸ σημεῖον. καὶ ἐὰν ἐπὶ πολλὰς ἡμέρας καυματίας αὐχμοὺς καὶ ἀνέμους πολυχρονίους σημαίνει. ἐὰν αἱ ἀκτῖνες αἱ μὲν πρὸς βορρᾶν αἱ δὲ πρὸς νότον σχίζωνται τούτου μέσου ὄντος κατ' ὄρθρον κοινὸν ὕδατος καὶ ἀνέμου σημεῖόν ἐστιν.

ἔστι δὲ σημεῖα ἐν ἡλίῳ καὶ σελήνῃ τὰ μὲν μέλανα ὕδατος, τὰ δ' ἐρυθρὰ πνεύματος. ἐὰν δὲ ὁ μὴν βορείου ὄντος ὀρθὸς εἱστήκῃ ζέφυροι εἰώθασιν ἐπιπνεῖν καὶ ὁ μὴν χειμερινὸς διατελεῖ. ὅταν μὲν ἡ κεραία τοῦ μηνὸς ἐπικύπτῃ βόρειος ὁ μείς· ὅταν δ' ἡ κάτωθεν νότιος· ἐὰν δ' ὀρθὸς καὶ μὴ καλῶς ἐγκεκλιμένος μέχρι τετράδος καὶ εὔκυκλος εἴωθε χειμάζειν μέχρι διχομηνίας. σημαίνει ζοφώδης μὲν ὢν ὕδωρ, πυρώδης δὲ πνεῦμα.

169–174 φασὶ ... ὅλως *om.* V 169 *ante* εἰ *inser.* καὶ M ἐν ἄνθρακι λαμπρῷ *nos* : ἄνθραξι λαμπροῖς *Schn.* (4.734) : ἐν ἄστρασι λαμπρὰ M *Bart.* 170 προσημαίνειν T *Schn.* : –ει M 174 γευομένοις M *Bart. Gryn. Schn.* (5.LVII) : γεν– *Furl. err. typogr.* 174sq. τὸ ἔτος τὸ βόρειον τοῦ νοτίου κρεῖττόν ἐστι V *Bart.* : ἔτος βέλτιον νοτίου βόρειον M 175sq. καὶ[II] ... σημεῖον *om.* V 175 ὀχεύωσι M : ὀχέωσι *Ald.* LT : πάλιν ὀχευθῶσι *Schn.* (4.734) : ὀχεύωνται *Wi.* 176 αἶγες *Furl.* : αἶγας M 178 ἀνέμων δὲ V *Bart.* : ἀνέμου δὲ καὶ πνευμάτων M καὶ V *Bart.* : κἂν M 178sq. ἀποστίλβων *nos* : ὑποστίλβων V : scintillans *Bart.* : ἀποστίλβῃ M 180 τὸ *om.* V 182sq. τούτου μέσου ὄντος MV : *ante* μέσου *prob.* δὲ *Schn.* (5.167) *e* hoc autem medio existente *Bart.* 183 ὄρθρον MV : ὀρθὸν *prob. Schn.* (5.167) *e* rectum *Bart.* : ὀρθρίον *Gryn.* : ἄθριον *Bö.* 74 184 ἔστι .... ὕδατος M *Bart.* : καθόλου δὲ τὰ ἐν ἡλίῳ καὶ σελήνῃ μέλανα σημεῖα ὕδατος σημαντικά V 185 δὲ M *Bart.* : δὲ καὶ *Furl.* : μέν V μὴν V : μεις M *acc. varr.* ὀρθὸς V *Bart. Ald.* LT : ὀρθρὸς M εἱστήκῃ *Ald.* LT : εἱστήκει MV 186 μὴν MV : μεὶς B 187 μὲν M *Bart.* : δὲ V *post* κεραία *inser.* ἡ ἄνω *Schn.* (4.736) 189 εὔκυκλος M *Bart.* : εὐκόλως V εἴωθε MV : ἔωθε *Heins.* 189sq. *post* σημαίνει *inser.* δὲ V 190 μὲν ὢν *om.* V

Some say that if hail seems to appear among bright coals this is 25
generally a sign of hail to come; but if there is an appearance ⟨in the fire⟩ just as of many small bright millet seeds this is a sign of fair weather if there is a wind, and of rain or wind if there is no wind. It is better for plants and animals if the rain comes first from the north than if it comes from the south; for it should be sweet rather than briny to the taste. Moreover, generally a "northern season" is overall better and even more salubrious than a southern one. And whenever sheep or goats copulate, this is a sign of a long winter. These then are the signs of rain. 26

Signs of Wind

The following are the signs of wind. The sun rising with a scorching heat without shining brightly is a sign of wind. And if the sun appears hollow, this is a sign of wind or rain. And if the sun is scorching hot over many days this signals a long period of dryness and winds. If at dawn its rays are split, some to the north and some to the south, the sun itself in the middle, this is a sign of both rain and wind.

There are also signs on the sun and the moon: black ones are 27
signs of rain, red ones are signs of wind. If the moon stands straight when a north wind blows, westerlies are accustomed to follow and the month continues to be stormy. But when, on the one hand, the ⟨upper⟩ horn projects, the month will have north winds; if, on the other hand, the lower one does, the month will have southerly winds. But if, up until the fourth day of the month, the moon is straight up, without a graceful inward bend, but forming a full circular shape, then it customarily is stormy until midmonth. A darkish moon signals rain; a reddish one signals wind.

28 αἴθυιαι καὶ νῆτται [πτερυγίζουσαι] καὶ ἄγριαι καὶ τιθασσαὶ ὕδωρ μὲν σημαίνουσι δυόμεναι, πτερυγίζουσαι δὲ ἄνεμον. οἱ κέπφοι εὐδίας οὔσης ὅποι ἂν πέτωνται ἄνεμον προσημαίνουσι. στροῦθοι χειμῶνος ἀφ' ἑσπέρας θορυβοῦντες ἢ ἀνέμου μεταβολὴν σημαίνουσιν ἢ ὕδωρ ὑέτιον. ἐρωδιὸς ἀπὸ θαλάσσης πετόμε- 195
νος καὶ βοῶν πνεύματος σημεῖόν ἐστι· καὶ ὅλως βοῶν μέγα ἀνεμώδης.

29 κύων κυλινδούμενος χαμαὶ ἀνέμου μέγεθος σημαίνει. ἡ ἄμπωτις βόρειον πνεῦμα σημαίνει, ἡ πλημμύρα δὲ νότιον. ἀράχνια πολλὰ φερόμενα πνεῦμα ἢ χειμῶνα σημαίνει. θάλασσα οἰδοῦσα 200
καὶ ἀκταὶ βοῶσαι καὶ αἰγιαλὸς ἠχῶν ἀνεμώδης. ἐὰν μὲν γὰρ ἐκ βορείων πλημμύρα ἥκῃ εἰς νότιον μεταβάλλει, ἐὰν δ' ἐκ νοτίων ἄμπωτις γένηται εἰς βόρειον μεταβάλλει. καὶ ὁ μὲν βορέας λήγων ἐλάττων ὁ δὲ νότος ἀρχόμενος. παρήλιος ὁπόθεν ἂν ᾖ ὕδωρ ἢ ἄνεμον σημαίνει. 205

30 ἡ πέμπτη καὶ δεκάτη ἀπὸ τροπῶν τῶν χειμερινῶν ὡς τὰ πολλὰ νότιος. βορείων δὲ γινομένων ξηραίνει πάντα, νοτίων δὲ ὑγραίνει. ἐὰν δὲ νοτίων ὄντων ψοφῇ τῶν κεκολλημένων εἰς τὰ βόρεια σημαίνει τὴν μεταβολήν· ἐὰν δὲ πόδες ἱδρῶσι νοτία ἡ μεταβολή. τὸ δὲ αὐτὸ σημεῖον καὶ ἐκνεφίου, καὶ ὀδαξῶν τὸν 210
δεξιόν. ἐχῖνος ὁ χερσαῖος σημεῖον πνευμάτων. ποιεῖται δὲ δύο ὀπὰς ὅπου ἂν οἰκῇ, τὴν μὲν πρὸς βορρᾶν, τὴν δὲ νοτόθεν· ὁποτέραν δ' ἂν ἀποφράττῃ ἐντεῦθεν πνεῦμα σημαίνει· ἐὰν δ' ἀμφοτέρας ἀνέμου μέγεθος.

191–197 αἴθυιαι … ἀνεμώδης *om.* V 191 πτερυγίζουσαι *secl. Schn.* (4.736) 193 πέτωνται M : πέπωνται *Heins.* 198 ἀνέμου μέγεθος MV *Bart.* : μ. ἀ. PC *Ald.* LT 198–201 *quattuor sententiae quae incipiunt* 1. ἡ ἄμπωτις, 2. ἀράχνια, 3. θάλασσα, 4. ἐὰν μὲν (MV *Bart.*) *ordinat* 1.4.2.3 *Schn.,* 2.1.4.3 *Wi.* 198 ἡ V *Gryn. typograph. in marg.* : ὁ M 199 ἡ *om.* M 200 οἰδοῦσα MV : ἀοιδοῦσα SNQ 201 αἰγιαλὸς V *Ald.* LT : αἰγιαλοὺς M γὰρ *om.* V *Bart.* 202 μεταβάλλει M : –βάλῃ V 203 γένηται V : γίν– M μεταβάλλει M : –βάλει V λήγων V *Ald.* LT : λήγον M 204 ὁπόθεν M *Bart.* : ὅθεν V 206–209 ἡ ... μεταβολήν *om.* V 206 πέμπτη *Ald.* L *Bart.* : πεμπικῇ M τροπῶν *Schn.* (4.738) : τριῶν M *Bart.* 208 *ante* τῶν *inser.* τι *Heins.* 209 βόρεα *Furl.* : νότια M *edd. cett. Bart.* δὲ *om.* V ἱδρῶσι M *Bart.* : ἱδρᾶσιν V : οἰδῶσι *Ald.* L : ἴδωσι C 209sq. νοτία ἡ μεταβολή M *Bart.* : ἔστιν ἡ μεταβολὴ νοτία V 210sq. τὸ ... δεξιόν *om.* V 211 *post* δεξιόν *lac. stat. Schn.* ὁ *om.* V σημεῖον πνευμάτων V : 211sq. ποιεῖται ... νοτόθεν *om.* V 213 δ' ἂν *om.* V *Bart.* ἀποφράττῃ M *Bart.* : –φράττων V ἐντεῦθεν πνεῦμα σημαίνει M *Bart.* : τὴν ἑαυτοῦ κατάδυσιν, καὶ τὰ πρὸς αὐτὴν τετραμμένα πνεύματα μηνύει V ἐὰν M : εἰ V

Shearwaters and ducks (both wild and tame) signal rain by diving, 28
and wind by flapping their wings. During calm weather kepphoi signal wind by the direction in which they fly. Sparrows chirping noisily on a winter's evening signal either a change in the wind or rain. A heron squawking while flying from the sea is a sign of breeze; and in general it is a sign of wind *whenever* it squawks loudly.

A dog rolling on the ground signals a great amount of wind. 29
Ebb tide signals a north wind, high tide a south wind. Many spiderwebs in motion signal wind or storm. A swelling sea, roaring headlands, and resounding strands are signs of wind. A high tide signals a north wind, An ebb tide, on the other hand, signals a south wind. And the north wind is weaker as it abates, the south wind when it begins. A mock sun signals rain or wind wherever it is in the sky.

The fifteenth day after the winter solstice is usually one of 30
southern winds. But if northerlies blow, everything dries up, whereas if southerlies blow, all is moist. And if while a south wind is blowing there is a noise from the glued joints, this signals a turn to northerlies. If feet sweat, the wind turns to a southerly. This same thing is also a sign of a hurricane, as too if someone feel pain in his right ⟨foot⟩. The hedgehog is a sign of wind: it makes two openings wherever it dwells, one to the north and the other to the south, and it signals the direction of the wind by whichever it shuts up; if it closes both this is a signal of much wind.

31 ἐὰν ὄρος προβοᾷ ἄνεμον προσημαίνει. ἐὰν ἐν θαλάττῃ ἐξ- 215
αίφνης πνεύματος γαλήνη γένηται μεταβολὴν πνεύματος ἢ ἐπί-
δοσιν. ἐὰν ἄκραι μετέωροι φαίνωνται ἢ νῆσοι ἐκ μιᾶς πλείους
νοτίαν μεταβολὴν σημαίνει· γῆ δὲ μέλαινα ὑποφαινομένη βόρει-
ον, λευκὴ δὲ νότιον. αἱ ἅλῳ περὶ τὴν σελήνην πνευματώδεις μᾶλ-
λον ἢ περὶ ἥλιον· σημαίνουσι δὲ πνεῦμα ῥαγεῖσαι περὶ ἄμφω, καὶ 220
ᾗ ἂν ῥαγῇ ταύτῃ πνεῦμα. ἐπινεφέλων ὄθεν ἂν ἀνατέλληται ἐν-
τεῦθεν ἄνεμος. αἱ κηλάδες νεφέλαι θέρους ἄνεμον σημαίνουσιν.
32 ἐὰν ἀστραπὴ πανταχόθεν γίνηται ὕδωρ σημαίνει, καὶ ὅθεν
ἂν αἱ ἀστραπαὶ πυκναὶ γίνωνται ἐντεῦθεν πνεύματα γίνεται.
θέρους ὅταν ἀστραπαὶ καὶ βρονταὶ γίνωνται ἐντεῦθεν πνεύματα 225
γίνεται ἰσχυρά· ἐὰν μὲν σφόδρα καὶ ἰσχυρὸν ἀστράπτῃ θᾶττον
καὶ σφοδρότερον πνεύσουσιν, ἐὰν δ' ἠρέμα καὶ μανῶς, κατ' ὀλί-
γον. τοῦ δὲ χειμῶνος καὶ φθινοπώρου τοὐναντίον· παύουσι γὰρ
τὰ πνεύματα αἱ ἀστραπαί· καὶ ὅσῳ ἂν ἰσχυρότεραι γίνωνται
ἀστραπαὶ καὶ βρονταὶ τοσούτῳ μᾶλλον παύονται· τοῦ δ' ἔαρος 230
ἧττον, ἂν ταὐτὰ σημεῖα γένηται ὥσπερ καὶ χειμῶνος.
33 ἐὰν νότου πνέοντος βορρᾶθεν ἀστράπτῃ παύεται· ἐὰν δ'
ἔωθεν ἀστράπτῃ εἴωθε παύεσθαι τριταῖος, οἱ δὲ ἄλλοι πεμπταῖοι
ἑβδομαῖοι ἐναταῖοι, οἱ δὲ δειλινοὶ ταχὺ παύονται. οἱ βορέαι
παύονται ὡς ἐπὶ τὸ πολὺ ἐν περιτταῖς οἱ δὲ νότοι ἐν ἀρτίαις. 235
ἄνεμοι αἴρονται ἅμ' ἡλίῳ ἀνατέλλοντι καὶ σελήνῃ. ἐὰν δ' ἀνατέλ-

215 προβοᾷ MV$^{p.c.}$ *Bart.* : προσβορᾷ P$^{a.c.}$: πρὸς βορᾷ P$^{p.c.}$C : πρὸς βοῤῥᾶ *Ald.* L : πρὸς βορρεῖν T : πρὸς τῇ κορυφῇ βοᾷ *tent. Schn.* (5.168) προσημαίνει M : σημαίνει V 216 πνεύματος^{I} *secl. Bonav.* γένηται MV : γίνηται T *Schn.* : γίνεται PC *Ald.* L 217 ἢ ... πλείους *om.* V *ante* νῆσοι *inser.* αἱ M, καὶ *Wi.* 218 δὲ *Bart.* : τε M : *om.* V 218sq. ὑποφαινομένη βόρειον MV *Bart.* : β. ὑ. *Ald.* LT : βόρειον *secl. Schn.* (5.168) 219 ἅλῳ V : ἅλωνες M *Bart.* τὴν *om.* V 221 ἀνατέλληται V PC *Ald.* LT : –τέληται M : –τέλλῃ τι *Bö.* 84 222 αἱ ... σημαίνουσιν *om.* V 223 γίνηται M : γέν– V 224 ἂν V C *Ald.* L : ἐὰν MP : *om.* T γίνεται M : γίνονται V 225 ὅταν MV *Bart.* : ὅθεν ἂν *Schn.* (4.740) 226 γίνεται M : γίνονται VN : γένηται P 227 πνεύσουσιν M : πνέουσιν V *Bart.* ἐὰν M : εἰ V 231 ἂν ... χειμῶνος *om.* V γένηται ὥσπερ *nos* : λέγω ὥσπερ M : sicut *Bart.* 232 βορρᾶθεν VNC *Ald.* LT. : βόρρανθεν M : βόρραθεν *Schn.* ἀστράπτῃ M : –άψῃ V δ' *ex* autem *Bart. nos* 233 ἔωθεν ἀστράπτῃ *Schn.* (5.LVII.168) *ex* ab oriente coruscat *Bart.* : ἐῶος ἀστραπαῖος MV 234 ταχὺ VSNFQAP$^{p.c.}$C *Ald.* LT *Bart.* : παχὺ MPB βορέαι M$^{p.c.}$: βοραῖοι V 235 νότοι *Schn.* : νότιοι MV 236 αἴρονται *Ald.* LT : ἄρονται M : ἄρχονται V *Bart.* δ' *ex* autem *Bart. nos* 236sq. ἀνατέλλων V *Ald.* LT *Bart* : –ον^{τ} M : –ονται SNFQABPC

If a mountain roars it signals a wind to come. If on the open sea a 31
sudden calm occur it signals a change ⟨in direction⟩ of the wind or
an increase. If headlands appear to hang in midair, or if instead of
one island there appear to be more than one, this signals the onset
of a southern wind. But if the land appears somewhat dark, it
signals a wind from the north; but if the land appears bright, the
wind will come from the south. Halos around the moon are signs
of wind, more so than halos around the sun. But if the halos
around either are broken, they signal wind, the location of the
break being the location of the wind. Cloudiness when ⟨the sun⟩
rises indicates the direction whence wind will arise. Mottled clouds
in summer signal wind.

If lightning occurs all around, it signals rain; and from 32
whatever direction the bolts come thick and fast will come winds.
In summer lightning and thunder also give the direction of strong
winds. If the lightning is frequent and strong, winds will blow
faster and stronger. But if, on the other hand, the lightning is mild
and infrequent, winds will be of little account. In winter and fall,
though, the opposite occurs, for lightning puts a halt to the winds,
and the stronger are the lightning and thunder, the sooner the
winds are halted. In spring, though, if the signs are the same, the
winds halt even less than in winter.

If lighting flashes in the north while Notos blows, it ⟨the wind⟩ 33
ceases. If lighting flashes at dawn, it ⟨the wind⟩ usually ceases two
days later, whereas other winds cease on the fourth, sixth, or
eighth day, although late-afternoon winds quickly cease. North
winds cease for the most part on odd-number days, south winds on
even-numbered days. Winds start up with the rising of the sun and

λων ὁ ἥλιος καὶ σελήνη παύσωσιν ἐπιτείνει τὰ πνεύματα· σελήνης δὲ ληγούσης λήγει μᾶλλον τὰ πνεύματα. χρονιώτερα δὲ καὶ ἰσχυρότερα τὰ πνεύματα γίνεται τὰ ἡμέρας ἢ νύκτωρ ἀρχόμενα.

34 ἐὰν ἐτησίαι πολὺν χρόνον πνεύσωσι καὶ μετόπωρον γένηται ἀνεμῶδες ὁ χειμὼν νήνεμος γίνεται, ἐὰν δ' ἐναντίως καὶ ὁ χειμὼν ἐναντίος. πρὸς κορυφῆς ὄρους ὁπόθεν ἂν νεφέλη μηκύνηται ταύτῃ ἄνεμος πνευσεῖται. αἱ νεφέλαι ἐπὶ τῶν ὄπισθεν προσίζουσαι καὶ ἐντεῦθεν πνευσοῦνται. Ἄθως μέσος διεζευγμένος νότιος καὶ ὅλως τὰ ὄρη διεζωσμένα νότια ὡς τὰ πολλά. οἱ κομῆται ἀστέρες ὡς τὰ πολλὰ πνεύματα σημαίνουσιν, ἐὰν δὲ πολλοὶ καὶ αὐχμόν. μετὰ χιόνα νότος, μετὰ πάχνην βορέας εἴωθε πνεῖν. μύκητες ἐπὶ λύχνου νότιον πνεῦμα ἢ ὕδωρ σημαίνουσιν.

35 αἱ δὲ στάσεις τῶν πνευμάτων οὕτως ἔχουσιν ὡς ἐν τῷ γράμματι διώρισται. τῶν δ' ἀνέμων ἔτι πνέουσι τοῖς ἄλλοις ἐπιπίπτουσι μάλιστα ἀπαρκτίας, θρακίας, ἀργέστης. ὅταν δὲ μὴ ὑπ' ἀλλήλων διαλύωνται τὰ πνεύματα ἀλλ' αὐτὰ καταμαρανθῶσι μεταβάλλουσιν εἰς τοὺς ἐχομένους ἐπὶ δεξιὰ ὥσπερ ἡ τοῦ ἡλίου ἔχει φορά. ὁ νότος ἀρχόμενος ξηρός, τελευτῶν δὲ ὑγρός. καὶ ὁ εὖρος. ὁ δ' ἀπηλιώτης ἀπ' ἀνατολῆς ἰσημερινῆς ὑδατώδης· διὰ λεπτῶν δ' ἄγει τὰ ὕδατα.

36 ὑγροὶ δὲ μάλιστα ὅ τε καικίας καὶ λίψ· χαλαζώδης δ' ὅ τε ἀπαρκτίας καὶ θρακίας καὶ ἀργέστης· νιφετώδης δὲ ὅ τε μέσης [ἢ βορέας] καὶ ἀπαρκτίας· καυματώδης δὲ νότος καὶ ζέφυρος

237 ὁ *om.* V *ante* παύσωσιν *inser.* μὴ *Schn.* (2.602, 5.LVII.168) 237sq. σελήνης ... πνεύματα *om.* C *Ald.* LT 238 ληγούσης λήγει *nos* : φθινούσης λήγει M : ληγούσης ἤτοι φθινούσης, λήγει V : diminuta finiunt (fiunt *Bart.Z*) *Bart.* 239 τὰ^{II} *om.* V 240 ἐτησίαι M *Bart.* : ἔτη *spat. vac. ca. 2 litt.* V : boreae temporales *Bart.* 241 ἐναντίως M : ἐναντίος V 242 ἐναντίος V *Ald.* LT : ἐναντίως M κορυφῆς ὄρους M : κορυφὴν ὄ. V : κορυφὰς ὄ. *Schn.* : a vertice montis *Bart.* 243 ἐπὶ *nos* : ἐκ MV *Bart.* 244 ἐντεῦθεν *nos* : ὄπισθεν MV : a posteriori *Bart.* 244sq. Ἄθως ... πολλά *om.* V 244 Ἄθως M *Bart. Schn.* (5.LVII.169) : *om. Ald. spat. vac. ca. 8 litt.* LT,* *Gryn.*, † *Furl.* : Ὕμηττος *Furl. in notis Schn.* 244 μέσος M *Bart.* : Μύσιος *tent. Bonav.* 247 εἴωθε *Wi.* : εἰώθασι MV : consuevit *Bart.* 248 μύκητες ... σημαίνουσιν *om.* V 250 πνέουσι V : πνεύσουσι M 251 θρακίας M : θρασκίας V ἀργέστης M : ἀργέτης V 253 τοὺς ἐχομένους MV : τὴν ἐχουμένην *Furl.* 255 ἀπηλιώτης M : ἀφ– V 257 ὅ τε V *Bart.* : *om.* M 258 θρακίας M : θρασκίας V ἀργέστης M : ἀργέτης V νιφετώδης VPC *Ald.* LT : –εις M 259 ἢ βορέας *secl. Ho.* : καὶ βορρᾶς V καυματώδης VPC *Ald.* LT : –εις M καὶ^{II} *om.* V

moon. If the sun and moon rising stop the winds, they increase in intensity. As the moon wanes, winds wane more. Winds that start up during the day last longer and are stronger than those those beginning at night.

If etesian winds blow for a long time and there is a windy 34
autumn, the winter will be windless. But if the opposite occurs, the winter will turn out opposite as well. A wind will blow along the path from which a cloud stretches out from the peak of a mountain. Clouds sitting on the back ⟨of mountains⟩ will also blow from this direction. When Mt. Athos is girded around its middle, it will be produce rain; and in general mountains ⟨so⟩ girded will lead to rain. Comets generally indicate winds, and, if there are many of them, drought as well. After snow a south wind is likely to blow; after frost a north wind. Snuff on a lamp signals either wind or rain from the south.

The positions of the winds are as defined in the figure. Of all 35
the winds the ones that most often collide with others while they are still blowing are Aparktias, Thrakias, and Argestes. But when winds are not neutralized by one another but die down by themselves, they change into the next ones on the right-just like the motion of the sun. When Notos begins it is dry; when it ends it is moist. Euros likewise. Apeliotes, coming from where the sun rises, is wet, but its rains are gentle. The wettest winds are Kaikias 36
and Lips. Aparktias, Thrakias , and Argestes bring hail. Meses and Aparktias bring snow. Notos, Zephyros, and Euros bring heat. The

καὶ εὖρος· οἱ μὲν οἷς ἂν ἐκ πελάγους προσπίπτωσιν, οἱ δὲ οἷς ἂν διὰ γῆς. δασύνουσι δ' οὐρανὸν νέφεσι καὶ καλύπτουσι καικίας μάλιστα εἶτα λίψ. καὶ οἱ μὲν ἄλλοι ἄνεμοι ἀφ' ἑαυτῶν τὰ νέφη ὠθοῦσι, καικίας δὲ μόνος πνέων ἐφ' ἑαυτόν. αἴθριοι δὲ μάλιστα θρακίας καὶ ἀργέστης καὶ τῶν λοιπῶν ἀπαρκτίας· ἐκνεφίαι δὲ μάλιστα ὅ τε ἀπαρκτίας καὶ ὁ θρακίας καὶ ὁ ἀργέστης.

37 γίνονται δὲ ἐκνεφίαι ὅταν εἰς ἀλλήλους ἐμπίπτωσι πνέοντες μάλιστα μὲν μετοπώρου, τῶν δὲ λοιπῶν ἔαρος. ἀστραπαῖος δὲ θρακίας καὶ ἀργέστης καὶ ἀπαρκτίας καὶ μέσης. ἐὰν ἐν τῇ θαλάσσῃ πάπποι φέρωνται πολλοὶ οἱ γινόμενοι ἀπὸ τῶν ἀκανθῶν ἄνεμον σημαίνουσιν ἔσεσθαι μέγαν. ὅθεν ἂν ἀστέρες διάττωσι πολλοὶ ἄνεμον ἐντεῦθεν· ἐὰν δὲ πανταχόθεν ὁμοίως πολλὰ πνεύματα σημαίνουσι· πνευμάτων μὲν οὖν σημεῖα ταῦτα.

38 χειμῶνος δὲ τάδε. ἥλιος δυόμενος εἰς μὴ καθαρόν. καὶ ὡς ἂν μερισθῇ δυόμενος οὕτως αἱ ἡμέραι ἐπιτελοῦνται. οἷον ἐὰν τὸ τρίτον μέρος ἀπολειφθῇ ἢ τὸ ἥμισυ. σελήνιον ἐὰν ὀρθὸν ᾖ μέχρι τετράδος καὶ εἰ εὔκυκλον χειμάσει μέχρι διχοτόμου. γέρανοι ἐὰν πρωῒ πέτωνται καὶ ἀθρόαι πρωῒ χειμάσει, ἐὰν δὲ ὀψὲ καὶ πολὺν χρόνον ὀψὲ χειμάσει. καὶ ἐὰν ἀποστραφῶσι πετόμεναι χειμῶνα σημαίνουσι.

39 χῆνες βοῶντες μᾶλλον ἢ περὶ σίτου μαχόμενοι χειμέριον. σπίνος [καὶ στρουθὸς] σπίζων ἔωθεν χειμέριον. ὄρχιλος ὡς εἰσιὼν

260sq. οἱ^{I} .... γῆς *om.* V 260 ἂν^{II} *Wi.* : ἐὰν M 263 μόνος VT *Schn.* (5.LVIII.169) : μόνον M ἐφ' V : εἰς M ad se *Bart.* 264 θρακίας M : θρασκίας V ἀργέστης M : ἀργέτης V τῶν λοιπῶν *om.* V ἀπαρκτίας M : ἀπαρτίας V 265 θρακίας M : θρασκίας V ὁ ἀργέστης M : ἀργέτης V 268 θρακίας M : θρασκίας V ἀργέστης M : ἀργέτης V 269 θαλάσσῃ M : θαλάττῃ V 270 σημαίνουσιν ἔσεσθαι μέγαν M : μέγα σ. V 271 διάττωσι πολλοὶ M : π. δ. V : videntur currere *Bart.* ὁμοίως MV *Bart.* : *secl. Schn.* (5.LVIII.169) 273sq. καὶ ὡς ἂν μερισθῇ MV *Bart.* : κἂν ὡσεὶ μερισθῇ *delib. Schn.* (5.169) 274 οἷον *om.* V ἐὰν *nos* : εἰ M *Bart.* : εἴτε V 275 τρίτον M *Bart.* : ἥμισυ V ἀπολειφθῇ MV : –λειφθείη *Schn.* (4.743) : –ληφθείη *non prob. Schn.* (5,169) *sed tent. Ho. in app. crit.* ἢ τὸ ἥμισυ M *Bart.* : εἴτε τὸ τρίτον V *ante* σελήνιον *inser.* τὸ *Heins. sed non prob. Schn.* (4.743) σελήνιον ἐὰν ὀρθόν M : σελήνη ἐὰν ὀρθή V 276 εἰ εὔκυκλον M *Bart.* : εὔκυκλος V 277 ἀθρόαι V : –οι M 278 ἀποστραφῶσι MV : ὑποστραφῶσι *Schn.* (5.169) *e* revertantur *Bart.* πετόμεναι V *Schn.* : –οι M : πετώμενοι *Ald.* L 280 ἢ MV : καὶ ἢ *Schn.* : κλαγγῇ *Bö.* 84 : *om. Bart.* περὶ σίτου *nos* : περὶ σί^{τ} M : περὶ σῖτον SNFQABPC *Ald.* LT*, prob. Schn.* (5.169) *e* circa cibum *Bart.* : ἐπὶ σίτῳ V 281 καὶ στρουθὸς (MV *Bart.*) *seclusimus* : 281–283 ὄρχιλος ... καὶ^{II} *om.* V 281 ὡς *secl. Schn.* (4.744)

effects are felt differently, depending on whether they fall upon one from out of the sea or from across land. The winds that most thicken and conceal the sky with clouds are first Kaikias and then Lips. And whereas all other winds drive away clouds, Kaikias alone blows them unto itself. Thrakias and Argestes are the chief winds to bring clear skies; ahead of all the others in this regard is Aparktias. Aparktias, Thrakias, and Argestes are most likely to bring hurricanes.

Hurricanes occur when ⟨winds⟩ fall upon one another while 37
still blowing, chiefly in the fall and, of the other seasons, next in spring. Thrakias, Argestes, Aparktias, and Meses bring lightning. If there are many down-like thistle seeds floating on the sea, they are a sign that a big wind is coming. Wind will come from the quarter of the sky whence many shooting stars come, but shooting stars coming from all directions signal many winds. These, then, are the signs of winds.

Signs of Storms

The following are signs of storm: The sun setting into haze. And 38
the way in which it is divided is the way the days following will turn out. For example, if a third is left out, or half. If the moon, less than full, is straight ⟨up⟩ until the fourth of the month and if it forms a good circle, it will storm until midmonth. If a flock of cranes flies in early morning, it will storm early; but if it flies late and over a long period of time, it will storm late. And if they turn about in flight they signal storm.

Geese honking more than usual when they fight for food are a 39
sign of storm. A sparrow chirping at dawn is a sign of storm. A

καὶ εἰσδυόμενος εἰς ὀπὰς χειμῶνα σημαίνουσι καὶ ἐριθεὺς ὡσαύτως. κορώνη ἐὰν ταχὺ δὶς κρώζῃ καὶ τρίτον χειμερία. καὶ κορώνη καὶ κόραξ καὶ κολοιὸς ὀψὲ ᾄδοντες χειμέριοι. στρουθὸς ἐὰν λευκὸς ἢ χελιδὼν ἢ ἄλλο τι τῶν μὴ εἰωθότων λευκῶν χειμῶνα μέγαν σημαίνουσιν, ὥσπερ καὶ μέλανες ἐὰν πολλοὶ φανῶσιν ὕδωρ.

40 καὶ ἐὰν ἐκ πελάγους ὄρνιθες φεύγωσι χειμῶνα σημαίνουσι. καὶ σπίνος ἐν οἰκίᾳ οἰκουμένῃ φθεγγόμενος χειμέριον. ὅσα ὕδωρ σημαίνει χειμῶνα ἄγει, ἐὰν μὴ ὕδωρ χιόνα καὶ χειμῶνα. κόραξ φωνὰς πολλὰς μεταβάλλων χειμῶνος χειμέριον. κολοιοὶ ἐκ τοῦ νότου πετόμενοι καὶ τευθίδες χειμέριαι. φώκη ἐν λιμένι ἀποψοφοῦσα καὶ πολύποδα ἔχουσα χειμέριον. καὶ οἱ πλεύμονες οἱ θαλάττιοι ἐὰν πολλοὶ φαίνωνται ἐν τῷ πελάγει χειμερινοῦ ἔτους σημεῖον. πρόβατα ἐὰν πρωῒ ὀχεύηται πρώϊον χειμῶνα σημαίνουσι.

41 μετοπώρῳ ἐὰν πρόβατα ἢ βόες ὀρύττωσι καὶ κοιμῶνται ἀθρόοι πρὸς ἀλλήλους ἔχοντες τὰς κεφαλὰς τὸν χειμῶνα χειμέριον σημαίνουσιν. ἐν δὲ τῷ Πόντῳ φασὶν ὅταν Ἀρκτοῦρος ἀνατείλῃ, θᾶττον ἐναντίους τῷ βορρᾷ νέμεσθαι. βόες μᾶλλον ἐσθίοντες τοῦ εἰωθότος καὶ ἐπὶ τὸ δεξιὸν κατακλινόμενοι χειμέριον. καὶ ᾦτα κρούων ὄνος χειμέριον καὶ μαχόμενα πρόβατα καὶ ὄρνιθες περὶ σίτου παρὰ τὸ ἔθος ὁμοίως· προπαρασκευάζονται γάρ. καὶ μῦες τρίζοντες καὶ ὀρχούμενοι χειμέριον.

282 ἐριθεὺς *Schn. Bart.* : ἐριθὺς M 284 κορώνη ... χειμέριοι *post* χειμῶνα σημαίνουσι (*lin.* 288) *trsp.* V 284 χειμέριοι M : –ιον V 284–288 στρουθὸς ... καὶ *om.* V 288 σημαίνουσι M : δηλοῖ V *Bart.* : *post* σημαίνουσι *inser.* κορώνη ... χειμέριοι (*lin.* 284) V 289sq. καὶ ... χειμῶνα^{II} *om.* V 289 ἐν *Furl. Bart.* : ἐὰν M 290 σημαίνει χειμῶνα ἄγει MV : Fortasse χειμώνας *Bonav.* 291 φωνὰς πολλὰς M *Bart.* : πολλὰς φωνὰς V μεταβάλλων M : –βάλων V χειμῶνος χειμέριον M : χειμέριον V : χειμῶνος σημεῖον *Schn.* (5,170) *e* tempestatis signum *Bart.* 292 νότου MV *Bart.* : νομοῦ *Maass* χειμέριαι M : –ιον V φώκη MV *Bart.* : φωνὴ PC *Ald.* LT : mortua *Bart.MBAVGEF* 293 καὶ πολύποδον (-α *nos*) ἔχουσα M : *om.* V : κ. πολύποκλον ἔ. P : κ. πολύπλοκον ἔ. *Furl.* : κ. π. ἠχοῦσα *Schn.* (5.LVIII, 170) : κ. πολύποδες * * ἔχουσα *Coray* καὶ οἱ πλεύμονες οἱ M : κ. οἱ πνεύμονες οἱ *Ald.* LT : πνεύμονες V 295 πρώϊον M : πρώϊμον V 298 ἀλλήλους MV : ἀλλήλων SNFQAPC *Ald.* LT : invicem *Bart.* 299 σημαίνουσι V *Bart.* : σημαίνει M *Bart.GE* 299sq. ἐν ... νέμεσθαι *om.* V 301 τὸ *om.* V 302 ᾦτα κρούων ὄνος M : ὅ. ᾦ. κ. V *Bart.* χειμέριον M *Bart.* : τὸ αὐτὸ V καὶ^{II} *om.* V 303 ὁμοίως V : *om.* M *Bart.* 304 μῦες M : αἱ μ. T : οἱ μ. V τρίζοντες PC *Ald.* LT : τρίξοντες M : τρύζοντες V

wren and a robin likewise entering and hiding in their lairs signal storm. If a crow cackle twice in quick succession and ⟨then⟩ a third time, this is a sign of storm. And a crow and a raven and a jackdaw singing late are signs of storm. If a sparrow is white, or a swallow or any other of those not normally white, they signal a great storm, just as also black birds appearing in large numbers signal rain.

And if birds flee from the sea they signal storm. And a chaf- 40
finch singing in an inhabited house is a sign of storm. All that signal rain lead to storm; if not rain then snow and storm. A raven in winter producing many sounds is a sign of storm. Jackdaws flying from the south and cuttlefish are signs of storm. A seal making its loud sound in the harbor while holding an octopus is a sign of storm. And if many jelly fish appear in the sea this is a sign of a stormy season. If the smaller cattle mate early they signal an early winter.

If in fall the small cattle or the cows dig at the earth and bed 41
down keeping their heads close to one another, they signal that the winter will be stormy. In Pontos, they say that when Arktouros rises, they ⟨the cattle⟩ graze while facing north more hurriedly ⟨than usual⟩. Cows eating more than usual and lying on their right side are a sign of storm. And an ass snapping his ears is a sign of storm; and likewise cattle and birds fighting for food more than usual, since they are getting prepared in advance. And mice squeaking and dancing are a sign of storm.

42 καὶ κύων τοῖς ποσὶν ὀρύττων ὁμοίως καὶ ὀλολυγὼν ἄδουσα μόνη ἀκρωρείας χειμέριον. γῆς ἔντερα πολλὰ φαινόμενα χειμῶνα σημαίνει. καὶ ἐὰν πῦρ μὴ θέλῃ ἅψασθαι χειμέριον. καὶ ἐὰν λύχνος ἅπτεσθαι μὴ ἐθέλῃ χειμῶνα σημαίνει· καὶ τέφρα πηγνυμένη νιφετόν σημαίνει. λύχνος εὐδίας ἡσυχῇ καιόμενος χειμῶνα σημαίνει· καὶ ἐὰν μέλαιναι φλόγες αἰθύσσωσι χειμέριαι. καὶ ἐὰν χειμῶνος ὄντος μύκαι μέλαιναι ἐπιγένωνται χειμῶνα σημαίνει· καὶ ἐὰν ὥσπερ κέγχροις πολλοῖς κατάπλεως ᾖ χειμερίσει· καὶ ἐὰν κύκλῳ περὶ τὸ λαμπρὸν ὦσιν εὐδίας οὔσης χιονικόν.

43 ἡ τοῦ Ὄνου Φάτνη εἰ συνίσταται καὶ ζοφερὰ γίνεται χειμῶνα σημαίνει. καὶ ἐὰν ἀστραπὴ λαμπρὰ μὴ ἐν τῷ αὐτῷ μένῃ χειμέριον. ἐπὶ Πλειάδι δυομένῃ ἐὰν λάμψῃ παρὰ Πάρνηθα καὶ Βρίλλητον καὶ Ὕμηττον, ἐὰν μὲν ἅπαντα καταλάμψῃ μέγαν χειμῶνα σημαίνει. ἐὰν δὲ τὰ δύο ἐλάττω, ἐὰν δὲ Πάρνηθα μόνον εὐδιεινόν· καὶ ἐὰν χειμῶνος ὄντος νεφέλη μακρὰ ἐπὶ τὸν Ὕμηττον ᾖ χειμῶνος ἐπίτασιν σημαίνει. Ἄθως καὶ Ὄλυμπος καὶ ὅλως ὀρέων κορυφαὶ κατεχόμεναι ὑπὸ νεφελῶν χειμέριον. ἐὰν εὐδίας γενομένης νεφέλιον φαίνηται ἐν τῷ ἀέρι. παρατεταμένον καὶ τιλλόμενον οὔπω παύεται ὁ χειμών.

44 ἐὰν τὸ μετόπωρον εὐδιεινὸν παρὰ τὸ εἰκὸς γένηται τὸ ἔαρ γίνεται ψυχρὸν ὡς τὰ πολλά. ἐὰν πρωὶ χειμάζειν ἄρχηται πρωὶ παύεται καὶ ἔαρ καλόν, ἐὰν δὲ τοὐναντίον καὶ ἔαρ οὐ γίνεται. ἐὰν ὁ χειμὼν ὑέτιος τὸ ἔαρ αὐχμηρόν, ἐὰν δ' αὐχμηρὸς ὁ χειμὼν τὸ ἔαρ καλόν. ἐὰν ἡ †σκωρία γίνηται ἐπιεικὴς† τὰ πολλὰ γίνεται

305 ποσὶν V *Bart.* T : πολλοῖς M ὀρύττων ὁμοίως V : ὀρύττουσα M *Bart.* 305–308 καὶ[II] ... καὶ *om.* V 306 ἀκρωρείας M : –ίας *Schn.* (4.745) 307 πῦρ M : πυρῶν SNFQAPC *Ald.* LT ἅψασθαι *nos* : σκέψασθαι M *Bart.* : ἅπτεσθαι *Furl.* : ἅψεσθαι *Heins.* 309 σημαίνει *om.* M λύχνος *Furl.* : λυχνίας M 309–321 λύχνος ... χειμέριον *om.* V 309 εὐδίας *Furl.* : ὠδίας M : serenitate *Bart.* ἡσυχῇ *nos* : –αῖος M : quiete *Bart.* καιόμενος *Ald.* LT : καίμενος M : adurens *Bart.* 310 καὶ[I] ... χειμέριαι M : *om. edd., restit. Schn.* (5.170) *e transl. lat. Bart. et* ἀπαΐσσωσι *e* urantur *Bart. propos.* 311 ἐπιγένωνται M : –γίν– *Schn.* 312 ἐὰν ὥσπερ M *Bart.* : ὥσπερ ἐὰν *Wi.* 1866 κατάπλεως M : καταπλέων *Heins.* 316 λάμψῃ P[a.c.]C *Ald.* LT : λήψῃ M παρὰ *nos* : κατὰ *Heins.* : *om.* M 317 Βρίλλητον *nos* : Βρίληττον M : Βρίλητον T καταλάμψῃ *Wi.* : –λήψῃ M 320 ᾖ M : ἢ PC *Ald.* L : secl. *Furl., om.* T *edd. cett., restit. Schn.* (4.747) 322 γενομένης M : γιν– VPC *Ald.* LT 325 ἄρχηται MV : ἄρξ– *Ald.* LT 326 οὐ γίνεται MV *Bart.* : ὄψιον ἔσται *Wi.* 327 ἐὰν ὁ MV : ἐὰν PC *Ald.* L : καὶ T : si autem *Bart.* 328 καλόν MV *Bart.* : οὐ καλόν T 328sq. ἐὰν .... λιμός *om.* V 328 σκωρία M : ὀπώρα *Schn.* (4.747, 5.LVIII.170) : erubigo *Bart.* γίνηται M : γίνεται PC *Ald.* L

And likewise a dog digging with its paws and a tree frog singing 42
solo at the crack of dawn are signs of storm. Many "earth guts" [i.e., worms] appearing signal storm. And if a fire resists kindling it is a sign of storm; and if a lamp is hard to light it signals storm. And the build up of ash signals snow. A lamp sputtering while burning during fair weather signals storm. And flames flickering darkly are signs of storm. And if during winter black snuff develops it signals storm. And if it is as though filled with many millet seeds, it will storm. And if they ⟨the millet seed-like objects⟩ surround the flame during fair weather, this is a sign of snow.

If the Ass' Manger draws itself together and become dark, it 43
signals storm. And if brilliant lightning does not remain in the same place, it is a sign of storm. If at the setting of the Pleiades it flashes on Mts. Parnes, Brilettos, and Hymettos, then (i) if it flashes over all three it signals a mighty storm, (ii) if over two of them, a smaller storm, and (iii) if only over Parnes, fair weather. And if during a storm a large cloud covers Hymettos it signals an increase in intensity of the storm. Mts. Athos and Olympos, and mountain peaks in general when covered by clouds, are signs of storm. If, when the weather clears, a cloud is visible stretched out through the sky and looking plucked, the storm is not yet over.

If the fall turns out unusually fair, the ⟨following⟩ spring will 44
generally be cold. If winter begins early it ends early and the spring is fair; if the reverse, there will be no spring. If winter is rainy, the spring will be dry; but if the winter is dry, the spring will be fair. If the late summer is fair, famine will befall the cattle. If the spring

τοῖς προβάτοις λιμός. ἐὰν δὲ τὸ ἔαρ καὶ τὸ θέρος ψυχρὰ γίνηται ἥ τε ὀπώρα γίνεται καὶ τὸ μετόπωρον πνιγηρὸν καὶ οὐκ ἀνεμῶδες.

45 οἱ πρῖνοι ἐὰν εὐκαρπῶσι χειμῶνες πολλοὶ σφόδρα γίνονται. ἐὰν ἐπὶ κορυφῆς ὄρους νέφος ὀρθὸν στῇ χειμῶνα σημαίνει, ὅθεν καὶ Ἀρχίλοχος ἐποίησε «Γλαῦχ' ὅρα· βαθὺς γὰρ ἤδη κύμασι ταράσσεται πόντος, ἀμφὶ δ' ἄκρας ὀρθὸν ἵσταται νέφος», ὅ ἐστι σημεῖον χειμῶνος. ἐὰν δ' ὁμόχρως ᾖ ὑμένι λευκῷ χειμέριον. ὅταν ἑστώτων νεφῶν ἕτερα ἐπιφέρηται, τὰ δ' ἠρεμεί, χειμέριον.

46 ὁ ἥλιος ἐὰν χειμῶνος διαλάμψας πάλιν ἀποκρυφθῇ καὶ τοῦτο ποιήσῃ δὶς ἢ τρὶς ἡμέρα χειμέριος δίεισιν. ὁ τοῦ Ἑρμοῦ ἀστὴρ χειμῶνος μὲν φαινόμενος ψύχη σημαίνει, θέρους δὲ καῦμα. ὅταν μέλιτται μὴ ἀποπέτωνται μακρὰν ἀλλ' αὐτοῦ ἐν τῇ εὐδίᾳ πέτωνται χειμῶνα ἐσόμενον σημαίνουσι. λύκος ὠρυόμενος χειμῶνα σημαίνει τριῶν ἡμερῶν. λύκος ὅταν πρὸς τὰ ἔργα ὁρμᾷ ἢ εἰσίῃ χειμῶνος ὥρᾳ χειμῶνα σημαίνει εὐθύς.

47 ἔστι δὲ σημεῖα χειμώνων μεγάλων καὶ ὄμβρων καὶ ὅταν γίνωνται ἐν τῷ μετοπώρῳ πολλοὶ σφῆκες καὶ ὅταν ὄρνιθες λευκοὶ πρὸς τὰ ἐργάσιμα πλησιάζωσι καὶ ὅλως τὰ ἄγρια θηρία ἐὰν πρὸς τὰ ἐργάσιμα σπεύδοντα βόρειον καὶ χειμῶνος μέγεθος σημαίνει.

329 δὲ *om.* M ἔαρ καὶ τὸ θέρος M *Bart.* : θέρος κ. τ. ἔαρ V γίνηται M : γένωνται V 330 τὸ *om.* M, *restit. Schn.* (4.747) 332 εὐκαρπῶσι M *Bart.* : καρπῶσι V 333–336 ὅθεν ... χειμέριον *om.* V 334sq. Archilochus fr. 105 West 334 Γλαῦχ' *Ald.* LT : γλαῦκ' M 335 δ' *Furl.* : δὲ M (*contra metrum; vide infra comm.*) ἄκρας M : ἄκρα *Schn.* (4.748) *Wi. Ho. post* ἄκρας *inser.* γυροῦν *Schn.* (4.748) 335sq. ὅ ἐστι σημεῖον M : Σῆμα χειμῶνος *Schn.* (4.748) : quae ostendit *Bart.* 336 ἐὰν δ' ὁμόχρως ᾖ *Vasiloudi* : ἐὰν δ' ὁμόχρων (sc. νέφος) ᾖ *Wi.* : ἐὰν ὀπόμοχρως ἦν M : ἐὰν ὀπόμοχρως ᾖ T : ἐὰν ὁ πομόχρως ᾖ *Gryn.* : ἐὰν νεφέλη ὁμόχρως ᾖ *Furl.* : καὶ ἐὰν ὁμόχρως ᾖ *tent. Schn.* (5.170) *ex* et si colorabuntur *Bart.* 337 ἠρεμεὶ χειμέριον V : ἠρεμῇ χειμέρια M : ἠρεμῇ χειμέριον T 338 ὁ ἥλιος M *Furl.* : *om. Bart. Ald. spat. vac. ca. 6 litt.* LT : οὗ V ἀποκρυφθῇ M : ἀποκρυβῇ V 339 ποιήσῃ PC *Ald.* LT : ποιήσει MV 339sq. δίεισιν ... καῦμα *om.* V 341sq. μακρὰν ... πέτωνται *om.* V 341 αὐτοῦ M : ἐπ' αὐτοῦ τοῦ σμηίου *Furl.* : ἐπ' αὐτοῦ τοῦ σμήνους *Heins.* : in eodem *Bart.* 341sq. πέτωνται PC *Ald.* LT : πέτονται M 342 σημαίνουσι V : σημαίνει M 343sq. τριῶν ... εὐθύς *om.* V 343 τριῶν ἡμερῶν. λύκος *nos* : λ. τ. ἡ. M *Bart.* : διὰ τ. ἡ. λ. *Schn.* ὁρμᾷ *Furl.* : ὥρᾳ M : movetur *Bart.* εἰσίῃ *Schn.* (5.171) *ex* intrat *Bart.P* : εἴσω M *Bart.* 345 σημεῖα V : σημεῖον M χειμώνων μεγάλων M *Bart.* : μ. χ. V *Bart.P* καὶ^{II} *om.* V 345sq. γίνωνται V : γέν– M 347 ἐὰν *om.* V 348 τὰ *om. Heins. edd. cett., restit. Schn.* (5.LVIII) σπεύδοντα *om.* M

and summer are cold, late summer and fall will be stifling hot and windless.

If the evergreen oaks have good fruit, frequent storms occur. If 45
a cloud stands upright on a mountain peak, it signals storm; hence Archilochos wrote, "Glaukos, look! The deep sea is already stirred up with waves, and around the heights a cloud stands straight up" (fr. 105 West), which is a sign of storm. If it is uniformly colored with a white covering, it is a sign of storm. When clouds move towards other clouds that remain at rest, they are signs of storm.

If during winter the sun shines clear and then is covered up, 46
and this happens two or three times, the day will be stormy throughout. If Mercury is visible in winter it signals cold, if in summer it signals heat. When bees during fair weather do not fly far away but only in the same spot, this signals that a storm is coming. A howling wolf signals a storm within three days. When a wolf runs up to or enters cultivated lands during winter it signals an immediate storm.

It is a sign of big storms and rains, both when many wasps 47
occur in the fall, and when white birds approach cultivated lands; and, in general, if wild animals run toward cultivated lands, they signal a north wind and a great storm. If the parts of Parnes facing

τῆς Πάρνηθος ἐὰν τὰ πρὸς ζέφυρον ἄνεμον καὶ τὰ πρὸς Φύλης φράττηται νέφεσι βορείων ὄντων χειμέριον τὸ σημεῖον.

48 ὅταν πνίγη γίνηται τὰ πολλὰ ἰσχυρῶς, ἀνταποδίδωσι καὶ γίνεται χειμὼν ἰσχυρός. ἐὰν ὕδατα ἐαρινὰ πολλὰ γένηται, καύματα ἰσχυρὰ ἐν τοῖς πεδινοῖς καὶ κοίλοις γίνεται. δεῖ οὖν τὴν ἀρχὴν ὁρᾶν. ἐὰν τὸ μετόπωρον εὐδιεινὸν γίνηται σφόδρα ἔαρ ὡς τὰ πολλὰ γίνεται ψυχρόν· ἐὰν δὲ τὸ ἔαρ ὄψιον γένηται καὶ ψυχρόν, ἡ ὀπώρα ὀψία γίνεται καὶ μετόπωρον ὡς τὰ πολλὰ πνιγηρόν.

49 οἱ πρῖνοι ὅταν εὐκαρπῶσι σφόδρα, ὡς μὲν τὰ πολλὰ χειμῶνα ἰσχυρὸν σημαίνουσιν, ἐνίοτε δὲ καὶ αὐχμούς φασι γίνεσθαι. καὶ ἐάν τις σπάλακα λαβὼν ὑποπάσας ἄργιλον εἰς πιθάκνην θῇ σημαίνει ταῖς φωναῖς αἷς ἀφίησιν ἄνεμον καὶ εὐδίαν. καὶ τὸ πανταχοῦ δὲ λεγόμενον σημεῖον δημόσιον χειμέριον ὅταν μῦες περὶ φορυτοῦ μάχωνται καὶ φέρωσιν.

50 εὐδίας δὲ σημεῖα τάδε. ἥλιος μὲν ἀνιὼν λαμπρὸς καὶ μὴ καυματίας καὶ μὴ ἔχων σημεῖον μηδὲν ἐν ἑαυτῷ εὐδίαν σημαίνει. ὡς δ' αὕτως σελήνη πανσελήνῳ. καὶ δυόμενος ἥλιος χειμῶνος εἰς καθαρὸν εὐδιεινός, ἐὰν μὴ ταῖς προτέραις ἡμέραις εἰς μὴ καθαρὸν δεδυκὼς ᾖ ἐξ εὐδιῶν· οὕτω δὲ ἄδηλον. καὶ ἐὰν χειμάζοντος ἡ δύσις γένηται εἰς καθαρὸν εὐδιεινόν· καὶ ἐὰν δύνων ὁ ἥλιος χειμῶνος ὠχρὸς ᾖ, εὐδίαν σημαίνει.

51 καὶ ὁ μεὶς ἐὰν τριταῖος ὢν λαμπρὸς ᾖ εὐδιεινόν. καὶ ἡ τοῦ Ὄνου Φάτνη ὅτε ἂν καθαρὰ καὶ λαμπρὰ φαίνηται εὐδιεινόν. ἅλως δὲ ἐὰν ὁμαλῶς παγῇ καὶ μαρανθῇ εὐδίαν σημαίνει. αἱ κοιλάδες νεφέλαι χειμῶνος εὐδιειναί. Ὄλυμπος δὲ καὶ Ἄθως καὶ

349–354 τῆς ... ὁρᾶν *om.* V 351 γίνηται M : γένηται μετοπώρου *Schn.* (5.171) *e* praefocatio fit *Bart.* τὰ πολλὰ ἰσχυρῶς M : ἰσχυρὰ ὡς τὰ πολλὰ *Schn.* (5.LVIII.171) : ὡς τὰ πολλὰ *Schn.* (2.603, 5.171) : ut multum *Bart.* 354 γίνηται M : γέν– V *ante* ἔαρ *inser.* τὸ *Schn.* (2.603, 5.LVIII) 356 *ante* μετόπωρον *inser.* τὸ *Schn.* (4.751) ὡς τὰ πολλὰ *om.* V 357sq. οἱ … καὶ^{II} *om.* V 359 σπάλακα V *Furl.* : σπάκα M : σπάρκα A : σπάκα* *Gryn* : σκολόπακα *Furl. in notis* ὑποπάσας M : –σπάσας V πιθάκνην V : πιθάκην M 361 μῦες MV : σύες Maass 363 *ante* εὐδίας *inser.* περὶ εὐδίας σημείων PC *Ald.* L 364 μηδὲν M : οὐδὲν V εὐδίαν σημαίνει *om.* V 364sq. ὡς δ' αὕτως M : ὡσαύτως δὲ καὶ V 365 πανσελήνῳ M : πανσέληνος V καὶ δυόμενος ἥλιος M *Bart.* : ἥ. δ. V 366sq. ἐὰν ... ἄδηλον *om.* V 368 ὁ ἥλιος *om.* M *Bart.* 369 εὐδίαν V *Bart.* (serenitatem) : ἐν εὐδίᾳ M *Bart.P* (in serenitate) 370 ᾖ *om.* V 370sq. καὶ^{II} ... εὐδιεινόν *om.* V 373 κοιλάδες M : κοῖλαι V : κηλάδες *Ho.* 373sq. Ὄλυμπος … ἔχωσιν M *Bart.* : ὅταν τὰ ὄρη τὰ ὑψηλὰ καθαρὰς ἔχωσιν κορυφάς V

west and toward Phyle are fenced in by clouds while northerlies blow, the sign is for storm.

When there are severe periods of great heat, this is balanced 48
with a severe storm. If it rains a lot in the spring, there are severe heat spells in the plains and hollows. One should, therefore, look to the beginning ⟨of each season⟩. If fall is very fair, the spring for the most part is cold; if the spring is late and cold, summer will end late and the fall for the most part chokingly hot.

When the evergreen oaks produce much fruit, this usually sig- 49
nals a severe winter; and sometimes, they say, a dry spell follows. And if someone take a blind-rat (mole?) and place it in a cask, having first pressed down potter's earth, it ⟨the animal⟩ signals wind and fair weather by the sounds it makes. And mice fighting to carry off tiny scraps, as people everywhere recognize, are a sign of storm.

Signs of Fair Weather

The following are the signs of fair weather. When the sun rises 50
bright but not scorching and without any mark on itself showing, it signals fair weather. Likewise when the full moon rises. And when in winter the sun sets clear, it is a sign of fair weather-unless on the preceding days the sun had gone from fair weather to set where it was unclear; in this case the sign is unsure. And if during a storm the sun sets clear, the sign is for fair weather. And if it is a pale yellow while setting during a storm, it signals fair weather.

And if the moon is bright on the third day it is a sign of fair 51
weather. And when the Ass's Manger is clear and bright it is a sign of fair weather. And if a halo forms and fades away evenly it signals fair weather. Mackerel clouds in winter signal fair weather. And when Mts. Olympos and Athos (and those mountains regularly

ὅλως τὰ ὄρη τὰ σημαντικὰ ὅταν τὰς κορυφὰς καθαρὰς ἔχωσιν εὐδίαν σημαίνει. καὶ ὅταν τὰ νέφη πρὸς τὴν θάλασσαν αὐτὰ παραζωννύῃ εὐδιεινόν. καὶ ὅταν ὕσαντος πρὸς δυσμὰς χαλκῶδες τὰ νέφη χρῶμα ἔχῃ, εὐδιεινόν. εὐδία γὰρ ὡς τὰ πολλὰ τῇ ὑστεραίᾳ.

52 ὅταν δὲ ὁμίχλη γένηται ὕδωρ οὐ γίνεται ἢ ἔλαττον. ὅταν γέρανοι πέτωνται καὶ μὴ ἀνακάμπτωσιν εὐδίαν σημαίνει· οὐ γὰρ πέτονται πρὶν ἢ ἂν πρὸ ἑαυτῶν καθαρὰ ἴδωσι. γλαῦξ ἡσυχαῖον φθεγγομένη ἐν χειμῶνι εὐδίαν προσημαίνει· καὶ νύκτωρ χειμῶνος ἡσυχαῖον ᾄδουσα. θαλαττία δὲ γλαῦξ ᾄδουσα χειμῶνος μὲν εὐδίαν σημαίνει, εὐδίας δὲ χειμῶνα. καὶ κόραξ δὲ μόνος μὲν ἡσυχαῖον κράζων, καὶ ἐὰν τρὶς κράξας μετὰ τοῦτο πολλάκις κράξῃ εὐδιεινός.

53 καὶ κορώνη ἕωθεν εὐθὺς ἐὰν κράξῃ τρὶς εὐδίαν σημαίνει καὶ ἑσπέρας χειμῶνος ἡσυχαῖον ᾄδουσα. καὶ ὄρχιλος ἐξ ὀπῆς ἐκπετόμενος καὶ ἐξ ἑρκίων καὶ ἐξ οἰκίας ἔξωθεν εὐδίαν σημαίνει. καὶ ἐὰν χειμῶνος βορεύοντος βορρᾶθεν ὑπόλαμψις γένηται λευκή, νοτόθεν δὲ ἐὰν πεφραγμένη ᾖ νεφέλη ὀγκώδης, ὡς ἐπὶ πολὺ εἰς εὐδίαν σημαίνει μεταβολήν. καὶ ὅταν βορέας νεφέλας πολλὰς κινῇ ἐκπνέων μέγας εὐδίαν σημαίνει.

54 πρόβατα ὀψὲ ὀχευόμενα εὐδιεινὸν ἀποτελοῦσι τὸ σημεῖον. καὶ βοῦς ἐπὶ τὸ ἀριστερὸν ἰσχίον κατακλινόμενος εὐδίαν σημαίνει· καὶ κύων ὡσαύτως· ἐπὶ τὸ δεξιὸν δὲ χειμῶνα. τέττιγες πολλοὶ γινόμενοι νοσῶδες τὸ ἔτος σημαίνουσι. λύχνος χειμῶνος καιόμενος ἡσυχαῖος εὐδίαν σημαίνει. καὶ ἐὰν ἐπ' ἄκρου οἷον κέγχρους

375 καὶ *om.* V θάλασσαν M : θάλατταν V αὐτὰ *nos* : αὐτὴν MV *Bart.* 376 καὶ *om.* V 377 εὐδιεινόν *om.* M *Bart.* 377–379 εὐδία … ἔλαττον *om.* V 380sq. οὐ … ἴδωσι *om.* V 381 πρὸ ἑαυτῶν *nos* : πετόμεναι M : –νοι *Wi.* : utique volantes *Bart.* 384 μόνος V *Bart. Ald.* LT : μόνως M 385 καὶ *om.* V τρὶς MV : quis *Bart.* κράξας MV *Bart.* : κράξῃ *Schn.* (5.172) 386 εὐδιεινός M *Bart.* (serenus) : –νόν V *Bart.P* (serenum) 387 ἕωθεν M$^{p.c.}$V *Schn.* (5.172) : ὅθεν *Ald.* LT 388 ἡσυχαῖον *om.* V 388–393 καὶ … σημαίνει *om.* V 389 ἐξ ἑρκίων *Schn.* (4.754) : ἐξ ὀρκίων M : *om. Bart.* 390 βορεύοντος M *Schn.* (5.172) : βορείου ὄντος *Coray* ὑπόλαμψις M *Schn.* (5.LVIII.172) : –ληψις *Ald.* L λευκή M *Bart.* : *del. Schn.* (5.172) 391 νοτόθεν *Bart. Furl.* : νοτόθεν νότοθεν M ἐὰν πεφραγμένη M : ἐ. πεφαγμένη *Ald.* L : ἐ. πεφρασμένη *Furl.* : ἐ. πεφασμένη *Schn.* : ἐναντία τεταγμένη *Schn.* (5.LVIII.172) : opposita *Bart.* 394 ἀποτελοῦσι τὸ σημεῖον *om.* V 396 τὸ *om. Ald.* LT 397 *post* σημαίνουσι *desinit* V 397sq. καιόμενος PC *Ald.* LT : καίμενος M 398 ἄκρου M : ἄκρον *Ald.* LT : ἄκρῳ *Schn.* (4.754)

looked to for signs) have clear peaks it signals fair weather. And when the clouds gird them down to the very sea, it is a sign of fair weather. And also when the clouds are coppery in color at sunset after a rain, it will be fair; for generally the next day will be fair.

When mist occurs there will be little or no rain. When cranes 52
fly without turning back, this signals fair weather; for they do not fly until they see a clear sky ahead of them as they fly. An owl calmly hooting during a storm signals fair weather; likewise if it sings calmly at night during a storm. And a sea-owl singing during a storm signals fair weather, but during fair weather it signals a storm. And a solitary raven croaking calmly, and if it croaks thrice and afterwards it croaks many times, it is a sign of fair weather.

And if right at dawn a crow cackles thrice it signals fair 53
weather; and likewise if in the evening during a storm it sings softly. And if a wren flies out of its nest, whether from an outside wall or from the house itself, it signals fair weather. And if during a storm blowing in from the north a white gleam appears in the north while a massive cloud has built up in the south, this generally signals a change to fair weather. And when a strong north wind stirs up many clouds and blows them away, it signals fair weather.

Cattle mating late ⟨in the season⟩ produce a sign of fair 54
weather. And an ox lying on his left flank signals fair weather; and a dog likewise (on their right side in winter). The birth of many cicadas signals that the season will be unhealthy. A lamp burning calmly in winter signals fair weather. And ⟨likewise⟩ if it ⟨the lamp⟩

ἔχῃ λαμπρούς· καὶ ἐὰν ἐν κύκλῳ τὴν μύξαν περιγράψῃ λαμπρὰ γραμμή.

55 ὁ τῆς σχίνου καρπὸς σημαίνει τοὺς ἀρότους· ἔχει δὲ τρία μέρη καὶ ἔστιν ὁ πρῶτος τοῦ πρώτου ἀρότου σημεῖον, ὁ δεύτερος τοῦ δευτέρου, ὁ τρίτος τοῦ τρίτου· καὶ ὡς ἂν τούτων κλίνῃ κάλλιστα καὶ γένηται ἀδρότατος οὕτως ἕξει καὶ ὁ κατὰ τοῦτον ἄροτος.

56 λέγεται δὲ καὶ τοιάδε σημεῖα ὅλων τε τῶν ἐνιαυτῶν γίνεσθαι καὶ τῶν μορίων· ἐὰν ἀρχομένου τοῦ χειμῶνος ζόφος ᾖ καὶ καύματα γίνηται καὶ ταῦτα ἄνευ ὕδατος ὑπ' ἀνέμων διαλυθῇ, πρὸς τὸ ἔαρ σημαίνει χάλαζαν ἐσομένην. καὶ ἐὰν μετὰ τὴν ἐαρινὴν ἰσημερίαν ὁμίχλαι πίπτωσι, πνεύματα καὶ ἀνέμους σημαίνουσιν εἰς ἑβδομον μῆνα ἀμφοτέρων ἀριθμουμένων. ὅσαι μὲν ἅμα μηνοειδεῖ τῇ σελήνῃ πίπτουσιν, αὗται μὲν πνεύματα σημαίνουσιν εἰς ἐκεῖνον τὸν χρόνον, ὅσαι δ' ἀμφικύρτου οὔσης τῆς σελήνης ὕδατα. καὶ ὅσῳ ἂν μᾶλλον ἐφ' ἑκατέρῳ τῷ σχήματι ὁμίχλαι πίπτωσι μᾶλλον τὰ εἰρημένα σημαίνει.

57 σημαίνει δὲ καὶ τὰ πνεύματα ἅμα ταῖς ὁμίχλαις ἐπιπιπτούσαις γινόμενα· καὶ ἐὰν μὲν ἀπ' ἠοῦς καὶ μεσημβρίας γίνηται τὰ πνεύματα, ὕδατα σημαίνει· ἐὰν δ' ἀφ' ἑσπέρας καὶ ἀπὸ τῆς ἄρκτου πνεύματα καὶ ψύχη. οὓς δὲ κομήτας Αἰγύπτιοι λέγουσιν οὐ μόνον τὰ προειρημένα σημαίνουσιν ὅταν φαίνωνται ἀλλὰ καὶ ψύχη· τοῖς δὲ ἄστροις εἴωθεν ὡς ἐπὶ τὸ πολὺ σημαίνειν καὶ ταῖς ἰσημερίαις καὶ τροπαῖς, οὐκ ἐπ' αὐταῖς ἀλλ' ἢ πρὸ αὐτῶν ἢ ὕστερον μικρῷ.

399 λαμπρούς M : –άς *Ald.* LT περιγράψῃ M : περιγράφῃ *Ald.* LT 399sq. λαμπρὰ γραμμή *Sch.* (4.755) : λαμπρᾷ γραμμῇ M 408 ταῦτα ἄνευ ὕδατος *Schn.* (2.603, 5.LVIII.172) : τὰ ἄνευ ὕδατος *Furl.* : τὰ ἀνύδατος M : quae sunt aquae *Bart.* 420 σημαίνουσιν *Schn.* (5.LVIII.173) *e* significant *Bart.* : σημεῖα M 421 τοῖς δὲ ἄστροις εἴωθεν M : ἐπὶ δὲ τοῖς ἄστροις δυομένοις ἢ ἀνατέλλουσιν ἔωθεν *Schn.* (5.605,5.LVIII) : ἐπὶ δὲ τοῖς ἄστροις εἴωθεν *Wi.*

has on its surface what looks like shiny millet seeds; and if a bright line encircles the wick.

The fruiting of the mastic give signals for plowings: It has three 55
parts, the first ⟨fruiting⟩ being the sign of the first plowing, the second of the second, and the third of the third. And in whatever way ⟨each⟩ of these incline for the best and come to be ripest, so too will the corresponding plowing.

Miscellaneous Signs

In addition, the following are said to be signs for whole seasons or 56
for ⟨smaller⟩ parts of the year. If at the start of winter it is overcast and it gets hot, and then these conditions are broken up by wind without rain, then this signals that there will be hail as spring begins. And if mists descend after the spring equinox, they signal breezes and winds for six months. The mists that descend when there is a crescent moon signal winds for that time; those that descend during a gibbous moon signal rain. And the more mists descend during either phase, the more they signal the results just mentioned.

Also significant are the winds that accompany the descending 57
mists: If, on the one hand, the winds arise from the east and south, they signal rain; but if they arise from the north, they signal winds and cold. What the Egyptians call comets signal not only the aforementioned when they appear but also cold. It is normal for the stars, equinoxes, and solstices to be generally significant, not only at their occurrences but also either shortly before or after.

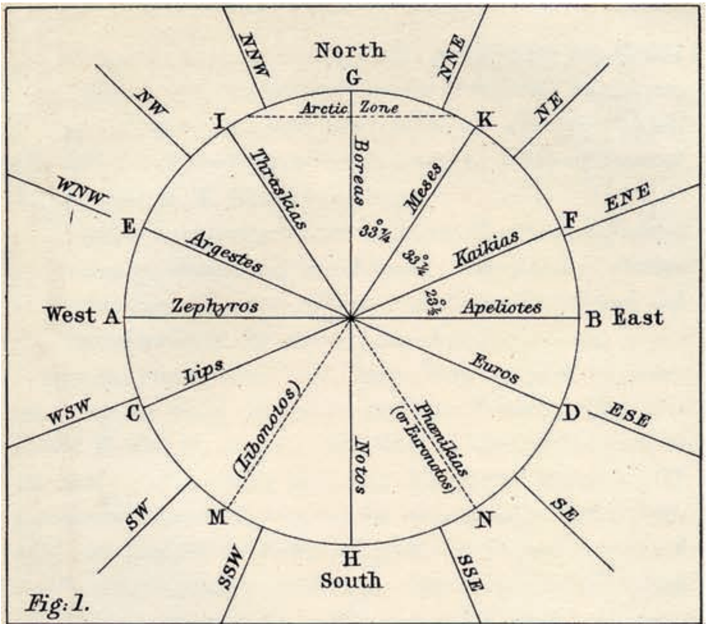

North
G
NNW
NNE
NW
NE
I
K
Arctic Zone
Boreas
Thraskias
Meses
33¼°
33¼°
WNW
E
F
ENE
Argestes
Kaikias
23°
West A
Zephyros
Apeliotes
B East
Lips
Euros
WSW
C
D
ESE
(Libonotos)
Phoenikias
(or Euronotos)
Notos
SW
M
N
SE
SSW
H
South
SSE

Fig: 1.

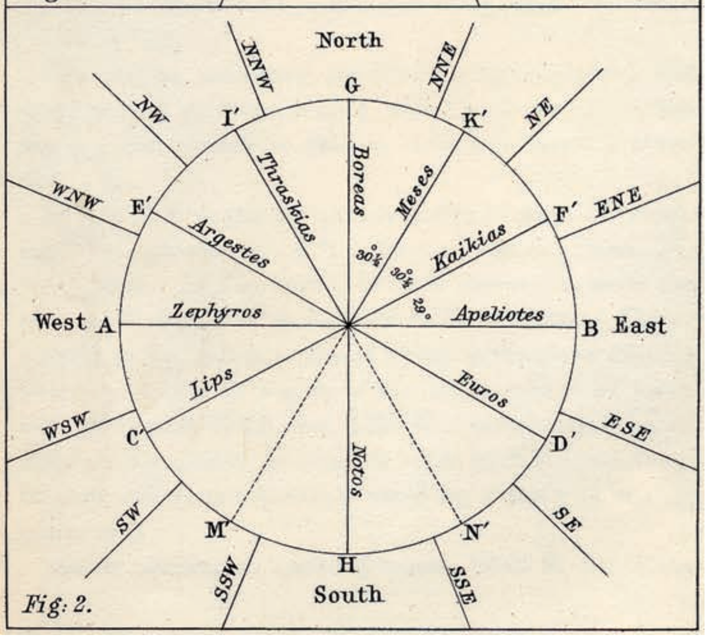

North
G
NNW
NNE
NW
NE
I′
K′
Boreas
Thraskias
Meses
30¼°
30¼°
WNW
E′
F′
ENE
Argestes
Kaikias
29°
West A
Zephyros
Apeliotes
B East
Lips
Euros
WSW
C′
D′
ESE
Notos
SW
M′
N′
SE
SSW
H
South
SSE

Fig: 2.

COMMENTARY

Note: An em-dash in the lemmata indicates that all words omitted are commented on; three dots indicate that only the printed words are commented on. Authors referred to only by last name can be identified through the bibliography. See also the list of frequently used abbreviations at the beginning of the bibliography.

1

1.4 σημεῖα] A σῆμα or σημεῖον is one thing, which need not be concrete or visible, that gives evidence of another, such as the stone grave marker on the shore that tells passing sailors (who in a preliterate age would in any case be too far away to see any pictures or signs) for years to come that someone killed by Hektor is buried here; *Il.* 7.87 ff. καί ποτέ τις εἴπῃσι καὶ ὀψιγόνων ἀνθρώπων | νηὶ πολυκλήϊδι πλέων ἐπὶ οἶνοπα πόντον· | ἀνδρὸς μὲν τόδε σῆμα πάλαι κατατεθνηῶτος | ὅν ποτ' ἀριστεύοντα κατέκτανε φαίδιμος Ἕκτωρ; cf. Soph. *OC* 94 f., where Oedipus is warned to look for signs that he had reached his final resting place: ἢ σεισμὸν ἢ βροντήν τιν' ἢ Διὸς σέλας. In *DS,* the root σημ- is used exclusively to indicate forthcoming meteorological phenomena—forthcoming either because they do not yet exist anywhere or because they have not yet arrived in the locale where the sign has been observed. It should be noted that Hesiod uses this root only once in *Works and Days*, and in a sense that is somewhat different from that found in all subsequent weather literature: (γεράνου φωνὴν) ἥ τ' ἀρότοιό τε σῆμα φέρει καὶ χείματος ὥρην | δεικνύει ὀμβρηροῦ (*WD* 450 f.). In *DS* the crane and/or its cry is straightforwardly the sign (38.276-9, 52.379-81); here, in what may be regarded a periphrasis with essentially the same meaning, it *brings* the sign. Since Zeus is responsible for all astronomical phenomena, the general term for such signs is διοσημία, that is, Διὸς σημεῖον. The term is defined by Schol. Aristoph. *Ach.* 171 διοσημία δέ ἐστιν ὁ παρὰ καιρὸν χειμών; as one example from a large number, cf. *Il.* 13.242-4 ἀστεροπῇ … ἧν τε Κρονίων … δεικνὺς σῆμα βροτοῖσιν. Note also Xen. *Oec.* 17.2 (Isomachos:) ἐπειδὰν γὰρ ὁ μετοπωρινὸς χρόνος ἔλθῃ, πάντες που οἱ ἄνθρωποι πρὸς τὸν θεὸν ἀποβλέπουσιν, ὁπότε βρέξας τὴν γῆν ἀφήσει αὐτοὺς σπείρειν. See also Arist. *Pr.An.* 70a6, a definition of a logical sign: σημεῖον δὲ βούλεται εἶναι πρότασις

ἀποδεικτικὴ ἢ ἀναγκαία ἢ ἔνδοξος, i.e., "If *X*, then *Y,*" which is exactly how it appears in *DS*; see C. A. Freeland, "Scientific explanation and empirical data in Aristotle's *Meteorology*," *OSAP* 8 (1990) 67-102; M. F. Burnyeat, "The origins of non-deductive reasoning," in J. Barnes et al. (eds.), *Science and Speculation* (Cambridge 1982) 193-238.

Observation of such signs, whether they are called σήματα, τεκμήρια, or μαρτύρια, is an important part of empirical science; see G. E. R. Lloyd, *Magic, Reason and Experience* (Cambridge 1979) 126-225; see further R. J. Hankinson, *Cause and Explanation in Ancient Greek Thought* (Oxford 1998) 56 f. (in medicine); L. Taub, *Ancient Meteorology* (London 2003) 96-98.

1.4 ὑδάτων καὶ πνευμάτων καὶ χειμώνων καὶ εὐδιῶν] The four main divisions of *DS*, in the order in which they will appear. Cf. the first two lines of Vergil's section on weather signs: *atque haec ut certis possemus discere signis,* | *aestusque pluviasque et agentis frigora ventos …* (*G.* 1.351 f.); see the introduction, pp. 29-35. Aratos does not bother to provide a table of contents. (But Vergil's *haec … ipse pater statuit* [1.351-3] adapts Aratos' references to Zeus at the beginning of his *Diosemia* section; cf., e.g., 772 [Zeus] πάντη δ' ὅ γε σήματα φαίνων).

1.4 ὑδάτων] ὕδωρ = "rain" from Homer on; e.g. *Il.* 16.385 (LSJ s.v. I 2). The plural is often used of water in motion, whether flowing rivers or rain, or of discrete volumes of water, such as in Hippocrates' *Airs Waters Places*. Either explanation can be applied here; cf. Pi. *O.* 11.2 f. ἔστιν δ' οὐρανίων ὑδάτων [sc. χρῆσις].

1.4 πνευμάτων] "Winds" of course, but note that Anaximenes can say ὅλον τὸν κόσμον πνεῦμα καὶ ἀὴρ περιέχει (13 B 2), which can be hendiadys ("air in motion"), synonymy (so explicitly Ps.-Plut. *Plac.* 876ab), or a true disjunction; see G. Wöhrle, *Anaximenes aus Milet* (Stuttgart 1993) 63-66.

1.4 χειμώνων] In general either "winter (time)," as in c. 2; or (as more usually throughout this work) "storm(s)," both meanings as old as Homer. (Similarly, χεῖμα can be either winter or storm.) See further below, c. 38.

1.4 εὐδιῶν] "(Instances of) fair weather." Usually found in the singular in both poetry and prose; cf. Pi. *I.* 7.38 εὐδίαν ἐκ χειμῶνος, Xen. *Hell.* 2.4.14 ἐν εὐδίᾳ χειμῶνα ποιοῦσιν. For the pl. cf. Plato *Leg.* 961e ἔν γε χειμῶσι καὶ εὐδίαις.

1.5 ἐγράψαμεν] When used in the active voice, followed by a direct object, the simplex γράφω means more "write down" or "write out" (rather than "write about" or "describe" [Hort]), which meaning fits rather well with the bare listing that follows. Does the plural indicate a group effort, as when *Aristotle* records contemporary observations, on which see G. E. R. Lloyd, *Aristotelian Observations* (Cambridge 1996) 162 f. Note [Arist.] *De Mundo* 292a7-9, printed below. On the other hand, Aristotle occasionally uses διεγράψαμεν of his own efforts: *EE* 1230b12, 1231b8, 1233a9; *Meta.* 1054a31; *Rhet.* 1378a27. Note also Ptol. *Phaseis* 2.66 καὶ τούτων ἀνέγραψα τὰς ἐπισημασίας καὶ κατέταξα κατά τε Αἰγυπτίους καὶ [ten names omitted] Δημόκριτον.

A first-person reference by an author now anonymous is frustrating, but presumably originally authorship was obvious, perhaps in a first sentence now lost. Cf. (the anonymous) *Dissoi Logoi* 1.2 ἐγὼ … σκέψομαι. On the other hand, neither Aristotle nor Theophrastos ever seems to have identified themselves; for the latter's introductory statements of purpose, cf. *Stones* 1 περὶ δὲ τούτων νῦν λέγωμεν, *Winds* 1 χρὴ λέγειν, *Meta.* 1 πῶς ἀφορίσαι δεῖ … τὴν ὑπὲρ τῶν πρώτων θεωρίαν; *CP* 1.1 οἰκείως ἔχει διελεῖν, *HP* 1.1 τῶν φυτῶν τὰς διαφορὰς καὶ τὴν ἄλλην φύσιν ληπτέον. Since *DS*'s ἐγράψαμεν is so much in accord with these, it would be a mistake to use Steinmetz's observation (*Physik* 14 f.) that Theophrastos does not use γράφειν of his own work to argue that *DS* is not by Theophrastos. J. G. Wood. *Theophrastus of Eresus on Winds and on Weather Signs* (London 1894) 11 actually believed that in the phrase that appears at the end of *De Ventorum Situ* (see the Appendix), ὑπογέγραφα δέ σοι, the "I" is Aristotle and the "you" is Theophrastos.

1.5 καθ' ὅσον ἦν ἐφικτόν] Cf. [Arist.] *De Mundo* 391b3 καθόσον ἐφικτόν. Cronin "Authorship" 313 adduces similar expressions in Lysias and Plato. That is, the author declares that he has recorded (see above, on ἐγράψαμεν) all the signs he came across.

1.5-6 ἃ μὲν … λαβόντες] For the use of the demonstratives ὃς μὲν … ὃς δέ with participles, cf. Dem. Cor. 71 πόλεις Ἑλληνίδας ἃς μὲν

ἀναιρῶν, εἰς ἃς δὲ τοὺς φυγάδας κατάγων. Philemon fr. 116 K-A uses them with a finite verb. The practice is derided as a solecism by Lucian, *Pseudosophist* 1; see K-G 2.228.

1.5 προσκοπήσαντες] That is, the author is willing to stand behind some of the signs on the basis of his own correlation between signs and sequelae; others he has not observed himself but is willing to trust his sources. Are there others he has rejected because they do not stand up to observation or seem wrong *prima facie*? For the role of observation in Greek astronomy and Aristotle in particular, see G. E. R. Lloyd, *Magic, Reason, and Experience* (Cambridge 1979) 169-225.

1.6 ἑτέρων] That is, Matriketas, Kleostratos, Phaeinos, Meton, "and others"; see c. 4, with nn.

1.6 οὐκ ἀδοκίμων] Cf. Arist. *De Caelo* 292a7-9 ὁμοίως δὲ καὶ περὶ τοὺς ἄλλους ἀστέρας λέγουσιν οἱ πάλαι τετηρηκότες ἐκ πλείστων ἐτῶν Αἰγύπτιοι καὶ Βαβυλώνιοι, παρ' ὧν πολλὰς πίστεις ἔχομεν περὶ ἑκάστου τῶν ἄστρων. On Egyptians, see below, 57.419.

1.6-7 τὰ μὲν οὖν ἐπὶ τοῖς ἄστροις] Not surprisingly, stars were long regarded as markers or signs (σημεῖα) of location, direction, or seasons; cf. Eur. *Ion* 1156 f. ὑάδες τε, ναυτίλοις | σαφέστατον σημεῖον, *Rhesos* 528 f. πρῶτα δύεται σημεῖα, Eur. Fr. 482 *TrGF*, Parm. 28 B 10.1 f. τὰ τ' ἐν αἰθέρι πάντα | σήματα (and Tarán ad loc., p. 242), Genesis 1.14 "Let them [sc. stars] be for signs." See further Webb *JHS* 41 (1921) 75; E. Pfeiffer, *Gestirne und Wetter in griechischen Volksglauben* (Leipzig 1914). As the watchman in the *Agamemnon* says (4 f.) ἄστρων κάτοιδα νυκτέρων ὁμήγυριν | καὶ τοὺς φέροντας χεῖμα καὶ θέρος βροτοῖς. In fact, though, *DS* makes little actual use of them for predicting the weather; see 23.155.

1.7 δυομένοις] See on 2.9 συνδύνῃ.

1.7 τῶν ἀστρονομικῶν] As Maass *GGA* [1893] 625 notes, this may also be rendered "from my astronomical works," just as Aristotle can say ἐν τοῖς φυσικοῖς, "in my *Physics*," but this reads badly in the context of the sentence. It could simply be neuter, ἀστρονομικά, "astronomical works" in general (so most scholars; e.g., Rehm *Parapegmastudien* 123,

Cronin "Authorship" 313). Hort renders "from astronomy," as in Pl. *Prt.* 315c, but since Plato more often applies the adjective to men skilled in starlore we, following Wood, translate accordingly (*Tht.* 145a, *Rep.* 530a, *Tim.* 27a), which fits nicely with the roster of astronomers given below in c. 4. The sense is hardly affected, however the word is taken: Whether men or their writings, the reference is to people like Aristotle as well as *his* sources (see above, on οὐκ ἀδοκίμων).

More questionable is the need for a summary of astronomical risings and settings, as these form no part of the work as it now stands. As Wood 11 suggests, this may be taken as an indication that *DS* was once longer. Kaibel, "Aratea," *Hermes* 29 (1894) 118, on the other hand, takes this, less likely, as a sign that *DS* was left unfinished. Rehm, loc. cit., dismisses it as a pastiche.

2

2.8 δύσεις δικταί] These are the perceptible rather than the actual settings: (i) As night falls, the star is seen in the west for a short time before it too sets. (ii) The star is one of the last to be seen to set on the western horizon before the light of the sun overwhelms the nighttime sky. The first is the heliacal setting: The next night its drop below the horizon will occur before sunset and hence be invisible. The second is the cosmical setting: the night before the sun will rise before the star's dropping below the horizon can be seen. These settings and the risings to be given below are the well known *semeia* of the seasons. Kaibel, "Aratea," *Hermes* 29 (1894) 118 n. compares Chrysippos fr. 683 *SVF* (Stob. 1.206.25 Wachs.) διχῶς γὰρ λέγεσθαι, δύσιν, τὴν μὲν κατὰ τὴν ἀνατολήν, τὴν δὲ κατὰ τὴν ἐπιτολήν. Cf. Pliny *NH* 18.218 *exortus occasusque binis modis intelleguntur.*

2.8 τε γάρ] Our author follows Aristotle, who, "in several passages, appears to use τε γάρ without following τε or καί for γάρ or καὶ γάρ" (Denniston 536).

2.8 ἀφανισμοί] A technical term of astronomy for the disappearance from view of heavenly bodies, whether by eclipse (occultation), by being overwhelmed by the greater light of the sun, or by setting below the horizon. Note in particular Eudoxos' title Περὶ ἀφανισμῶν ἡλιακῶν (fr. 128 Lasserre = Philod. *De Dis.* 1 col. 21.28-30). As Lasserre, *Die Frag-*

mente des Eudoxos von Knidos (Berlin 1966) says ad loc., when applied to stars, the word refers not so much to the *process* of disappearance from view caused by the sun as to the *state* of being invisible; thus, even shortly before the reappearance of a star (φαῦσις) one can speak of its ἀφανισμός.

2.9 συνδύνῃ] This is the form found in Autolykos, *Risings and Settings*. Elsewhere in this work the simplex δύνω is found (as well as δύομαι). V's reading may yet be the right one.

2.10 ἀνατέλλοντι δύνῃ] We keep the reading of the mss. It is common for compounds to be followed by their simplexes with the same meaning, so that here δύνῃ = συνδύνῃ; see R. Renehan, *Studies in Greek Texts* (Göttingen 1976) 11-27. Strictly interpreted, this refers to the true cosmical setting, i.e. when the star can be determined to set at the moment of sunrise. But since no stars are visible once the sun is visible, ordinary people looking at the heavens for signs are more likely to be satisfied with the perceptible or apparent cosmical setting; i.e., the star is seen to set for the first time (this season) just before the sun rises. As the equivalent sentence below on one sort of rising makes clearer (προανατέλλῃ), what the author means here is that the star is seen to set (in the west) very soon *before* the sun rises (in the east). We can make this explicit by reading either ἀνατελοῦντος or προδύνῃ. The first conjecture is unconvincing (and not only because futures of ἀνατέλλω are found only in late authors); for the second cf. Arist. *Mete*. 343b20 (a comet in the western sky) οὐκ ὤφθη ὡς προδεδυκὼς τοῦ ἡλίου. Rather than change the text, however, we attribute the carelessness to the author and not to a scribe. He could, for example, have omitted a previous sentence with προανατελλ-; see the comment above on *simplex pro composito*.

For explanations of the various permutations of rising/setting, real/apparent, and heliacal/acronychal, see Autolykos, *Risings and Settings* 1, prol.; G. R. Mair's intro. to the Loeb Aratus, pp. 202 f.; West, *Hes. WD* 379 f.

2.10 ἀνατολαὶ διτταί] These, unlike the complementary pair of settings, are given the labels "morning" (= heliacal) and "acronychal" (= cosmical), respectively. (i) The star rises only to disappear at the rising of the sun. (ii) As the sun sets in the west, the star is just above the horizon in the east, and will rise as the night progresses.

Our author, like Aristotle and Th., uses ἀνατολή for the rising of stars (note 1.2 ἐπιτολή); others reserve the word for the sun, using ἐπιτολή for stars; see Böhme 59 f., Cronin "Authorship" 315 ff.

2.10 ἑῷοι] Here, unusually, a two-termination adjective, as in Eur. *Ph*. 169, D.H. 1.12.2; generally, and everywhere else in *DS*, an adjective of three terminations. Cronin "Authorship" 316 wonders "whether the carelessness, to which this inconsistency is due, was that of the author or of a scribe." One should also consider whether differences such as this, as well as some others to be noted below in the course of the commentary, may be due to cut-and-paste method employed by the author/compiler. In contexts such as this, "heliacal" is a usual translation (unnoticed by LSJ). See W. Kastner, *Die griechischen Adjektive zweier Endungen auf −ΟΣ* (Heidelberg 1967) 73 f.

2.11 ἀκρόνυχοι] Since ἄκρα are extremities, ἀκρόνυχος came to mean "at nightfall" (but not "at night's end," for which Aratos manufactures 308 ἀκρόθι νυκτός and 740 ἄκρα … νυκτῶν). Cf. Arat. 775 ἄκρῃ νυκτί, Pi. *P*. 11.10 ἄκρᾳ σὺν ἑσπέρᾳ, Hes. *WD* 567 ἀκροκνέφαιος ("just at dusk," West). Cronin "Authorship" 316 points out that this seems to be a fourth-century word, often associated with Eudoxos and Dositheos, although Aristotle uses it only once (*Mete*. 367b26) and Theophrastos never.

2.12-13 Ἀρκτούρου … ἀνατολαί] Since its great brightness made it an easy star to observe (cf. *Od*. 5.272), both its winter (ca. Feb. 17) and fall (ca. Sept. 8) risings became standard time markers. For the former, cf. Hes. *WD* 565-567 (60 days after the fall equinox) δή ῥα τότ' ἀστὴρ | Ἀρκτοῦρος προλιπὼν ἱερὸν ῥόον Ὠκεανοῖο | πρῶτον παμφαίνων ἐπιτέλλεται ἀκροκνέφαιος, Thuc. 2.78.2 περὶ Ἀρκτούρου ἐπιτολάς. For the latter, cf. Hes. *WD* 609 f. εὖτ' ἂν δ' Ὠρίων καὶ Σείριος εἰς μέσον ἔλθῃ | οὐρανόν, Ἀρκτοῦρον δ' ἐσίδῃ ῥοδοδάκτυλος Ἠώς. See further McCartney *CW* 20 (1926) 49 f., Kidd on Aratos 91-95.

2.12 λεγόμεναι] Not "so-called," but as in the phrases τὸ λεγόμενον, λέγεται, what is said often and hence familiar; i.e., = ὀνομαζόμεναι (Rehm *Parapegmastudien* 7), for which see below.

2.13 ἀμφοτέρως] That is, not all stars have both heliacal and cosmical risings.

2.15 ὀνομαζομένων] "Well-known" (Cronin), "familiar" (Hort), "which have received names" (Wood). That is, following Wood, *DS* refers only to the stars and constellations which have been given names. See above, on λεγόμεναι.

2.15 Πλειάδος] This small star cluster with its collective name is here treated like a single star. Its rising in the spring (ca. May 11) and setting in the fall (late October) were commonly used to mark the beginning and end of good sailing weather (whence the false etymology from πλεῖν) and sowing and planting; see West on Hes. *WD* 383-4. As Cronin "Authorship" 320 notes, both Aristotle and Th. prefer the collective name to the plural Πλειάδες; probably first used thus in the fifth century (Hipp. *Epid.* 1.1). The literature, both ancient and modern, on the Pleiades as season markers is huge; see McCartney *CW* 20 (1926) 47 f.

2.15 Ὠρίωνος καὶ Κυνός] In June and July, respectively. Arktouros, the Pleiades, Orion, and Seirios were used as regular "weather-*cum*-season" signs (Cronin "Authorship" 316; cf., e.g., Hes. *WD* 609 f., quoted above), whereas *DS* proceeds to list *irregular* signs of short terms of possibly abnormal fair and foul weather which, although coming more in one season than another, lack the gross regularity of the seasons. Böker 1629 f. thinks that since Seirios (Sirius) appears far less in Greek weather literature than in Babylonian, a section devoted to this star must have been lost in what he calls *die Grundschrift* behind *DS* and all other Greek weather literature.

3

3.16 λοιπῶν σημείων] Sc., other than astronomical signs, which are independent of location (within Greece); that is, the weather signs that constitute the rest of this work.

3.17 ὄρη ὑψηλὰ καὶ αὐλῶνες] Mountains, visible from afar and natural loci for meteorological discontinuities, figure frequently in the literature (as will be documented immediately below and elsewhere); in *DS* alone the following mountains are named: Hymettos, Parnes, Brilet-

tos, Athos, Pelion, Olympos (see the index), as well as the mountainous sites of Aigina and Euboia. Valleys are mentioned less, but cf. Pliny *NH* 18.357 *nebulae montibus descendentes aut caelo cadentes vel in vallibus sidentes serenitatem promittent.* Arat. 988-990 and Verg. *G.* 1.401 mention the clouds falling to the base of a mountain as a sign of clear weather but neither specifies valleys (and the latter says *campoque recumbent*). See further W. Capelle, *Berges- und Wolkenhöhen bei griechischen Physikern* (Leipzig 1916) 13 f.; Böker 1645 f.

3.17 μάλιστα δέ] μᾶλλον δέ would make a more appropriate contrast with ἔνια μέν. As the text stands the mountains mentioned are a special case of ὄρη ὑψηλά. At 5.32 the δέ marks off μάλιστα κυριώτατα. See McCartney *CW* 20 (1926) 51 f.

3.18 θάλασσαν] Signs such as described here would be especially useful to sailors looking toward the coast, but they could also be observed by our mountain-going astronomers, and could be useful to island dwellers as well.

3.18 καθήκει] Hdt. 7.22.2, ὄρος μέγα … ἐς θάλασσαν κατῆκον (of Mt. Athos).

3.19 τὰ νέφη προσπίπτει πρὸς τοὺς τοιούτους τόπους] See M. P. Nilsson, *History of Greek Religion* (Oxford 1925) 113, "Every traveller in Greece will have noticed how the clouds swiftly gather round the highest mountain-top in the neighborhood. In a short time the sky is covered with clouds, the roar of the thunder is heard, and the rain pours down." See below, cc. 34, 45, 51. Note also one of the rare similes in Homer to contain a weather portent, which also, like *DS*, recognizes the importance of "where one is situated," *Il.* 4.275-278:

> ὡς δ' ὅτ' ἀπὸ σκοπιῆς εἶδεν νέφος αἰπόλος ἀνήρ
> ἐρχόμενον κατὰ πόντον ὑπὸ Ζεφύροιο ἰωῆς·
> τῷ δέ τ' ἄνευθεν ἐόντι μελάντερον ἠΰτε πίσσα
> φαίνετ' ἰὸν κατὰ πόντον, ἄγει δέ τε λαίλαπα πολλήν.

3.19-20 μεθισταμένων εἰς τοὐναντίον] Cf. Th. *Winds* 24, 26, where it is explained that winds blowing from over water give way to reverse land winds, which occurs mostly in hollows (ἐν μὲν γὰρ τοῖς κοίλοις ὁ ἀὴρ συναθροίζεται προσπίπτων). The air becomes concentrated and hence heavier in the hollows.

3.20 ἀντιμεθίστανται] There are too many examples, and not only in unpolished prose, of neuter plural nouns taking plural verbs to favor a change to the singular; see K-G 1.64-66.

3.20 ὑγρότερα γινόμενα] *DS* is in agreement with Th.: οὐ μικρὰ δ' ἐνταῦθα ἀλλὰ μεγίστη ῥοπὴ τὸ τὰς χώρας ὕψος ἔχειν· ὅπου γὰρ ἂν προσκόψῃ τὰ νέφη καὶ λάβῃ στάσιν, ἐνταῦθα καὶ ὕδατος γένεσις, "It is highly important if the district has elevations. For whenever the clouds into an obstacle [and so suffer compression; cf. Th. *Winds* 3] and stop, rain is generated" (*Winds* 5). γενόμενα would be more exact but is not a necessary conjecture. Cf. [Arist.] *Probl.* 26.7 (940b35-38) πρὸς ἀνάντη μόλις ῥεόντων [sc. ἀνέμων], ἐνταῦθα ὑφίσταται μᾶλλον τὰ νέφη, οὗ ἀδυνατεῖ ἔτι προωθεῖν αὐτὰ ἄνεμος. ὑφιστάμενα δὲ καὶ πιεζόμενα ῥήγνυται. That Theophrastos, in opposition to Aristotle's view that rain is caused by cooling alone, explicitly said that rain is caused by the compression of clouds against mountains is recorded by Proklos *In Plat. Tim.* 22e καὶ γὰρ τοῦτο ἓν εἶναι αἴτιον ὄμβρων φησὶν ὁ Θεόφραστος τὴν τῶν νεφῶν πίλησιν πρός τινα τῶν ὀρῶν, Olympiodoros *In Arist. Mete.* 80.30-81.1 Stüve ἰστέον δέ, ὅτι ὁ μὲν Ἀριστοτέλης αἴτιον λέγει τῆς εἰς ὕδωρ μεταβολῆς τὴν ψύξιν μόνον· Θεόφραστος δὲ οὐ μόνον τὴν ψύξιν αἰτίαν φησὶ τῆς τοῦ ὕδατος γενέσεως, ἀλλὰ καὶ τὴν πίλησιν, and Galen *In Hippocr. Aer. Aqu. Loc.* 8.6 (Th. frr. 211a-c). See further R. W. Sharples, "Some aspects of the secondary tradition of Theophrastus' *Opuscula*," in W. W. Fortenbaugh and R. W. Sharples (eds.), *Theophrastean Studies: On Natural Science* etc. (New Brunswick 1988) 44, who also adduces a similar statement in the Syriac translation of Th.'s *Meteorology*; and Sharples' comm. ad loc. (3.1, pp. 194-198). See further P. Steinmetz, *Die Physik des Theophrast* (Bad Homburg 1964) 217-221.

3.21 διὰ βάρος] The weight is caused by the compression. In describing Theophrastos' similar theory, Proklos and Olympiodoros use συνωθουμένων and πίλησιν (frr. 211 a-b); Theophrastos himself in *Winds* specifies only the diffusion and rarefaction of the winds, but when he says that they become colder passing through a narrow passage (διὰ στενοῦ, c. 3), his argument is all but complete; note the square brackets added to the translation of *Winds* 5, above.

3.22 ἔστι ... λαβεῖν ... γνώμονα] *DS* frankly acknowledges its dependence on others for meteorological observations. Cf. Arist. *De Caelo*

291a29-32 περὶ δὲ τῆς τάξεως αὐτῶν, ὃν μὲν τρόπον ἕκαστον κεῖται τῷ τὰ μὲν εἶναι πρότερα τὰ δ' ὕστερα, καὶ πῶς ἔχει πρὸς ἄλληλα τοῖς ἀποστήμασιν, ἐκ τῶν περὶ ἀστρολογίαν θεωρείσθω. Later works of empirical science have the luxury of getting their facts from other texts. Pioneer investigators have to depend on observations made either by themselves or others. Yet just as later writers often fail to mention the works they read, fifth- and fourth-century authors often write as if all their facts derive from personal observations. *DS*'s frank, and early (unlike Aristotle's, quoted above), acknowledgement of dependence on the observation of others, who are even named (again, unlike Aristotle, who several times in *De Caelo* and *Meta*. refers vaguely to οἱ μαθηματικοί), deserves more notice, and praise, than it has received. When Theophrastos in his work on odors remarks on the practices of οἱ τὰ ἀρώματα καὶ τὰ διαπάσματα συντιθέντες, οἱ τὰ μύρα κεραννύντες, and οἱ μυρεψοί (*Odors* 8), he comes very close to telling us that he consulted with these experts, just as it can be deduced that Aristotle in *HA* "and his helpers consulted hunters, fishermen, horse-rearers, pig-breeders, bee-keepers, eel-breeders, doctors, veterinary surgeons, midwives and many others with specialized knowledge of animals" (Lloyd, *Magic Reason Experience*, 211; cf. 211 f. for an assessment of Aristotle's ability to judge his sources). Elsewhere, Theophrastos, although not attempting to disguise the fact that he has consulted with others, is even more oblique in indicating his debt to others. In *Stones*, e.g., he uses phrases like 20 λαμβάνουσι δὲ τὴν πίστιν διά … , 21 σημεῖον δὲ λαμβάνουσιν ὅτι … . See Steinmetz *Physik des Theophrast* 100 f. Nobody, though, is as explicit as Thucydides in laying out his method (1.22): of some things he himself was witness, for others he depended on eye-witnesses whose memories may be faulty, and who furthermore for historical/political events may not be disinterested informants, so that no source can be taken at face value. As many have noted, this statement of method is designed to mark a distinct advance over Herodotos (e.g., 2.123.1, 7.152.3).

3.22 ἱδρυμένος ᾖ] The perfect conveys the sense of encamping, i.e., in this context, taking up a position for long-term observation; cf. Eur. *Hipp*. 639 κατ' οἶκον ἵδρυται γυνή. Periphrastic perfects of moods other than indicative are more common than "monolectic" forms; see W. J. Aerts, *Periphrastica* (Amsterdam 1965) 39, although it remains barely possible that *DS* uses a periphrastic form to "denote a state rather than action" (Smyth § 599).

3.22 τοιοῦτον] I.e., one who has paid attention to location, as well as to the relevant meteorological and astronomical signs.

3.22 γνώμονα] A close parallel in Aisch. *Ag.* 1130 θεσφάτων γ. The word is nicely defined by Fraenkel ad loc. as "The man who, from experience, insight, and special knowledge, is capable of deciding and judging." Wood, less likely, takes γνώμονα here to mean "indication," with which compare Theogn. 543-6 χρή με παρὰ στάθμην καὶ γνώμονα τήνδε δικάσαι … ὄφρα μὴ ἀμπλακίης αἰσχρὸν ὄνειδος ἔχω.

3.23 σαφέστατα] A local person knows best; as a saying recorded by Polybios 9.25.3 has it, ἐγχώριοι … τὰς τῶν ἀνέμων στάσεις … κάλλιστα γινώσκουσιν.

4

4.24 γεγένηται] Wood's "have become" is better than Hort's "have been found." The verb could also suggest that each person named below is a native of the place; but see below, on Phaeinos.

4.25 Ματρικέτας] Since Methymna is on the north coast of Lesbos, the obscure Matriketas may have been known personally to the author of *DS*; see Cronin "Authorship" 322. No other literary source mentions him. Lepetymnos, 838 m, is one of five notable mountains on Lesbos (Pliny *NH* 5.140; and in general on wind and weather on Lesbos, Bürchner, "Lesbos," *RE* 12 [1925] 2115-17). Note that while Meton is identified below as an Athenian, *DS* gives only the place of observation for Matriketas (in Methymna), Kleostratos (in Tenedos), and Phaeinos (in Athens), from which we should not infer that the first two were not in fact citizens of these places, as we are specifically told of Phaeinos (but perhaps not by the author; see below), since Kleostratos is specifically identified as Tenedean by six secondary sources.

4.25 ἀπό] *Observing* from, not *taking his signs* from, as the following τὰ περὶ τὰς τροπὰς shows. Sokrates in the *Clouds* also recognized that height was beneficial for observing the heavens (though his reasons are not the obvious ones; 227-232). For a study of the way weather signs appear in the *Clouds*, see A. M. Bowie, *Aristophanes: Myth, Ritual and Comedy* (Cambridge 1993) 124-7.

4.26 Κλεόστρατος] Author of an hexameter *Astrologia* (or *Phainomena*), two lines of which are extant (fr. 1 Bernabé = DK 6 B 1):

ἀλλ' ὁπόταν τρίτον ἦμαρ ἐπ' ὀγδώκοντα μένῃσι
〈.?.〉 [Diels supplies a line *exempli gratia*; Bernabé does not]
σκορπίος, εἰς ἅλα πίπτει ἅμ' ἠοῖ φαινομένηφι.

Kleostratos, called ἀρχαῖος by the scholion ad Eur. *Rh*. 528 which quotes these lines, is usually dated to the late sixth century BC (so Diels, Fotheringham, Webb, Samuel) on the basis of the "discoveries" attributed to him, but Aratos too is often credited with the facts of his poem, which we know to be derived from Eudoxos; see Sider on Philodemos *Epigram* 31.1 (*AP* 11.318). We would not rule out a Hellenistic date, which, if early enough, could still be contemporary with Theophrastos. Height of Mt. Ida: 1770 m. See W. Kroll, "Kleostratos (7)," *RE* Supplb. 4.912; J. K. Fotheringham, "Cleostratus," *JHS* 39 (1919) 164-184 (who prints the most complete collection of testimonia); E. J. Webb, "Cleostratus redivivus," ibid. 41 (1921) 70-85; Fotheringham, "Cleostratus (III)," ibid. 45 (1925) 78-83; D. R. Dicks, "Solstices, Equinoxes, and the Presocratics," ibid. 86 (1966) 26 f. (Dicks argues that Fotheringham, Webb, and W. Burkert, *Lore and Science in Anc. Pythagoreanism* [Cambridge, Mass. 1972] 314 f., are too uncritical of the ancient evidence); A. E. Samuel, *Greek and Roman Chronology* (Munich 1972) 39 f.

4.26 Φαεινός] *RE* (1). Metics were originally drawn to Athens to pursue a trade, but their status was inherited by their children, who were not restrained from other activities. As teacher of Meton, he would have to have been active in the mid fifth century. See below, on Meton, who was said to have derived his 19–year cycle from Phaeinos.

4.27 Λυκαβηττοῦ] The Athenian hill somewhat to the east of the Acropolis, 277 m high. Other Attic mountains are higher (see below on 20.131 f. Hymettos and 43.316 Parnes; Mt. Pentelikon is 1105 m), but Lykabettos is more convenient for someone living in Athens. C. Theander, "ΛΥΚΑΒΑΣ, ΛΥΚΑΜΒΗΣ," in *Symbolae Philologicae O. A. Danielsson* (Uppsala 1932) 349-351, although he acknowledges the name's preGreek origin, argues that it means something like "annual service to a/the god"; this is unlikely. For the insertion of "parasitic" nasals before consonants, typically stops, see W. Schulze, *Orthographica* c. 1 (in his *Orthographica et Graeca Latina*, ed. E. Fraenkel, Rome 1958); L. Threatte, *The Grammar of Attic Inscriptions*. I. *Phonology* (Berlin 1980) 488-491. Note too the form Μέντων just below.

4.27 τὰ περὶ τὰς τροπάς] "The things concerned with solstices"; including, e.g., the correlation between solstice and forthcoming weather patterns. According to Schol. in Aristoph. *Aves* 997 = Philochoros 328 F 222 FGrHist, Meton set up an instrument for determining solstices on the Pnyx (in 433/432 BC), traces of which have been found; see W. Judeich, *Topographie von Athen* (Munich 1905) 351 f.; K. Kourouniotis and H. A. Thompson, "The Pnyx in Athens," *Hesperia* 1 (1932) 207-211. Paul Tannery, *Recherches sur l'histoire de l'astronomie ancienne* (Paris 1893) 18, noting that Lykabettos lacks the height of the other mountains named, reasonably suggests that the use of the phrase τὰ περὶ τὰς τροπάς means that Phaeinos used Lykabettos as a "gnomon gigantesque," noting where its shadow fell throughout the year. He weakens his case for the originality of Phaeinos by linking the name Lykabettos (whose ending suggests a pre-Greek origin) with the obscure word λυκάβας, so that "on pourrait soupçonner que la situation topographique de cette hauteur l'avait depuis longtemps désignée pour le même usage, avant même toute pratique du gnomon" (ibid. n. 1); see Theander, *Symbol. Danielsson* 349.

4.27-8 παρ' … ἀκούσας] ἀκούω is very occasionally found with a preposition + gen. (LSJ s.v. I 1 c); for this particular combination, cf. Soph. *OT* 6 f., 95. More noteworthy here is that the verb is used absolutely in the sense "be a student (of)," which elsewhere is late (it is Diogenes Laertius' favorite verb for this). Since παρακούειν (Aristotle's use of which is missed by Bonitz: *EN* 1149a26) has quite a different sense, the preposition παρά contributes nothing to the meaning.

4.27-8 Μέτων] The most famous of those named here (to the extent that he could appear as a character in Aristophanes' *Birds* of 414 BC), he is credited with several important observations about the relationship between astronomical signs and the cycle of the year, in particular the nineteen-year cycle mentioned here. See G. J. Toomer, "Meton," *Dict. of Scientific Biography* 9.337-340, who considers it possible that "Phaeinos was an Asian Greek who acted as transmitter of Babylonian astronomical knowledge" (339). See also Böker 1618 f. and, for a recent detailed survey of his accomplishments, A. C. Bowen and B. R. Goldstein, "Meton of Athens and astronomy in the late fifth century B.C.," in E. Leichty et al. (eds.), *A Scientific Humanist: Studies in Memory of Abraham Sachs* (Philadelphia 1988) 39-81.

Since Meton's cycle was developed in 432 BC, this provides a terminus post quem for the prologue if not the entire work.

4.28 ἐνιαυτόν] Schneider justifies this reading by comparing App. Vat. Proverb. 3.88 Μέτων Ἀθηναῖος ἀστρολόγος ὁ τὴν ἐννεακαιδεκαετηρίδα συνταξάμενος καὶ ὀνομάσας ἐνιαυτόν. τοὺς οὖν μακρὰς ὑπερθέσεις ποιουμένους ἐπισκώπτοντες ἔλεγον, Ἀναβάλλεσθαι εἰς τὸν Μέτωνος ἐνιαυτόν. Cf. Ael. *VH* 10.7 τὸν μέγαν ἐνιαυτὸν, ὡς ἔλεγεν, εὗρε καὶ ἔφατο αὐτὸν ἑνὸς δέοντα εἴκοσιν ἐτῶν, Athen. 7.278b, Pliny *NH* 2.13, 5.140. Hence, Hort's supplement is unecessary.

4.28-9 ἦν δὲ ὁ μὲν Φαεινός … Ἀθηναῖος] This reads very much like an intrusive gloss, an inference derived from the distinction to be drawn between Ἀθήνῃσιν and Ἀθηναῖος.

4.29-30 καὶ … δέ] A combination at home in Plato and Aristotle; Denniston 199-201. καί simply adds, δέ emphasizes ἄλλοι.

4.30 ἠστρολόγησαν] This may be the first appearance of this verb. Cf. Sosipater 1.15 K-A, of a very thorough teacher of cookery (one who took the lesson of the *Republic* to heart), ἐδίδασκεν ἡμᾶς πρῶτον ἀστρολογεῖν; found next in Polyb. 9.20.5. The verb used earlier is ἀστρονομέω (Aristoph., Plato; cf. ἀστρονόμος, found in Xenophon and at the beginning of this chapter). Is the aorist used here inceptive ("came to study astronomy"), or does it rather suggest that the writer lived so long after the men he mentions that their activity can be summarized with an concentrative aorist rather than an imperfect?

5

5.31-2 ἄλλα … παθημάτων] The mss. offer a confusing choice of alternates. In addition to inarticulate τε and καίς, note that M reads τῶν … τινῶν ("verba subobscura," Bonaventura), which suggests that V's deviation is due, at least in part, rather to editorial emendation than to scribal error. Our text hopes to make sense in terms of the divisions found in what follows in *DS*: i.e., in addition to astronomical weather signs (which here would seem, at least at first glance, to include *all* heavenly phenomena, including meteorological) there are also signs derived from animals, which may be further divided into domestic and

"others," as there seems to be a dichotomy between κατ' οἰκίαν and ἑτέρων. Thus, (i) after ζώων we retain the καί of M, (ii) we read Schneider's καί before ἑτέρων, and thus (iii) produce what seems to be a necessary contrast between domestic animals and others (such as crows, ravens, herons, cranes, and wolves), and (iv) on the assumption that the one τε given by the mss. is correct (should it, though, be changed to τῶν?) we supply its complement by reading τῶν τε for the mss.' τινῶν (which is in itself unobjectionable), the two τες now separating animals from their behavior, which in turn calls for reading Schneider's τρόπων (see next lemma); see Rehm *Parapegmastudien* 124 n. 3, who defends Schneider against F. Dirlmaier, *Gnomon* 14 (1938) 131; see also Cronin "Authorship" 322 f.

5.31 ζῴων] Cf. Pliny *NH* 8.102 *milia praeterea, utpote cum plurimis animalibus eadem natura rerum caeli quoque observationem et ventorum, imbrium, tempestatum praesagia alia alio modo dederit, quod persequi immensum est*, a task which Pliny nonetheless decides to pursue in Book 18; Cic. *Div.* 1.15 *inest in ranunculis vis et natura quaedam significans aliquid per se, ipsa satis certa, cognitioni autem hominum obscurior.*

5.32 τῶν τε τρόπων καὶ παθημάτων] Schneider (approb. Böhme) altered τόπων to τρόπων. It is true that "places" (*in primis* mountains) can provide signs, but παθημάτων would now be left hanging, with no discernable sense, whereas "habits and affections," referring back to animals is precisely what we find thoughout *DS* (our translation "reactions" for the latter word seems to catch its meaning). τῶν, as usual, is possessive: from animals and *their* ways.

5.32 μάλιστα] For μάλιστα with superlative, see LSJ s.v. μάλα III 3. κυριώτατα can be taken as adverb (with λαμβάνεται), which makes ⟨τά⟩ unnecessary. What are in fact "The best signs"? Most scientists would say those that are themselves examples of weather: clouds, winds, and atmospheric conditions in general, which include rainbows and solar and lunar halos. They have little faith in signs derived from animal behavior; see the Introduction, p. 8.

5.33-4 σελήνη νυκτὸς οἷον ἥλιος] Since the moon can be seen during daylight, νυκτός is necessary, and ἡμέρας goes without saying. For the thought, cf. Arist. *GA* 777b25 f. (ἡ σελήνη) γίγνεται γὰρ ὥσπερ

ἄλλος ἥλιος ἐλάττων. Different is Th. *Winds* 17 (ἡ σελήνη) οἷον γὰρ ἀσθενὴς ἥλιός ἐστιν, where the thought is that the moon's influence on winds is less than that of the sun.

5.34 σύνοδοι] "Conjunctions," normally in astronomy (as elsewhere) of two distinct items. Here it is of two "moons" i.e., "months."

5.34 χειμέριοι] Similarly, Arist. *GA* 738a20-22 αἱ δὲ τῶν μηνῶν σύνοδοι ψυχραὶ διὰ τὴν τῆς σελήνης ἀπόλειψιν, διόπερ καὶ χειμερίους συμβαίνει τὰς συνόδους εἶναι τῶν μηνῶν μᾶλλον ἢ τὰς μεσότητας.

5.36-7 ἀπόλειψις … ἔκλειψις] Our translation of both words as "loss" treats them as synonyms (Hort renders both as "failure"), but, as Böhme 63 f., conjectured, the sentence would read much better were they transposed and read with ἀπόλειψις = "waning," "absense," and ἔκλειψις = "eclipse." Then the waning (actually the time of least light) of the moon is compared to an eclipse of the sun. Note Wood's translation, "The obscuration of the moon also occurs in a similar way to an eclipse of the sun," which implicitly makes the transposition suggested but which, ignoring the force of the οὖν, regards this sentence as making a new point ("also," which is not in the Greek) rather than continuing with the preceding.

6

6.40 διχοτομίαι διορίζουσι τὰς ὥρας] We take the meaning to be that, although time is a continuum, various bipartitions are used to separate it into meaningful sections. Arist. uses διχοτομία of the moon's quarters (*GA* 777b22; cf. *De Mundo* 291b21, 292a4), but the moon of course does not determine the day or the year. Cf. Pliny *NH* 18.280 *semenstri spatio intra se* (sc. *Pleiades*) *messes vindemiasque et omnium maturitatem conplexis*. The two units resulting from a dichotomy need not be of equal amount; see Sider *RSC* 24 (1976) 345 n. 37. V's διχοτομαί was not a Greek word.

6.42 Πλειάς] See above, on 2.15.

7

7.45 τροπαὶ καὶ ἰσημερίαι] Cf. Hipp. *Aer.* 11 μέγισται δέ εἰσιν αἵδε αἱ τέσσαρες καὶ ἐπικινδυνόταται· ἡλίου τροπαὶ ἀμφότεραι καὶ μᾶλλον αἱ θεριναὶ καὶ αἱ ἰσημερίαι νομιζόμεναι εἶναι ἀμφότεραι, μᾶλλον δὲ αἱ μετοπωριναί· δεῖ δὲ καὶ τῶν ἄστρων τὰς ἐπιτολὰς φυλάσσεσθαι καὶ μάλιστα τοῦ Κυνός, ἔπειτα Ἀρκτούρου, καὶ ἔτι Πληϊάδων δύσιν. Similarly, [Arist.] *Probl.* 26.26 (942b25-943a4) discusses the equinoxes as seasonal and weather signs. Pliny *NH* 18.220 says of the equinoxes and solstices *cardines temporum quadripertita anni distinctione constant.*

7.46 κατάστασις] Regularly applied to atmospheric conditions by poets as well as medical (e.g., *Aer.* 11, in the sentence just after the one quoted above) and scientific writers. Th. *HP* 8.8.7 in fact has the same phrase, ἀέρος κατάστασις.

7.46-7 ὡς ἐπὶ τὸ πολύ] A common phrase in *DS*, an admission that weather signs express only the likelihood that a particular event will follow. ὡς ἐπὶ (τὸ) πολύ at 7.46 f., 8.53 f., 9.57 f., 10.67, 13.89, 23.157 f., 33.235, 53.391, 57.421. Similarly, ὡς τὰ πολλά at 11.70 f., 24.163, 165, 166, 167 f., 25.170, 30.206 f., 34.245, 246, 44.325, 48.354 f., 356, 51.377. See van Raalte on Th. *Met.* 7b10 εἰκότως, a root, by the way, found in *DS* only in the phrase παρὰ τὸ εἰκός.

7.48 διέχει] Schneider's διέχει, which rids the text of a δεῖ that claims more than this cautious work does elsewhere, is surely right. He compares (2.601) *Probl.* 1.26 (862b7-9) διὰ τί μετὰ τὰς τροπὰς ἀμφοτέρας μέχρι ἑκατὸν ἡμερῶν ἀποθνήσκουσι μάλιστα; ἢ ὅτι ἄχρι τοσούτου ἑκατέρα ἡ ὑπερβολὴ διέχει, ἥ τε τοῦ θερμοῦ καὶ τοῦ ψυχροῦ; (an important parallel since LSJ would suggest that διέχει does not mean "prevail, continue" in a temporal sense). Schneider further observed that Bart.'s *opportet se sic habere* suggests an original δεῖ οὕτως ἔχειν, but the οὕτως would perhaps have been omitted more easily if the word order were δεῖ ἔχειν οὕτως ἕως, which also makes the corruption from διέχει to δεῖ ἔχειν easier.

7.48 οὕτως] Deduced from Bart.'s *sic*; probably lost through haplography with the following ἕως.

8

8.51 τὸν μῆνα] The full moon at midmonth makes for an obvious division, especially as the brighter nights more readily allow for civic festivals; in Athens alone, e.g., the Synoikia, Greater Mysteries, Lenaia, Anthesteria, and City Dionysia all took place at midmonth. The locus classicus for days of the moon/month and related activities is Hes. *WD* 770 ad fin. General awareness of the month's quarters and eighths is less clear. For an excessive example of being guided by the moon, cf. Theophrastos' *Deisidaimon*; *Charact.* 16.10; for further parallels, see H. Bolkestein, *Theophrastos' Charakter der Deisidaimonia als religionsgeschichtliche Urkunde* (Giessen 1929 = Religionsgeschichtliche Versuche und Vorarbeiten 21.2) 44-51. Our text of course is more interested in the relation between the moon and weather; cf. Aratos 805-810

> σήματα δ' οὔ τοι πᾶσιν ἐπ' ἤμασι πάντα τέτυκται·
> ἀλλ' ὅσα μὲν τριτάτῃ τε τεταρταίῃ τε πέλονται
> μέσφα διχαιομένης, διχάδος γε μὲν ἄχρις ἐπ' αὐτὴν
> σημαίνει διχόμηνον, ἀτὰρ πάλιν ἐκ διχομήνου
> ἐς διχάδα φθιμένην· ἔχεται δέ οἱ αὐτίκα τετρὰς
> μηνὸς ἀποιχομένου, τῇ δὲ τριτάτῃ ἐπιόντος.

Pliny *NH* 18.350 *sunt et ipsius lunae viii articuli, etc.*

8.53 νουμηνίας ὡς ἀπ' ἀρχῆς] This is all too obvious, as most Greek cities called the first day of each month νουμηνία (vel sim.); see A. E. Samuel, *Greek and Roman Chronology* 14 f. and passim.

9

9.58 πρωί] This adverb meaning "early" is usually applied to days (less often to seasons). No other source defines as precisely as here but most people would have assumed that it would end by noon.

9.58 δείλη] Cf. *Il.* 21.111 ἢ ἠὼς ἢ δείλη ἢ μέσον ἦμαρ, but Xen. *An.* 1.8.8 ἤδη τε ἦν μέσον ἡμέρας … ἡνίκα δὲ δείλη ἐγίγνετο.

9.59 τὰ τῆς νυκτὸς μέρη τὰ ἀνάλογα] Since the moon is not correlated to the night the way the sun is to the day, we must assume that the analogous parts of the night are simply the equivalent temporal divisions, however difficult they must have been to determine.

9.63 κατὰ τὸν ὑπογεγραμμένον τρόπον] For ὑπογράφειν = "write below," cf. Heron Alex. *Def.* p. 14 Heiberg, the first sentence after the table of contents, καὶ τὰ μὲν πρὸ τῆς γεωμετρικῆς στοιχειώσεως τεχνολογούμενα ὑπογράφων σοι καὶ ὑποτυπούμενος, κτλ; LSJ s.v. I 1. Wood awkwardly translates "in accordance with the method hereafter stated," but perhaps all that is meant is "as in the way illustrated by all that follows" in *DS* (as is indeed the case) rather than "method." Hort opts for "The accepted method," as if it were synonymous with Aristotle's τὸν ὑφηγημένον τρόπον (*NE* 1108a3), "The accepted method," but it is not clear what this would mean, in a work as unmethodical as *DS*.

10

10.64 ὕδατος] For Theophrastos' views on the origin of rain, see above, on 3 ὑγρότερα γινόμενα.

10.64 δοκεῖ] A modest beginning.

10.65-6 ἐπιφοινίσσον] Elsewhere in early authors this verb is used only by [Aristotle] in *Physiog.* (Lucian uses the active in a transitive sense.) Dawn is famously rosy (fingered) in the poets (see West on Hes. *WD* 610), but not just before rains; *DS* must be referring to a more unusual reddish color that signaled this. Cf. Matthew 16.2 ὀψίας γενομένης λέγετε, Εὐδία· πυρράζει γὰρ ὁ οὐρανός. (But people do not recognize "The signs of the times," σημεῖα τῶν καιρῶν). Red skies also occur in perhaps the most famous English weather sign: "Red sky at night, shepherd's delight; red sky in morning, shepherd's warning" (Marriott 309 ff., with variants).

10.66 σημεῖον ... ἐπισημαίνει] In context these words can refer only to the coming of rain. These and similar ellipses are fleshed out in the translation. The verb, here and at 21.140, where again no object is specified, thus means something like "is significant." Elsewhere in weather literature, especially in parapegmata, ἐπισημαίνει is attached to certain days to indicate that the day in question marks a seasonal change; cf. also *Geop.* 7.10, where the setting of the Pleiades, the equinoctes, etc. are summed up with καὶ καθόλου περὶ πάσας τὰς ἐπισημασίας, and in general A. Rehm, "Episemasiai," *RE* Supplb. 7 (1940) 175-198. (LSJ s.v.

ἐπισημασία III 2 mistakenly defines the word's occurrence in *Geop.* merely as "changes in the weather," rather than as "points in the year when changes in the weather are likely to occur.") Lehoux *Parapegmata* 130-137, allows that ἐπισημαίνει is used like σημαίνει here (132 n. 29), but argues that at 22.147 it has the meaning it regularly has in weather literature, "indicates a change in the weather," but it seems better to understand the simplex and compound as synonyms in *DS*. See further, Lehoux, "Impersonal and intransitive ἐπισημαίνει," *CP* 99 (2004) 78-85.

10.66 αὐθημερόν] V's –ών falls just short of the truth. The Aldine's αὐθημερινόν, a much rarer and much later word (although it has been conjectured for Eupolis fr. 205 K-A), would have to be an adjective modifying an understood ὕδωρ, which is not impossible (cf. Polyainos *Strategemata* 4.3.32 γάλα αὐθημερινόν), but the adverb αὐθημερόν, common from the fifth century on (Aischylos, Thuc., Hdt., Aristoph.) is far preferable. (Thus for LSJ s.v. αὐθημερινός 4 "= sq. [i.e., αὐθημερός], Thphr. *Sign.* 10," read "= sq., Polyaen. 4.3.32.")

10.68 τριταῖα] Sc. ὕδατα; cf. Pi. *N.* 7.17 f. σοφοὶ δὲ μέλλοντα τριταῖον ἄνεμον | ἔμαθον.

11

11.71 ῥάβδοι] These rays or streaks of light are explained by Aristotle *Mete.* 3.2-6, esp. in the last chapter. They, like halos, rainbows, and mock suns (παρήλιοι, see below, 22.151) are all said to be due to one form or another of reflection (*Mete.* 371b18-21), the important factors being the amount and location of moisture present. Whereas rainbows display colors in the sky opposite the sun, halos are gleaming (and colorless) circles immediately surrouding it. ῥάβδοι (like mock suns) occur alongside the sun (not above, below, or opposite), either at sunrise or, most often, at sunset, neither too near nor too far from the sun (372a12-17, 377b27-31). The reflection from mist or clouds surrounding the sun or moon, when it is of uneven consistency, will appear to the eye as only incomplete, straight sections of a rainbow (373b33-74a18, 377a31-78a17). Aristotle regards these rays as a sign of rain but less so than mock suns (377b23-26). See further *De Mundo* 395a35 f. ῥάβδος δ' ἐστὶν ἴριδος ἔμφασις εὐθεῖα, Ps.-Plut. *Plac.* 3.6 (= Aët. 3.5.6), Seneca

QN 1.9-11 (who translates as *virgae*), Alexander *in Aristotelis Mete*. 173.31 ff. Hayduck, Olympiodorus *in Aristotelis Mete*. 210.5, 265.15 Stüve; Gilbert 615 n. 1, 617.

A modern explanation of this phenomenon could be that *rhabdoi* are sun pillars above (and below if the sun is high enough above the horizon at sunrise and -set) mock suns, which satisfy all of Aristotle's criteria, but which also occur when a sun pillar of greater brightness can be seen above (and below) the sun itself, the existence of which is explicitly denied in Aristotle's account: ἐκ πλαγίας αἰεὶ καὶ οὔτ' ἄνωθεν οὔτε πρὸς τῇ γῇ οὔτ' ἐξ ἐναντίας, *Mete.* 372a11 f. See Greenler 65-72 with pl. 3-3 for an explanation of how the atmospheric presence of asymmetric ice crystals can produce pillars of light above light sources at or near the horizon.

11.71-2 νοτόθεν ... βορρᾶθεν] To the south and north of the sun, not due south and north; see above on ῥάβδοι. Two uncommon adverbs, usually in the formula γείτων βορρᾶθεν, γείτων νοτόθεν, as in Plato's will (D.L. 3.41, 42) and (in a reasonable restoration of Kirchhoff) *IG* I^3 1458.5 (and restored in line 2 and in 426.70 in this inscription); cf. also *IG* II^2 1241 and Hipp. *Vict*. 2.37; see further, below on 53.390.

11.72 ἀνίσχων] This verb is regularly used of the rising sun (6 × by Hdt. alone).

11.72-3 μέλαν σημεῖον] If the sun shines clear at sunrise, without any blemish, almost like a sacrificial animal, then fair weather will follow; see below, 50.363-4. Otherwise, it is a sign of rain, as here and below, c. 27; cf. also Arat. 836 f. ἢ εἴ που μελανεῖ· καί τοι τὰ μὲν ὕδατος ἔστω | σήματα μέλλοντος, Vegetius 4.41.4 *sol* ... *pluvia sit inpendente maculosus*, Sunspots? See below, c. 50. Wood 72 n. 61 records that sunspots were visible to the naked eye on September 4th, 1893. (Of course, one hopes that nobody looked directly at the sun without some sort of protection.) Wood may well be right in conjecturing σῆμα, which a careless scribe would understandably have turned into the frequently occurring σημεῖον.

11.73 ἴσχῃ ... ἀνέχῃ] V's error (ἀνίσχῃ) can be attributed to scribal error arising from the preceding ἀνίσχων; although ἴσχειν usually has a more charged sense than ἔχειν (cf. LSJ s.v. ἴσχω), we regard ἴσχῃ as the

choice of the author and leave it untouched; see below, 13.86, where V "corrects" ἴσχωσιν to ἔχωσιν. If ἴσχῃ did not intervene, Schneider's conjecture for ἀνέχῃ would be unnecessary, as the simplex could retain the meaning of the immediately preceding complex; see n. ad 2.10, ἀνατέλλοντι δύνῃ.

This would be a good place for *DS* to have mentioned the weather sign found in Hes. *WD* 547-553, where a wide-spread morning mist (ἠώιος … ἀὴρ) signals evening rain or wind.

11.73-4 ἀκτῖνες … ἀποτείνωσι πρὶν ἀνατεῖλαι] Cf. Arat. 869 f. ἔτ' ἐόντι πέρην ὁπότε προταθεῖσαι | ἀκτῖνες φαίνωνται ἐπίσκιοι ἠῶθι πρό, Pliny *NH* 18.344 *si ante exortum nubes globantur, hiemem asperam denuntiabunt, Geop.* 1.3.2 ἀνατέλλοντος δὲ τοῦ ἡλίου, ἂν παρὰ τὰς ἀκτῖνας σκοτεινὸν νέφος φανῇ, ὄμβρον δηλοῖ. V's ἀποτείνωσι is preferable to M's ἀνα-, which probably arose from dittography from the words before and after.

11.75 καταφερομένου] The same genitive absolute construction used thrice by Aristotle, *Mete.* 372a13, *HA* 552b21, 623a21.

11.77 καυματίας] Masc. adjective (sc. ἥλιος). This word appears three other times in *DS* (26.178, 180, 50.363) and nowhere else, although καυματ[ίας] is reasonably restored at *P.Vienna gr.* 1 col. 2.25 (see intro. p. 15 and Neugebauer op. cit. p. 43). καυματώδης is more usual, appearing in (i.a.) Aristotle, Th., and even here in *DS* (36.259). Bonaventura's tentative καυματίσας is not necessary.

12

12.79 πανσελήνῳ] Sc. νυκτί, as at Schol. in Aratum 188 ἐν νυκτὶ πανσελήνῳ (cf. also Arist. *HA* τὰς νύκτας π.), and construe as an dative of time, as at *DS* 8.54, 50.365, Hdt. 2.47 τῇ αὐτῇ π., Schol. in Aristoph. *Ach.* 84 τῇ π. (The usual phrase is ἐν τῇ πανσελήνῳ.) *DS*, however, is the only one to write σελήνη πανσελήνῳ (also in 50.365), which might be thought to read oddly: "The moon at full-moon night." An easy change, which perhaps should be resisted, is to read -ος; cf. Thuc. 7.50 ἐτύγχανε γὰρ [sc. ἡ σελήνη] πανσέληνος.

12.79 ἀνίσχουσα] The full moon rises at sunset.

12.80 μείς] As this paragraph and below, 27.185, show, *DS* uses this word for a crescent moon. Cf. Chrysippos fr. 677 *SVF* (2.199.33 f. = Stob. 1.219.24) μεὶς δ' ἐστί … τὸ φαινόμενον τῆς σελήνης πρὸς ἡμᾶς ἢ σελήνη μέρος ἔχουσα φαινόμενον πρὸς ἡμᾶς.

12.80-81 ἐὰν μὲν ᾖ ἀργυρώδης εὐδίαν, εἰ δὲ πυρώδης ἄνεμον, ἐὰν δὲ ζοφώδης ὕδωρ σημαίνει] For our author a rather long periodic sentence, perhaps built up over time by accretion, as is suggested by the εἰ of the second clause, which we do not regularize. Note that Arat. 802-804 contains these same three signs in the same order: πάντη γὰρ καθαρῇ κε μάλ' εὔδια τεκμήραιο, | πάντα δ' ἐρευθομένῃ δοκέειν ἀνέμοιο κελεύθους, | ἄλλοθι δ' ἄλλο μελαινομένῃ δοκέειν ὑετοῖο. Cf. also Nigidius Figulus ap. Schol. in Germanicum 112 *si rubet* [sc. *luna*] *quasi aurum, ventos ostendit;* Lucan 5.549 *ventorumque notam rubuit*, Pliny *NH* 18.347 *si splendens exorta puro nitore fulsit, serenitatem; si rubicunda, ventos; si nigra, pluvias portendere creditur.*

This reading was agreed upon by the two editors with only the various mss. readings before us; it then seemed further confirmed by the parallels in Aratos and Pliny.

12.81-2 σημαίνει δὲ ὅτι ἂν σημαίνῃ τριταῖος ὢν ὁ μείς] Oddly phrased, probably reflecting poor composition (of the cut-and-paste variety) rather than textual corruption, the over-all idea being to state that the sign conditions of the previous clause pertain (most) on the third day of the month, a particularly significant (the *mot juste* here) day. Cf. 10.67-9, 51.370, and most of all *CCAG* 8.1.139.18-22, which lists five weather signs for the third day of the month: τριταία λεπτὴ καὶ καθαρά, εὔδιος. τριταία ἀμφοτέραις ταῖς κεραίαις ἐξ ἴσου φαίνουσα, εὔδιον ἄνεμον δηλοῖ διὰ νυκτός. τριταία λεπτὴ πυρρά, πνεύματα μέλλοντα δηλοῖ. τριταία βόρειον μέρος καθαρὸν ἔχουσα, νότον δηλοῖ. τριταία παχὺ κέρας ἔχουσα καὶ παχεῖα οὖσα, ἢ νότον ἢ χειμῶνα σημαίνει.

13

13.83 ἀστέρες πολλοὶ διᾴττοντες] The usual term in scientific writings for shooting stars; i.e., meteors which are seen to burn up on entering the atmosphere. cf. Anaxag. 59 A 1 (D. L. 2.9) τούς τε διᾴττοντας

οἷον σπινθῆρας ἀπὸ τοῦ ἀέρος ἀποπάλλεσθαι, Arist. *Mete*. 341b35, *De Mundo* 395a32. See also Aristoph. *Pax* 838 f. τίνες δ' ἄρ' εἰσ' οἱ διατρέχοντες ἀστέρες | οἳ καόμενοι θέουσιν; Such impressive and irregular occurrences would quite naturally be taken as omens; cf. *Il.* 4.75-77: (Athena)

βῆ δὲ κατ' Οὐλύμποιο καρήνων ἀίξασα.
οἷον δ' ἀστέρα ἧκε Κρόνου πάις ἀγκυλομήτεω,
ἢ ναύτῃσι τέρας ἠὲ στρατῷ εὐρέι λαῶν.

And in Peripatetic literature, very much in agreement with *DS*, cf. *Probl*. 26.23 (942b16-19) διὰ τί, ὅταν ἀστέρες διάττωσιν, ἀνέμου σημεῖον; ἢ ὅτι ὑπὸ τοῦ πνεύματος φέρονται, καὶ πρότερον ἐκεῖ γίνεται πνεῦμα ἢ παρ' ἡμῖν; διὸ καὶ ἀφ' οὗ ἂν τόπου φέρωνται οἱ ἀστέρες, ἐν τούτῳ καὶ τὸ πνεῦμα γίνεται.

See below, 37.270 f., where it is said that if meteors are seen to come from all sides, winds too be many. Aratos 926-932 deals with both possibilities:

καὶ διὰ νύκτα μέλαιναν ὅτ' ἀστέρες ἀΐσσωσι
ταρφέα, τοὶ δ' ὄπιθεν ῥυμοὶ ἐπιλευκαίνωνται,
δειδέχθαι κείνοις αὐτὴν ὁδὸν ἐρχομένοιο
πνεύματος· εἰ δέ κεν ἄλλοι ἐναντίοι ἀΐσσωσιν,
ἄλλοι δ' ἐξ ἄλλων μερέων, τότε δὴ πεφύλαξο
παντοίων ἀνέμων, οἵ τ' ἄκριτοί εἰσι μάλιστα,
ἄκριτα δὲ πνείουσιν ἐπ' ἀνδράσι τεκμήρασθαι.

See further Lydos *De Ost*. 20 (48.10-13 Wachsmuth) εἰ ἀστὴρ διάττοι ἀπὸ τοῦ νότου ἐπὶ τὸν βορρᾶν, οὐ μόνον αὐτὸν πνεῦσαι τὸν νότον, ἀλλὰ καὶ πόλεμον τοῖς ἐπιθαλασσίοις δηλοῖ, Ptol. *Tetr*. 2.14.10 καὶ τῶν ἐπιγινομένων δὲ κατὰ καιροὺς ἐν τοῖς μετεώροις αἱ μὲν τῶν κομητῶν συστροφαὶ ὡς ἐπὶ πᾶν αὐχμοὺς καὶ ἀνέμους προσημαίνουσι καὶ τοσούτῳ μείζονας ὅσῳ ἂν ἐκ πλεόνων μερῶν καὶ ἐπὶ πολὺ ἡ σύστασις γένηται. αἱ δὲ διαδρομαί καὶ οἱ ἀκοντισμοὶ τῶν ἀστέρων, εἰ μὲν ἀπὸ μιᾶς γίνοιντο γωνίας, τὸν ἀπ' ἐκείνης ἄνεμον δηλοῦσιν· εἰ δ' ἀπὸ τῶν ἐναντίων, ἀκαταστασίαν πνευμάτων· εἰ δὲ ἀπὸ τῶν τεττάρων, παντοίους χειμῶνας μέχρι βροντῶν καὶ ἀστραπῶν καὶ τῶν τοιούτων, Verg. *G*. 1.365-367 *saepe etiam stellas vento impendente videbis* | *praecipitis caelo labi, notisque per umbram* | *flammarum longos a tergo albescere tractus*, Pliny *NH* 18.351, Seneca *NQ* 1.1.11, 1.14.6, *Geop*. 1.11.9, Anon. Laur. 8.6.

13.84 ἀκτῖνες ἀθρόαι] See next lemma.

13.85 χειμῶνος] Not unreasonably, Furlanus, ignorant of V, supplied ὕδατος. It remains possible that V's reading itself is nothing more than an ancient supplement, and that ὕδατος is to be either printed or understood. Note that "rain" is suggested by the parallel passages: Pliny *NH* 18.342 *cum occidentis aut orientis radii videntur coire, pluvias*, 343 *si in ortu aut in occasu contracti cernentur radii, imbrem* (note that Rackham, in the Loeb, unaware of the parallel passages, mistranslates *contracti* as "shortened."), and Aratus 840-844

> εἰ δέ οἱ ἢ ἀνιόντος ἢ αὐτίκα δυομένοιο
> ἀκτῖνες συνίωσι καὶ ἀμφ' ἑνὶ πεπλήθωσιν,
> ἤ ποτε καὶ νεφέων πεπιεσμένος ἢ ὅ γ' ἐς ἠῶ
> ἔρχηται παρὰ νυκτὸς ἢ ἐξ ἠοῦς ἐπὶ νύκτα,
> ὕδατί κεν κατιόντι παρατρέχοι ἵματα κεῖνα.

χειμῶνος is, however, supported by *CCAG* 8.1.138.33 ἐπισπώμενος εἰς ἑαυτὸν τὰς ἀκτῖνας, χειμέριος. (And to make things more interesting, *Geop*. 1.2.4 takes this as a sign of fair weather: καὶ ἀνατέλλοντι δὲ καὶ δυομένῳ εἰ συστελλόμεναι φαίνονται ἀκτῖνες καὶ νέφη πεπιεσμένα περὶ αὐτόν, εὐδίαν δηλοῖ.)

13.86 οἷον ἐκλείποντος] Cf. Aratos 862-865

> ἀλλ' ὁπότ' ἠελίοιο μαραινομένῃσιν ὁμοῖαι
> ἐξαπίνης ἀκτῖνες ἀπ' οὐρανόθεν τανύωνται,
> οἷον ἀμαλδύνονται ὅτε σκιάῃσι κατ' ἰθὺ
> ἱσταμένη γαίης τε καὶ ἠελίοιο σελήνη.

13.86 χρῶμα] Hort adduces Pliny *NH* 18.356 *nube gravida candicante, quod vocant tempestatem albam, grando imminebit.*

13.87 πόκοις ἐρίων ὅμοιαι] An easy comparison; cf. Aristoph. *Clouds* 343 εἴξασιν (sc. νεφέλαι) δ' οὖν ἐρίοισιν πεπταμένοισιν, Arist. *Mete*. 374a3, Th. *Mete*. 1.24 "clouds … rarefied like wool" (tr. Daiber 1992, p. 262), Aratos 938 f. πολλάκι δ' ἐρχομένων ὑετῶν νέφεα προπάροιθεν | οἷα μάλιστα πόκοισιν ἐοικότα ἰνδάλλονται, Varro Atacinus fr. 21 Morel-Büchner *nubes sicut vellera lanae constabunt*, Lucr. 6.504, Verg. *G*. 1.397 *tenvia nec lanae per caelum vellera ferri*, Pliny *NH* 2.356; Gilbert 493 n. 2.

13.88 σημαίνει] As Schneider notes, σημαίνουσι would be better Greek, but we, like him, leave the text as it is.

13.89 πολύ] Conceivably, as in the next clause, this was once ἐπὶ τὸ πολύ.

13.89 ἐπὶ τὸ πολύ] Used of signs that cannot be relied on as much as one identified as a σημεῖον *tout court*. *DS* has several phrases to indicate this: see on 46-7 ὡς ἐπὶ τὸ πολύ.

13.89 ἶρις] LSJ s.v. II 2, "any *bright-coloured circle* surrounding another body." Atmospheric moisture being necessary for a heavenly rainbow (Arist. *Mete*. 373a35–b1), a small-scale rainbow could readily be taken as a sign of rain—but why from the south? On the rainbow as a weather sign, see further below on 22.147 ἶρις.

13.89-90 περὶ λύχνον ἢ διὰ λύχνον] Cf. Arist. *Mete*. 374a26-28 τὸ δὲ τοῦ λύχνου φῶς οὐ λευκὸν ἀλλὰ πορφυροῦν φαίνεται κύκλῳ καὶ ἰριῶδες. Lamps figure often among the weather signs; cf. 14.94, 34.248, 42.307-313, 54.397-400. For the reading of lamps in magic papyri, see Ganszyniec, "Lychnomanteia," *RE* 13 (1927) 2115-19.

13.90 νότια] νότιος = "*in* or *from* the south"; here obviously the latter, as we are rarely interested in the weather elsewhere.

14

14.91 μύκητες] Similarly c. 42, below. In order to make sense of this and related passages it is important to distinguish the following: (i) the wick, which in Greek is μύξα, i.e., because like "mucus" it comes out of the "nose" of the lamp; see Kallim. *Epigram* 56 Pf. (ii) The snuff (or, in some older or archaizing British English translations, such as that of LSJ, "fungus") that forms on the burnt ends of lamp wicks; in Greek μύκης, with the heteroclitic plurals μύκητες and μύκαι—but here, although this word is etymologically connected to μύξα (see Chantraine, *Dict. Etymol.* s.vv.), the immediate metaphorical sense is that of "mushroom," because of the knobby appearance of a burnt wick-end; cf. Th. *HP* 1.1.11 for the basic sense "mushroom" and Archil. 252 W for the word used as a synonym for penis (with which in turn compare the modern scientific ad-

jective *phalloeides* to describe some mushrooms). But since it is not the mere presence of snuff (which will always form while the lamp burns) but the nature of the accompanying sparks/flame (for which various Greek words are used) that signal rain, μύκητες came to have (at least in texts referring to weather signs) the sense "sparks," a meaning missing from LSJ and unrecognized by the commentators on the several texts. The clearest evidence for μύκητες = "sparks" is Aratos 976 f. (it is a sign of rain if) λύχνοιο μύκητες ἀγείρωνται περὶ μύξαν | νύκτα κατὰ σκοτίην (*vel* νοτίην, Kidd's reasonable conjecture). It is stretching the limits allowed "poetic plurals" to speak in English of "snuffs" or "funguses" (for *fungi* used by Latin authors, see below) around one wick. The scholia ad loc. also take μύκητες = "sparks": τὸ πῦρ ὡμολόγηται ξηρᾶς οὐσίας, ὑγρὸς δὲ ἀὴρ πολλάκις ἐν χειμῶνι ἐμπίπτων τῷ πυρὶ ἀποτελεῖ τούτους τοὺς σπινθῆρας. … ἄλλως· προσέχειν δὲ χρὴ ὁπόταν καὶ περὶ τὰς μύξας τῶν λύχνων μύκητες ἀθροίζωνται. Similarly Schol. ad Arat. 980, ὅταν οὖν περὶ ἁπτομένῳ λύχνῳ μύκητες συνιστῶνται χειμῶνος ὥρᾳ, αἵ τε φλόγες τεταγμένως καὶ κατὰ φύσιν εἰς ὕψος αἴρωνται, ποτὲ δὲ πλαγιάζωνται, καὶ λεπταὶ πομφόλυγες περὶ αὐτὰς γίνωνται καὶ σπινθῆρες ἀπορρέωσι, μὴ ἔστω σοι ἀπόβλητον, ἀπὸ κοινοῦ; Apul. *Met.* 2.11 *iam vespera lucernam intuens Pamphile: "quam largus," inquit, "imber aderit crastino."* That is, one "reads" the sparkling red points of the *lit* wick.

Since wherever the word appears in the singular it refers to but one mushroom-shaped object, it is probably wrong to translate the plurals as "snuffs" (as Trypanis does in translating the passage from the *Hekale* given below) or to think of it a some sort of collective plural, which is implicit in modern discussions.

Cf. Aristoph. *V.* 260-263

> κοὐκ ἔσθ' ὅπως οὐχ ἡμερῶν τεττάρων τὸ πλεῖστον
> ὕδωρ ἀναγκαίως ἔχει τὸν θεὸν ποιῆσαι.
> ἔπεισι γοῦν τοῖσιν λύχνοις οὑτοὶ μύκητες.
> φιλεῖ δ' ὅταν τοῦτ' ᾖ ποιεῖν ὑετὸν μάλιστα.

Kallim. *Hekale* fr. 25 Hollis (269 Pf.) ὁππότε λύχνου | δαιομένου πυρόεντες ἄδην ἐγένοντο μύκητες (Hollis translates "when, while the lamp was alight, fungus continually formed with the sparks," but it would be more precise to say "fiery sparks continuously formed"); Agathias Scholasticus *Epigram* 85.1 Viansino (*AP* 5.263) μήποτε, λύχνε, μύκητα φέροις, μηδ' ὄμβρον ἐγείροις, schol. ad Aristoph. *V.* 262. Note too that Bart. translated τρεῖς μύκαι as *tres scintillae*. (Furlanus does not explain his conjecture σπινθῆρες for τρεῖς μύκαι.)

The discussion above seems to make best sense of the Greek evidence. Classical Latin texts suggest that, as *OLD* s.v. *fungus* 1 b has it, the plural meant "a fur or mildew formed on the wick of a lamp," which of course could not happen in the presence of a flame. Thus, Verg. *G.* 1.390-392 speaks of seeing *putris concrescere fungos*, "powdery snuff forms." Pliny *NH* 18.357 says that it is a sign of rain *si in lucernis fungi, si flexuose volitet flamma*, where, note, the *fungus* is kept distinct from the action of the flame. In general, then, whereas Greeks read the flames, Romans, it would seem, studied extinguished lamps, discerning signs of rain in the powdery, fungus-like, grey excrescence on the blackened wick. Servius ad Verg. *G.* 392 explains how the ash is affected by the weather: *favilla, quae cum fumo solet egredi, prohibita aeris crassitate in lucernis residet et quasdam velut fungorum imitatur imagines.* See further below, 34.248, 42.307-13; Apul. *Met.* 2.11.

14.92 πλήθους καὶ μεγέθους] Hendiadys; cf. Anaxag. 59 B 1 fin. πλήθει καὶ μεγέθει (but perhaps these are the words of Simplicius; so Sider ad loc., p. 79 f.), Pl. *Rep.* 614a, D.C. 52.30.

14.93 κεγχρώδεις] See below, 25.170 f.

14.94 ⟨ὁ λύχνος⟩] The most likely word to complete the sense.

14.94 διαλιπών] For the use of this verb in the participle to mean "intermittent(ly)," cf. Arist. *Mete.* 362a28 διαλείποντες πνέουσιν (sc. ἄνεμοι), *Phys.* 226b27-31 (LSJ s.v. II 4). Here it refers to sparks, as is clearer in Vergil's *scintillare* (*G.* 1.392). Th. *Winds* 1 distinguishes winds that are διαλείποντας from those that are ἀνωμαλεῖς, where presumably the latter blow even more irregularly than the former.

14.94-5 οἷον πομφόλυγας] Similarly as a sign of rain, Aratos 979 f. ἠΰτε κοῦφαι πομφόλυγες, explained by the scholion ad loc., αἵ τε φλόγες τεταγμένως καὶ κατὰ φύσιν εἰς ὕψος αἴρωνται, ποτὲ δὲ πλαγιάζωνται, καὶ λεπταὶ πομφόλυγες περὶ αὐτὰς [sc. μύκητας] γίνωνται καὶ σπινθῆρες ἀπορρέωσι.

14.96 χειμῶνος ὄντος μύκαι] σπινθῆρες was the conjecture of Furlanus. In the parallel passage on signs of storms (42.310 f.), we read καὶ ἐὰν χειμῶνος ὄντος μύκαι μέλαιναι ἐπιγίνωνται, χειμῶνα σημαί-

νει, which strongly suggests that we should maintain μύκαι here. Assuming that the τρεῖς of the mss. is a corruption of ὄντος we fill out the thought with the same word as found on 42.311.

15

15.97 ὄρνιθες] On birds in general as weather signs, cf. Aristoph. *Aves* 596 f.

προερεῖ τις ἀεὶ τῶν ὀρνίθων μαντευομένῳ περὶ τοῦ πλοῦ·
"νυνὶ μὴ πλεῖ, χειμὼν ἔσται." "νυνὶ πλεῖ, κέρδος ἐπέσται."

Pliny *NH* 18.364 *Nec mirum aquaticas aut in totum volucres praesagia aeris sentire*.

15.97 λουόμενοι] Arist. fr. 270.21 Gi. (Ael. *NA* 7.7) seems to suggest that birds do this to moisten themselves in advance of wind (which would dry them out): ἀπειλοῦσι δὲ πνεῦμα λουόμενοί γε ὄρνιθες, καὶ ἀνέμων τινὰς ἐμβολὰς ὑποφαίνουσι. Cf. Aratos 942 f. (as a sign of rain)

πολλάκι λιμναῖαι ἢ εἰνάλιαι ὄρνιθες
ἄπληστον κλύζονται ἐνιέμεναι ὑδάτεσσιν.

Varro Atac. fr. 22.1-3 Morel-Büchner

tum liceat pelagi volucres tardaeque paludis
cernere inexpletas studio certare lavandi
et velut insolitum pennis infundere rorem.

Verg. *G.* 1.387 (*hic locus de Varrone est*, Servius ad 1.375)

et studio incassum videas gestire lavandi.

15.97 μή] Primarily a generic negative of ἐν ὕδατι βιοῦντες ("non-aquatic"), but also serving as the proper negative in a conditional clause.

15.98 φρῦνος λουόμενος] We print V's masculine against M's feminine, regarding it as more likely to have been turned into the more usual feminine form than the reverse. φρῦνος is feminine also at Babrios 28.6, as guaranteed by meter and context. Three species of toad were known in Greece: *Bufo vulgaris, B. viridis*, and *Bombinator igneus* (D'Arcy W. Thompson, "Fauna," in L. Whibley, *A Companion to Greek Studies* [Cambridge 1931] 45). Cf. *Probl.* 1.22 (862a10 f.) διὰ τί γίνεται τὰ ἔτη νοσώδη ὅταν γένηται φορὰ τῶν μικρῶν βατράχων τῶν φρυνοειδῶν;

15.98 βάτραχοι μᾶλλον ᾄδοντες] The voice of the frog, a φιλόμβριος ὑγρὸς ἀοιδός (*AP* 6.43), was often taken as a forecast of rain. Cf. Aratos 947 αὐτόθεν ἐξ ὕδατος πατέρες βοόωσι γυρίνων ("fathers of tadpoles" = "frogs"), Ael. *NA* 9.13 ὅταν δὲ βάτραχοι γεγωνότερον φθέγγωνται καὶ τῆς συνηθείας λαμπρότερον, ἐπιδημίαν δηλοῦσιν ὑετοῦ, Cic. *Ad Att.* 15.16b *pluvias metuo, ranae enim* ῥητορεύουσιν, *Div.* 1.15 *inest in ranunculis vis et natura quaedam significans aliquid per se, ipsa satis certa, cognitioni autem hominum obscurior*, Pliny *NH* 18.361 *ranae quoque ultra solitum vocales*, Plut. *Sollert. Animal.* 982e ἄλλως δὲ λαμπρύνουσι τὴν φωνήν, ὑετὸν προσδεχόμενοι· καὶ τοῦτο σημεῖον ἐν τοῖς βεβαιοτάτοις ἐστίν. On frogs, see Thompson ibid. (prev. lemma).

Some few weather signs in this text are aural and do not require sight of the animal itself; cf. *Il.* 10.274-276, where it is specifically said that Odysseus and Diomedes could hear but not see a heron, which Athena had sent as a favorable sign. Cf. cc. 39 f., 53 for some examples of bird cries. See the general index, s.v. sounds.

15.99-100 σαύρα … σαλαμάνδραν] Th. (*De Igne* 60 f.) and others (e.g., Arist. *HA* 552b16) thought that the salamander (*S. maculata* or *atra*) was unaffected by fire, but this does not seem relevant here. Some lizards and salamanders do in fact resemble each other, but in fact the former are reptiles and the latter amphibia. The predictive powers of the lizard mentioned here are mild compared with the uses lizards are put to elsewhere; see A. D. Nock, "The lizard in magic and religion," *Essays on Religion and the Ancient World* (Oxford 1972) 1.271-276.

15.100 ἔτι δὲ καί] *DS* is fond of emphasizing additions with δὲ καί (11 × elsewhere), only here with the further emphasis of ἔτι; hence our "furthermore … also"; see Denniston 305.

15.100 χλωρὸς βάτραχος] On frogs as predictors of weather, see above and Hesych. s.v. μάντις· ὁ ἐν τοῖς κήποις βάτραχος. As the frogs themselves say in Aristophanes' play (*Frogs* 246-249),

> ἢ Διὸς φεύγοντες ὄμβρον
> ἔνυδρον ἐν βυθῷ χορείαν
> αἰόλαν ἐφθεγξάμεσθα
> πομφολυγοπαφλάσμασιν.

15.101 χελιδόνες ὕδωρ] Cf. Arat. 944 f. λίμνην πέρι δηθὰ χελιδόνες ἀίσσονται | γαστέρι τύπτουσαι αὔτως εἰλυμένον ὕδωρ, Verg. *G.* 1.377 *arguta lacus circumvolitavit hirundo*.

15.101 τύπτουσαι] Cf. Pliny *NH* 18.363 *hirundo tam iuxta aquam volitans ut pinna saepe percutiat*, Varro Atac. fr. 22.4 Morel-Büchner *aut arguta lacus circumvolitavit hirundo.* During or just before a rain, swallows will skim along the surface of the water, "striking" it when they drop even lower to catch insects, which do in fact appear at times of rain (personal observation). Hauser *Bauernregeln* (Zurich 1975) 373 and 376 f. records a number of predictions of rain from low-flying swallows (but with no mention of their hitting water) as well as predictions of fair weather from their flying high. J. Morton, *The Role of the Physical Environment in Ancient Greek Seafaring* (Leiden 2001) 292, records that "sensors in the ears of swallows which register changes in atmospheric pressure and so warn the birds of development in weather conditions are described in *Incredible Journey: A Swallow's Journey* (BBC 1, 8.00 pm, Thursday, 9 Jan. 1997)."

15.103 ἀνακύπτων ὀσφραίνηται] (This entire sentence was accidentally omitted by Wimmer.) Cf. Arat. 954 f. καὶ βόες ἤδη τοι πάρος ὕδατος ἐνδίοιο | οὐρανὸν εἰσανιδόντες ἀπ' αἰθέρος ὀσφρήσαντο, Varro Atac. fr. 22.5 f. *et bos suspiciens caelum (mirabile visu)* | *naribus aerium patulis decerpsit odorem*, Ael. *NA* 7.8 βοῦς ἐὰν βοᾷ καὶ ὀσφραίνηται, ὗειν ἀνάγκη, Pliny *NH* 18.364 *boves caelum olfactantes seque lambentes contra pilum*, Verg. *G.* 1.375 f. *bucula caelum* | *suspiciens patulis captavit naribus auras*, Geop. 1.3.10 βόες πρὸς μεσημβρίαν ὁρῶσαι, *CCAG* 8.1.137 βοὸς βοῶντος καὶ τὴν γῆν ὀσφραινομένου ὗειν ἀνάγκη.

16

16.104 κορώνη] Cf. Aratos 949-953, who surveys the crow's way with water before rain:

ἢ που καὶ λακέρυζα παρ' ἠϊόνι προϊχούσῃ.
κύματος ἐρχομένου χέρσῳ ὑπέτυψε κορώνη,
ἢ που καὶ ποταμοῖο ἐβάψατο μέχρι παρ' ἄκρους
ὤμους ἐκ κεφαλῆς, ἢ καὶ μάλα πᾶσα κολυμβᾷ,
ἢ πολλὴ στρέφεται παρ' ὕδωρ παχέα κρώζουσα.

There was what seems to be a distinct κορώνη θαλάσσιος, but as Kidd ad loc. shows *DS*, Aratos, and the remaining weather texts are surely referring to the common crow, as they use the same language elsewhere to describe their various characteristics, esp. their cries (see below). Note also Verg. *G.* 1.388 *tum cornix plena pluviam vocat improba voce* [Serv. ad loc. calls *vocat* poetic; *non enim vocat, sed denuntiat pluviam*], Hor. *O.* 3.17.12 f. *aquae nisi fallit augur* | *annosa cornix*, Lucr. 5.555 f. *caput spargens undis, velut occupet imbrem,* | *instabili gressu metitur litora cornix*, Lucan 5.555 f. *quodque caput spargens undis, velut occupet imbrem,* | *instabili gressu metitur litora cornix, Geop.* 1.3.7 κορώνη ἐπ' αἰγιαλοῦ τὴν κεφαλὴν διαβρέχουσα ἢ πᾶσα νηχομένη καὶ νυκτὸς σφοδρότερον κρώζουσα ὄμβρους προμηνύει.

For the crow as a sign of storm, see also below, 39.283 f., Arat. 1001 f. καὶ ἥσυχα ποικίλλουσα | ὥρῃ ἐν ἑσπερίῃ κραυγὴν πολύφωνα κορώνη, 1022 f. καὶ ἐννεάγηρα κορώνη | νύκτερον ἀείδουσα, Arist. fr. 270.21 Gi. (Ael. *NA* 7.7), Plut. *QC* 674b. For the crow as a sign of fair weather, see below, 53.387 f.

16.104 κορυσσομένη] Maass *GGA* (1893) 628 withdrew his earlier conjecture πτερυσσομένη (*Aratus* 354), having come to regard κορυσσομένη as one of the many "hoch poetisch" words in *DS* (he was convinced that its whole clause is either a direct quotation of Archilochos or a close paraphrase, comparing the explicit quotation below, 45.334 f.) Derived from κόρυς, "helmet," the verb used in the middle to indicate some movement of the head reminiscent of shaking one's helmet; cf. *Il.* 4.442 and (of a wave) 4.424 (with Kirk's n. ad loc.). Böhme 83 conjectured λακερυζομένη, comparing Arat. 949 f. (see above).

16.106 κόραξ] A common fowl sign of foul weather; cf. esp. Arat. 963-969 (with the chief similarites underlined):

> δή ποτε καὶ γενεαὶ κοράκων καὶ φῦλα κολοιῶν
> ὕδατος ἐρχομένοιο Διὸς πάρα σῆμ' ἐγένοντο,
> φαινόμενοι ἀγεληδὰ καὶ ἰρήκεσσιν ὁμοῖον 965
> φθεγξάμενοι. καί που κόρακες δίους σταλαγμοὺς
> φωνῇ ἐμιμήσαντο σὺν ὕδατος ἐρχομένοιο,
> ἤ ποτε καὶ κρώξαντε βαρείῃ δισσάκι φωνῇ
> μακρὸν ἐπιρροιζεῦσι τιναξάμενοι πτερὰ πυκνά.

The raven's sound was one of Demokritos' weather signs: Plut. *De Sanit. Praec.* 14.129a (DK 68 B 147 = 581a Luria) ἄτοπον γάρ ἐστι

κοράκων μὲν λαρυγγισμοῖς καὶ κλωσμοῖς ἀλεκτορίδων καὶ συσὶν ἐπὶ φορυτῷ μαργαινούσαις, ὡς ἔφη Δ., ἐπιμελῶς προσέχειν σημεῖα ποιουμένους πνευμάτων καὶ ὄμβρων, τὰ δὲ τοῦ σώματος κινήματα καὶ σάλους καὶ προπαθείας μὴ προλαμβάνειν μηδὲ προφυλάττειν μηδ' ἔχειν σημεῖα χειμῶνος ἐν ἑαυτῷ γενησομένου καὶ μέλλοντος. Cf. Arist. fr. 270.21 Gi. (Ael. *NA* 7.7, a passage replete with avian weather signs attributed to Aristotle) κόραξ δὲ ἐπιτρόχως φθεγγόμενος καὶ κρούων τὰς πτέρυγας καὶ κροτῶν αὐτάς, ὅτι χειμὼν ἔσται κατέγνω πρῶτος. κόραξ δὲ αὖ καὶ κορώνη καὶ κολοιὸς δείλης ὀψίας εἰ φθέγγοιντο, χειμῶνος ἔσεσθαί τινα ἐπιδημίαν διδάσκουσι. κολοιοὶ δὲ ἱερακίζοντες … ὑετὸν δηλοῦσι, Euphorion fr. 89 Powell ὑετόμαντις ὅτε κρώξειε κορώνη, Plut. *Sollert. Animal.* 129a, Nikand. *Ther.* 406 (with schol.) κόραξ τ' ὀμβρήρεα κρώζων, Hor. *O.* 3.27.10 *imbrium divina avis imminentium*, id. 3.17.12 *aquae augur*, Lucr. 5.1083-86. Ael. *NA* 6.19 says that the raven wants to imitate the sound of rain (βούλεται δὲ τῶν ὄμβρων μιμεῖσθαι τὰς σταγόνας ὁ κόραξ), which may explain the origin of this particular sign. For the raven as a sign of fair weather, see below, on 52.384-69. In general, crows are bad news; cf. Hes. *WD* 747 μήτοι ἐφεζομένη κρώξῃ (with West's n.).

16.106 πολλὰς μεταβάλλων ἔωθεν φωνάς] Pliny *NH* 10.43.60, Lucr. 5.1078-86, and Porphyry *Abstin.* 3.4 allude to the various sounds birds make, but at any one time their cry tends to be unvarying. Thus, we prefer to follow Bart. (as Schneider was minded to do), rather than follow the Greek mss., whose reading is banal, since all ravens regularly make different sounds and trying to discern two that are the same produced together is not easy.

16.106 τούτων] Partitive genitive; sc. φωνήν τινα.

16.107 ἐπιρροιζήσῃ] Here and in Aratos (see above) this verb occurs between verbs referring to sounds made by the raven's voice and his wings. Wood translates as "croaks" (sim. LSJ and some commentators on Aratos), but Hort is surely right to understand it as a reference to the sound made by the raven's wings, as we see with the related words ῥοῖζος (Ael. *NA* 2.26, LXX *Wisdom of Solomon* 5.11) and ῥοῖβδος (Soph. *Ant.* 1004 πτερῶν γὰρ ῥοῖβδος οὐκ ἄσημος ἦν). As writers on rhetoric make clear, the word is vaguely onomatopoetic of the whirring made by something moving rapidly through the air, such as an arrow, a falling tree, or a

whip, which is not a sound one associates with the raven's croak. See further, Kidd on Arat. 969.

16.107 τινάξῃ τὰ πτερά] Schneider's suggestion makes good sense (cf. *Od*. 2.151 τιναξάσθην πτερὰ πυκνά, the model for Aratos 969), as the active cannot be used absolutely, and "wings" are suggested by Bart. (see app. crit.), Arat. 969, and Arist. fr. 270.21 (the last two given above).

16.109 φθειρίζηται] That birds suffer from lice is mentioned by Arist. *HA* 557a10-14. See below, 17.118.

16.109 ἐάντε εὐδίας ἐάντε ὕδατος] If this is to make any sense, it must mean that if during fair weather the raven makes the same sound that it does during rainy weather (imitating raindrops; on the mimicry of ravens, cf. further below, on 40.290 f.), rain can be expected. J. Pollard, *Birds in Greek Life and Myth* (London 1977) 112 understands the raven's making this sound while it is raining as "a sign of *protracted* bad weather" (our emphasis).

16.110 σταλαγμούς] Imitated, it would seem, by Aratos 966 (see above). Kidd persuasively argues that σταλαγμούς makes for acceptable Aratean metrics.

16.111 κολοιοί] Jackdaws; for them and ravens together, cf. *Geop*. 1.3.8 κόρακες καὶ κολοιοὶ ἀθρόως ἐπιφαινόμενοι καὶ κρώζοντες; for their imitating hawks, cf. Arist. fr. 270.21 (given above); for the daw as a weather sign, cf. Ov. *Am*. 2.6.34 *pluviae graculus auctor aquae*. (For the *Geoponica* as evidence for Theophrastos, see Sharples *Th. Comm*. 5, on fr. 383.)

16.111 ἱερακίζουσιν] How?—by soaring/hovering or by screeching? Since this verb appears only here and in the obviously related Arist. fr. 270.21 (quoted just above, on κόραξ), it is impossible to say for sure (Aratos 965 f., quoted above, may be just a guess), but c. 40 suggests the latter. The verb appears again only in the later derivative weather literature: Anon. Laur. 11.22 and *CCAG* 8.1 p. 138.9. Apostolios *Paroim*. cent. 1.38 οἱ κολοιοὶ δὲ ἱερακίζοντες καὶ πετόμενοι πῆ μὲν ἀνωτέρω, πῆ δὲ κατωτέρω κρυμὸν ("frost") καὶ ὑετὸν δηλοῦσιν is copied from Aristotle/Aelian.

17

17.114 ἱέραξ] This had been the only place in classical literature where the hawk is said to be a weather sign, except for one unclear passage in Dionysios *De Aucupio* 2.9 (quoted below, on 18.123 ἐρωδιός), where hunters are said to look to the hawk for a sign just as (?; the Greek is ὁπόσα) sailors look to the heron for a sign of wind; that is, presumably, hunters read the hawk's flight for signs of wind. We can now add a newly published epigram of Poseidippos, 21 Austin-Bastianini, beginning νηὶ καθελκομένῃ πάντα πλέον' ἰνὶ φανήτω | ἴρηξ. See Sider, "Posidippus on weather signs and the tradition of didactic poetry," in K. Gutzwiller (ed.), *The New Posidippus: A Hellenistic Poetry Book* (Oxford 2005) 166-170.

17.114 καθεζόμενος καὶ εἴσω εἰσπετόμενος] Probably *hysteron proteron*, as translated by Wood and Hort. εἰσπτόμενος would be an easy change. Still, it has to be said that the only way a hawk is going to get in a tree is by flying, so there may be deeper corruption. Thompson *GGB* 117 abbreviates the passage, calling "a hawk sitting on a tree a sign of rain." For the dependence of hunters on hawks as a weather sign, see Dionysios *De Aucupio* 2.9, quoted below, on 18.123 ἐρωδιός.

17.115-6 φανῶσι] Sc. on the mainland, as noticed by McCartney *CW* 14 (1921) 91. This is made clear in the parallel passages; cf. Aratos 1094-96, οὐδὲ μὲν ὀρνίθων ἀγέλαις ἠπειρόθεν ἀνήρ | ἐκ νήσων ὅτε πολλαὶ ἐπιπλήσσωσιν ἀρούραις | ἐρχομένου θέρεος, χαίρει. Likewise Arist. fr. 365 Gi. (cited in full in the next lemma), where ἐκ τῶν νήσων πετόμενοι τοῖς γεωργοῖς seems to assume an appearance on the mainland. Cf. also Plut. fr. 20 Sandbach ξηρότεραι γὰρ αἱ νῆσοι τῶν ἠπείρων ὑπάρχουσαι ὥς φησι Πλούταρχος, θᾶττον καὶ ῥᾷον τοῦ αὐχμηροῦ καταστήματος ἀντιλαμβάνονται. διὸ καὶ τὰ ὄρνεα φεύγει καὶ ταῖς ἠπείροις ἐπιπελάζει. The failure to mention the mainland is probably due to carelessness on the part of the author (he may have thought it not worth mentioning), rather than scribal omission.

17.116 ὄρνιθες οἳ βιοτεύουσιν ἐν νήσῳ] There is a diminuendo in terms of result: (i) rain, (ii) less water, (iii) drought; but the number (and configuration?) of birds producing these results does not correlate in any meaningful way: (i) packed together (in large number?), (ii) moderate in

number, (iii) very many. A likely explanation is that three (literally) isolated observations were brought together by the redactor and put together without comment. Cf. Arist. fr. 365 Gi. (Schol. in Arat. 1095 ed. Martin) ὅταν μὲν ὑγρὸς ᾖ καὶ ψυχρὸς ὁ ἀήρ, τὸ τηνικαῦτα καὶ αἱ νῆσοι βρεχόμεναι ἀναφύουσι, καὶ τὰ ἐν αὐταῖς ὄρνεα τρέφουσιν. ὅταν δὲ αὐχμώδης ᾖ καὶ ξηρός, τότε παντελῶς τῶν νήσων μὴ ἀναφυουσῶν ἐπὶ τὴν γῆν τὰ ἐν ταῖς νήσοις ὄρνεα φεύγουσιν, εἰς ἣν δύνανται κἂν ἐξ ὀλίγου τρέφεσθαι. καὶ οἱ κολοιοὶ δὲ ἐκ τῶν νήσων πετόμενοι τοῖς γεωργοῖς σημεῖον αὐχμοῦ καὶ ἀφορίας. ἐὰν δὲ ἔμμετροι χωροῦσι, εὐκαρπίαν δηλοῦσιν. (Martin considers τρέφεσθαι the last word of the quotation from Aristotle, but the entirety of the scholion may be his.) See also Aratos 1094-96, quoted in the previous lemma.

17.117 μέτριοι] = ὀλίγοι, a rare usage; LSJ s.v. II gives only Xen. *Cyr.* 2.414 [ἱππεῖς] μέτριοι, "a reasonable number of horsemen," but the same sense is found below, 24.163.

17.117 αἰξὶ καὶ βουσίν] And good for their herdsmen and owners as well. A rare instance in *DS* of at least the hint of some practical use for a weather sign.

17.117 ὑπερβολῇ] "Excessively," with πολλοί (LSJ s.v. I 4), a common Aristotelian usage ("pro adverbio usurpatur," Bonitz s.v.).

17.118 ὄρνιθες καὶ ἀλεκτρυόνες] The most common of domestic birds, chickens (usually hens, but sometimes including roosters) could be called simply "birds": Athen. 373a ἀλλὰ μὴν καὶ ὄρνιθας καὶ ὀρνίθια νῦν μόνως ἡ συνήθεια καλεῖ τὰς θηλείας, cf. also Aisch. *Eum.* 866 ἐνοικίου δ' ὄρνιθος, Soph. fr. 436 θήλεαι ὄ., Nikand. *Ther.* 558 ὄ. κατοικίς, Thompson *GGB* 33. On chickens as weather signs, cf. Demokritos 68 B 147 (quoted above, on 16.106 κόραξ), Aratos 960-962:

> καὶ τιθαὶ ὄρνιθες, ταὶ ἀλέκτορος ἐξεγένοντο,
> εὖ ἐφθειρίσσαντο καὶ ἔκρωξαν μάλα φωνῇ,
> οἷόν τε σταλάον ψοφέει ἐπὶ ὕδατι ὕδωρ.

Arist. fr. 270.21 Gi. ἀλεκτρυόνες γε μὴν καὶ ὄρνιθες οἱ ἠθάδες πτερυσσόμενοι καὶ φρυαττόμενοι καὶ ὑποτρύζοντες χειμῶνα δηλοῦσιν, *Geop.* 1.3.8 αἱ κατοικίδιαι ὄρνις πυκνῶς κονιώμεναι … ὄμβρον σημαίνουσι, Plut. *De Tuenda San.* 129a.

17.119 ὗον] Not modifying ὕδωρ, but an impersonal accusative absolute; but note 51.376 ὕσαντος. As Aristoph. *Clouds* 1280 Δία ὕειν ὕδωρ shows, Zeus (or clouds) rains down water (or gold). ὕδωρ is never the subject of this verb in the active, only in the passive.

18

18.120 ἐὰν νῆττα ἥμερος] The domestic duck. For ducks in general as a weather sign, cf. below, 28.191, Aratos 970 f.

καὶ νῆσσαι οἰκουροὶ ὑπωρόφιοί τε κολοιοὶ
ἐρχόμενοι κατὰ γεῖσα τινάσσονται πτερύγεσσιν.

Furlanus' conjecture (or reading of ms. N), ἡ νῆττα ἥμερος ⟨ἐάν⟩, which produces an unwanted definite article and an ungrammatical predicate position for the adjective, has been followed by subsequent editors.

18.120 ὑπιοῦσα] Perhaps merely neutral, "getting under" (Hort), but this verb often indicates sneaky behavior, which would be appropriate here. Aratos, however, keeps it neutral.

18.120 ὑπὸ τὰ γεῖσα] In a well built structure there would be no room between eaves and cornice (γεῖσον) for a duck to perch —see A. T. Hodge, *The Woodwork of Greek Roofs* (Cambridge 1960) cc. 7 f.—, but doubtless in many ordinary buildings there would be, or would develop, crevices for perching, if not for ducks then for smaller birds; cf. Theaitetos *AP* 10.16.5 ὑπὸ γεῖσα δόμους τεύξασα χελιδών. For roofs in general as a locus for bird signs, see West on Hes. *WD* 747.

18.121 ἀλεκτρυόνες] According to Th. fr. 355A (Ael. *NA* 3.38) cocks do not crow when it is moist, which contradicts this sign, but does not disprove Th. as author.

18.123 ἐρωδιός] Wood, Hort, and (on the imitation in Aratos) Kidd take this bird to be the heron; Thompson, however, *GGB* 104 (on the parallel passage in Aristotle) thinks it "probably" a shearwater, although this term has been applied to different species (Thompson, *CR* 32 [1918] 92 ff.). With no great confidence, we translate with the majority. Cf. Arat. 972 (continuing the sentence from the passage quoted above on ducks) ἢ ἐπὶ κῦμα διώκει ἐρωδιὸς ὀξὺ λεληκώς, Aristotle fr. 270.21 Gi. ἐρωδιὸς δὲ κνεφαῖος (= ὄρθιον) βοῶν τὰ αὐτὰ (sc. χειμῶνα ἰσχυρὸν)

… . πετόμενος δὲ ἐρωδιὸς τῆς θαλάττης εὐθὺ ὕδωρ ἐξ οὐρανοῦ ῥαγήσεσθαι αἰνίττεται, Dionysios *De Aucupio* 2.9 init. φίλτατοι δ' εἰσὶν οἱ ἐρωδιοὶ τοῖς ἀνθρώποις καὶ προσημαίνουσιν εὐδίαν τε καὶ χειμῶνα, μάλιστα πρὸς ἐκεῖνο τὸ μέρος, ὅθεν ἂν μέλλῃ σφοδρότατος ἄνεμος πνεῖν, ἐπὶ τοῖς στήθεσι τὰς κεφαλὰς κατακλίνοντες. ναύτης γοῦν οὐκ ἄν ποτε ἑκὼν ἐρωδιὸν ἀποκτείνειεν, ἐπειδὴ πιστεύονται τοῖς ἁλιεῦσιν ἐν τῇ θαλάττῃ σημαίνειν ὁπόσα τοῖς θηραταῖς ἐπὶ τῆς γῆς οἱ ἱέρακες, Pliny *NH* 18.363 *ardea in mediis harenis tristis*, Lucan 5.553 f. *quodque ausa volare | ardea sublimis pinnae confisa natanti.*

18.124 ἐπὶ θάλατταν] For direction of flight as an omen, cf. Dionysios *De Aucupio* 2.9 (previous lemma).

19

19.126 σπίνος] A finch or some other sparrow-like bird; see below, 39.281. Since a very common type of finch in present-day Athens is still called σπῖνος, Thompson *GGB* 266 s.v. σπίζα equates the two, identifying the ancient bird of this name as the chaffinch, *fringulla coelebs*. He is followed by Dunbar on Aristoph. *Aves* 1079. For this bird as a weather sign, cf. Arat. 1024 (below, 39.281 f.), Ael. *NA* 4.60 σπίνοι δὲ ἄρα σοφώτεροι καὶ ἀνθρώπων τὸ μέλλον προεγνωκέναι. ἴσασι γοῦν καὶ χειμῶνα μέλλοντα, καὶ χιόνα ἐσομένην προμηθέστατα ἐφυλάξαντο. καὶ τοῦ καταληφθῆναι δέει, ἀποδιδράσκουσιν ἐς τὰ ἀλσώδη χωρία, καὶ αὐτοῖς τὰ δάση κρησφύγετα ὡς ἂν εἴποις ἐστίν.

Furlanus' attempt to make sense of the codd. fails, since herons are not associated with houses (to say nothing of the unexampled use of the mere adjective standing for an understood ἐρωδιός, despite Arist. *HA* 609b22 πελλὸς ἐ., which Furlanus cites). Schneider's conjecture is the most likely, as the chirping of the finch is cited similarly elsewhere in *DS* as a weather sign: 23 σπίνος φθεγγόμενος ἔωθεν.

19.126 οἰκίᾳ οἰκουμένῃ] There is no special emphasis on the house being inhabited; the thought is rather: If a chaffinch flies into your house. For this expression, cf. Menander fr. 846 K-A ἄνευ κακῶν γὰρ οἰκίαν οἰκουμένην | οὐκ ἔστιν εὑρεῖν. Bart. translates *in domo habitans*, but he probably took the second word (which he would have found without subscript) as a nominative.

19.127 χύτρα] The humble ceramic cooking vessel which Sokrates mentions in order to test Hippias' definition of beauty (*Hi. Ma*. 288). Wood worries unnecessarily, (i) that the contents of the pot are not given, but this is probably irrelevant and if it weren't ὕδατος could easily be taken ἀπὸ κοινοῦ; and, second, that it is not specified that the pot when sparking is placed over a fire, although this is all that *chytrai* are used for. The pot Sokrates describes contains ca. 5 gallons. See further B. A. Sparkes (well named in this context) and L. Talcott, *The Athenian Agora*, vol. 12, *Black and Plain Pottery* (Princeton 1970) 224-226 (with plates).

19.127 σπινθηρίζουσα] For this verb LSJ try to maintain an overly nice distinction between "emit sparks" and "cause the emission of sparks." The real question is what conditions would produce the effect described here. Elsewhere in Greek meteorological theory, sparks are thought of as broken-off bits of bright material; e.g., Anaxag. 59 A 82 (shooting stars are like sparks [σπινθήρων δίκην] carried off from the aither), Metrodoros of Chios 70 A 14 (shooting stars occur when τὴν εἰς τὰ νέφη τοῦ ἡλίου βίαιον ἔμπτωσιν πολλάκις σπινθηρίζειν), schol. in Aristoph. *Pacem* 839 οἱ καόμενοι· οἱ σπινθηρίζοντες, οἱ καλούμενοι διάττοντες, ἐν τῷ λάμπειν τοὺς σπινθῆρας πέμποντες.

19.127 πᾶσα] We follow Wood in taking this with the preceding word; Hort takes it with what follows, although περίπλεως by itself means very full (not that pleonasm is unheard of in texts of all sorts).

19.128 ἴουλοι] A "centipede" (Wood) or, more likely, "millepede" (Hort), as the word indicates something that looks like a piece of wool; see J. Scarborough, "Nicander's toxicology II," *Pharmacy in Hist*. 21 (1979) 18; ibid. "Nicander *Theriaca* 811: A note," *CP* 75 (1980) 138-140; I. C. Beavis, *Insects and other Invertebrates in Classical Antiquity* (Exeter 1988) 13 f. Aratos 959 f. imitates this passage: ἀθρόοι ὤφθεν ἴουλοι | τείχε' ἀνέπτοντες (as a sign of rain). Schol. MA ad loc. describes the animal: ὁ δὲ ἴουλός ἐστι σκώληξ μυρίοις ποσὶ χρώμενος. ὅμοιος ταῖς σκολοπένδραις (millepedes, taken together with ἴουλοι by Arist. *HA* 523b18), ἄλλοι δὲ τὸν σκώληκα τὸν μυρίοις ποσὶ χρώμενον. Cf. schol. ad Ap.Rh. 1.972 (= Th. fr. 374), where Theophrastos is cited for having called the *ioulos* an ὄνος; see also Sharples' n. ad fr. 374.

19.129 δελφίς] The dolphin as a weather sign: Pliny *NH* 18.361 *delphini tranquillo mari lascivientes flatum ex qua veniant parte, item spargentes aquam iidem turbato tranquillitatem*, Cic. *De Div*. 2.70, Artemid. 1.16 (p. 110 Hercher), Lucan 5.552 *incertus qui provocat aequora delphin*.

20

20.131-2 Ὕμηττος ὁ ἐλάττων ... ὁ μέγας] Mt. Hymettos, as the term is normally used, actually comprises two peaks, a higher one at 1027 m above sea level, and a lower one separated from it by a valley (κοίλῳ) at 774 m.

20.131 ἄνυδρος] An area is usually so called because it is without (much) groundwater (e.g., Hes. fr. 128 Ἄργος ἄνυδρον), but here the name may have arisen because prevailing winds might cause rains to drop on the far side of the higher peak, leaving the smaller peak comparatively free of rainfall.

20.131 ⟨ἐν⟩ τῷ κοίλῳ] Hort's conjecture is very likely, even without Bart.'s *in concavitate*. See above, 3.17, on weather signs found in heights and valleys.

20.132 νεφέλιον] That clouds do in fact carry (and hence portend) rain is well known: In Aristophanes' *Clouds* they introduce themselves as παρθένοι ὀμβροφόροι (298), and Strepsiades quotes an anonymous poetic tag, ὄμβρους θ' ὑδάτων δροσερᾶν νεφελᾶν (338). To make this all the more explicit, Sokrates employs a rational argument (μεγάλοις σημείοις) to prove scientifically that it is clouds and not Zeus who (are the source of) rain: ποῦ γὰρ πώποτ' ἄνευ νεφελῶν ὗοντ' ἤδη τεθέασαι; | καίτοι χρῆν αἰθρίας ὗειν αὐτόν [sc. τὸν Δία], ταύτας δ' ἀποδημεῖν (370 f.). As is implicit in this argument, clouds are a necessary but not sufficient condition for rain, so that we still need to know *which* clouds are signs of rain. In this place, the diminutive sense of the word seems pertinent: "small cloud."

20.135 ἰσημερίαν] *Probl.* 26.26 (see just above) assumes that Lips blowing at either equinox produces rain, which is consistent with the language of *DS*.

20.135 λίψ] A rare instance in *DS* of a wind being used as a weather sign. The west-south-west wind; cf. below, 36.257-262; Arist. *Mete*. 364b18, 25, where Lips is said to be moist and airy (i.e., not dense); Th. *Winds* 51 (= Adesp. Eleg. 7 West^2) quotes the first line of an elegiac couplet on this wind's effect on weather: λὶψ ἄνεμος ταχὺ μὲν νεφέλας, ταχὺ δ' αἴθρια ποιεῖ. (For the second line, see below on 35 ἀργέστης) [Arist.] *Probl*. 26.26 (942b25 f.) asks (and then answers) the question, διὰ τί, ἐὰν περὶ ἰσημερίαν λὶψ πνεύσῃ, ὕδωρ γίνεται;

21

21.136 βρονταί] Mention of thunder and lightning right after that of clouds is appropriate, for all are obvious signs of rain; cf. Aristoph. *Clouds* 265 Νεφέλαι βροντησικέραυνοι. Arist. discusses thunder and lightning in *Mete*. 2.9-3.1.

21.136 μᾶλλον ὕδωρ] For thunder and lightning as weather signs, cf. Pliny *NH* 18.354, where varying amounts of thunder and/or lightning are read to predict varying amounts of wind and/or rain — a passage that led Furlanus to insert ⟨ἄνεμον ἢ⟩ before ὕδωρ, but the next sentence (as we read it from V) supports a simple μᾶλλον ὕδωρ.

21.138 ἀστραπαί] These are the flashes of lightning, overlapping in ordinary thought with thunder bolts, κεραυνοί; cf., e.g., Aisch. *Th*. 430 (a description of a shield device) τὰς δ' ἀστραπάς τε καὶ κεραυνίους βολάς, where the artist could not have distinguished flash from bolt. [Arist.] *De Mundo* 395a21-23 explains: τὸ δὲ ἀστράψαν ἀναπυρωθέν, βιαίως ἄχρι τῆς γῆς διεκθέον, κεραυνὸς καλεῖται.

21.138 γε] This is unlikely to be right, as γε is not used elsewhere in *DS*, and in any case ἐάν γε makes no sense here (Denniston 126). τε, with which γε is often confused, although an improvement in sense, is almost equally alien to this work's style, but does appear just below at 22 ἐάν τε πολλά.

21.138 πανταχόθεν] This one word is spelled out by Aratos 933-936 into all the major winds/directions with the addition of the vivid picture of a sailor being surrounded on all sides by these threats of storm:

αὐτὰρ ὅτ' ἐξ εὔροιο καὶ ἐκ νότου ἀστράπτῃσιν,
ἄλλοτε δ' ἐκ ζεφύροιο καὶ ἄλλοτε πὰρ βορέαο,
δὴ τότε τις πελάγει ἔνι δείδιε ναυτίλος ἀνήρ,
μή μιν τῇ μὲν ἔχῃ πέλαγος τῇ δ' ἐκ Διὸς ὕδωρ.

21.139 ᾖ] The ἄν read by many mss. would suggest a mixed condition where the optative is unexpressed, which is possible but not as likely as simple dittography after ἀνέμου.

21.140 ἀκρωρείας] "At the beginning of dawn"; see above, on 2.11 ἀκρόνυχοι. Here and again at 42.306; elsewhere only in late Greek literature: Georg. Mon. *Chronicon Breve* 110.416, where, owing to iotacism, it is spelled -ίας, which is how Schneider (followed by Wimmer) printed it in order to distinguish it from its homonym with the sense "mountain heights." The lexika should accordingly replace ἀκρωρία with ἀκρωρεία (B). Bart. translated *in vertice montis*, but few weather signs depend upon one's being on a mountaintop (however much this location gives a broader view of weather conditions generally; cf. above, c. 4), whereas the time of day is often a factor. "Woher ἀκρωρία [*sic*] stammt, weiss ich nicht," Kaibel *Hermes* 29 (1894) 103, who thought the word ill constructed, since ὥρα does not = "day." But since the period of daylight was often thought of as (δώδεκα) ὧραι (LSJ II 2 b), the word is not so objectionable as Kaibel thinks.

21.140 νότου ... νοτόθεν] Stylistically clumsy, but necessary for clarity's sake. On the signs given by the different winds, cf. Arat. 933 f. (quoted above, on 21.138), Varro Reat. ap. Isid. *DNR* 38.2 *item Varro dicit signum esse tempestatis dum de parte aquilonis fulget et dum de parte euri intonat*, Verg. *G.* 370-373

at Boreae de parte trucis cum fulminat et cum
Eurique Zephyrique tonat domus, omnia plenis
rura natant fossis atque omnis navita ponto
umida vela legit.

Geop. 1.3.3 ἐὰν δέ ποτε μὲν ἐκ νότου, ποτὲ δὲ ἐκ βορέου ἢ εὔρου ἀστραπαὶ φέρωνται, προορατέον ὅτι ἐκεῖθεν μὲν ὄμβρος, ἔνθεν δὲ ἄνεμος ἐπενεχθήσεται. *DS* and Aratos keep all four directions; Varro (as quoted) has only north and east, Vergil drops the south, and the *Geoponika* drops the west.

21.141 ζέφυρος … πρὸς βορείου] We take this phrase to mean "northwest" (although the more precise "westnorthwest" may be meant). This is admittedly odd, but less so than "when the west wind is accompanied by lightning from the north" (Hort), which is certainly a possible observation but not one that would drive a storm toward the observer. Arist. *Pol.* 1290a18 f. says that aristocracy goes with oligarchy the way Zephyros goes with Boreas; i.e., Zephyros is more of a northern than a southern wind.

21.141 ἄνωθεν] Perhaps "*from* on high" (LSJ I 1), with which cf. Thuc. 4.75 ὕδατος ἄνωθεν γενομένου, but as in this case the adverb is unnecessary, simply "on high" (ibid. I 2) may be what is meant; i.e., a reference to cloud-to-cloud lightning that does not reach the ground. (Furlanus and some subsequent editors omit this adverb without comment.)

21.144 ἀστραπαί] "Ad verba βορρᾶθεν ἀστράπτων deest aut nomen venti aut Ζεύς" (Schneider). Conceivably, however, the wind, namely βορέας, was once written before βορρᾶθεν, where some few letters (2-3) were erased in M (and where a somewhat larger space was left in mss. SQ). Cf. above, νότου … νοτόθεν. Bart.'s *coruscationes* led Schneider to alter to ἀστραπαί.

22

22.145 Εὔβοια … μέση] Below, 34.244, this same adjective is applied to Mt. Athos and other mountains, meaning "half-way up" (not "half-way down," which would not allow for the girdle metaphor). Here, as Wood suggests, "Euboia" stands in for its several mountains (e.g., Dirphys, Olympos, Ocha); see M. Cary, *The Geographic Background of Greek & Roman History* (Oxford 1949) 73-75.

22.145 διαζωσθῇ] This verb is often applied to geological features; note esp. Xen. *Mem.* 3.5.25 (Attica) μέση διέζωσται ὄρεσιν ἐρύμνοις. Aratos probably wrote v. 940 (given below) having just read a passage in Eudoxos very similar to this one. For a similar phrase, cf. 34.244. The reading of the codd., διαχωθῇ, "block up," is certainly wrong.

22.145 διὰ ταχέων] The phrase is relative: At Pl. *Apol*. 32d it equals eight months.

22.146 Πήλιον] In southern Magnesia; height 1635 m.

22.147 ἶρις] Rainbows are among the most notable of signs of rain, wind, and storm; in our sources as early as Homer; cf. *Il*. 17.547-549 ἠΰτε πορφυρέην ἶριν θνητοῖσι τανύσσῃ | Ζεὺς ἐξ οὐρανόθεν, τέρας ἔμμεναι ἢ πολέμοιο | ἢ καὶ χειμῶνος δυσθαλπέος, 12.26-28, Schol. ad. *Il*. 23.199 ἡ Ἶρις φανεῖσα πολλάκις ἀνέμων κίνησιν δηλοῖ, Tzetz. *Alleg. Hom*. 15.82 Ἶρις δ' ἐκ πελάγους ἄνεμον φέρει ἢ μέγαν ὄμβρον; Gilbert 605 ff., 11.27 f., 15.82. It is interesting to note that even when the goddess Iris moves from one place to another over water in Homer, she is accompanied by agitated seas; cf. *Il*. 24.77-79, 95 f. Note too Emped. 31 B 50 (= 44 Wr. = 57 Inw.) Ἶρις δ' ἐκ πελάγους ἄνεμον φέρει ἢ μέγαν ὄμβρον. See Gilbert 605 ff. The Souda records an unusual refinement: τῆς ἴριδος … τὸ πυρρὸν πνευμάτων [sc. σημαντικόν]; τὸ δὲ μελανίζον ὑδάτων. Note that in Anaxagoras 59 B 21 the words χειμῶνος … σύμβολον applied to the rainbow have been taken away from Anaxagoras by O. Jöhrens, approb. F. Solmsen, and restored to the scholiast quoting him (approb. Erbse); see Sider ad loc. Since rainbows can appear when moisture is present in the air, they may just as well occur after as before rain showers. The Swiss sources in Hauser *Bauernregeln* 489-491 similarly are of two minds; e.g. "Argt la seira bel'ora veira" along with "Argt la sera fa lera." Pliny *NH* 2.150 denies that rainbows have predictive value (but that was before he compiled the weather signs of book 18).

22.147 ἐπισημαίνει] All editors and translators understand "rain" to be the understood object, but as Lehoux *Parapegmata* 130-137 shows, this verb often appears without an object in weather literature. He argues that it thus means only "There is a change in the weather," but it still seems that in this context it is permissible to understand what specific change is meant. See above, on 10.66. Note how elliptical this paragraph is.

22.147-8 πολλαὶ ἴριδες] Two rainbows can appear at the same time, the second one a paler reflection of the primary one, tracing a larger concentric circle and with its colors in reverse order; but no more than two (οὐδὲ δυοῖν πλείους ἴριδες γίνονται ἅμα, Arist. *Mete*. 371b32 f.; cf.

375b12-15). On rainbows in general see further Arist. *Mete*. 375a30–b15, Gilbert 610. The second-order rainbow occurs when the sun hits water droplets at a 52° angle from the eye to the direction of the sun so that a beam of light is reflected four times within a droplet before being directed to the eye. A fifth reflection is possible, but this would put the third-order rainbow back in the direction of the sun where its inherent faintness would be all but overwhelmed by the brightness of the sun; see Greenler 5-7 with figs. 1-3. Since *DS* says "many" rather than "two," he must mean (ignoring second-order rainbows) that one appears soon after another, which could happen when the sun is frequently cut off by clouds. On the other hand, note Aratos 940 f., Pliny *NH* 18.353 *arcus cum sunt duplices, pluvias nuntiant; a pluviis serenitatem non perinde certam*, which could be used to argue that πολλαί is an error (*multae*, Bart.). Cf. further Arat. 940 ἢ διδύμη ἔζωσε διὰ μέγαν οὐρανὸν Ἶρις, Verg. *G.* 1.380 f. *et bibit ingens | arcus, Geop.* 1.3.5 Ἶρις δὲ διπλῆ φανεῖσα ὄμβρους δηλοῖ, Anon. Laur. 9 Ἶρις ἤγουν τόξον διπλοῦν φανὲν ἐν τῷ οὐρανῷ ὄμβρους δηλοῖ.

22.148 ἐπὶ πολύ] This cannot be one of *DS*'s many terms to indicate likelihood (see above, on 7.46 f. ὡς ἐπὶ τὸ πολύ); more likely it means "for/over a long time"; cf. Thuc. 5.16.2, Λακεδαιμονίοις ἐπὶ πολὺ τάδε θεωροῖς ἀφικνουμένοις, 7.38.1 τῆς δὲ ἡμέρας ἐπὶ πολὺ προσπλέοντες.

22.149 ὀξεῖς] Neither "suddenly" (Hort) nor "burning" (Wood); rather the emphasis is on the brightness of the sun breaking through the clouds (which admittedly may be sudden, but after a rain is not particularly burning); cf. *Il.* 14.345 ὀξύτατον πέλεται φάος εἰσοράασθαι. That the sharpness is relative is shown by *Probl.* 14.13 (910a5-11) (asking why suffocating heat is experienced more in cold than in warm regions) ἢ οὐδέ ἐστι ξηρότερος [ὑγρότερος Ross] ὁ ἀὴρ ἐν τοῖς τόποις τοῖς τοιούτοις, ἀλλὰ φαίνεται παρὰ τὸ ἐναντίον, ὥσπερ ὁ ἐκ νεφέλης ἥλιος παρὰ τὸ ἐκ τῆς σκιᾶς θιγγάνεσθαι;

22.149 νεφῶν] This is the more common Peripatetic word of the two offered by the mss., and is further defended by the preceding plural ἥλιοι.

22.149 μύρμηκες] For this practice (which actually refers to pupae rather than eggs), cf. Arat. 956 f. μύρμηκες ὀχῆς ἓξ ὤεα πάντα | θᾶσσον ἀνηνέγκαντο, Varro Atac. fr. 22.7 Morel-Büchner *nec tenuis formica*

cavis not evehit ova, Verg. *G.* 1.379 f. *saepius et tectis penetralibus extulit ova | angustum formica terens iter*, Pliny *NH* 18.364 *formicae … aut ova progerentes*. A. Platt, "Miscellanea," *CQ* 5 (1911) 255 (adduced by Kidd) points out that "what the ants really carry out … is their pupae, but these are commonly called 'eggs' to this day"; see also Davies-Kathirithamby 43.

Aelian also reports that ants, even though they remain underground, have the ability to know (Hes. *WD* 778 calls the ant ἴδρις) the day of the full moon (*NA* 1.22). And Plutarch *De Sollertia Animalium* 968a (who also refers to the weather sign involving ants' pupae) reports that ants can detect when the grain they have stored is about to germinate under moist conditions (they then eat the germ to prevent germination).

22.149 κοίλῳ] The sense "low place" is determined from the following ὑψηλόν; cf. *Od*. 4.1 κοίλην Λακεδαίμονα, since Sparta is hemmed in by mountains.

22.151 παρήλιοι] Suns alongside the sun: i.e., "mock suns" (or "sun dogs") caused when suspended flat hexagonal ice crystals, which tend to float with their flat surface horizontal, refract light 22° to either or both sides of the sun (north and/or south) at either sunrise or sunset; see Greenler 27, Arist. *Mete*. 372a10-21, Arat. 880-891:

σκέπτεο δ' ἢ ἀνιόντος ἢ αὐτίκα δυομένοιο
εἴ που οἱ νεφέων τὰ παρήλια κικλήσκονται
ἢ νότου ἠὲ βορῆος ἐρεύθεται ἢ ἑκάτερθε,
μηδ' οὕτω σκοπιὴν ταύτην ἀμενηνὰ φυλάσσειν.
οὐ γάρ, ὅτ' ἀμφοτέρωθεν ὁμοῦ περὶ μέσσον ἔχωσιν
ἠέλιον κεῖναι νεφέλαι σχεδὸν ὠκεανοῖο,
γίνεται ἀμβολίη Διόθεν χειμῶνος ἰόντος·
εἴ γε μὲν ἐκ βορέαο μί' οἵη φοινίσσοιτο,
ἐκ βορέω πνοιάς κε φέροι, νοτίη δὲ νότοιο,
ἢ καί που ῥαθάμιγγες ἐπιτροχόωσ' ὑετοῖο.
ἑσπερίοις καὶ μᾶλλον ἐπίτρεπε σήμασι τούτοις·
ἑσπερόθεν γὰρ ὁμῶς σημαίνετον ἐμμενὲς αἰεί.

Poseidonios fr. 121 E-K and Ptolemy *Tetr*. 2.14.2 call them νέφη. See further Gilbert 617 f. and below, 29.204. Anaxagoras deserves credit for recognizing that their origin is similar to that of rainbows: παραπλησίως δὲ (sc. τῇ ἴριδι) αἰτιολογεῖται τὰ καλούμενα παρήλια (Aët. 3.5.11 = Anaxag. 59 A 86, where his explanation of s may be found).

22.152 ἅλως] Arist. *Mete*. 372b22, and on halos in general, *Mete*. 3.2. Aristotle's nom. plural is ἅλῳ, but Demosth. 42.6 uses ἅλως also. Arist. loc. cit. 372b16-34 regards halos as a weather sign, and it is instructive to compare his attempts always to understand why this is so with the more sterile statements in *DS*: γίγνεται μὲν οὖν ἡ ἀνάκλασις τῆς ὄψεως συνισταμένου τοῦ ἀέρος καὶ τῆς ἀτμίδος εἰς νέφος, ἐὰν ὁμαλὴς καὶ μικρομερὴς συνισταμένη τύχῃ. διὸ καὶ σημεῖον ἡ μὲν σύστασις ὕδατός ἐστιν, αἱ μέντοι διασπάσεις ἢ μαράνσεις, αὗται μὲν εὐδιῶν, αἱ δὲ διασπάσεις πνευμάτων. ἐὰν μὲν γὰρ μήτε καταμαρανθῇ μήτε διασπασθῇ, ἀλλ' ἐαθῇ τὴν φύσιν ἀπολαμβάνειν τὴν αὐτῆς, ὕδατος εἰκότως σημεῖόν ἐστι, δηλοῖ γὰρ ἤδη γίγνεσθαι τοιαύτην τὴν σύστασιν, ἐξ ἧς τὸ συνεχὲς λαμβανούσης τῆς πυκνώσεως ἀναγκαῖον εἰς ὕδωρ ἐλθεῖν. διὸ καὶ μέλαιναι γίγνονται τὴν χρόαν αὗται μάλιστα τῶν ἄλλων. ὅταν δὲ διασπαθῇ, πνεύματος σημεῖον. ἡ γὰρ διαίρεσις ὑπὸ πνεύματος γέγονεν ἤδη μὲν ὄντος, οὔπω δὲ παρόντος. σημεῖον δὲ τούτου διότι ἐντεῦθεν γίγνεται ὁ ἄνεμος, ὅθεν ἂν ἡ κυρία γίγνηται διάσπασις ἀπομαραινομένη δὲ εὐδίας· εἰ γὰρ μὴ ἔχει πως οὕτως ὁ ἀὴρ ὥστε κρατεῖν τοῦ ἐναπολαμβανομένου θερμοῦ μηδ' ἔρχεσθαι εἰς πύκνωσιν ὑδατώδη, δῆλον ὡς οὔπω ἡ ἀτμὶς ἀποκέκριται τῆς ἀναθυμιάσεως τῆς ξηρᾶς καὶ πυρώδους· τοῦτο δὲ εὐδίας αἴτιον. ("The reflection of our vision takes place when the air and vapor are condensed into cloud, if the condensation is uniform and its constituent particles small. This formation is therefore a sign of rain, while if it is broken it is a sign of wind; if it fades, of fine weather. For if it neither fades nor breaks, but is allowed to reach its full development, it is reasonable to regard it as a sign of rain, since it shows that a condensation is taking place of the kind, which, if the condensing process continues, will necessarily lead to rain. And for this reason these halos are the darkest of all in color. But when it is broken it is a sign of wind; for its break up is due to a wind that is already in being but has not yet arrived. An indication that this is so is that the wind springs from the quarter in which the main break occurs. When it fades it is a sign of fine weather. For if the air is not yet in a state to overcome the heat contained in it and to develop into a watery condensation, it is clear that the vapor has not yet separated from the dry and fiery exhalation which causes fine weather.") On halos, see Gilbert 600-604, Greenler 22-26, Taub *Ancient Meteorology* 97, and below, 31.219, 51.372.

22.152 ἅμα] A halo is seen when ice crystals of varying shapes reflect (with some refraction) the sun in a circle at 22° from a line from the eye to the sun. But when the flat crystals that produce a mock sun begin to predominate the halo will shine brighter at the same height as the sun to the north and south (as described above), so that mock suns seem superimposed on the halo. See Greenler, pl. 2-3.

22.153 μέλαιναι] As Arist. *Mete*. 372b24 f. says, when the air is thick with water (and hence a sign of rain), the halo appears black, or at any rate, darker than the air around it; see V. J. Bruno, *Form and Color in Greek Painting* (NY 1977) 83-85 (building on earlier work by Platnauer).

23

23.155-6 Ὄνοι ... Φάτνη] This condition is repeated at 43.319 f.; its converse is given at 51.370. Aratos 892-908 discusses the Manger and Asses as weather signs; note esp. 903 f. εἰ δὲ μελαίνηται, τοὶ δ' αὐτίκα ἐοικότες ὦσιν | ἀστέρες ἀμφότεροι, περὶ χ' ὕδατι σημαίνοιεν, Theokr. 22.21 ἐκ δ' Ἄρκτοι τ' ἐφάνησαν Ὄνων τ' ἀνὰ μέσσον ἀμαυρή | Φάτνη, σημαίνουσα τὰ πρὸς πλόον εὔδια πάντα, Pliny *NH* 18.353 *sunt in signo Cancri duae stellae parvae Aselli appellatae, exiguum inter illas spatium obtinente nubecula, quam Praesepia appellant; haec cum caelo sereno apparere desiit, atrox hiems sequitur; si vero alteram earum aquiloniam caligo abstulit, auster saevit, si austrinam, aquilo*, Ptol. *Tetrab*. 2.102, Nonnos 1.459. Note also that *P.Vind.* gr. 1, a collection of weather signs, contains a title [τὰ ἐκ το]ῦ Φατνίου σημεῖα, below which all that can be read is [τὸ νε]φέλιον τὸ ἐγ [τοῖς ὄν]ρις (fr. 1, col. 1.18 f.); for the text (originally published by Wessely) see O. Neugebauer, "Über griechische Wetterzeichen und Schattentafeln," *Sitzungsb. d. Österr. Akademie d. Wissensch., phil.-hist. Kl.* 240 (1962) 29-39; see also G. Arrighetti, "Problemi di letteratura meteorologica greca," *Maia* 15 (1963) 411 f. In addition to Kidd on Aratos, see Gow and Sens on Theokr. ad loc. (A. Sens, *Theocritus: Dioscuri (Idyll 22*) [Göttingen 1997].) And on the varying brightness of fixed stars in general as weather signs, see Böker 1631-33, F. Boll, "Fixsterne," *RE* 6 (1909) 2429.

23.155-6 τὸ μεταξὺ τὸ νεφέλιον] The grammar is correct but unexpected. Perhaps τὸ μεταξύ is an intrusive gloss.

23.156 τοῦτο] Sc. τὸ νεφέλιον. As the Pliny and Aratos passages (previous lemma) make clear, the reference here is only to the nebula, the Asses remaining clear.

23.157 ἐπὶ Ἀρκτούρου] Although both the heliacal rising of Arktouros in September and its cosmical setting in March were regularly (with or without the presence of rain just then) taken as signs of stormy weather (*vehemens sum exoriens, quom occido vehementior* says Arcturus himself in Plautus *Rudens* 71), the phrase "at (the time of) Arcturus" (whether with ἐπί or περί; see Kidd on Aratos 745) refers only to the September rising, ca. 12 days before the fall equinox. Cf. Aratos 744-747

> καὶ μέν τις καὶ νηὶ πολυκλύστου χειμῶνος
> ἐφράσατ' ἢ δεινοῦ μεμνημένος Ἀρκτούροιο
> ἠέ τεων ἄλλων, οἵ τ' ὠκεανοῦ ἀρύονται
> ἀστέρες ἀμφιλύκης, οἵ τε πρώτης ἔτι νυκτός.

23.157-8 ἐὰν μὴ—ἢ ἄνεμος] One of the few statements in *DS* that reads like an entry in a parapegma; see further below, on 30.206 ἡ πέμπτη κτλ.

23.158 δημόσιον ... λεγόμενον] Although no parallel can now be found among the collected Greek proverbs.

23.159 μυίας] Cf. Aratos 975 δάκνωσιν μυῖαι, *Geop*. 1.39, Anon. Laur. 11.48. Hence μυας, the reading of the M tradition, has to be understood as an example of monophthongization (μύας), which begins in the classical period (most notably in υἱός) rather than as a lexical variant "mice" (μῦας); on the phonology, see Threatte, *Grammar of Attic Inscriptions* 1.338-344. Moreover, mice in Greek seem always, even when explicitly female, to be modified with masculine articles, adjectives, etc. (see LSJ s.v. μῦς), and then the likelihood of flies biting seems more in line with the other signs given, whereas biting mice must have been rather a rare occurrence.

23.160 σπίνος] Essentially a repetition from 19.126.

24

24.162 τῆς δὲ νυκτός] The reading of most mss., τῆσδε τῆς ν., could stand if we thought that this sentence had been crudely transcribed from another context. But it should also be noted that the simple article before "night" is also odd, a mere νυκτός (or νύκτωρ) usually sufficing for the sense "at night."

24.162 τὸν Ὕμηττον] Mt. Hymettos, to the south-east of Athens, is visible from much of the ancient city.

24.163-4 μετρίων ἡμερῶν] "A few days" (Wood and Hort); see above on 17.117 μέτριοι.

24.164 τοῦ Διὸς τοῦ Ἑλλανίου] Note that no word for temple area, mountain, altar, or building appears (although Hort translates "on the temple of Zeus"); cf. Pindar *Nem.* 5.10 f. (for Pytheas of Aigina) πὰρ βωμὸν πατέρος Ἑλλανίου στάντες, *Paian* 6. 125 f. (Aigina =) Διὸς Ἑλλανίου φαεννὸν ἄστρον. As Pausanias tells the story, Zeus received the epiklesis (Pan) Hellenios when Aiakos (Achilles' grandfather) successfully prayed to him for rain over all of Greece (2.29.6). In 2.30.3 Pausanias locates the mountain of Zeus Panhellenios as that where the (still impressive) temple of Artemis Aphaia is located. See further H. Schwabel, "Zeus I. Epiklesen," *RE* 10A (1972) 303; Jessen "Hellenios (I)," ibid. 8 (1912) 176 f.; A. B. Cook, *Zeus* 2.2 (Cambridge 1925) 894 f., 3 (1941) 1164 f. As Wood notes, this hilltop could be seen from the higher elevations in Athens (and still can on those days when pollution levels are low enough). J. Morton, *The Role of the Physical Environment in Anc. Gk. Seafaring* (Leiden 2001), 290 n. 9, reports that local fishermen told him they still believe a cloud over the peak of Aigina was a sign of rain.

24.165-6 ἐὰν ὕδατα ... αὐχμηρόν] *Probl.* 1.9 wonders why it is "That, if the winter is characterized by south winds and rainy and if the spring is dry with the wind in the north, both the spring and the summer are unhealthy," but does not posit a causal link between rainy winters and dry springs.

24.167 χιόνες πολλαί] The sense (not recognized by LSJ) being "many snowfalls" although Hort's "much snow" adequately conveys the sense. Cf. [Arist.] *De Mundo* 394a16 νέφη τε καὶ ὄμβροι καὶ χιόνες καὶ χάλαζαι. Th. *CP* 2.1.2 explains why a lot of snow (χιόνος πλῆθος) is good for trees' producing fruit the next season, but does not regard the snow as a weather sign.

25

25.169 ἄνθρακι λαμπρῷ] This conjecture "coal" (ἄνθραξι iam Schneider) is strongly indicated by Aratos 1041 f. ἄνθρακι δὲ ζώοντι χαλάζης, ὁππότε λαμπρὸς αὐτὸς ἐείδηται, i.e., "in live charcoal there are signs of hail, when the coal itself is seen to be bright" (Kidd). And for the dative λαμπρῷ rather than the nominative λαμπρά given by the mss., cf. Aratos loc. cit., Bart. *si in stella lucenti grando supervideatur.* The dative also tells us that the coals have been ignited; cf. Thuc. 4.100 ἄνθρακας ἡμμένους. The singular ἄνθρακι rather than Schneider's plural seems marginally easier paleographically (an early majuscule misreading), as well as being supported by Aratos (which admittedly could just be a poetic sg. for pl.) and Bart. In general, prose usage calls for the plural, but cf. Th. *Sens.* 75 τὸν ἄνθρακα τῶν χλωρῶν ξύλων ἢ τῶν αὔων.

This and the next sign are read in domestic fires, a number of which signs are collected by Pliny *NH* 18.357 f. *Ab his terreni ignes proxime significant. pallidi namque murmurantesque tempestatum nuntii sentiuntur, pluviae etiam si in lucernis fungi, si flexuose volitet flamma. ventum nuntiant lumina cum ex sese flammas elidunt aut vix accenduntur; item cum in aeno pendente scintillae coacervantur, vel cum tollentibus ollas carbo adhaerescit, aut cum contectus ignis e se favillam discutit scintillamve emittit, vel cum cinis in foco concrescit et cum carbo vehementer perlucet.*

25.169 χάλαζα] For the various ancient theories concerning the way water freezes to form hail, see Gilbert 503-510; and cf. below, 36.257 f., 56.407-09, and Aratos 1041 f., quoted in the preceding lemma. Hail could be particularly destructive to crops. Th. *CP* 5.8.2-3 uses the words χαλαζοκοπία and χαλαζοκοπέω to describe its force. Even trees not killed off as a result of hail be open to disease later (Th. *HP* 4.14.1). On hail in general, see McCartney *CW* 28 (1938) 1-7.

25.170 προσημαίνειν] Conceivably the 3 sg. is what the author carelessly wrote, the subject being the action of the preceding clause, as often. This complex of the far more usual σημαίνειν occurs twice more in *DS*, at 31 and 52. Since the prefix adds nothing to the meaning (all weather signs are meant to give prior warning), it may be that all three instances were taken from a common source, which would have been a comprehensive one, since the three signs ("hail" seen in lamp, mountain, owl) and the three events (hail, wind, fair weather) have nothing in common.

25.172-3 ἄμεινον ... ζῳοις] A statement of this sort, with the explanatory next sentence, belongs more to Th.'s scientific works on plants, where, e.g., he says that plants suffer less rot (rust) if they are exposed to wind (*HP* 8.10.2), and that plants can be destroyed by violent winds (3).

Or, closer to what we have here, see *CP* 2.1.5-3.3, where north wind and rain are said to be better than those from the south for many reasons, not one of them the reason given here. Similarly, Hipp. *Sacred Disease* 16 contrasts the salubrious north wind with the harmful effects of the south wind.

25.172-3 ἄμεινον πρῶτον ... βόρειον ... νοτίου] Literally, "north first is better than south (first)," which is clear enough, however awkward. Heeger 38 should not have thought about expelling πρῶτον.

25.173 φυομένοις] "growing things," but in this context, clearly in the more particular sense "plants" (and so rendered by all translators), although LSJ give no hint that φυόμενα was used this way. This is, however, regular Aristotelian usage: *De Anim*. 543a25, *GA* 731a8, *HA* 543b24, etc.

25.173 δέ] = γάρ, as often; see W. Headlam, *On Editing Aeschylus* (London 1891) 119 f., M. L. West, *Textual Criticism and Editorial Technique* (Stuttgart 1973) 23; Denniston, *GP* 23; Sider, *Anaxagoras*[2] (Sankt Augustin 2005) 119 f.

25.174 γευομένοις] Although one ms. (S) has γενομένοις a.c., this same error in Furlanus's Greek text (although he translates *gustantibus*, as did Bart.) was copied by Heinsius and Schneider, who then changed his mind and urged γευομένοις. Hence the erroneous statement in

Wimmer crediting Schneider with this "correction." Rain from the south (in Greece) tastes of the sea, which could be bad for plants unaccustomed to salt build-up.

25.174-5 τὸ ἔτος—κρεῖττον] V's Greek is straightforward; that of the other codd. is wretched, reading more like a marginal gloss that got mangled when inserted into the text. A "northern season" is one in which northern winds prevail. Usually the adjective in this sense (LSJ s.v. 2) is applied to individual seasons. Note in particular Hipp. *Aer.* 10, where the seasons and the year are examined ὁκοῖόν τι μέλλει ἔσεσθαι τὸ ἔτος, εἴτε νοσηρὸν εἴτε ὑγιηρόν· ἢν μὲν γὰρ κατὰ λόγον γένηται τὰ σημεῖα ἐπὶ τοῖσι ἄστροισι δύνουσί τε καὶ ἐπιτέλλουσιν … οὕτω τὸ ἔτος ὑγιεινότατον εἰκὸς εἶναι. Note how here and elsewhere in Greek literature on weather lore, ἔτος is to be understood as "season" rather than, as all the lexika say, as "year." And we should understand "seasons not only [as] the larger divisions of the year … , but also [as] smaller divisions which might perhaps be called seasonal points; for instance the times of cherry blossoming and hop-picking are also seasons"; M. P. Nilsson, *Primitive Time Reckoning* [Lund 1920] 46; cf. also 51-54. As Nilsson points out later (86), these seasons, large and small, are older than the idea of the (solar) year. Outside of weather literature, note Theokr. 7.85 ἔτος ὥριον = the seasonable part of the year, i.e., "spring" (with Gow's n. ad loc.) and Philetas fr. 3 Powell ἐκ Διὸς ὡραίων ἐρχομένων ἐτέων. Similarly, when Pliny *NH* 18.226 talks of the farmer's ability to predict the *anni temperies*, which comes *alibi tardius alibi maturius*, he looks forward only to the next season; cf. Arruntius *Hist.* 5 *totus hiemavit annus*, and in general OLD s.v. *annus* 7, which recognizes this use in Latin. See further C. J. Emlyn-Jones, "ἔτος and ἐνιαυτός in Homeric formulae," *Glotta* 45 (1967) 156-161; R. S. P. Beekes, ibid. 47 (1969) 138 ff.

25.175 ὑγιεινότερον] On climate and health in *DS*, see on 54.397 νοσῶδες.

25.175 ὀχεύωσι] Schneider, followed by Wimmer, read the middle, which can refer to both male and female (cf. Hdt. 2.64.2), but our author may have been thinking only of the activity of the males: cf. Arist. *HA* 574a12-15 τῶν δὲ προβάτων ἐὰν μὲν τὰ πρεσβύτερα ὁρμᾷ πρὸς τὴν ὀχείαν κατὰ τὴν τεταγμένην ὥραν, φασὶν οἱ ποιμένες σημεῖον εὐετη-

ρίας εἶναι τοῖς προβάτοις, ἐὰν δὲ τὰ νεώτερα, κακοθηνεῖν τὰ πρόβατα, Ael. *NA* 7.8 ἀναβαινόμενα δὲ τὰ αὐτὰ [i.e., πρόβατα] πρωὶ πρώιον χειμῶνα ὁμολογεῖ. Schneider also inserted πάλιν before this word to provide some more sense ("when sheep or goats have a second breeding season," Hort), and this or something like it may well have dropped out; perhaps ⟨μᾶλλον⟩ as in 39.280 χῆνες βοῶντες μᾶλλον. Cf. Aratos 1068-74

> θήλειαι δὲ σύες, θήλεια δὲ μῆλα καὶ αἶγες
> ὁππότ' ἀναστρωφῶσιν ὀχῆς, τὰ δέ γ' ἄρσεσι πάντα
> δεξάμεναι πάλιν αὖτις ἀναβλήδην ὀχέωνται, 1070
> αὐτώς κε σφήκεσσι μέγαν χειμῶνα λέγοιεν.
> ὀψὲ δὲ μισγομένων αἰγῶν μήλων τε συῶν τε
> χαίρει ἄνολβος ἀνήρ, ὅ οἱ οὐ μάλα θαλπιόωντι
> εὔδιον φαίνουσι βιβαιόμεναι ἐνιαυτόν.

Cf. *Geop*. 1.4.2 καὶ αἶγες καὶ οἷες ὀχευθεῖσαι, καὶ πάλιν ὀχεύεσθαι βουλόμεναι μακρότερον σημαίνουσι χειμῶνα; sim. Anon. Laur. 11.5 (ὗες for οἷες). Arist. *HA* 575b17-19 records that cows too were included in this sign: ὅταν δὲ πολλαὶ κύωσι καὶ προσδέχωνται τὴν ὀχείαν, σφόδρα δοκεῖ σημεῖον εἶναι καὶ χειμῶνος καὶ ἐπομβρίας. (And Ael. *NA* 7.8 says that when goats rush from their pens to their fodder it is a sign of rain.)

26

26.178 ἀνέμων δέ] καὶ πνευμάτων add. plerique, which mixes singular and plural. V's ἀνέμων seems preferable. Moreover, that the same hand in M wrote περὶ σημείων ἀνέμων in marg. suggests that ἀνέμων was in an ancestor of M. Th. *Winds* 36 Cortant and Eichenlaub associates winds with other meteorological observations, some of which occur beforehand (and hence, it is implicit, can be used as weather signs): κοινὰ δὲ καὶ τὰ τοιαῦτα πλειόνων, οἷον ἀστέρων τε καὶ ⟨σελήνης⟩ καὶ ἅλων καὶ παρηλίων φάσις καὶ ἀπομάρανσις ἢ ῥῆξις, καὶ εἴ τι τοιοῦθ' ἕτερον. πρότερον γὰρ ὁ ἀὴρ ὁ ἄνω τῷ πάσχειν ἀποδηλοῖ τὴν τῶν πνευμάτων φύσιν.

26.178 ἀνατέλλων ὁ ἥλιος] Contrast Pliny *NH* 18.342 *purus oriens atque non fervens serenum diem nuntiat.* There was general recognition that the sun is a factor in the production of winds: ὁ δ' ἥλιος καὶ παύει καὶ συνεξορμᾷ τὰ πνεύματα (Arist. *Mete*. 361b24); see also *Probl*. 26.34

(944a25) διὰ τί αἰρομένου τοῦ ἡλίου καὶ αὐξάνεται καὶ πίπτει τὰ πνεύματα; Th. *Winds* 16-18.

26.178 καί] The κἂν of the other codd. would have to mean "even if," which is contrary to the sense required here. A simple "and" is all that is required.

26.179 κοῖλος] This may be a reference to a corona close to the sun; and since coronas are formed from the diffraction through suspended water crystals this could indeed be a sign of upcoming rain (Greenler 140 f.) Note that the ancients did not distinguish, as modern science does (Greenler 139), between "corona" and "halo" (Lat. *corona* is expressly stated to be the translation of ἅλως by Seneca *NQ* 1.2.1: *hunc Graeci halo vocant, nos dicere coronam aptissime possumus.*) More likely, perhaps, the sun penetrating misty air illuminates the air immediately around its circumference, so that while the sun would appear dimmer the brighter circular cloud pattern can be taken as the ring of the sun itself. This is known a "watery sun"; see Kahl 61 (with photo). This ring too would be called a halo by the Greeks. Cf. Schol. on Aratos 811 (a passage describing lunar halos) ὅταν τοίνυν περί τι ἄστρον νέφη συστῇ συνεχῆ καὶ κοῖλα, ἐνσταθῇ δὲ ὁ ἀὴρ ἐπὶ ταῦτα, εἶτα ἀνάκλασιν σχῇ εἰς αὐτὸ τὸ ἄστρον, ἐμφαίνεται τοῦτο καθ' ἑκάστην ἀνάκλασιν, καὶ οὕτως ἡ ἅλως ἀποτελεῖται. Here it is the cloud that is said to be hollow, but another observer of the same phenomenon could understandably attribute the hollowness to the sun. Cf. also Varro Reat. ap. Isid. *DNR* 38.4 *sol si exoriens concavus videtur, ita ut e medio fulgeat et radios faciat partim ad aquilonem, partim ad austrum, tempestatem humidam et vernosam futuram innuit*, Lucan 5.544 *orbe quoque exhaustus* [sc. *sol*] *medio languensque recessit*, Pliny *NH* 18.344 *si nubes solem cicumcludent, quanto minus luminis relinquent tanto turbidior tempestas erit*. Since Aratos' word is ἀλωαί, Gilbert 601 n. 2 thinks that he is here distinguishing between *diffuse Lichtkreise* and coronas and halos (*Lichtkränze oder Lichtringe … in grösserer Entfernung*), but Kidd is no doubt correct to take this Greek word as simply an epicizing form of ἅλωες. Cf. further Aratos 828 (weather will not be fair) ὁππότε κοῖλος ἐειδόμενος περιτέλλῃ (sc. the sun), Ptol. *Tetr.* 2.14.2 ὡς ἐφ' ἑαυτὸν κοιλούμενος, Verg. *G.* 1.442 *conditus in nubem medioque refugerit orbe*.

26.181-2 ἀκτῖνες … σχίζωνται] The Greek here, although inelegant, suggests crepuscular rays, which are often seen at dawn or evening radiating from the sun behind low-lying stratocumulus clouds, which are moisture laden and hence dark but also irregular enough to allow the sun to shine through in places, more often downwards than upwards; see Greenler 129-131; Kahl 65. In English these rays are said to "draw up water." Stratocumulus clouds are not themselves turbulent (cf. Pliny, quoted below), but are often seen before and after storms. Cf. Aratos 829-31 (continuing the passage given just above; i.e., weather will not be fair)

οὐδ' ὁπότ' ἀκτίνων αἱ μὲν νότον αἱ δὲ βορῆα
σχιζόμεναι βάλλωσι, τὰ δ' αὖ πέρι μέσσα φαείνῃ
ἀλλά που ἢ ὑετοῖο διέρχεται ἢ ἀνέμοιο.

Pliny *NH* 18.343 *si in exortu spargentur partim ad austrum partim ad aquilonem, pura circa eum serenitas sit licet, pluviam tamen ventosque significabunt*, Verg. *G.* 1.445 f. *aut ubi sub lucem densa inter nubila sese | diversi rumpent radii*, Lucan 5.541-543 *nam sol non … | concordesque tulit radios: Noton altera Phoebi, | altera pars Borean diducta luce vocabat*, Anon. Laur. 2.6 ἐὰν ἀνίσχοντος τοῦ ἡλίου ἀκτῖνες πρὸς βορὰν ἢ πρὸς νότον ἀποτείνωσι, τά τε περὶ τὸν ἥλιον καθαρὰ ᾖ, ὕδωρ καὶ ἄνεμον προσδέχεσθαι χρή.

27

27.184-5 ἡλίῳ … ἐρυθρά] This compendious phrase would seem to cover either body marked by either color. But are the *semeia* of the same sort? The fuller description in Aratos suggests that at times they are overall coloring and at other times red or black spots. Of the moon he says

πάντη γὰρ καθαρῇ κε μάλ' εὔδια τεκμήραιο,
πάντα δ' ἐρευθομένῃ δοκέειν ἀνέμοιο κελεύθους,
ἄλλοθι δ' ἄλλο μελαινομένῃ δοκέειν ὑετοῖο. (802-4)

And of the sun,

μή οἱ ποικίλλοιτο νέον βάλλοντος ἀρούρας
κύκλος, ὅτ' εὐδίου κεχρημένος ἥματος εἴης,
μηδέ τι σῆμα φέροι, φαίνοιτο δὲ λιτὸς ἁπάντη. (822-5)
… .
σκέπτεο …

εἴ τί που ἢ οἱ ἔρευθος ἐπιτρέχει, οἷά τε πολλὰ
ἑλκομένων νεφέων ἐρυθαίνεται ἄλλοθεν ἄλλα, 835
ἢ εἴ που μελανεῖ· καί τοι τὰ μὲν ὕδατος ἔστω
σήματα μέλλοντος, τὰ δ' ἐρευθέα πάντ' ἀνέμοιο. (832-7)

Ptolemy *Tetrab.* 2.14, also for purposes of predicting the weather, distinguishes between clear, reddish, and mottled appearances of the sun and moon. The mottled appearance of the sun is not due to sunspots, which are not easily seen by the naked eye, but rather to the imposition of clouds dark enough to stand up to the powerful rays of the sun, at least at sunrise and sunset. Cf. Verg. *G.* 1.441 f. *ille* (sc. *sol*) *ubi nascentem maculis variaverit ortum* | *conditus in nubem.* We regard M's complicated sentence the lectio difficilior, which was simplified by V, whose σημαντικά probably arose as a marginal gloss. For this word, see below, on 30.210 σημεῖον.

27.184-5 τὰ μὲν μέλανα ὕδατος, τὰ δ' ἐρυθρὰ πνεύματος] Cf. Varro Reat. ap. Pliny *NH* 18.348 (of the moon alone) *si rutila, ventos; nigrescens imbres.*

27.185 ἐὰν δὲ ὁ μήν] To judge from Fifth- and Fourth-century inscriptions, Attic used this form of the nominative rather than μείς (*IG* I^3 402.14, 15, 17, 22; 403 Bb.65; II^2 1369.24), and in the two senses found here, both "month" and "crescent(-shaped object)." Since, moreover, no other passage displays both μήν and μείς, V's text seems preferable. Two minor problems remain, (i) what seems to be a μέν solitarium and (ii) μείς = "month" in the next sentence, but both can be explained if we consider the ὅταν μέν … ὅταν δέ clauses as later insertions (quite possibly by the original compiler in a cut-and-paste mode, rather than by a later redactor), so that the ἐὰν μέν clause looks forward to ἐὰν δέ, which was misunderstood by a later redactor, who altered the beginning of the sentence while at the same time altering μήν to μείς. (Note that the second μήν of this sentence was altered to μείς in cod. B.)

In general the shape of a crescent moon was assessed for its predictive value; cf. above, c. 12, and Aratos 778-798 σκέπτεο δὲ πρῶτον κεράων ἑκάτερθε σελήνην κτλ, McCartney, *CW* 22 (1928) 33 f. Points to be noted are whether the horns are blunted, what color the moon seems to be, and what whether the horns lean forward or incline backward, and on what day of the month these signs are sighted. On the particular observation made here about the uprightness of the crescent moon, note 790-793

ἀλλ' ὀρθαὶ ἑκάτερθε περιγνάμπτωσι κεραῖαι,
ἑσπέριοί κ' ἄνεμοι κείνην μετὰ νύκτα φέροιντο.
εἰ δ' αὕτως ὀρθὴ καὶ τέτρατον ἦμαρ ἀγινεῖ,
ἦ τ' ἂν χειμῶνος συναγειρομένοιο διδάσκοι.

There are, however, two significant points of differences between *DS* and Aratos. First, the former's positing a northern wind as one of the conditions is lacking in the latter (and unparalleled elsewhere); second, whereas *DS*, since it does not specify whether the crescent moon in question begins or ends the month, would seem willing to predict the stormy nature of the month from a sign that could occur at its beginning, Aratos on the other hand more cautiously specifies that σήματα δ' οὔ τοι πᾶσιν ἐπ' ἤμασι πάντα τέτυκται (805), but that "Those that occur on the third and fourth days are valid up to the half-moon," etc. (tr. Kidd). It would seem likely, therefore that *DS*'s βορείου ὄντος is an error for something like τρίτῳ φθίνοντος. (βορείου, sc. ἀνέμου, however, though unusual, can stand; cf. e.g. Xen. *Cyn*. 8.1, Arat. 795, 907.) Thus, *DS*'s prediction for the rest of the month can be thought more reasonable, and it is paralleled in Varro (see below). For some parallel predictions in English made from the position of the crescent moon, see Marriott 207 f.

27.185 εἱστήκῃ] This augmented subjunctive is slightly supported by IG I^3 476.177 εἱστηκότα; see Threatte 2.501, who also adduces καθηστηκώς as a possible parallel, but the only literary parallels to turn up on the TLG disk are Jo. Chrys. *Adv. Iud*. 48.852, id. *Mut. Nom*. 51.145, but this may mean only that instances in earlier (and more "carefully") edited authors have been emended away.

27.186 ζέφυροι εἰώθασιν ἐπιπνεῖν καὶ ὁ μὴν χειμερινὸς διατελεῖ] This same pair, here both results, occurs as cause and result in Varro Reat. ap. Pliny *NH* 18.349 *si ante quartam non apparuerit* [sc. *luna*] *vento favonio flante, hiemalis toto mense erit*.

27.187 κεραία] ⟨ἡ ἄνω⟩ seems to be a reasonable insertion, given the corresponding δέ clause, but it is not really necessary; cf. Aratos 788 f. (immediately preceding the lines quoted in the last lemma) εἰ δέ κ' ἀπ' ἀμφοτέρων κεράων τρίτον ἦμαρ ἄγουσα | μήτ' ἐπινευστάζῃ μήθ' ὑπτιόωσα φαείνῃ, where it is assumed that the leaning forward or back is that of the upper horn. On the other hand, just below, in a similar passage, Aratos specifies the upper horn (794 f. τὸ μετήορον).

27.188-9 ἐὰν δ' ὀρθός—διχομηνίας] Cf. Varro Reat. ap. Pliny *NH* 18.348 *si quarto die luna erit directa, magnam tempestatem in mari praesagiet, nisi si coronam circa se habebit et eam sinceram, quoniam illo modo non ante plenam lunam hiematurum ostendit.*

27.188-9 μὴ καλῶς ἐγκεκλιμένος ... καὶ εὔκυκλος] This oddly phrased esthetic description seems to describe a crescent-shaped moon where the ends of the horns extend past a diameter. Cf. the slightly fuller description in Aratos 796 τριτόωσαν ὅλος περὶ κύκλος ἑλίσσῃ. Since, eclipses aside, the shapes formed by the illuminated moon are regular from month to month, the full or nearly full circle of the moon must, as Kidd ad loc. plausibly argues, refer to "earth shine," "when the lunar crescent is slender" and "The outline of the dark part is faintly visible." As Kidd also shows, the scholia to Aratos offer misguided interpretations. One, e.g., explains the phenomenon in question as if it were the lunar equivalent to a watery sun (see above), which perhaps could obtain during a full moon, not (and certainly not exclusively) on the third day of the lunar cycle.

28

28.191 αἴθυιαι καὶ νῆτται] Contrast 18.120, a tame flapping duck under the eaves signals rain. αἴθυιαι are usually taken to be shearwaters of some sort, but Pliny's translating this word as *mergi* (see below) allows for the possibility that they are rather to taken as cormorants; see W. G. Arnott, "Notes on *gavia* and *mergi* in Latin authors," *CQ* 14 (1964) 249-262, who, although noting that "nothing in ancient Greek literature about αἴθυια actually prevents its identification as a cormorant or shag" [a smaller variety of cormorant] (254), but is hesitant to do so, since Aristotle elsewhere calls the cormorant κόραξ. Shearwaters are great divers; cf. Apoll. Rh. 4.966, Aratos 296 κολυμβίσιν αἰθυίῃσι. For these two birds as sign of bad weather, cf. Arist. fr. 270.21 Gi. (Ael. *NA* 7.7) νῆτται δὲ καὶ αἴθυιαι πτερυγίζουσαι πνεῦμα δηλοῦσιν ἰσχυρόν (= *CCAG* 8.1.138.16 = Anon. Laur. 11.35), Aratos 918 f. πολλάκι δ' ἀγριάδες νῆσσαι ἢ εἰναλίδιναι | αἴθυιαι χερσαῖα τινάσσονται πτερύγεσσιν, Verg. *G.* 1.361. Pliny offers another sign: *NH* 18.362 *mergi* (= αἴθυιαι, but see above) *anatesque pinnas rostro purgantes ventum*. Thompson *Gk. Birds* 27 allows the αἴθυια to represent a number of shearwater species, including *Puffinus yelkuan*, but see below, on κέπφοι.

28.193 κέπφοι] A bird that has long defied exact identification, but generally agreed to be a petrel or shearwater of some sort, the precise identification of which is hindered by the fact that "The taxonomy of the *Puffinus* shearwaters is complex and is constantly changing as it becomes better understood"; O. J. Merne and P. Yésou, in W. J. M. Hagemeijer and M. J. Blair (eds.), *The EBCC Atlas of European Breeding Birds* (London 1997) 22. There are, however, two detailed color illustrations labeled as κέπφος in codex Vindob. med. gr. 1, most famous for its Dioskorides, but which also contains Dionysios *De Aucupio* (f. 480^{v} for the illustrations, reproduced in black and white in Garzya's Teubner ed., but for purposes of identification only the excellent color facsimile should be consulted). On the basis of a color illustration (see our frontispiece), along with the literary evidence (below), Elke Böhr, an art historian who has studied ancient representations of birds, and her husband Hans-Joachim, a forester and ornithologist, have kindly identified this bird for me as the Levantine shearwater, *Puffinus yelkouan*, a separate species of shearwater; note that until recently this bird was considered (and there are those who still would so consider) a subspecies, *Puffinus puffinus yelkouan*, of the Manx shearwater, *P. p. p.* See S. Cramp et al., *Handbook of the Birds of Europe, the Middle East, and North Africa: The Birds of the Western Palearctic,* 1 (Oxford 1977) 145, with pl. 15. (I thank Elke Böhr for much needed bibliographical guidance in the preparation of this note.) Earlier scholars (without, it seems, having seen the color illustrations in the Vienna codex) have identified this bird as the storm petrel (whose current scientific name is *hydrobates pelagicus*; previously *Thalassidroma pelagica*); so, e.g., Pollard *Bird*s 196 n. 15, and Garzya (ad Dionysium; see below). But this bird "was first recorded in Greece in the 19th century" (G. Handrinos and T. Akriotis, *The Birds of Greece* [London 1997], and thus may not have been known in ancient times. Kidd ad Arat. 916 identifies the κέπφος as Cory's Shearwater (*Calonectris diomedea*). Even ancient authorities were in doubt; cf. Hesychios s.v. κήξ· ὁ λάρος κατὰ Ἀπίωνα. λέγεται δὲ καὶ καύηξ. τινὲς καὶ αἴθυιαν ἀποδιδόασιν· οἱ δὲ κέπφον. οἱ δὲ διαφέρονται ἀλλήλων. (*Bart.* just gives up, omitting the clause altogether.) Thompson takes no stand on the bird's identification other than to cast doubt on its being *Hydrobates pelagicus;* he further suggests that the word is of non-Greek origin and possibly taken over from Egyptian *k.bh.w.* Since the κέπφος, like the λάρος, was considered stupid (and men could be so called), Felix Solmsen, *IF* 30 (1912) 7 n.1 connected the word to Hesychios κεμπός (not in LSJ)·

κοῦφος, ἐλαφρὸς ἄνθρωπος. (And note that these birds' habit of "shearing" the waves is described by Dionysios *De Aucupio* 2.11 as the κέπφοι's eating the wave's foam: αὐτὴν δὲ τὴν τῆς θαλάσσης ἄχνην ἐσθίουσι.)

For its role as a weather sign, cf. Schol. ad Arat. 916 ἐπειδὰν οὖν προαίσθηται ὀλίγου πνεύματος πνεῖν μέλλοντος, ἵπταται, οὐ φεύγων τὸν ἄνεμον, ἀλλ' αὐτοῦ τοῦ ἀνέμου ἀντιπρόσωπος, Dionysios *De Aucupio* 2.11 σημαίνει τοῖς ἁλιεῦσιν ἐπιτυχίαν, Aratos 916 f. (who follows *DS* closely) καί ποτε καὶ κέπφοι, ὁπότ' εὔδιοι ποτέωνται, | ἀντία μελλόντων ἀνέμων εἰληδὰ (= "in flocks," Kidd) φέρονται.

On the illustrations in the Vienna codex, see L. Brubaker, "The Vienna Dioskorides and Anicia Juliana," in A. Littlewood et al. (eds.), *Byzantine Garden Culture* (Washington 2002) 189-214.

28.194 στρουθοί] Sparrows are not generally taken as weather signs; indeed *DS* may be the sole authority (if that is the word); see below, 39.284.

28.195 ἐρωδιός] Taken to be a heron here, as often, although Thompson, from its occasional identification in lexica with λάρος and αἴθυια takes it as another word for gull (as well as for heron). Cf. Arist. fr. 270.21 Gi. (Ael. *NA* 7.7) ἐρωδιὸς δὲ κνεφαῖος βοῶν τὰ αὐτὰ (sc. χειμῶνα ἰσχυρόν) ἔοικεν ὑποδηλοῦν … . πετόμενος δὲ ἐρωδιὸς τῆς θαλάττης εὐθὺ ὕδωρ ἐξ οὐρανοῦ ῥαγήσεσθαι αἰνίττεται. As Cronin "Authorship" 309 notes, a number of weather signs in this fragment are not found in *DS*. Cf. also Aratos 913-915

> καὶ δ' ἂν ἐπὶ ξηρὴν ὅτ' ἐρωδιὸς οὐ κατὰ κόσμον
> ἐξ ἁλὸς ἔρχηται φωνῇ περιπολλὰ λεληκώς,
> κινυμένου κε θάλασσαν ὕπερ φορέοιτ' ἀνέμοιο.

28.196 καὶ ὅλως] We take this to mean that a loudly squawking heron is a sign of wind, even it is not flying in from the sea.

29

29.198 κύων] In general, see Xen. *Cyneg.* 5.1-6, which discusses the effects that various seasons, winds, and rains have on scents, with which cf. also [Arist.] *Probl.* 26.22 (942b13) διὰ τί οἱ κύνες τὰ ἴχνη ἥκιστα εὑρίσκουσι ζεφύρου πνέοντος. Most pertinent here is *Cyneg.* 5.3 οἱ

ὄμβροι οἱ γιγνόμενοι διὰ χρόνου ὀσμὰς ἄγοντες τὴν γῆν ποιοῦσι δύσοσμον, which suggests that the dog is not so much rolling as getting close to the ground in order to perceive a scent there that will be soon lost in the wind.

29.198 ἀνέμου μέγεθος] In this sentence one might fairly infer that the extent of the rolling is correlated to that of the wind, but this same phrase at 30.214, where it is a yes-or-no situation, shows that for this author these words mean a "strong wind."

29.198-9 ἄμπωτις ... πλημμύρα] There does not seem to have been much Peripatetic speculation on the nature of tides; cf. [Arist.] *De Mundo* 396a25-27 πολλαί τε ἀμπώτεις λέγονται καὶ κυμάτων ἄρσεις συμπεριοδεύειν ἀεὶ τῇ σελήνῃ κατά τινας ὡρισμένους καιρούς. And Aristotle himself (*Mete*. 366a18-21) likens the daily fluctuation of day- and night-time winds (the latter being calmer than the former) to the ebb and flow of tides, but this vague comparison in no way suggests a theory of tides. Later writers on the subject are Seleukos, Pytheas of Massilia, and (most notably in our sources) Poseidonios (F 214-220 Edelstein-Kidd). Th. *Meta*. 10a28 asks τίνος γὰρ ἕνεκα αἱ ἔφοδοι καὶ ἀνάρροιαι θαλάττης, which seems to refer to tides; for a discussion see van Raalte ad loc. and Laks-Most ad loc. (p. 76 n. 7).

29.199 ἀράχνια] Cf. [Arist.] *Probl*. 26.61 (947a33) διὰ τί τὰ ἀράχνια τὰ πολλὰ ὅταν φέρηται, πνεύματός ἐστι σημεῖα; A seemingly obvious answer, that something as delicate as a spiderweb will move in winds too slight for humans to feel on their skin, is ignored in favor of other suggestions, the least unlikely being that air towards the ground contracts, which is a sign of storm. Cf. also Arat. 1033 (as a sign of storm) ὅτε νηνεμίῃ κεν ἀράχνια λεπτὰ φέρηται, *Geop*. 1.3.9 ἀράχνια μὴ ὄντος ἀνέμου καταφερόμενα ... χειμῶνα ἐσόμενον δηλοῦσι ≈ Anon. Laur. 11.7, Pliny *NH* 11.84, where the mere presence of many spider webs are taken as a sign of rain; he also says, ibid., that spiders' weaving webs higher than usual signals rivers rising in flood and (8.103) can even foretell the collapse of a building. See further Beavis, *Insects* 40.

29.200-01 θάλασσα οἰδοῦσα ... ἀνεμώδης] The sea swells and makes noise that can be perceived either in midsea or along the shore as the waves break. Since there is both swelling and noise, one has to note

SNQ's ἀοιδοῦσα for οἰδοῦσα, but the morpholology is unparalleled, a singing sea is altogether too poetical (more so than howling headlands; see next lemma), and in any case the many parallels in the weather literature guarantee the latter word. Cf. Aratos 909-912

σῆμα δέ τοι ἀνέμοιο καὶ οἰδαίνουσα θάλασσα
γινέσθω καὶ μακρὸν ἔπ' αἰγιαλοὶ βοόωντες, 910
ἀκταί τ' εἰνάλιοι ὁπότ' εὔδιοι ἠχήεσσαι
γίνωνται, κορυφαί τε βοώμεναι οὔρεος ἄκραι.

Verg. *G.* 1.356-359

continuo ventis surgentibus aut freta ponti
incipiunt agitata tumescere et aridus altis
montibus audiri fragor, aut resonantia longe
litora misceri et nemorum increbrescere murmur.

Verg. *A.* 10.98 f., Pliny *NH* 18.359 *mare si … murmurabit intra se, ventum praedicit … , litora ripaeque si resonabunt tranquillo, asperam tempestatem, item maris ipsius tranquillo sonitus spumaeve dispersae aut aquae bullantes … . saepe et silentio intumescit inflatumque altius solito iam intra se esse ventos fatetur*, Seneca *Agam.* 466-469*, Geop.* 1.11.7 ἄνεμον δὲ προμηνύει θάλασσα κυμαίνουσα (continued in next lemma), and a fragment of Psellos (*Hermes* 8 [1853] 167) ἄνεμον δέ σοι σημαίνουσιν ἠχοῦντες ἐπὶ πλεῖστον αἰγιαλοὶ καὶ ἀθρόον ἀνοιδαίνουσα θάλασσα καὶ οἷον βομβοῦσαι αἱ κορυφαὶ τῶν ὀρῶν. The roaring of mountain tops, which forms part of a regular trilogy in this literature (Vergil substitutes the sound of trees) is reserved in *DS* for 31.215, προβοᾷ, on which see the commentary. Bart.'s *sublevatum* may derive from an exemplar with οἴσουσα.

29.201 ἀκταὶ βοῶσαι] A poetic personification, as Heeger 11 notes, typically used of the sea; cf. *Il.* 17.265 ἠϊόνες βοόωσιν, 14.394 κῦμα … βοάᾳ, Ai. *PV* 431 βοᾷ … κλύδων. Note also *Geop.* 1.11.7 (continued from last lemma) καὶ ἐπὶ τοῖς αἰγιαλοῖς μεγάλα ἠχοῦσα.

29.203-04 βορέας … ἀρχόμενος] [Arist.] *Probl.* 26.20 (942b2) and 26.45 (945a29) quotes a hexameter saying, ἀρχομένου γε νότου καὶ λήγοντος βορέαο, in the latter chapter putting it into the same context found here: "Why is it that the South wind is weak when it begins to blow, but becomes stronger as it ceases, while with the North wind the contrary is the case, hence the proverb, εὖ πλεῖν ἀρχομένου κτλ" (tr. Forster). Th. *Winds* 5 paraphrase this line.

29.204 παρήλιος] For mock suns, see above, on 22.151. The necessary presence of ice crystals in the direction of the sun could indeed signal the onset of weather associated with them.

30

30.206 πέμπτη καὶ δεκάτη ἀπὸ τροπῶν τῶν χειμερινῶν] Schneider deserves credit for the correct reading. A parapegmatic annual weather sign is rare in this work; see above on 23.157 f. ἐὰν μὴ—ἢ ἄνεμος. It does, however, come in the midst of a section concerned specifically with the alternation between north and south winds, which, as *Probl.* 26 *passim* shows, was a common concern. Note 941b13-15 (26.12) ἔστι δὲ καὶ ἡ μετὰ τὰς χειμερινὰς τροπὰς πεντεκαιδεκάτη νότιος. Rehm *Parapegmastudien* 129 ff. argues that this sign derives from Euktemon (see introduction).

30.207 βορείων ... ξηραίνει] The usual result of Boreas, acc. to Th. *Winds* 59. ξηραίνει and ὑγραίνει either impersonal (Hort) or, less likely, intransitive with πάντα as subject.

30.207-08 νοτίων δὲ ὑγραίνει] Generally, but not universally, Notos was thought of as warm and moisture laden; cf. Th. *Winds* 57, (sc. οἱ νότοι) ὑγρότητα γὰρ ἐνιᾶσι τοῖς σώμασι καὶ θέρμην ἀλλοτρίαν θερμοὶ φύσει καὶ ὑγροὶ ὄντες, but here and elsewhere Th. describes Notos with other characteristics.

30.208 ψοφῇ τῶν κεκολλημένων] Th. *Winds* 58 also mentions how inanimate objects may be moistened or dried out by various winds, οἷον αἵ τε ῥηγνύμεναι χορδαὶ καὶ οἱ ψόφοι τῶν κεκολλημένων. As both verbs are imprecise, it would be hard to know what noise comes from what source. ψόφος can be almost any inarticulate sound, and κολλ- can be used of almost any man-made joints. Creaking furniture (caused by the drying out of joints) seems a better guess than, say, the cracking sound of metal objects as the atmospheric change makes curved surfaces bow in or out. The matter seems to be settled by *Probl.* 1.24 (862a27 f.), which asks διὰ τί ἐν τοῖς νότοις βαρύτερον ἔχουσι καὶ ἀδυνατώτερον οἱ ἄνθρωποι; The answer lies in the amount of moisture in our joints, which are likened to glued joints which make a noise when dried: δηλοῦσι δὲ οἱ ψόφοι τῶν κεκολλημένων, τὸ γὰρ γλίσχρον ἐν τοῖς ἄρ-

θροις πεπηγὸς μὲν κινεῖσθαι κωλύει ἡμᾶς, ὑγρὸν δὲ λίαν ὂν συντείνεσθαι. Th. *HP* 5.6.2 discusses the glue used on the tenons in furniture making; and he frequently mentions in his two works on plants the wood-working qualities of the various woods; see G. M. A. Richter, *The Furniture of the Greek, Etruscans, and Romans* (London 1966) 122-125.

30.208 ⟨τι⟩] suppl. Fu. is an easy way to regularize the text, but should be resisted, as a partitive genitive all by itself may occasionally serve as subject; cf. Hdt. 3.102 εἰσὶ γὰρ αὐτῶν καὶ παρὰ βασιλέι, K-G 1.346 An. 3.

30.209 βόρεια] As Furlanus noticed, this sentence has to be altered so that one of the south winds gives way (textually) to a northerly. We follow him in altering the second, as this produces a pleasing parallel with the next sentence: in each the hallmark of the coming wind (dryness of Boreas, moistness of Notos) is signalled by early effects in, respectively, furniture and feet.

30.209 ἱδρῶσι] The mss. (and Bart. *sudaverint*) are, V's ἱδρᾶσι not withstanding, in agreement. The Aldine's οἰδῶσι, should probably be rejected, therefore, although swollen feet are in fact a sign not of wind but of rain or storm, especially among older people, as the lowered air pressure before a storm will allow the blood in the feet to collect there, owing to poor circulation, and cause the feet to swell, allowing them to act like a crude barometer (as with Bill Fortenbaugh's mother, e.g.). Sweaty feet as a sign suggests that the moisture of one's feet presages the moist wind to come. Although Th. *On Sweat* offers no exact parallel, cc. 35-37, which treats sweaty feet and feet in water, are consistent; note esp. 35.225 οἱ ἱδρῶτες ὅπου θερμὸν καὶ ὑγρόν. Elsewhere in Greek literature, swollen feet are usually taken as a symptom (not a sign) of starvation; cf. Hes. *WD* 497, *Sc.* 265 f., [Arist.] *Probl.* 1.6, Verg. *Cat.* 13.40, Ov. *Met.* 8.807 f.

But whether the feet swell or sweat, it is worth noting that only here and in the next sign (shooting pains in the foot) does *DS* look to the human body and its sensations for weather signs, something that is nowadays rather common. (Böker 1613 missed this passage when he said that *die Grundschrift* of all weather literature contained no such signs.) This is even more noteworthy since the parallel passage just above on the sign from noise in furniture made a direct comparison to creaking human

joints. Perhaps one of the sources had a section of signs drawn from people's own perceptions. McCartney *CW* 24 (1930) 25 interprets Th. *Winds* 35 to mean that "we are responsive to changing conditions in the atmosphere and that they make themselves felt in advance of the winds they portend," but this may be reading too much into Theophrastos' Greek: καὶ ἐπὶ τῆς θαλάττης καὶ τῶν ὑδάτων ἐστί τισι τὰ αὐτὰ σημεῖα λαβεῖν. (But McCartney cites many interesting modern sources for people reading themselves for signs of impending weather.) Also noting the failure to regard bodies as weather signs is Plut. *De Sanit. Praec*. 14.129a (= Demokritos DK 68 B 147 = 580 Luria) "For it is strange to look attentively to the croaks of crows, the clucking of hens, and pigs raging over scraps, as Demokritos says, regarding them as signs of wind and storm; but not to take account of bodily motions, restlessness, and (other) preliminary feelings, and not to have any signs within one's own self of an imminent and forthcoming storm" (ἄτοπον γάρ ἐστι κοράκων μὲν λαρυγγισμοῖς καὶ κλωσμοῖς ἀλεκτορίδων καὶ συσὶν ἐπὶ φορυτῷ μαργαινούσαις, ὡς ἔφη Δημόκριτος, ἐπιμελῶς προσέχειν σημεῖα ποιουμένους πνευμάτων καὶ ὄμβρων, τὰ δὲ τοῦ σώματος κινήματα καὶ σάλους καὶ προπαθείας μὴ προλαμβάνειν μηδὲ προφυλάττειν μηδὲ ἔχειν σημεῖα χειμῶνος ἐν ἑαυτῷ γενησομένου καὶ μέλλοντος).

For sweat as a sign in general, see G. Bastianini and C. Gallazzi, *Posidippo di Pella. Epigrammi* (Milan 2001) 143. The English poet John Taylor, on the other hand, devotes one section of his *Drinke and Welcome* (1637) to these signs:

> Some by a painefull elbow, hip, or knee,
> Will shrewdly guesse, what wether's like to be:
> Some by their cornes are wondrous weather-wise,
> And some by biting of lice, fleas, or flies:
> The gowt, sicatica, the Gallian *Morbus*,
> Doth oft foretell if tempests shall disturb us;
> For though these things converse not with the stars,
> Yet to mans grief they are Astronomers.

30.209-10 νοτία ἡ μεταβολὴ] Not a very precise phrase, but clear enough in context: a change *to* the south; i.e., the beginning there of a wind. Cf. Thuc. 2.43.5 (in a speech) ἡ ἐναντία μεταβολή, a change *to* the opposite.The phrase occurs again, 31.218.

30.210 ἐκνεφίου] Hurricanes occur, according to Arist. *Mete*. 351a2-5, most often in autumn, next often in spring, when one wind "falls upon" another while it is still blowing. See Gilbert 558-563, who tries to distinguish ἐκνεφίας from τυφών. See further below, 36.264.

30.210-11 ὀδαξῶν τὸν δεξιόν] Schneider indicates a lacuna after these words, but we agree with Hort that this phrase can remain; for other examples of a participle without an accompanying finite verb, cf. K-G 2.109. Earlier editors construed as if the participle agreed with ἐχῖνος, which preserves the surface grammar at the cost of losing all sense.

30.211 ἐχῖνος ὁ χερσαῖος] The hedgehog, not to be confused (in Greek) with ἐχῖνος ὁ θαλάσσιος, the similarly prickly sea urchin (cf. Germ. *Seeigel*). Cf. Arist. *HA* 612b4-10 περὶ δὲ τῆς τῶν ἐχίνων αἰσθήσεως συμβέβηκε πολλαχοῦ τεθεωρῆσθαι ὅτι μεταβαλλόντων βορέων καὶ νότων οἱ μὲν ἐν τῇ γῇ τὰς ὀπὰς αὐτῶν μεταμείβουσιν, οἱ δ' ἐν ταῖς οἰκίαις τρεφόμενοι μεταβάλλουσιν πρὸς τοὺς τοίχους, Plut. *Sollert. Animal*. 972a τὸ δὲ κοιταῖον αὐτῶν ὀπὰς ἔχει δύο, τὴν μὲν πρὸς νότον τὴν δὲ πρὸς βορέαν βλέπουσαν· ὅταν δὲ προαίσθωνται τὴν διαφορὰν τοῦ ἀέρος, ὥσπερ ἱστίον κυβερνῆται μεταλαμβάνοντες ἐμφράττουσι τὴν κατ' ἄνεμον τὴν δ' ἑτέραν ἀνοίγουσι, Antig. *HM* 8; all that Pliny *NH* 8.133 claims for them is that *mutationem aquilonis in austrum condentes se in cubile praesagiunt*. The hedgehog's "one big trick" (Archilochos fr. 201 West; cf. Emped. 31 B 83) is to roll himself into a protective ball, but closing off one entrance to an imminent wind would run a close second. This behavior is attested for hedgehogs by K. Herter, "The insectivores," in B. Grzimek (ed.), *Animal Life Encyclopedia* 1 (1975) 209: "Occasionally they also construct their own burrow in the ground. The tunnel frequently has two openings. One is usually plugged depending on the wind direction." (According to Pliny *NH* 8.138 the squirrel also closes the entrance facing the wind.)

30.211 σημεῖον] σημαντικόν, the reading of most codd., appears elsewhere in *DS* only at 51.374, τὰ ὄρη τὰ σημαντικά, where the sense is not (as it would be if read here) a mere synonym for σημεῖον, but "mountains that are a source of signs." This latter meaning is in accord with Aristotle's use, where σημαντικός is applied to things *generally*, not *specifically*, meaningful. Since later Greek uses σημαντικός + genitive in

the sense of σημεῖον (e.g., D.S. 3.4 σ. πάσης κακίας, Gal. *in Epid.* 17(1).405 K σ. παρωτίδων), V seems here to be witness to an early stage of its transmission. (Arist. *Top.* 106b35 demonstrating the several meanings of ὑγιεινός is the exception that proves the rule: οἷον εἰ ὑγιεινὸν τὸ μὲν ὑγιείας ποιητικὸν τὸ δὲ φυλακτικὸν τὸ δὲ σημαντικόν … ῥηθήσεται.)

30.212 ὀπάς] This is the classical word; κατάδυσις in V's elaborate paraphrase is not found in this sense until the second cent. AD and ὀπή occurs again in *DS*, at 39.282 and 53.388.

31

31.215 προβοᾷ] This is either what the mss. have or what they point to (*antesonet* Bart.). Only P^{ac} has προσβορᾶ (one word), which has been corrected to accord with the other mss. πρὸς βορρα, first printed by Aldus and then by all subsequent editors, does not even make for a coherent text, as Hort notes (he posits an ellipse just before). The mistake may have arisen from M, in which the omicron of this word has a tail that makes it look like a rho. For προβοᾷ, cf. *Il.* 12.277 τώ γε προβοῶντε μάχην ὤτρυνον Ἀχαιῶν, Soph. *Ph.* 218 προβοᾷ τι γὰρ δεινόν, where in each case the προ- *may* but need not be (and is not so taken by LSJ or the commentaries ad locc.) temporal, which is how we choose to interpret it here. For the personification, see above, on 29.201 ἀκταί. Cf. further Arat. 180 κορυφαί τε βοώμεναι οὔρεος ἄκραι, with schol. ad loc. τῶν ὀρῶν βοήν. For roaring mountain tops as a weather sign, see 29.200 f. θάλασσα … ἀνεμώδης. A dry, hot, katabatic wind (*Föhn* in German) can be quite noisy.

31.216 πνεύματος γαλήνη] The first word, deleted by Bonaventura, is necessary because, strictly speaking, γαλήνη refers only to the calmness of the water; cf. Pl. *Tht.* 153c νηνεμίας τε καὶ γαλήνας, Arist. *Top.* 108b25 (each is a kind of ἡσυχία) γαλήνη μὲν ἐν θαλάσσᾳ, νηνεμία δ' ἐν ἀέρι. Here, however, we must understand "a calmness of wind," ἐν θαλάττῃ spelling out the location.

31.216 μεταβολὴν πνεύματος] Here we must understand "a change *in direction*," to provide the proper contrast with ἐπίδοσιν, which probably means (or does it only allow for?) an increase in the previous wind.

31.217 ἄκραι … νῆσοι] At first glance, this could be taken to refer to clouds occluding the lower heights of headlands and peaks. (The peaks of one island separated by clouds so as to appear isolated might be better observed from one of the island's peaks, perhaps by one of the astronomers mentioned in c. 4, but this phenomenon might also be seen from a ship. As with the sweating feet, a moist condition is taken as sign of an imminent (and moist) south wind.) Clouds, however, are not specified; and a parallel passage from Arist. *Mete*. 373b10-11 suggests that *DS* is rather alluding to two varieties of mirages caused by atmospheric refraction: (i) *superior mirage*. When the air close to the surface, here that of the sea, is cooler than that above it, light rays are bent downwards, so that objects appear higher than their true position. This can even permit an object to be seen (a ship or mountain peak) that is below the horizon; or, as *DS* seems to mean here, for an object to be seen to hover in midair (Greenler 161 f.). *Mete*. 3.4, concerned with ἀνάκλασις ("reflection," because Aristotle and others explained refraction in these terms; when the distinction was understood διάκλασις was used for "refraction"; see Mugler *Optique* s.vv.), observes that distant and dense air reflects: διόπερ αἵ τ' ἄκραι ἀνεσπασμέναι φαίνονται ἐν τῇ θαλάττῃ, … ὅταν εὖροι πνέωσι (313b10). (ii) *inferior mirage*. When, on the other hand, the surface of the sea is warmer than the air above, objects appear lower than their true position (Greenler 154-159). Thus, to take the case of the island(s), what under usual circumstances, probably from the fixed position of a nearby coast, is seen to be one island with high peaks, under the conditions described here, "loses" its lower level so that only now separated peaks are seen, each a "separate" island. (An inferior mirage is often seen in deserts, but it is understandable that Aristotle says ἀπὸ δὲ ὕδατος μάλιστα ἀνακλᾶται, 373b14.)

31.217 ἐκ μιᾶς πλείους] LSJ s.v. ἐκ A I 3, "To denote change or succession."

31.218 δέ] τε does not occur elsewhere in *DS*, so that this is an easy change, especially given Bart.'s *autem*.

31.218-19 βόρειον] Schneider mistakenly calls this an addition of Furlanus (placed after ὑποφ.), but it occurs in all mss. Th. *Winds* 60 also warns (in a two-line hexameter) of a cloud seen, presumably from a ship at sea, over a dark mainland: διὰ τί ποτ' λέγεται· μή ποτ' ἀπ' ἠπείρου

δείσῃς νέφος, ὡς ἀπὸ πόντου | χειμῶνος, θέρεος δὲ ἀπ' ἠπείροιο μελαίνης. Similarly, [Arist.] *Probl.* 26.57 (which has ἀλλ' for ὡς). (Note the odd but metrically necessary hiatus at δὲ ἀπ', which has parallels in inscriptions, where metrical standards are lower.)

31.219 ἅλῳ περὶ τὴν σελήνην] For paraselenic halos, see Greenler 180 f.; B. L. Cardon, "An unusual lunar halo," *American Journal of Physics* 45 (1977) 331. Like solar halos, the primary (see below for the secondary) ones are 22° away from the sun, and caused by the presence in the air of ice crystals. Since nights are generally less windy than days, the winds that arise at dawn after the observation of a lunar halo may have been, on the whole, stronger than normal. Or, after observation of something as unusual as a lunar halo, observers may have been more ready to notice the next day's wind. Lunar halos are mentioned by Arist. *Mete.* 373a27 πλεονάκις δὲ γίγνονται αἱ ἅλῳ περὶ τὴν σελήνην διὰ τὸ τὸν ἥλιον θερμότερον ὄντα θᾶττον διαλύειν τὰς συστάσεις τοῦ ἀέρος, Seneca *NQ* 1.2.10, but most notably by Th. *Mete.* c. 14, "The halo round the moon occurs when the air becomes thick and is filled with vapor, so that a wavelike movement arises in it on account of the moonlight. In a similar way, if we throw a stone into water, a circular movement occurs round the stone" etc. (tr. Daiber).

DS's plural (*pace* Hort, who translates "a halo") includes the possibility of seeing the rarer and fainter secondary halo at 46° (Greenler 47-50), as is spelled out with greater clarity by Aratos 811-817, who even makes up a physically impossible third halo:

εἰ δέ κέ μιν περὶ πᾶσαν ἁλωαὶ κυκλώσωνται
ἢ τρεῖς ἠὲ δύω περικείμεναι ἠὲ μί' οἴη,
τῇ μὲν ἰῇ ἀνέμοιο γαληναίης τε δοκεύειν,
ῥηγνυμένῃ ἀνέμοιο, μαραινομένῃ δὲ γαλήνης·
ταὶ δύο δ' ἂν χειμῶνι περιτροχάοιντο σελήνην, 815
μείζονα δ' ἂν χειμῶνα φέροι τριέλικτος ἁλωή,
καὶ μᾶλλον μελανεῦσα, καὶ εἰ ῥηγνύατο μᾶλλον.

31.220 ῥαγεῖσαι] Conversely, at 51.372 we read that a uniform halo signals fair weather. The broken halos referred to are probably what are now called Parry arcs, some of which indeed look like broken rings around the sun, caused by the presence of complex ice crystal, which refract light through varying angles. See W. E. Parry, *Journal of a Voyage for the Discovery of a Northwest Passage* (London 1821; repr. NY 1968);

Greenler 38-44, with illustration on p. 35. A possible objection to this identification is that Parry arcs tend to be symmetrical about the sun's vertical axis, so that a "break" on one side has a counterpart on the other. Cf. Pliny *NH* 18.349 *si caligo orbisve nubium incluserit, ventos qua se ruperit.* Seneca *NQ* 1.2.5 also mentions broken halos. See Marriott 321 "The open side of the (lunar) halo tells the quarter from which the wind or rain may be expected."

31.221 ἐπινεφέλων] "If it is overcast"; sc. ὄντων, as in Hdt. 7.37, [Arist.] *Probl.* 939b15, where the verb is impersonal and the adjective predicate. On gen. absolutes without the verb, see K-G 2.102. An impersonal accusative absolute, ἐπινεφέλον, would not be recognized as such; cf. 50.367 χειμάζοντος.

31.221 ὅθεν ἂν ἀνατέλληται] Wood renders "*when* the sky is clouded, the wind will come from the quarter on which there is a lifting [of the clouds]" (our italics, his brackets). This is hardly elegant, but as he says it makes for far greater sense than to use ὅθεν ἂν ἀνατέλληται, a general statement, to apply to the one spot on the horizon where the sun must rise every day, as others do. But as this verb can be applied to other heavenly bodies such as the moon, which has just been mentioned, ὅθεν can be retained.

31.222 κηλάδες νεφέλαι] Hesychios s.v. κηλάς· νεφέλη ἄνυδρος, καὶ χειμερινὴ ἡμέρα, καὶ αἴξ, ἥτις κατὰ τὸ μέτωπον σημεῖον ἔχει τυλοειδές. (The definition concerning the goat is repeated s.v. κηλάδες.) Since a κηλίς is a stain or blemish, Hort may be right to suggest that "mottled clouds" are cirrocumuli, filling the sky with small narrow bands of clouds (a "mackerel sky"); Dunlop 46 f.

32

By the minimal standards of *DS*, this chapter stands out as a distinct and well formed literary unit: lightning everywhere, lightning from only one quarter, and then a survey of lightning through the seasons beginning with summer and ending with spring. Perhaps this paragraph was taken whole from an earlier work whose authorship was noted in the first sentence. Another unusual feature is the use of παύουσι and παύονται as though the relationship between lightning and winds were a causal one,

which is perfectly in accord with a search for a scientific theory, but which we have seen is largely absent from *DS* so far, where *post hoc* is not explicitly converted into *propter hoc*. Pliny *NH* 18.354 is also devoted to interpreting lightning, the factors being season, time of day, direction, and the present state of the sky. It is noticable that none of Pliny's signs precisely matches those of *DS*, although one comes close; see below.

32.223 πανταχόθεν] Did anyone really need to be told that lightning on all sides was a sign of rain?

32.225 θέρους] Cf. Aratos 924 f. καὶ θέρεος βρονταί τε καὶ ἀστραπαὶ ἔνθεν ἴωσιν, | ἔνθεν ἐπερχομένοιο περισκοπέειν ἀνέμοιο, Pliny *NH* 18.354 *cum aestate vehementius tonuit quam fulsit* [contrast *DS*'s καί], *ventos ex ea parte denuntiat, contra si minus tonuit, imbrem, Geop.* 1.3.3 = Anon. Laur. 9.

32.231 ἧττον ... ὥσπερ] For ὥσπερ after comparisons, cf. Xen. *HG* 2.3.17 ἧττόν τι οἴει ὥσπερ τυραννίδος ταύτης τῆς ἀρχῆς χρῆναι [sc. ἡμᾶς] ἐπιμελεῖσθαι ("for us, less than a tyranny, to care less for this government"), Xenoph. B 3.8 οὐ μείους ὥσπερ χίλιοι; cf. LSJ s.v. ὥσπερ IV; T. W. Allen, *Rev. Philol.* 60 (1934) 239. Earlier editors and translators take ὥσπερ as if it were likening the situation in winter to that of spring, but the whole sentence is set in contrast with the preceding, which describes winter and fall; which cannot be in turn contrasted with what pertains to spring and winter.

32.231 ἂν ταὐτὰ σημεῖα γένηται] The ἂν ... λέγω of the codd. is problematic. With the former word as the simple particle Hort understands εἶναι, which he thought "perhaps should be read." But there is no "perhaps" about it; ἄν can stand alone only when its verb is immediately clear from context, usually because it has appeared in the previous clause; K-G 1.243 f. Nor is a potential optative (which εἶναι would have to represent) found in these weather signs. The latter word is also suspect, as nowhere else does *DS* use a first-person singular verb (although this could have been taken over from the original posited above). Note, moreover, that in Bart. *si* = ἄν = ἐάν and λέγω is missing: *vere autem minus, si eadem signa sicut et hieme*. (Wood takes σημεῖα as predicate, which results in a forced sentence that directly contradicts the preceding one: "But in spring I take less account of these same matters as

signs, as also in winter.") If Bart. reflects the true text, an original γένηται may have been written as a particularly messy compendium, which was missing in Bart.'s source and misread by the source of the Greek mss.

33

33.232 νότου πνέοντος βορρᾶθεν] Cf. Aratos 427 βορέω δὲ παρ' ἀστράψῃ ἀνέμοιο.

33.233 ἔωθεν ἀστράπτῃ] The mss. present an ἄν without a subjunctive. Bart.'s version, *si autem ab oriente coruscat*, suggests that his source had ἑῶος (which can mean "east," as ἔωθεν cannot) ἀστράπτῃ, which provides a proper verb. Now, however, with this impersonal verb, ἑῶος cannot modify an understood "wind," as the adjj. of the next clause do. ἔωθεν easily solves the problem.

33.233 ἄλλοι] "Winds," presumably; but which winds? "Other winds than a south wind" (Hort). "Other [such] winds" (Wood). The Latin translators get away with an uninformative *alii*. The logical structure of this passage is a typical mishmash, so that Hort's going back merely as far as he does seems incautious. Wood's understood τοιοῦτοι would rob the previous clause of almost all of its predictive value. The following οἱ δὲ δειλινοί suggests that we are still dealing with morning winds, the only contrast remaining lies with ἀστράπτῃ, but this would be a crabbed way of saying "Those winds arising in the morning without lightining." One solution might be to conjecture μεσημβρινοί for ἄλλοι, which would describe what happens to winds that blow at midday (while lightining flashes), between those in the morning and those in the evening. Cf., e.g., Th. *Winds* 31, where there is a contrast between τῆς μεσημβρίας and ἅμα τῇ δείλῃ. This, however, is not paleographically attractive, and it might grant the text a logical structure it never had.

33.234-5 βορέαι ... νότοι] Although the mss. show more regular forms, these plurals occur, respectively, 16 and 17 times in Aristotle. The plural refers somewhat vaguely to "winds from the north ... south"; cf. Arist. *Mete*. 361a21-23 καλοῦνται δ' οἱ μὲν ἀπὸ τῆς ἄρκτου βορέαι, οἱ δὲ ἀπὸ τῆς μεσημβρίας νότοι, 364a13-16 ἔστι δὲ τῶν εἰρημένων πνευμάτων βορέας μὲν ὅ τ' ἀπαρκτίας κυριώτατα καὶ θρασκίας καὶ μέσης ... . νότος δὲ ὅ τε ἰθαγενὴς ὁ ἀπὸ μεσημβρίας καὶ λίψ.

33.235 ἐν περιτταῖς] Cf. Pliny *NH* 2.129 *septentriones impari fere desinunt numero*.

33.236 αἴρονται] As in English, though not as commonly, winds in Greek can be said to "rise" (although one would not know this from LSJ); cf., e.g., Th. *Winds* 17, 31 ἐπαίρεσθαι. Because it occurs between two forms of παύω, V converted it to ἄρχονται. Winds can in fact occur as the rising sun warms the land and then the air and sets up a temperature variation.

33.236 ἅμ' ἡλίῳ ἀνατέλλοντι καὶ σελήνῃ] Cf. Th. *Winds* 15 ὁ ἥλιος δοκεῖ καὶ κινεῖν ἀνατέλλων καὶ καταπαύειν τὰ πνεύματα· διὸ καὶ ἐπαυξάνεται καὶ πίπτει πολλάκις. … 17 ποιεῖ δὲ καὶ ἡ σελήνη ταὐτά, πλὴν οὐκ ὁμοίως· οἷον γὰρ ἀσθενὴς ἥλιός ἐστι. διὸ καὶ νύκτωρ δεινότεραι.

33.236 ἐάν δ'] The lack of a δέ in all the Greek mss. could reflect the cut-and-paste style rather than arising from a scribal omission. More usually in this work, a δέ causes us mentally to insert a μέν in the preceding clause. We choose, however, to follow Bart. (*autem*).

33.237 παύσωσιν] Sc. πνεύματα; cf. Th. *Winds* 15, cited above. Schneider (not Wimmer, as Hort says) conjectured μή before this word, which Wimmer strangely prints without translating.

33.237 ἐπιτείνει] Intransitive, not a very common use in classical Greek, but note Arist. *Phys.* 238a5 ἐπιτείνῃ ἡ κίνησις, *De Caelo* 288b27, *Pol.* 1293a26, fr. 374 Gi. Hort, following Furlanus, adds "presently," presumably to make the run of thought smoother (and be more in accord with Theophrastos' account).

33.237-8 σελήνης δὲ ληγούσης] The variation between V and M can be explained if a marginal ἤτοι φθινούσης became an intrusive gloss in V and if φθινούσης supplanted ληγούσης in M. φθινούσης is of course the usual word for the waning of the moon/month (but cf. *IG* XII(3) 325.20 f. μηνὸς … λήγοντος), but *DS* (or its source) may have liked the jingle of ληγούσης λήγει. The thought is that if the wind affects winds, less of the moon will yield less wind; cf. Th. *Winds* 17 αἱ σύνοδοι τῶν μηνῶν χειμερινώτεραι.

33.238-9 χρονιώτερα δὲ καὶ ἰσχυρότερα] Th. *Winds* 16 f. disagrees (c. 17 cited in part above), also allowing for greater variation in the intensity of winds caused by sun and moon.

34

34.240-2 ἐὰν ἐτησίαι … ἐναντίος] For statements of this sort, correlating the nature of successive seasons, see below, c. 44.

34.240 ἐτησίαι] In theory, etesian winds are any winds which were felt to be annuals (being derived from ἔτος). According to Aristotle, who describes them most fully (*Mete.* 361b31-362a31), etesians proper, *the* Etesians, begin after the summer solstice and again after Seirios rises (late July); weaker etesians blow after the winter solstice. They generally come from a northerly or northwesterly direction, but as Pliny *NH* 2.128 notes, they may come from a number of directions (he also records that midwinter etesians are called *ornithiae*; cf. Hipp. *Epid.* 7.105, Arist. *Mete.* 362a23). See also *Probl.* 26.51. Th. *Winds* mentions them often, without paying them special attention. See Rehm, "Etesiai," *RE* 6 (1907) 713-717; Gilbert 570-572, McCartney *CW* 24 (1930) 18 f. In form, ἐτησίαι (plural only, with or without ἄνεμοι) is, like ὀρνιθίαι and some other names for winds, a masculine adjective See L. N. Carapiperis, *The Etesian Winds*, vol. I, *The Opinions of the Ancient Greeks on the Etesian Winds. Ἐθνικὸν Ἀστεροσκοπεῖον Ἀθηνῶν. Ὑπομνήματα*, Ser. II, Μετεωρολογικά, 9. Athens 1962; West ad Hes. *WD* 663.

34.242 πρὸς κορυφῆς … μηκύνεται] Cf. Arat. 920 ἢ νεφέλη ὄρεος μηκύνεται ἐν κορυφῇσιν, Pliny*NH* 18.356 *cum in cacuminibus montium nubes consident* (as as sign of storm).

34.243-4 αἱ νεφέλαι ἐπὶ … πνευσοῦνται] The mss. present a knotty sentence. ἐκ does not sit well with προσίζουσαι, and ὄπισθεν gives location not source. Yet both Wood and Hort agree in ignoring ἐκ—"settle down *on*," "cling *to*"—and translating ὄπισθεν as "*from* behind," "*from* the back." This does indeed seem to be the sense, but in order to obtain it from a Greek text, we suggest the modest alteration of ἐκ to ἐπί and reading ἐντεῦθεν for ὄπισθεν. Cf. the immediately preceding sentence, where ταύτῃ ~ ἐντεῦθεν, and 22.145-7 καὶ ἐὰν ἐπὶ τὸ Πήλιον νεφέλη προσίζῃ, ὅθεν ἂν προσίζῃ ἐντεῦθεν ὕδωρ ἢ ἄνεμον σημαίνει. Note

also the similar weather prediction in cod. Mutin. 85 (*CCAG* 4.4.110; see introduction) ἐὰν ἐπὶ τὰς κορυφὰς τῶν ὀρέων ἐφεζόμεναι καὶ ὡς ἐν κύκλῳ ἐπαίρωνται ἕως κορυφῶν τῶν ὀρέων, ἐκεῖθεν ἐλεύσεται ὁ ἄνεμος.

34.244 Ἄθως] Mt. Athos, 2033m high and located at the southern tip of Cape Akte in Macedonia, was visible to sailors from many miles out at sea. Clearly visible in M, it must have been obliterated in H, perhaps by an inkblot as it was passed around Aldus' shop. The one page remaining of H as well as others used by Aldus' printers show many ink marks. (A similar loss marked by a space occurs in the Aldine at 46.338 ὁ ἥλιος.) At any rate, the Aldine leaves a blank to indicate that a word cannot be read. Later editions mark the loss either with either a cross (†, Furlanus, Heinsius) or an asterisk (*, Grynaeus). Furlanus in his notes, however, argues that the missing mountain was Hymettos, and he was followed by Schneider, who also, on what evidence we do not know, argued for Athos, and in this latter choice was followed by Wimmer. Hymettos was not a bad guess, "nam Hymetti supra etiam habita mentio" (Furlanus 123), but so too have other mountains been mentioned in c. 4. Bonaventura more cleverly derived the name Mt. Mysios from the mss. μέσος.

34.244 μέσος διεζευγμένος] Cf. 22.145 ἡ Εὔβοια ὅταν διαζωσθῇ μέση, where as here "by clouds" must be supplied.

34.244 νότιος] This adjective when applied to a stationary body gives either its relative position, "to the south, southern," or means "moist." Applied to a mobile atmospheric condition (rain, wind, storm), it means "from the south." What it cannot mean is "subject to a southern wind," which is in effect how Wood and Hort render: "mountains so begirt indicate S. wind" (Wood), "there will generally be a southern wind" (Hort's impersonal translation of both νότιος and νότια). "Moist," on the other hand, slightly extended to mean "source of moisture," is lexically easier, as well as being truer to meteorological facts than Wood and Hort's view.

34.245-6 κομῆται ἀστέρες] These hirsute stars are discussed most fully by Arist. *Mete*. 1.6-7 and Seneca *NQ* 7 (and by Poseidonios; cf. frr. 131 f. E-K). In general see Gilbert 642-658, esp. 642 f. on their hairiness. For their role as weather signs, cf. Arist. ibid. 344b18-20 περὶ δὲ τοῦ

πυρώδη τὴν σύστασιν αὐτῶν εἶναι τεκμήριον χρὴ νομίζειν ὅτι σημαίνουσι γιγνόμενοι πλείους πνεύματα καὶ αὐχμούς, b26-28, Aratos 1092 f. (sc. εἶεν) μηδ' εἷς μηδὲ δύω μηδὲ πλέονες κομόωντες | πολλοὶ γὰρ κομόωσιν ἐπ' αὐχμηρῷ ἐνιαυτῷ, Ptol. *Tetrab*. 2.14.10 αἱ μὲν τῶν κομητῶν συστροφαὶ ὡς ἐπίπαν αὐχμηροὺς καὶ ἀνέμους προσημαίνουσι, Claudian *Proserp*. 1.231-236, esp. 235 f. *crine minaci | nuntiat aut ratibus ventos aut urbibus hostes.* Since the ancient view, from Aristotle onwards, usually explained their tails in terms of density of air and exhalations, it would seem reasonable that they had predictive value for weather; Gilbert 649. As Kidd ad Arat. 1092 notes, since true comets are rare, the frequent discussion in ancient literature of "many" seen at (almost) the same time may point to some confusion with meteors. See below, 57.419. Although the Aristotle passage quoted above agrees with *DS*, Aristotle ap. Sen. *QN* 7.28.1 (not among Gigon's fragments) says otherwise: *Aristoteles ait cometa significare tempestatem et ventorum intemperantiam et imbrium*; see Cronin "Authorship" 309, who tentatively suggests "That Aristotle in a work now lost and concerned partly or entirely with weather signs expressed the opinion about comets ascribed to him by Seneca, or else that Seneca is incorrectly recalling the words in *Meteorology*." Another possibility is that in Seneca's copy of Arist. *Mete*. (or an intermediate source) χειμῶνας had been miswritten as αὐχμούς. See Marriott 215 "After an unusual fall of meteors, dry weather is expected." On comets as weather signs in general, see McCartney *CW* 23 (1929) 12 f.

34.247 πάχνην] "Hoar frost," τὸ ἐπὶ γῆς συμπαγὲν ἐκ δρόσου (Pl. *Tim*. 59e); cf. D.L. 7.153 ἐπειδὰν ἢ ἐκ γῆς ἢ ἐκ θαλάττης ἀνενεχθεῖσα ὑγρασία ὑφ' ἡλίου μὴ τυγχάνῃ κατεργασίας· καταψυχθὲν δὲ τοῦτο πάχνην καλεῖσθαι. (Coming as it does between two explicit references to Poseidonios this too may derive from him [= F 263 Thummer], but is not so regarded by Edelstein-Kidd). Th. *Winds* 50 quotes the second half of a dactylic proverb: φιλεῖ δὲ νότος μετὰ πάχνην, as does [Arist.] *Probl.* 26.3, which derives from *Winds* 50.

34.247 μύκητες] See above, on c. 14.

35-37 The stations and natures of the winds

With the exception of one prediction of the usual sort (on wind-borne thistles), this passage stands out from the rest of *DS*, in that it reads more like a short treatise on winds in general. Although some of the statements concerning the nature of the winds have implications for weather prediction, this is not their primary function. Since this passage appears at the end of the section on winds, it is easy to imagine that it was inserted later; the proper place for such a disquisition would be at the beginning. And *DS*, as constituted, clearly does not feel the need for such general passages anywhere else.

On the other hand, we are told that Aristotle, in *his* work on weather signs included the fragment now known as *On the Position and Names of Winds* (see next lemma), which is primarily a list of wind names (an anemasticon?), telling us what each wind is called and what is its domain, beginning with Boreas in the north and working its way around the windrose in a clockwise direction; see the Appendix. It would seem then that Aristotle (or whoever wrote *Vent. Sit.*) thought it appropriate to include a brief overview of the winds, perhaps so that readers thoughout Greece would be able to "Translate" the Attic wind names into their own area's preferred appellations. *DS*, on the other hand, is more concerned with the characteristics of each wind than its various names. In this it is somewhat like Theophrastos, who, however, in his sections on the nature of the individual winds (*Winds* 37-45 *et passim*) pays more attention to the natural causes of these differences. And in Aristotle's *Meteorologika* 2.6 the emphasis is on the relative positions of the winds (especially whether or not they are diametrically opposed to others): περὶ δὲ θέσεως αὐτῶν καὶ τίνες ἐναντίοι τίσι καὶ ποίους ἅμα πνεῖν ἐνδέχεται καὶ ποίους οὔ, ἔτι δὲ καὶ τίνες καὶ πόσοι τυγχάνουσιν ὄντες καὶ πρὸς τούτοις περὶ τῶν ἄλλων παθημάτων κτλ. (363a21-4). There is thus no one reason for including a windrose in one's text, which makes its inclusion in *DS* all the more odd, as it is the only one of the four without justification within the text. See G. Kaibel, "Antike Windrosen," *Hermes* 20 (1885) 579-624; A. Rehm, *Griechische Windrosen*, Sitzungsb. d. Bayer. Akademie d. Wissensch., Phil. Kl. 1916, Abh. 3; D'Arcy W. Thompson, "The Greek winds," *CR* 32 (1918) 49-56; R. Böker, *RE* 8 A (1958) "Winde: E. Windrosen," 2326-81; J. Mansfeld, *The Pseudo-Hippocratic Tract Περὶ Ἑβδομάδων Ch. 1-11 and Greek Philosophy* (Assen 1971) 146-155; B. Obrist, *La cosmologie médiéval.* I. *Les fondements antiques* (Florence 2004).

35

35.249 στάσεις] The "stations" of the winds are the various points whence they arise; cf. Hdt. 2.26.2 (where also the verb ἵστημι is used of winds). Alkaios' τῶν ἀνέμων στάσιν (fr. 208a Voigt) comprehends the political use of this noun as well. According to the heading in the mss. Aristotle included a section in his *Περὶ Σημείων* (ἐκ τῶν Ἀριστοτέλους Π. Σημείων) a section on the ἀνέμων θέσεις καὶ προσηγορίαι (973 Bekker = fr. 363 Gi.); this need not have been his own word (cf. Arist. *Mete*. 362b33 τῶν πνευμάτων ἡ στάσις) but more likely, thinking of the diagram he drew to show positions of the winds, he was applying this word in its geometrical sense here, as in *Mete*. 2.6 (see next lemma). In any case, it seems clear that the compiler of *DS*—*if* he had Aristotle in front of him—decided to omit the annotated list. On the textual tradition of *Vent. Sit.*, see D. Harlfinger and D. Reinsch, "Die Aristotelica des Parisinus gr. 1741: Zur Überlieferung von Poetik, Rhetorik, Physiognomik, De signis, De ventorum situ," *Philologus* 114 (1970) 28-50. For its text, see the Appendix.

35.249-50 τῷ γράμματι] A more usual word would be διάγραμμα (see Mugler, *Dict. Géométrique* s.v.) or ὑπογραφή, but γράμμα in the sense "picture" (LSJ s.v. I), although less technical, can be retained (διαγράμματι though would be an easy conjecture). The diagram of *DS*'s windrose has not been transmitted by the mss., but it can be deduced from Aristotle's, which, also not drawn in any extant ms., can be reconstructed from *Mete*. 2.6 (δεῖ δὲ περὶ τῆς θέσεως ἅμα τοὺς λόγους ἐκ τῆς ὑπογραφῆς θεωρεῖν 363a25) and *Vent. Sit.*, as modified by Th. *Winds*: see Gilbert 539-557, Coutant & Eichenlaub l-liii, whom we follow, and below, on ἀπηλιώτης. Diagrams were inserted into scientific texts as early as the fifth century by Antiphon, Hippokrates of Chios, Demokritos, and Anaxagoras; see further O. Neugebauer, *A History of Ancient Mathematical Astronomy* (Berlin 1975) 2.751-755, who cites [751 n. 1] some later texts with figures: Euclid, Autolykos, Theodosios. In this immediate context *DS* calls Boreas Aparktias, calls the NW wind only Argestes, and ignores Phoinikias Some few further details will be given below; for a fuller discussion of Greek winds, see Gilbert Tl. II, Kap. 7, Coutant & Eichenlaub, and D'Arcy W. Thompson, "The Greek winds," *CR* 32 (1918) 49-56.

35.251 ἀπαρκτίας] Another name for Boreas, used by Aristotle in describing his windrose, either alone or, it would seem, as an adjective for the former (*Mete*. 363b15 where eds. insert καί between the two names), although Boreas may be an intrusive gloss (without the ἤ that it has in *DS*; see below).

35.251 θρακίας] This form, and not θρασκίας, which is the form favored by Aristotle, is found throughout M (V always has θρασκίας); and not θρᾳκίας either, which is what LSJ say of this word in *DS*. θρακίας is also found in *IG* XIV.308 (a bilingual list of winds found in Rome) and Arist. *Vent. Sit.* 973 b17 (κατὰ μὲν Θρᾴκην Στρυμονίας).

35.251 ἀργέστης] The NW wind (*DS* has been working its way counterclockwise from due north). Aristotle often describes this trio of winds as a unit: He too says ἐπιπίπτουσι δὲ τοῖς ἄλλοις μάλιστα καὶ παύουσι (*Mete*. 364b3-4), and that in doing so they bring fair weather, unless they are cold, in which case they are likely to bring hail (ibid. 22-23). And in the roundup of the winds' characteristics in the next two chapters these three appear as a unit four more times. As will be noted in detail below, there are many parallels between this section of *Mete*. (2.6) and *DS*.

V's regular spelling of this wind, ἀργέτης, although not noted by the lexica, must represent a later variant; see previous lemma. For the meaning of this name, which in Homer functions as an epithet for Notos and in Hesiod for Zephyros, see Gilbert 542 f. Th. *Winds* 51 (= Adesp. Eleg. 7 W^2) quotes a pentameter that associates Argestes with clouds in the neighborhood of Knidos and Rhodes: ἀργέστῃ δ' ἀνέμῳ πᾶσ' ἔπεται νεφέλη.

35.251-2 ὑπ' ἀλλήλων διαλύωνται] "As people say, the winds do battle when they blow against each other" (Th. *Winds* 54); cf., e.g., *Il*. 13.333 f., where the strife of the two armies is likened to blasts of winds; Alk. fr. 208a (above, on 35.249 στάσεις).

35.253 ἐπὶ δεξιά] Cf. Pliny *NH* 2.128 … *a laevo latere in dextrum ut sol ambiunt*; i.e., from east to west, the observer facing south, as Rackham notes ad loc. For an explanation, see Arist. *Mete*. 364b14-17 αἱ δὲ περιστάσεις γίγνονται αὐτῶν καταπαυομένων εἰς τοὺς ἐχομένους κατὰ τὴν τοῦ ἡλίου μετάστασιν, διὰ τὸ κινεῖσθαι μάλιστα τὸ ἐχόμενον

τῆς ἀρχῆς· ἡ δὲ ἀρχὴ οὕτω κινεῖται τῶν πνευμάτων ὡς ὁ ἥλιος. On the windrose this translates as "clockwise."

35.254 νότος … ξηρὸς … ὑγρός] A reason for this is given by Th. *Winds* 7 ὁ δὲ νότος ἧττόν τε ἔχων ὕλην, καὶ ταύτην οὐ πηγνὺς ἀλλ' ἀπωθῶν, αἰθρίαν ἄγει τοῖς πλησίον, ὑετιώτερος δ' ἀεὶ τοῖς πόρρω. See also *Probl.* 26.19 (942a29) διὰ τί ὁ νότος οὐκ ἀρχόμενος ἀλλὰ λήγων ὑέτιος;

35.254-5 καὶ ὁ εὖρος] As Arist. *Mete.* 364b20 says: ἀπ' ἀρχῆς δὲ οὗτος ξηρός, τελευτῶν δὲ ὑδατώδης. This phrase, though, looks like an intrusive gloss.

35.255 ἀπηλιώτης] That the Aristotelian windrose represents an attempt to impose order on the various names and directions Greeks applied to the winds is nicely demonstrated here. Most Greeks, Aristotle most of the time included, were happy to call the east wind Euros, whereas Sicilians called it Kaikias. The windrose assigns these three names adjacent positions which they probably never enjoyed in any one Greek location. Th. *Winds* 62 also notes that Apeliotes was also called Hellespontias (presumably elsewhere in mainland Greece), Karbas by the Phoenicians, and Berekyntias by the Pontine Greeks. Argestes was also called Olympias or Skiron in Greece proper (the place of Argestes on the Tower of the Winds in Athens is taken by Skiron), and Kirkias in Sicily. See Gilbert 545-547.

V's reading (ἀφ-) is a later variant (which also appears in Latin texts); cf. *IG* XIV.308.

35.255-6 διὰ λεπτῶν] Does this refer to the gentleness of the rain ("in light showers," Hort) or of the wind ("light breezes," Wood)? For the former, the medical writers offer some slight parallels, where wine, milk, and vomit are so called; but these liquids are light when most watery, whereas rain is pure water, and we mean something different when speaking of a light shower. Closer would be Eur. *IA* 813 λεπταῖς … Εὐρίπου ῥοαῖς, except that this is Markland's conjecture for the ms.' πνοαῖς. It is, however, a most reasonable conjecture; cf. Ion of Chios F 18 TrGF λεπτὸς Εὐρίπου κλύδων, and note that at Soph. *Ant.* 1238 the mss. offer both πνοήν and (correctly) ῥοήν. The range of λεπτός, however, is so wide that it could, even if a parallel is lacking, easily refer to breezes. With some hesitation, then, we so render it here.

36

36.257 ὑγροί] Here and below with χαλαζώδης, νιφετώδης, κτλ, we follow Hort in translating and understanding "*bringing* [sc. sooner or later] moisture, hail, snow," etc., which reads better in the context of a work interested in predicting weather, although strictly speaking these adjj. do not allow for such temporal slippage. Note too that sometimes the initial adjective applying to two or more winds is sometimes singular and other times plural.

36.257 χαλαζώδης] See above on 25.169.

36.258 νιφετώδης δὲ ὅ τε μέσης καὶ ἀπαρκτίας] Almost = Arist. *Mete*. 364b23, who adds as a reason for this οὗτοι γὰρ ψυχρότατοι.

36.259 [ἢ βορέας]] Hort correctly excludes. In this passage there is no possibility that "either Meses *or* Boreas brings snow," whereas Aparktias would very likely be glossed as Boreas with the common *or*-formula, at first in the margin and then located wrongly in the text. Note too that Boreas is absent from the parallel passage in *Mete*. quoted in the previous lemma.

36.259-60 καυματώδης δὲ νότος καὶ ζέφυρος καὶ εὖρος] = Arist. *Mete*. 364b23.

36.260-1 ἐκ πελάγους … διὰ γῆς] See Gilbert 565 f., who summarizes the ancient views that in general the seawind was understood as the return of a wind originally from the land.

36.261-2 καικίας μάλιστα εἶτα λίψ] According to the windrose, these are ἐναντίοι ἄνεμοι, which ἢ ταὐτὸ ποιοῦσιν ἢ ἐναντίον, οἷον ὑγροὶ λὶψ καὶ καικίας (Arist. *Mete*. 364b17). Opposite winds generally blow in opposite seasons (364a32-33).

36.263 καικίας δὲ μόνος πνέων ἐφ' ἑαυτόν] Cf. Arist. *Mete*. 364b12-14, exceptionally, ὁ δὲ Καικίας οὐκ αἴθριος, ὅτι ἀνακάμπτει εἰς αὐτόν· ὅθεν καὶ λέγεται ἡ παροιμία "ἕλκων ἐφ' αὐτὸν ὥστε καικίας νέφος"(an iambic trimeter, *Frag. Trag. Adesp*. 50 Nauck), Th. *Winds* 37 ὁ μὲν γὰρ Καικίας μόνος ἐφ' αὐτὸν ἄγει τὰ νέφη καθάπερ

καὶ ἡ παροιμία λέγει. *Probl.* 26.1 and 29 offer more details of the circuitous path taken by Kaikias that allows it to round up clouds; also Pliny *NH* 2.126 *Caecian in se trahere nubes.*

36.263 αἴθριοι] As Arist. *Mete*. 364b4-10 explains, this is so because their source is closest to us (since the *oikoumene* lies in the north, 364a7) and so, being stronger, can drive away clouds.

36.264 ἐκνεφίαι] "Hurricanes." So too *Mete*. 365a1-5 ἐκνεφίαι δὲ γίγνονται μετοπώρου μὲν μάλιστα, εἶτα ἔαρος, καὶ μάλιστα ἀπ. καὶ θρ. καὶ ἀργ. αἴτιον δ' ὅτι οἱ ἐκνεφίαι γίγνονται μάλιστα ὅταν τῶν ἄλλων πνεόντων ἐμπίπτωσιν ἕτεροι, οὗτοι δὲ μάλιστα ἐμπίπτουσιν τοῖς ἄλλοις πνέουσιν (above, c. 35). Cf. Varro ap. Nonium Marcellum 1.66 *ventique frigido se ab axe eruperant phrenetici, septentrionum filii, secum ferentes tegulas, ramos, syros*.

37

37.267 ἀστραπαῖος] Cf. Arist. *Mete*. 364b30-31 (ms. E) ἀστραπαῖοι δὲ μάλιστα οὗτοι (sc. ἀπ. θρ. ἀργ.) τε καὶ Μέσης· διὰ δὲ τὸ ψυχρὸν ἀστραπὴ γίνεται. For ἀστραπαῖοι the other mss. have (in varying word order) ἀστρὰς δὲ ποιοῦσιν μάλιστα.

37.269 πάπποι] "Grandpas," as the white fluffy seed containers of thistle are reasonably called; cf. Hesych. s.v. πάππος, Eustath. ad *Il.* 5.408 and *Od*. 11.520, both quoted by Kidd on Aratos 921:

> ἤδη καὶ πάπποι, λευκῆς γήρειον ἀκάνθης,
> σῆμ' ἐγένοντ' ἀνέμου, κωφῆς ἁλὸς ὁππότε πολλοὶ
> ἄκρον ἐπιπλώωσι, τὰ μὲν πάρος, ἄλλα δ' ὀπίσσω. (921-923)

So also *Geop.* 1.11.7 καὶ ἄκανθαι καὶ ξηρὰ φύλλα ἐναντία ὑπὸ τῶν ἀνέμων εἰλούμενα, Verg. *G.* 1.368 *saepe levem paleam et frondes volitare caducas*, Pliny *NH* 18.360. Modern weather lore has it that dandelion (*taraxacum officinale*) can predict storms, either by closing their blossoms beforehand or by having the thistledown blown off when there is no discernable wind; see R. Inwards, *Weather Lore* (London 1898) 183 ff. N. R. Silvester, "Notes on the behaviour of certain plants in relations to the weather," *Qu. J. Royal Meteorological Society* 52 (1926) 21, was willing to allow "That vertical currents ascending beneath a thundercloud would cause the down to fly off in an apparent calm," but his own

scientific observations failed to find evidence that this was indeed the case; nor that the blossom closed before rain.

37.270-1 ἀστέρες διάττωσι] See 13.83, above, where shooting stars (and their direction) were given as signs of rain and wind.

38

38.273 χειμῶνος] How does a χειμών differ from rain and wind, the two previous topics? Presumably by combining them in significant amounts; or, since χειμών is also the word for "winter," by substituting snow or hail for rain. In any case, storms were distinguished as early as Homer; cf. *Od.* 4.566 οὐ νιφετὸς οὔτ' ἂρ χειμὼν πολὺς οὔτε ποτ' ὄμβρος; cf. Hdt. 7.188.2 χειμών τε μέγας καὶ πολλὸς ἄνεμος ἀπηλιώτης. There may be some hendiadys (or hendiatreis) here, but the distinction is clear enough, cf. *Probl.* 25.26 (943a3) ὁ γὰρ ὄμβρος χειμών ἐστιν οἰκειότατος τῷ πνεύσαντι πνεύματι. See Bonaventura 417-19. Storms can also be characterized by degree. Thucydides speaks of a χειμὼν νοτερός (3.21), or other words may be employed: λαῖλαψ, ἄελλα, θύελλα, ἐκνεφίας, τυφών; see Gilbert 558 f. Theoretically, then, one should be able to predict a storm that goes beyond mere wind and/or rain.

38.273 εἰς μὴ καθαρόν] The choppiness of this sentence suggests yet another source. Cf. below, 50.365-7 δυόμενος ἥλιος … εἰς καθαρόν … εἰς μὴ καθαρὸν δεδυκὼς. Pindar frequently uses this adjective of light: *P.* 6.14 φάει … ἐν καθαρῷ, *P.* 9.90 καθαρὸν φέγγος, fr. 108b S-M σέλας καθαρὸν ἁμέρας. Cf. also Plato *Phdr.* 239c ἐν ἡλίῳ καθαρῷ.

38.273-4 ὡς ἂν μερισθῇ] Wood's translation, freer than ours, captures the sense: "according as is the proportion of the disc so covered as it sets such will the [following] days turn out." His bracketing of "following" is unnecessary, as this is implicit in ἐπι-.

38.275 ἀπολειφθῇ] This word can mean either "left in" (LSJ I 1) or "left out" (II 3). The mock mathematical tone of this incomplete sentence does not help either. The safest inference is that the more obscured (= the more left *out*) the sun is, the greater the storm will be.

38.275 σελήνιον] An uncommon word, which renders it more likely than V's σελήνη. Synesius *Calvitii enc.* 10, unnoticed by LSJ, says that bald men were called σελήνια, which suggests a small but *full* moon. [Arist.] *Mira.* 834b3-4 uses it of the moon as a body: ὁ πορθμὸς … αὔξεται καὶ φθίνει ἅμα τῷ σεληνίῳ (LSJ overtranslates as "The moon's phases"). Athen. 7.276e also uses it = σελήνη, LSJ again overtranslating, here as "moonlight." Dio Chrys. 7.70, however, uses it of a less-than-full moon, which is what must be meant here, as a (symmetrical) full moon cannot be called ὀρθόν.

38.275-6 ὀρθὸν ᾗ μέχρι τετράδος] The fourth day of the month was a good one for reading the crescent moon for signs; see above on 27.185 ἐὰν δὲ ὁ μήν. In addition to the passages cited there, note that Pliny *NH* 18.347 f. presents a survey of various views, one of which he attributes to Varro: *si quarto die luna erit directa, magnam tempestatem in mari praesagiet.* And for Nigidius Figulus' view see further Wachsmuth, *Lydus, De Ostentis*, Leipzig 1863, xxiv-xxvi.

38.276 εὔκυκλον] I.e., "clear," as is shown by Varro's parallel ap. Pliny *NH* 18.348 *si plenilunio per dimidium pura erit.*

38.276 γέρανοι] The flight of cranes must be studied for its shape, size, sound, altitude, direction, and time of appearance, which in various combinations signal storm, winter, or fair weather. Thus, storm is imminent when οὐδ' ὑψοῦ γεράνων μακραὶ στίχες αὐτὰ κέλευθα | τείνονται, στροφάδες δὲ παλιμπετὲς ἀπονέονται (Arat. 1031 f.). The storm will be severe when γέρανοι ἐκ τοῦ πελάγους ἐς τὴν γῆν πετόμεναι (Arist. fr. 270.21 Gi. = Ael. *NA* 7.7); cf. Ael. *NA* 3.14, cited below. Since, however, cranes are migratory birds whose arrival in fall signals winter (cf., e.g., *Il.* 3.4 f. γεράνων … αἳ … χειμῶνα φύγον, Verg. *G.* 1.374 f.), and since, as noted above χειμών can be either "winter" or "storm," one must discern which meaning is intended. Ancient confusion can be seen in the various scholia's attempts to explain Aristophanes' χειμὼν ὀρνιθίας (*Ach.* 876 f.) in both ways. Hesiod, in fact, treats the (southward) migration of cranes as a sign of winter and bad weather:

> φράζεσθαι δ' εὖτ' ἂν γεράνου φωνὴν ἐπακούσῃς
> ὑψόθεν ἐκ νεφέων ἐνιαύσια κεκληγυίης,

ἦτ' ἀρότοιό τε σῆμα φέρει, καὶ χείματος ὥρην
δεικνύει ὀμβρηροῦ. (*WD* 448-451)

Cf. Hdt. 2.22.4 γέρανοι δὲ φεύγουσαι τὸν χειμῶνα τὸν ἐν τῇ Σκυθικῇ χώρῃ γινόμενον φοιτῶσι ἐς χειμασίην ἐς τοὺς τόπους τούτους, i.e., Egypt; Theogn. 1197-99 ὄρνιθος φωνήν … ὀξὺ βοώσης | ἤκουσ', ἥτε βροτοῖς ἄγγελος ἦλθ' ἀρότου | ὡραίου. Their voice, which can be heard when they are as far away as two miles or as much as two miles high, described by ornithologists variously as *kruk, kurr, grooh, karoo* (see L. Walkinshaw, *Cranes of the World* [New York 1973] 36, 336) gives the crane its name (Thompson 68, however, says "etymology unknown"). According to unknown sources (ὥς φασιν) quoted by Ael. *NA* 1.44, their squawking was taken not merely as a sign of rain, but as its actual cause: τῶν γεράνων αἱ κλαγγαὶ καλοῦσιν ὄμβρους; cf. Poseidippos *Epigr.* 22.3 f. Austin-Bastianini ἡμῖν … | Θρῇσσα κατὰ προτόνων ἡγεμονέοι γέρανος, | σῆμα κυβερνητικῇ καταδέξιον, ἢ τὸ μέγ' [ἴσχει] | κῦμα. ([ἴσχει] Sider [εἶσι] eds. prr.), Verg. *A.* 10.265. The winter migration south of the European crane (*ardea rus* Linn.) occurs throughout October and November (Walkinshaw 24), or in Greek, or more specifically Attic, terms τοῦ Μαιμακτηριῶνος (Arist. *HA* 597a24), and takes them from northern Europe (over Greece, especially Thrace as many but not all veer towards Turkey to keep the mainland beneath) to Ethiopia and Sudan (Walkinshaw 45); cf. further Pliny *NH* 10.60, S. Cramp et al., *Birds of the Western Palaearctic* 2 (Oxford 1977) 618-626; J. Morton, *The Role of the Physical Environment in Ancient Greek Seafaring* (Leiden 2001) 298-301.

In the late hieroglyphic text of Horapollo, the crane becomes the visual symbol of the meteorologist: ἄνθρωπον εἰδότα τὰ μετέωρα θέλοντες σημῆναι γέρανον ἱπτάμενον ζωγραφοῦσιν· ἐκεῖνος γὰρ ὑψηλὸς πάνυ ἵπταται, ἵνα θεάσηται τὰ νέφη, μὴ ἄρα χειμάζῃ, ἵνα ἐν ἡσυχίᾳ διαμένῃ (2.98 ed. Thissen).

38.277 πρωΐ … ὀψέ] Most likely, earlier and later in the year than usual, rather than early or late in the day, as in 9.58-60. See above on the confusion between storms and winter.

38.277 ἀθρόαι] To be more specific, in the classic V-formation of migrating fowl like ducks and geese. LSJ s.v. γέρανος, reading Wimmer's text, which has ἀθρόοι here and πετόμεναι in the next sentence, cite this one passage for evidence of ὁ γέρανος. In fact, ἀθρόος can be a two-

termination adjective, so that ἀθρόοι in itself would not determine gender. (For masc. γέρανος, see instead Epicharmos fr. 76.2 K-A [where ὁ is guaranteed by meter] ἦ παμπόνηρον ὄψον, ὦ 'τᾶν, ὁ γέρανος [the joke here is that the speaker has misheard γ' ἔρανον] and Nonnos 14.332 Θρηικίοις γεράνοισιν.) Similarly at 52.381, V retains the correct feminine ending of πετόμεναι (whixh we emend to read πρὸ ἑαυτῶν). Thus, grammatically, γέρανος' gender is common (κοινόν), not epicene (ἐπίκοινον), such as, e.g, χελιδών, which always has the female article ἡ; cf. Dionys. Thrax 24.8-25.2 Uhlig.

38.278 ἀποστραφῶσι] There is no reason to alter the mss. and read ὑπο- with some eds., especially as Aratos seems to have echoed this passage with στροφάδες δὲ παλιμπετὲς ἀπονέονται (1032; see above). (If, however, the codd. presented both readings, choosing would be difficult; cf. Ael. *NA* 3.14 κυβερνήτης ἰδὼν ἐν πελάγει μέσῳ γεράνους ὑποστρεφούσας καὶ τὴν ἔμπαλιν πετομένας, συνεῖδεν ἐναντίου προσβολῇ πνεύματος ἐκείνας ἀποστῆναι τοῦ πρόσω.) Cranes ride thermals and will accordingly deviate from a straight course; from shore they may look as through they were turning back; cf. *Il.* 2.459-462 ἔθνεα πολλὰ | χηνῶν ἢ γεράνων ἢ κύκνων δουλιχοδείρων | … ἔνθα καὶ ἔνθα ποτῶνται. See N. Elkins, *Weather and Bird Behaviour* (Calton 1988) 165, "migration is inhibited by opposing winds and rains, and northbound cranes in spring are delayed by low temperatures … . over sea they are influenced by crosswinds. Drifts in thermals can be quite considerable, since the birds must remain with the rising air in order to climb, even though it may be moving in a different direction not in accordance with their heading." For the idea that cranes flee storms, cf. Eur. *Hel.* 1478-81 (ed. Kannicht)

δι' ἀέρος εἴ⟨θε⟩ ποτανοὶ
γενοίμεθ' ⟨ὅπ⟩α Λιβύας
οἰωνοὶ στολάδες
ὄμβρον λιποῦσαι χειμέριον.

If the storm ahead is severe they may choose to land; Arist. *HA* 614b19-21 εἰς ὕψος πέτονται πρὸς τὸ καθορᾶν τὰ πόρρω, καὶ ἐὰν ἴδωσι νέφη καὶ χειμέρια, καταπτᾶσαι ἡσυχάζουσιν ~ Antig. *Hist. Mir.* 40 (note the πρός: they fly high *in order* to see a long distance; cf. the passage given above from the *Hieroglyphika* of Horapollo), Dionysios *De Aucupio* 2.18 καὶ χαίρουσι ταῖς εὐδίαις· κἂν χειμῶνος αἴσθοιντο, τῇ γῇ προσορμίζονται μέχρι σταθερᾶς πάλιν εὐδίας. See also Plutarch *De*

Sollertia Animalium 967b for some observations on the various formations of migrating cranes, depending on weather conditions.

39

39.280 χῆνες] These geese, unlike the cranes mentioned just above, would be domestic birds, which, although they may migrate silently (with stones in their craw, to discourage cackling, acc. to Ael. *NA* 5.54), raise a ruckus around the barnyard. Cf. Aratos 1021 f. (where again, *pace* Kidd ad loc., they seem to be domestic) καὶ χῆνες κλαγγηδὸν ἐπειγόμεναι βρωμοῖο | χειμῶνος μέγα σῆμα, *Geop.* 1.3.9 χῆνες μετὰ κλαγγῆς ἐπειγόμεναι πρὸς τροφήν, Pliny *NH* 18.363. In *Natural History* 55 (1946) 343, a reader observes that birds, especially juncos, "would congregate in the yard to fill up on grain we supplied … . It seemed like the birds almost knew when bad weather was coming." This was dismissed by J. T. Zimmer, a curator at the American Museum of Natural History in New York (the publisher of this journal), who, however, was happy to add his own personal observation that "*Stomoxys*, the stable fly, ordinarily particularly obnoxious in the evening, becomes troublesome before storms"; cf. Aratos 975. Aratos 1104-12 observes that before a storm sheep are eager to pasture and reluctant to return in the evening.

39.280 περὶ σίτου μαχόμενοι] M's περὶ σῖτον is unlikely, since when, as it often does, μάχεσθαι takes περί, it is always followed by the genitive, as it is again here at 41.302-3; and V's ἐπὶ σίτῳ is paralleled only by phrases like *Il.* 5.124 ἐπὶ Τρώεσσι μάχεσθαι, "fight *against* the Trojans." π. σίτων cannot be ruled out, however (for the plural, which is commoner than LSJ lets on cf. Eur. *Alc.* 548, Pl. *Phdr.* 259a, Arist. *Ph.* 230b2).

39.281 [καὶ στρουθός]] Although this bird may be specifically a sparrow, it also "is often used generically … of any small birds" (Thompson 268, who cites, i.a., a gloss *fringillus*, σπίνος, ὁ στρουθός). Since the καί is missing from several mss. and since the parallel in Aratos mentions only the σπίνος ἠῷα σπίζων (1024), we regard στρουθός as an intrusive gloss later made to fit better with a καί in some mss.

39.281-2 ὀρχίλος … ἐριθεύς] Wren and robin, respectively. They are taken together in the same sign also by Aratos 1025 f. καὶ ὀρχίλος καὶ

ἐριθεὺς | δύνων ἐς κοίλας ὀχεάς. Only the latter in Arist. fr. 270.21 Gi. (Ael. *NA* 7.7) ἐρίθακος (= ἐριθεύς) δὲ ἐς τὰ αὔλια καὶ τὰ οἰκούμενα παριὼν δῆλός ἐστι χειμῶνος ἐπιδημίαν ἀποδιδάσκων. Conversely, it is a sign of fair weather when the wren comes out of its lair;below, 53.388.

It is conceivable that the ἐριθύς of the codd. preserves a valid variant of ἐριθεύς (cf. ἰχθύς), but –θεύς is what is found elsewhere, although admittedly not often; in addition to Aratos 1025 (above), cf. Schol. Aristoph. *Vesp*. 927 ἔστι δὲ ὄρνεον ὑπὸ μέν τινων καλούμενον ἐριθεύς, ὑπὸ δὲ ἑτέρων ἐρίθυλος, ὑπὸ δὲ πλειόνων ἐρίθακος, Hesych. ἐριθεύς· ὁ ἐρίθακος.

39.281 ὡς] This reads badly but should probably be retained as a poor attempt at correlation with the following καὶ … ὡσαύτως; cf. LSJ s.v. A b. Similarly awkward is the plural verb, which can just as easily be the fault of a careless compiler as of a scribe.

39.282 ὀπάς] See below, 53.388.

39.283-4 χειμερία … χειμέριοι] "Sign(s) of storm," a meaning unknown to LSJ; sim. Arat. 879.

39.284 κορώνη καὶ κόραξ καὶ κολοιός] See above, 16.111 f., for the crow, raven, and jackdaw lumped together. There it was the raven, not the crow who croaks twice (as a sign of rain). Below, 53.387 f., the crow's croaking thrice quickly signals fair weather; cf. Plut. *Tuend. San*. 129c.

39.284 ὀψὲ ᾄδοντες] Cf. Arist. fr. 270.21 Gi. (of these three birds) δείλης ὀψίας εἰ φθέγγοιντο, χειμῶνος ἔσεσθαί τινα ἐπιδημίαν διδάσκουσι. That this is late in the day (not season) is shown by the echo in Aratos 1022 f. κορώνη | νύκτερον ἀείδουσα, καὶ ὀψὲ βοῶντε κολοιοί.

39.285 λευκός] Since storms come and go, faster than birds can change color, this must in origin be a sign of harsh winter, the unusual white color presaging greater than usual snow Cf. Arist. fr. 270.21 Gi. (Ael. *NA* 7.7) φανέντες δὲ ὄρνιθες πολλοὶ μὲν τὸν ἀριθμόν, λευκοὶ δὲ τὴν χρόαν, χειμὼν ὅτι ἔσται πολὺς ἐκδιδάσκουσι. See Hauser 372 "Quand on voit du canard le jabot se blanchir, et l'hirondelle revenir, le printemps au plutôt se va faire sentir" (Waadtland).

40

40.288 ἐκ πελάγους] Aristotle, as we have seen (above, on 38.276), said this about cranes; he also generalizes (and, unlike *DS*, explains): ὄρνιθες οἱ μὲν θαλάττιοι καὶ οἱ λιμναῖοι ἐς τὴν γῆν ἰόντες ὡς ἔσται χειμὼν πολὺς οὐκ ἀγνοοῦσιν (Arist. fr. 270.21 Gi. = Ael. *NA* 7.7). The same sign appears earlier in this section as ὄρνιθες δὲ ἐκ τοῦ πελάγους ἐς τὴν γῆν σὺν ὁρμῇ πετόμενοι μαρτύρονται χειμῶνα, which suggests that Aelian was copying from an extensive text.

40.289 οἰκουμένῃ] See above, on 19.126 οἰκουμένῃ.

40.289-90 ὅσα ... χειμῶνα] Not the most pellucid of sentences. Our English intentionally reproduces its awkwardness, but Wood has refashioned nicely: "Whatever indicates rain is followed by storm; and if it is not followed by rain it is followed by snow and storm." That is, as noted above on 38.273, it stands to reason, even the reason of superstitious country lore, that what signals rain or wind could also portend an excessive amount of these, namely a storm.

40.290-1 κόραξ φωνὰς πολλὰς μεταβάλλων] Since, as noted at 16.106-7, the raven has a wide range of sounds, the criterion here must lie not in πολλάς but in φωνάς, i.e., either noise vs. silence is the criterion, or else it lies in the particular sounds made. Lucr. 5.1083 ff. suggests the latter: *et partim mutant cum tempestatibus una | raucisonos cantus, cornicum ut saecla vetusta | corvorumque greges etc.* More particularly, cf. 16.106 and Aratos 963-969 (quoted above, on 16.106), where the raven imitates hawks (their screech, most likely) and the sound of raindrops; perhaps too βαρείῃ δισσάκι φωνῇ (968) is meant to be onomatopoetic of thunder. Cf. also Pliny *NH* 18.362 *tempestatem* (sc. *praesagiunt*) *corvique singultu quodam latrantes seque concutientes, si continuabunt; si vero carptim vocem resorbebunt, ventosum imbrem.*

40.292 νότου] Maass *Arati Phaenomena* xxvi conjectured νομοῦ to have this passage conform with Arat. 1026 f. φῦλα κολοιῶν | ἐκ νομοῦ ἐρχόμενα τραφεροῦ ἐπὶ ὄψιον αὖλιν, but what is clear in the latter passage would be vague to the point of meaninglessness if read in *DS*.

40.292 τευθίδες] Squids of some sort; see Thompson *GGF* s.v. Cf. Plut. *NQ* 18 (916a-b) διὰ τί τευθὶς φαινομένη σημεῖόν ἐστι μεγάλου χειμῶνος; ἢ πάντα φύσει τὰ μαλάκια δύσριγα διὰ γυμνότητα τῆς σαρκὸς καὶ ψιλότητα, μήτ' ὀστράκῳ μήτε δέρματι μήτε λεπίδι σκεπομένης ἀλλ' ἐντὸς ἐχούσης τὸ σκληρὸν καὶ ὀστεῶδες, διὸ καὶ κέκληται μαλάκια; ταχὺ δὴ προαισθάνεται δι' εὐπάθειαν τοῦ χειμῶνος· ὅθεν ὁ μὲν πολύπους εἰς γῆν ἀνατρέχει καὶ τῶν πετριδίων ἀντιλαμβανόμενος σημεῖόν ἐστι πνεύματος ὅσον οὔπω παρόντος, ἡ δὲ τευθὶς ἐξάλλεται, φεύγουσα τὸ ψῦχος καὶ τὴν ἐν βάθει ταραχὴν τῆς θαλάττης· καὶ γὰρ ἔχει μάλιστα τῶν μαλακίων εὔθρυπτον καὶ ἁπαλὸν τὸ σαρκῶδες, Epicharmos fr. 54 K-A ποταναὶ τευθίδες, Pliny *NH* 18.361 *lolligo volitans*, 32.15, Cic. *Div.* 2.145 *gubernatores cum exsultantis lolligines viderunt … tempestatem significari putant*, Ael. *NA* 9.52.

40.292-3 φώκη … πολύποδα ἔχουσα] Edd. from 1541 on have come to read φωνὴ … πολύπλοκον ἠχοῦσα, "a voice re-echoing in a harbour and making a confused sound indicates a storm" (Wood), which substitutes an unspecified sound for the (as usual) specific sign, here a seal doing something quite distinct. Seals, moreover, are fond of harbors. (Th. fr. 362A mentions that a seal in threat of being captured vomits its rennet.) It is true that the sound of the sea itself can be read for signs of storms, etc. (cf. Pliny *NH* 18.359 *mare si tranquillum in portu cursitabit murmurabitve intra se, ventum praedicat, si idem hieme, et imbrem, litora ripaeque si resonabunt tranquillo, asperam tempestatem, etc.*), but φωνή is used almost exclusively of articulate (usually human) voice, and, as Aristotle nicely puts it for our purposes, φωνὴ καὶ ψόφος ἕτερόν ἐστι (*HA* 535a27 f.). Cronin "Authorship" 332 is sympathetic to φώκη, but, believing it to be a conjecture of Coray, keeps to the φωνή of Schneider and Wimmer's text.

40.292-3 ἀποψοφοῦσα] Normally used of farts, but not out of place here since the snorts of seals are rather fartlike and they were thought of as smelly animals; cf. *Od.* 4.442 φωκάων ἁλιοτρεφέων ὀλοώτατος ὀδμή, Aristoph. *V.* 1035 = *Pax* 758 φώκης δ' ὀσμήν.

40.293 πολύποδα] The Greek *polypo(u)s* has a varied morphology, but πολύποδος, –ου, is not one of them; see LSJ s.v. πολύπους (B), Olson-Sens on Archestratos fr. 54.1. Hence read πολύποδ' or πολύποδα. Octopods make good eating; cf. Archestratos loc. cit. = fr. 184 *SH*. They

even occasionally, it was said (e.g., Hes. *WD* 524), nibbled on themselves when hungry; Thompson *Fishes* 207 f.

40.293-4 πλεύμονες οἱ θαλάττιοι] "A jellyfish or Medusa; perhaps from its rhythmical pulsation, as if breathing" (Thompson *Fishes* 203), but more likely from its snake-like appendages. Cf. Pliny *NH* 18.359 *pulmones marini in pelago plurium dierum hiemem portendunt*, 32.15, Cic. *Div.* 2.145. πλεύμων came to be spelled πν-, thanks to a false derivation from πνεῦμα (so LSJ and Chantraine), but even as late as the first cent. AD, a *defixio* kept πλεύμων (written twice) distinct from πνεῦμα (four times); *Hesperia* 6 (1935) 383. Moeris p. 309 states that πλεύμων is Attic, πνεύμων Hellenic (i.e., the form in general use), which may have been true is his day (ii c. AD), since the Modern Greek word is πνεύμων.

40.295 πρόβατα] Sheep, pigs, and goats, as Aratos (1068-74) spells out:

θήλειαι δὲ σύες, θήλεια δὲ μῆλα καὶ αἶγες
ὀππότ' ἀναστρωφῶσιν ὀχῆς, τὰ δέ γ' ἄρσεσι πάντα
δεξάμεναι πάλιν αὖτις ἀναβλήδην ὀχέωνται,
... μέγαν χειμῶνα λέγοιεν.
ὀψὲ δὲ μισγομένων αἰγῶν μήλων τε συῶν τε
χαίρει ἄνολβος ἀνήρ, ὅ οἱ οὐ μάλα θαλπιόωντι
εὔδιον φαίνουσι βιβαιόμεναι ἐνιαυτόν.

Cf. Arist. *HA* 575b17-19 ὅταν δὲ πολλαὶ κύωσι (sc. βόες) καὶ προσδέχωνται τὴν ὀχείαν, σφόδρα δοκεῖ σημεῖον εἶναι καὶ χειμῶνος καὶ ἐπομβρίας, Ael. *NA* 7.8 ἀναβαινόμενα δὲ (sc. πρόβατα) τὰ αὐτὰ πρωὶ πρώιον χειμῶνα ὁμολογεῖ, *Geop.* 1.4.2 καὶ αἶγες καὶ οἷες ὀχευθεῖσαι, καὶ πάλιν ὀχεύεσθαι βουλόμεναι μακρότερον σημαίνουσι χειμῶνα, Anon. Laur. 11.5 (goats and pigs). Where *DS* says "early," Aratos and later texts say "again and again."

41

41.297 πρόβατα ἢ βόες ὀρύττωσι] Cf. Aratos 1082-85

εἰ δὲ βόες καὶ μῆλα μετὰ βρίθουσαν ὀπώρην
γαῖαν ὀρύσσωσιν, κεφαλὰς δ' ἀνέμοιο βορῆος
ἀντία τείνωσιν, μάλα κεν τότε χείμερον αὐταὶ
Πληϊάδες χειμῶνα κατερχόμεναι φορέοιεν.

Geop. 1.4.3 καὶ ἐὰν τὰ βοσκήματα τὴν γῆν κατορύσσῃ, καὶ τὰς κεφαλὰς πρὸς βορρᾶν τείνῃ, χειμῶνα μέγαν προαγορεύουσιν, Anon. Laur. 11.13, Ael. *NA* 7.8.

41.299-300 ἐν δὲ τῷ Πόντῳ … νέμεσθαι] This sentence is regarded as corrupt by Wimmer, Wood, and Hort, in part because an apodosis is missing, but (punctuating before θᾶττον) we think that it is no more abrupt than others in this immediate vicinity (and elsewhere in this work). Cf. the passages from Aratos and the *Geoponica* (and the similar ones in Aelian and Anon. Laur.) cited above. Although neither has the business about Pontos and the rising of Arktouros (ca. Sept. 8; above, 2,12-13), Aratos' reference to the later setting of the Pleiades may have been intended as a variation the latter. O. Wenskus, *Astronomische Zeitangaben von Homer bis Theophrast* (Stuttgart 1990) 144 regards ἀνατεῖλαι as an ingressive aorist.

41.300-01 μᾶλλον ἐσθίοντες] For this motif, see above on 39.280.

41.301 ἐπὶ τὸ δεξιὸν κατακλινόμενοι] Cf. Aratos 1116 κοίτῳ πλευρὰς ἐπὶ δεξιτερὰς τανύσωνται. For the converse, see below, 54.395. The two are combined in Ael. *NA* 7.8 ὅτι δὲ βοῦς, ἐὰν μέλλῃ ὕειν ὁ Ζεύς, ἐπὶ τὸ ἰσχίον τὸ δεξιὸν κατακλίνεται, ἐὰν δὲ εὐδία, πάλιν ἐπὶ τὸ λαιόν, θαυμάζει ἥ τις ἢ οὐδείς, Anon. Laur. 11.9 f., *CCAG* 8.1.137. This passage of Aelian gathers the most cattle signs; it continues: "And I have also heard the following facts which are calculated to astonish one. If an ox bellows and sniffs the air, rain is inevitable. And if oxen eat copiously and more than is their custom, it portends a storm. When sheep dig the ground with their hoofs, it is likely to mean a storm; and if the rams mount them early in the day, it promises an early storm; and the same when goats lie huddled together. When pigs appear in cornland, they inform us that rain is departing. Now when lambs and kids leap on one another and frisk about, they promise a bright day … And if beasts of burden gambol and low more than is their custom, it shows that storm and rain are on their way; and if besides, they toss up the dust with their hoof, it signifies the same" (tr. A. F. Scholfield).

41.302 ὦτα κρούων ὄνος] An ass producing a cracking noise with its ears? Schneider prefers οὖδας. With no parallel in any of the related sources, this passage remains unclear. κρούω generally means to make a noise by knocking one thing against another.

41.303-04 προπαρασκευάζονται γάρ] An explanation! The verb was probably invented by Thucydides but found favor with fourth-century writers (Plato, Aristotle, Xenophon, Isaios).

41.304 μῦες τρίζοντες καὶ ὀρχούμενοι] Cf. Aratos 1132 f. (as a sign of storm) μύες τετριγότες εἴ ποτε μᾶλλον | εὔδιοι ἐσκίρτησαν ἐοικότα ὀρχηθμοῖσιν, Ael. *NA* 7.8 γαλαῖ δὲ ὑποτρίζουσαι καὶ μύες ἐκείναις δρῶντες τὰ αὐτὰ χειμῶνα ἔσεσθαι συμβάλλονται ἰσχυρόν, *Geop.* 1.3.13, Anon. Laur. 12.2, *CCAG* 8.1.137,13.

42

42.305 κύων] Cf. Arat. 1135 f. κύων ὠρύξατο ποσσὶν | ἀμφοτέροις χειμῶνος ἐπερχομένοιο δοκεύων, *Geop.* 1.3.11 κύνες ὀρύσσοντες τὴν γῆν χειμῶνα δηλοῦσι, Anon. Laur. 11.28.

42.305 ὀλολυγών] Cf. above, 15.100, χλωρὸς βάτραχος ἐπὶ δένδρου ᾄδων, as a sign of rain, as is Arat. 948 τρύζει ὀρθρινὸν ἐρημαίη ὀλολυγών. This would seem to suggest that here as well as in Aratos we are again dealing with a (tree) frog, but the vague name "cryer" led some ancient scholia to identify this animal with one or another bird (owl, nightingale, swallow) or cicada (cf., e.g., scholl. ad Arat. 948, Theokr. 7.139). For the most part, however, modern commentators favor the identification with the tree frog. Arist. *HA* 536a11 says that the mating cry of a male frog in a pond is an ὀλολυγών (sim. Plut. *Sollert. Anim.* 982e βάτραχοι … λαμπρύνουσι τὴν φωνήν, ὑετὸν προσδεχόμενοι, Ael. *NA* 9.13 ὅταν δὲ βάτραχοι γεγωνότερον φθέγγωνται καὶ τῆς συνηθείας λαμπρότερον, ἐπιδημίαν δηλοῦσιν ὑετοῦ) and Pliny *NH* 11.172 f., who seems to allude (perhaps indirectly) to the Aristotle passage, says that the male frog was called an *ololygon*, since it made this kind of mating call. Moreover, as Kidd points out, the Aratean context suggests that he too took it as a frog, or at any rate not a bird, since he collects bird signs elsewhere. Other passages where this same question is raised are Theokr. 7.139 (frog acc. to Gow), Euboulos fr. 102 K-A = 104 K (frog, acc. to Hunter ad 104), Nikainetos fr. 1.9 Powell, and Agathias Schol. 5.5 Viansino (*AP* 5.292; most likely a bird). See further S. Oliphant, "ἡ ὀλολυγών—What was it," *TAPA* 47 (1916) 85-106, Pease on Cic. *Div.* 1.14 (where Cicero translates Aratos' ὀλολυγών as *acredula*); F. Harder, "*Acredula*, ὀλολυγών," *Glotta* 12 (1923) 137-144, H.

White, *Studies in Theocritus and other Hellenistic Poets* (Amsterdam 1979) 9-16.

42.306 ἀκρωρείας] See above, on 21.140.

42.306 γῆς ἔντερα] Why our prosaic text should suddenly employ a kenning may seem a mystery, as perhaps kennings were in origin meant to be; see I. Wærn, *Γῆς ὄστεα: The kenning in pre-Christian Greek poetry* (Uppsala 1951) 70-74; 44 on γῆς ἔντερα. More likely, the term originated among farmers (see West on Hes. *WD* 524 ἀνόστεος) and in this case became a rather well known knickname, one found also in Arist.; cf. *IA* 705a27, 709a28, *GA* 762b26 (eel larvae? see Thompson *Fishes* 59), *HA* 570a16, in all of which Aristotle apologetically says καλούμενα *vel sim.*, as does Aratos 958 f. πλαζόμενοι σκώληκες | κεῖνοι, τοὺς καλέουσι μελαίνης ἔντερα γαίης, Pliny *NH* 18.364 *vermes terreni erumpentes*, Hesych. s.v. γαφάγας (a Syracusan word). Note also the didactic poem of Noumenios of Herakleia, which explains the term as clearly as possible: οἱ μὲν ἴουλοι | κέκληνται, μέλανες, γαιηφάγοι, ἔντερα γαίης (*SH* 584.2 f.). But *DS* (like Nikandros *Ther.* 388) feels free to use the kenning without further explanation. Two illustrated medieval mss. depict them as worms (clearly distinct from the snakes illustrated elsewhere in each ms.): Morgan M.652 f.201^{v}, Vat. Chis. 53 (F vii 159) f.231^{v}; see Z. Kádár, *Survivals of Greek Zoological Illuminations in Byzantine Manuscripts* (Budapest 1978), plates 66.2, 86.3.

42.307-08 πῦρ ... λύχνος] An open fire vs. an oil lamp, the former most likely the hearth fire, the igniting of which was tended to by the male head of the household; cf. Aisch. *Ag.* 1435 f. ἕως ἂν αἴθῃ πῦρ ἐφ' ἑστίας ἐμῆς | Αἴγισθος. On lamps see on 13.89 and 14.91.

42.308 τέφρα] Probably the build-up or hardening of white ash presages the white snow to come, just as a greater than usual number of white birds does. Cf. Aratos 1037 f. δὴ γὰρ καὶ ἀεικέϊ τέφρῃ | αὐτοῦ πηγνυμένῃ νιφετοῦ ἐπιτεκμήραιο, Pliny *NH* 18.358 *cum cinis in foco concrescit.*

42.309 νιφετὸν σημαίνει] Since νιφετός is a noun, not an adjective, V's verb is necessary.

42.309 λύχνος] The mss. have λυχνίας, elsewhere only attributed to Plato Comicus (fr. 159 K-A) by Pollux as a kind of stone, but since stones (coal excepted) do not burn (καιόμενος), alteration of the text was called for.

42.309 εὐδίας ἡσυχῇ] As it stands in the mss., a lamp burning gently (ἡσυχαῖος) during calm weather signals a storm, which is not likely (unless one allows for the banal fact that sooner or later a storm will follow anything). Our conjecture is suggested by Aratos 1035, whose context replicates that of this chapter, πῦρ αὔηται σπουδῇ (= with difficulty) καὶ ὑπεύδια λύχνα. For ἡσυχῇ = "slightly," especially with participles, cf. Th. *HP* 3.14.1 φύλλον … περικεχαραγμένον ἡσυχῇ, "slightly jagged," Plut. *Alex.* 4 ἡ. κεκλιμένος. At 54.398 ἡσυχαῖος can stay. LSJ s.v. ἡσυχαῖος conjecture ἡσυχαῖον (adverb).

42.310 καὶ ἐὰν μέλαιναι φλόγες αἰθύσσωσι χειμέριαι] Omitted by all printed editions. Echoed by Aratos, however, shows that it is original: 1034 φλόγες αἰθύσσωσι μελαινόμεναι λύχνοιο; cf. *Geop.* 1.3.9 = Anon. Laur. 11.34 λύχνου φλόγες μελαινόμεναι. Kidd, knowing *DS* only from printed editions, reasonably defended the variant μαραινόμεναι found in some mss. of Aratos, but now that "dark" in *DS* and Anon. Laur. chronologically brackets Aratos, μελαινόμεναι should be read in Aratos too. "Dark" (see above, on 22.153) presumably means "not bright, dim," so that μαραινόμεναι is not only an easy paleographical error, it is nearly synonymous with the true reading.

42.311 μύκαι] See 14.91, 34.248, 54.399.

43

43.314 ῎Ονου Φάτνη] If dark alone, a sign of rain; if "drawn up" as well, a sign of storm. The atmospheric conditions that presage storm obscure the spaces within the diffuse nebula, making it appear more compact; cf. Parmenides 28 B 2.4 f. for the implied opposition, οὔτε σκιδνάμενον … οὔτε συνιστάμενον.

43.315 ἀστραπὴ … μὴ ἐν τῷ αὐτῷ] Cf. 21.138 ἀστραπαὶ … πανταχόθεν, another way of saying the same thing, this time as a sign of rain. For the thought spelled out in detail, cf. Aratos 933-937

αὐτὰρ ὅτ' ἐξ εὔροιο καὶ ἐκ νότου ἀστράπτῃσιν,
ἄλλοτε δ' ἐκ ζεφύροιο καὶ ἄλλοτε πὰρ βορέαο,
δὴ τότε τις πελάγει ἔνι δείδιε ναυτίλος ἀνήρ, 935
μή μιν τῇ μὲν ἔχῃ πέλαγος τῇ δ' ἐκ Διὸς ὕδωρ·
ὕδατι γὰρ τοσσαίδε περὶ στεροπαὶ φορέονται.
Verg. *G.* 1.370-373, Pliny *NH* 18.354, *Geop.* 1.3.3.

43.316 λάμψῃ παρά] λήψῃ (and, in the following clause καταλήψῃ) cannot stand; (–)λάμψῃ makes immediate sense. Poetry can get away with using the simplex of this verb in a transitive sense (although even this is not straightforward; see Kannicht on Eur. *Helen* 1311), but ordinary prose needs a preposition here. κατά, favored by eds., is reasonable in light of the following complex, but we prefer the paleographically more attractive παρά, with the same sense (haplography with Πάρνηθα).

43.316-17 Πάρνηθα καὶ Βρίλλητον καὶ Ὕμηττον] All visible from Athens. "Parnes [1413 m high] lies 13 miles due N. of Athens and is the eastern … point of the range running east and west, which separates Boeotia from Megaris and Attica. Brilettus [1110 m high] lies about the same distance to the N.E … . This range attains an elevation of 3,636 feet, and is more generally known as Pentelicus … . Hymettus [1027 m high] … lies five miles to the S.E" (Wood 69 n. 52). Sokrates tells Strepsiades that the Cloud chorus is on their way from Mt. Parnes: βλέπε νῦν δευρὶ πρὸς τὴν Πάρνηθ'· ἤδη γὰρ ὁρῶ κατιούσας | ἡσυχῇ αὐτάς … . χωροῦσ' αὗται πάνυ πολλαὶ | διὰ τῶν κοίλων καὶ τῶν δασέων (*Clouds* 323-325). As was mentioned above, on 3.17, ὄρη, mountains were often associated with weather (and their signs). Pausanias 1.32.2 records that on Mt. Parnes there was an altar of Zeus Σημαλέος, the god of signs; and that on Mt. Hymettos there was a statue of Zeus Ὄμβριος.

43.317 ἅπαντα] Cf. ὅλως below. It looks as though someone took Phaeinos' observations from Mt. Lykabettos (above, 4.25) and those of two other observers located near Mts. Athos and Olympos, and then generalized from the particular. There is a similar generalization involving Mt. Athos at 34.244 f.

43.320-1 ὅλως ὀρέων κορυφαί … χειμέριον] See the Archilochos fragment cited below, 45. But when the clouds have cleared it is a sign of

fair weather; cf. *CCAG* 4.4.110 (text above, p. 28), which offers several ways to "read" mountain tops.

43.322-3 γενομένης … οὔπω] The rainstorm has stopped where the observer is, but, as the cloud shows, it is not yet over.

43.323 τιλλόμενον] Since clouds are visually comparable to sheep (see above, on 13.81), "plucked" is probably the metaphorical sense here; cf. *P.Cair.Zen*. 4.33 (iii b.c.) for the plucking rather than the more usual shearing of sheep. Aratos 1014 essentially offers the same sign of storm in litotes: οὐδέ ποθεν νεφέλαι πεπιεσμέναι ἀντιόωσιν. The clouds described here are probably cirrus fibratus, high clouds that do in fact often precede storms; see Dunlop 70, Ludlum 38.

44

The attempts to correlate the nature of the seasons in this chapter are reminiscent of some in Hipp. *Airs Waters Places*, e.g., 10 ἦν δὲ ὁ μὲν χειμὼν αὐχμηρὸς καὶ βόρειος γένηται, τὸ δὲ ἦρ ἔπομβρον καὶ νότιον, ἀνάγκη τὸ θέρος πυρετῶδες γίνεσθαι καὶ ὀφθαλμίας καὶ δυσεντερίας ἐμποιεῖν. The last clause gives the medical consequences that are Hippokrates' ultimate concern; all that *DS* offers along these lines is the famine suffered by the πρόβατα. Cf. also Pliny *NH* 18.351, and below, cc. 48, 56. *DS* names five seasons in this chapter: μετόπωρον, χειμών, ἔαρ, θέρος, ὀπώρα.

44.326 ἔαρ οὐ γίνεται] The opposite of a καλὸν ἔαρ are conditions like those of the preceding cold season or those of the following hot one; hence, as in English, one can say that "we had no spring this year." Wimmer's conjecture is unnecessary.

44.328 σκωρία γίνεται ἐπιεικής] The mss. present an altogether odd sentence: "If the dross [the only definition given for σκωρία by LSJ] becomes fitting/suitable, there will usually be hunger among the cattle." Bart. translates as *erubigo*, a post-classical word evidently meaning a "shameful thing," which suggests that Bart. understood the word's semantic field to be that of σκῶρ,"dung." This reasonable interpretation would now have the farmer reading the cattle's dung for signs of their future health, but this would not be a weather sign. Changing σκωρία to

ὀπώρα or ἔαρ (the first more attractive paleographically) takes care of (i). Schneider printed σκωρία, but still recognized the problem of (ii): "Ipsa observatio obscura est propter dubiam vocabuli ἐπιεικής significationem' (2.602). I.e., to rephrase our question above, Why would anything *appropriate* signal something bad like famine? A quick and easy solution is to insert a μή in the protasis or read ἀνεπιεικής (and then extend its semantic range ["unreasonable, unfair," LSJ] to mean "unseemly"). After this not very admirable alteration, however, we would still have a sentence that not only offers too vague a sign (an unsuitable season), but one that stands out in *DS* in not predicting weather but a possible consequence (famine) of this unsuitable season. Crucification seems the safest course.

45

45.332 πρῖνοι] This one Greek word describes (at least) two distinct varieties of trees, the holm oak (*Quercus ilex*) and the kermes (or holly) oak (*Q. coccifera*). Th. describes the varieties of oaks (δρῦς) at *HP* 3.5.2-7, nearly all of which (the ἄσπρις is said to be an exception) bear fruit, but one of these does he call πρῖνος, which in fact he explicitly distinguishes from the oak at 3.16.1: ὁ δὲ πρῖνος φύλλον μὲν ἔχει δρυῶδες, ἔλαττον δὲ καὶ ἐπακανθίζον, τὸν δὲ φλοιὸν λειότερον δρυός. αὐτὸ δὲ τὸ δένδρον μέγα, καθάπερ ἡ δρῦς … . καρπὸν δὲ ἔχει βαλανώδη· μικρὰ δὲ ἡ βάλανος … . φέρει δὲ παρὰ τὴν βάλανον καὶ κόκκον τινὰ φοινικοῦν. Here Th. may be describing the holm oak, which can attain a height of ca. 15 m, whereas the kermes oak is "usually encountered as a low impenetrable holly-like bush … . If left undisturbed, holly oak can grow into a small tree, but trees are only occasionally seen in the wild" (Polunin, *Trees and Bushes of Europe* [London 1976] 54). The fruit of both holm and kermes oaks is called ἄκυλος. All this is enough to distinguish these trees for modern readers in general, but not enough to tell us which tree is intended in *DS*, but as both are evergreen we follow Kidd in so translating. Cf. Aratos 1047 f. πρῖνοι μὲν θαμινῆς ἀκύλου κατὰ μέτρον ἔχουσαι | χειμῶνός κε λέγοιεν ἐπὶ πλέον ἰσχύσοντος, *Geop.* 1.4.1 πρῖνοι καὶ δρῦες τὸν καρπὸν πολὺν φέρουσαι ἐπὶ πλεῖον ἔσεσθαι τὸν χειμῶνα δηλοῦσι, combines the two broad varieties of oaks; sim. Anon. Laur. 11.47. See below, 49.357. See further Polunin *op. cit.* 52, 55 f., 199. For a survey of plants as weather signs, see McCartney, *CW* 17 (1924) 105-108.

45.332 σφόδρα] Often combining with a form of πολύς, "very many" (Wood; LSJ I 2), although Aratos (and his two Greek followers; see above) may be justified in taking it with χειμών; cf. Arist. *HA* 599a19 ἐν τοῖς σφόδρα ψύχεσιν καὶ ἐν ταῖς σφόδρα ἀλέαις (LSJ I 3).

45.333 ἐπὶ κορυφῆς ὄρους νέφος] Cf. Pliny *NH* 18.356 *cum in cacuminibus montium nubes consident, hiemabit*, where, note, nothing is said about the cloud's standing upright, which, if not a notion deriving directly from the Archilochos passage, may be a description of towering cumulus clouds, which build up with much moisture before storms (Kahl 69).

45.334 Ἀρχίλοχος] This trochaic passage (fr. 105 West) is quoted most fully by Herakleitos *Alleg. Hom.* 5.2, who not only completes the third line (with κιχάνει δ' ἐξ ἀελπτίης φόβος), he also, along with Plutarch, provides a word after ἄκρα, which is most likely Γυρέων (which is missing from *DS*; the mss. in the other sources are not in agreement). The Γύραι are a possible name for the peaks on Tenos, visible from Archilochos' Paros, as well as from Delos, where Cicero wrote of them with an allusion to Archilochos (see below); see F. H. Sandbach, "Ἄκρα Γυρέων once more," *CR* 56 (1942) 63-65. D'Arcy W. Thompson, "Archilochus, fr. 56," ibid. 55 (1941) 67, had argued for reading ἄκρα γ' οὐρέων, but we suspect that the second word here was omitted intentionally in *DS* precisely because it was a proper name and thus detracted from the general message that the author wanted to find. J. S. Clay, "ΑΚΡΑ ΓΥΡΕΩΝ: Geography, allegory, and allusion (Archil. fr. 105 W)," *AJP* 103 (1982) 201-203, agrees with C. M. Bowra, "Signs of storm (Archil. fr. 56 [D])," *CR* 54 (1940) 127-129, that there is an allusion here to the Γυραίη πέτρη of Hom. *Od.* 4.500 ff., where the lesser Aias met his death, and hence—Clay's point—Archilochos' reference is only a literary allusion and the Γύραι are not to be looked for on any map of the real world. See also M. Durán, "Los ἄκρ' ἀγυρέων y la berrachera simpatico en el fr. 105 W de Arquíloco," *Faventia* 23 (2001) 41-49.

On the phenomenon in question Sandbach aptly quotes from K. G. Fiedler, *Reise durch alle Theile des Königreiches Griechenland* (Leipzig 1841) 2.256: "An dem hohen Felsenkamme sammeln sich bei übrigens heiterem aber stürmischen Wetter Wolkendünste und bilden starken Nebel, aber nur so weit bis sie die höchsten Kuppen verlassen, dann lösen sich die schnell darüber gejagten Dünste wieder auf zu klarer Luft.

Zeigt Tschiknia ein umnebelt Haupt, so sucht der Schiffer einen Hafen zu erreichen, denn stärker und stärker wird der Sturm, bis Tschiknia klar wieder zum Himmel schaut." (Herakleitos reads the Archilochos passage as a political allegory, but all we care about here is the primary meteorological level.) E. Maass, *Aratea* (Berlin 1892) 355 thought that Aratos 920 νεφέλη ὄρεος μηκύνεται ἐν κορυφῇσιν derives from the Archilochos passage, a suggestion that Kidd passes over in silence.

The complete fragment of Archilochos 105 W runs as follows:

> Γλαῦχ' ὅρα· βαθὺς γὰρ ἤδη κύμασι ταράσσεται
> πόντος, ἀμφὶ δ' ἄκρα Γυρέων ὀρθὸν ἵσταται νέφος,
> σῆμα χειμῶνος, κιχάνει δ' ἐξ ἀελπτίης φόβος.

DS paraphrase the beginning of v. 4, which is given correctly by Herakleitos and Plut. *De Superst.* 8.169b. ἄκρα rather than *DS*'s ἄκρας is guaranteed by meter and Cic. *Ad Att.* 5.12.1 *omnia* ἄκρα Γυρέων *pura*.

45.336 ὁμόχρως ᾗ ὑμένι λευκῷ] Sc. νεφέλη, which Furlanus (approb. Schneider) printed. ὁμόχρως, no doubt the correct reading, is used by both Arist. (*HA* 749a22) and Th. (*HP* 9.4.10 [a likely conjecture for ὁμόχρω] and *De Sens.* 37 τὴν ὄψιν ὁμόχρων ποιεῖ τῇ νυκτί). This last passage also shows how to construe ours: "like in color to a white membrane." (Hort wonders unnecessarily whether "ὁμοῖον has perhaps dropped out after ὁμόχρων.") Any smooth covering can be called a ὑμήν, even one made of metal (cf. LSJ s.v.) Here the reference may be to cumulonimbus clouds, which "are huge masses of liquid and solid water … . Strong winds that flow over the tops of these clouds can freeze into a saucer-shaped cloud" (Kahl 71, with photo), which is called a pileus by the meteorologists but which could easily have been described by a Greek as a membrane.

ὁ πομοχρως in the codd. probably arose when a scribe meant to cancel the word misspelled ο̣̽ποχρως, which was ignored by a later scribe. We owe this suggestion to Maria Vasiloudi.

45.337 ἑστώτων νεφῶν ἕτερα ἐπιφέρηται] It is, as the grammar does not quite make clear, the moving not the stationary clouds that bring rain. They are the "floating clouds" Th. fr. 192 describes: τὰς ὑπόμβρους μάλιστα καὶ περιφερομένας ἐκάλουν πλωϊάδας, ὡς Θεόφραστος ἐν τετάρτῃ *Περὶ μεταρσίων* εἴρηκε κατὰ λέξιν, "ἐπεὶ καὶ αἱ πλωϊάδες αὗται νεφέλαι καὶ αἱ συνεστῶσαι, ἀκίνητοι δὲ καὶ τοῖς χρώμασιν ἔκλευκοι, δηλοῦσι διαφοράν τινα τῆς ὕλης, ὡς οὔτ' ἐξυδατου-

μένης οὔτ' ἐκπνευματουμένης" (to make sense, the "matter" of the last clause must refer only to that of the stationary clouds). And just as the Theophrastos passage helps us understand this one; it is *DS* that helps us see more clearly that these clouds "float" in relationship with other, "stationary," clouds. Cf. Aratos 1018-20 (expect storm) ὁππότε ταὶ μὲν ἔωσιν | αὐτῇ ἐνὶ χώρῃ νεφέλαι, ταὶ δ' ἄλλαι ἐπ' αὐταῖς, | ταὶ μὲν ἀμειβόμεναι, ταὶ δ' ἐξόπιθεν, φορέωνται. The situation described here can occur when air is both rising and sinking, bringing two types of clouds together in the sky before a thunderstorm; Kahl 85.

46

46.338 ὁ ἥλιος] There's a problem here. These words are missing in Bart. and the Aldine and appear as οὗ in V, an odd assortment, considering that Ald.'s exemplar H must have had it, since it appears in H's exemplar P and in H's descendant C, as well as in all other mss. except L, which derives from Ald. (Grynaeus marks the omission with an asterisk; Schneider and Wimmer print ὁ ἥλιος in brackets, i.e., as though this were an editorial insertion.) This cannot, it seems, be another place where a printer's inkblot had obscured the Greek; see above, on 34.244. None of Aratos' many sun signs (819-891) matches this one. No ms. affiliation can explain this. It may be the case that DS's original was ὁ μήν, which, as often happens (as in fact it does elsewhere in some mss. of *DS*) an archetype for all mss. (including Bart.'s exemplar) had written with a symbol for the moon: "ὁ ☽." This, if corrupted early, would explain its loss in Bart. and V's οὗ. Its corruption, furthermore, led to something illegible or otherwise incomprehensible, and then to the scribe of M or a predecessor supplying what must have seemed a reasonable conjecture, sun rather than moon. So far, so good. What remains to be explained is its loss in Ald., for which we are forced to rely on a most unlikely coincidence, that once again, as at 34.244, ink hid what H had, and this was the very word lost to the tradition earlier. And if so, where did Furlanus, who did not go back to M to get the correct "Athos," come up with ὁ ἥλιος? Did he guess and come up with it by guess work, just as we are, for the sake of argument, are imaging that M or an anscestor did?

46.339 Ἑρμοῦ ἀστήρ] Since nobody needs sight of the planet Mercury to know that winter will be cold and summer hot, the notion of "excessive" cold and heat is perhaps implicit. Aratos has no use for any

of the planets, dismissing them in a few lines (454-461). When he says οὐδ' ἔτι θαρσαλέος κείνων ἐγώ (460), he really means that he could find little on them in earlier literature useful for his purposes (including the predicting of weather). This passage provides the strongest link to Theophrastos' *De Signis*, for in Th. fr. 194 we learn that the Chaldaeans made predictions about individuals and not only meteorological phenomena, which affect many people in common; e.g.: τὸν ἀστέρα τοῦ Ἑρμοῦ χειμῶνος μὲν ἐκφανῆ γενόμενον ψύχη σημαίνειν, καύματα δὲ θέρους εἰς ἑκάστους ἀναπέμπειν· πάντα δ' οὖν αὐτοὺς (τοὺς Χαλδαίους) καὶ τὰ ἴδια καὶ τὰ κοινὰ προγινώσκειν ἀπὸ τῶν οὐρανίων ἐν τῇ *Περὶ Σημείων* βίβλῳ φησὶν ἐκεῖνος (Proklos *In Pl. Tim.* 40cd), where note that once again that one wants to insert the word "excessive" twice; see Regenbogen 1412-15. As Cronin "Authorship" 310 notes, however, the work alluded to by Proklos in fr. 194 clearly had a wider scope than *DS*.

Mercury as a weather sign is most fully discussed in Germanicus Caesar *Aratea* fr. 4.110-136. Cf. also Pliny *NH* 11.37; R. Böker, *RE* Supplb. 9 (1962) 1643 f., McCartney *CW* 27 (1933) 25 f. On the Chaldaeans' use of Mercury in predictions, see P. Kingsley, "Meetings with Magi: Iranian themes among the Greeks, from Xanthus of Lydia to Plato's Academy," *J.Roy.Asiatic Soc.* 3.5,2 (1995) 205-207, who cites references in Mesopotamian astrological literature to the predictive nature of the appeance (φαινόμενος, prob. the heliacal appearance) of Mercury.

46.341 μέλιτται] Cf. Arist. *HA* 627b10-13 προγινώσκουσι δὲ καὶ χειμῶνα καὶ ὕδωρ αἱ μέλιτται· σημεῖον δέ, οὐκ ἀποπέτονται γὰρ ἀλλ' ἐν τῇ εὐδίᾳ αὐτοῦ ἀνειλοῦνται, ᾧ γινώσκουσιν οἱ μελιττουργοὶ ὅτι χειμῶνα προσδέχονται. Aratos 1028-30

> οὐδ' ἂν ἔτι ξουθαὶ μεγάλου χειμῶνος ἰόντος
> πρόσσω ποιήσαιντο νομὸν κηροῖο μέλισσαι,
> ἀλλ' αὐτοῦ μέλιτός τε καὶ ἔργων εἰλίσσονται,

Ael. *NA* 5.13 οἶδε δὲ ἄρα ἡ μέλιττα καὶ ὑετοῦ ἀπειλοῦντος ἐπιδημίαν καὶ σκληρὸν πνεῦμα ἐσόμενον, Verg. *G.* 4.191-194, Pliny *NH* 11.10, 18.364. If by ἐν τῇ εὐδίᾳ *DS* means that when bees do not stray far in fair weather a storm is on the way, the phrase would have better been placed earlier in the sentence. It is clear, however (and illustrative of the way in which *DS* was compiled) that the sentence derives from Aristotle (or a closely related source), where the reversed word order, ἐν τῇ εὐδίᾳ αὐτοῦ, is somewhat clearer (but note that D'Arcy W. Thomp-

son thought it necessary to translate freely to bring out the sense: "*even* while it is *as yet* fine … within a restricted space"; emphasis added). On αὐτοῦ, "here," it should be noted that in the context of a work on weather signs such a phrase is not needed and in fact rarely stated; moreover, and more significant, it is only the immediate context (especially in contrast to μακράν) that directs us to understand αὐτοῦ in the specific sense "home"; cf. Pliny *NH* 18.364 *apes conditae*. Elsewhere (not excluding Aratos; see below), the word needs further specification of location, whether thanks to context (as in the Aristotle passage, where the word "home" appeared in the preceding sentence), with an adverb alone (ἔνθα(δε), κεῖθι, τῇ, ταύτῃ), or with a prepositional phrase (τῷδ' ἐνὶ χώρῳ, κατ' οἴκους, περὶ τεῖχος—all exx. taken from the entry s.v. in LSJ). (In spoken dialogue, it may appear alone because the speaker's location provides all the information needed to know where "here" is; e.g., Eur. *HF* 1397 αὐτοῦ γενοίμην πέτρος.) What about Aratos? According to Kidd, who takes μέλιτός τε καὶ ἔργων with εἰλίσσονται, he uses αὐτοῦ in the same bare sense as in *DS*. We think, however, that he is mistaken to compare εἰλίσσονται to the two forms of πονέομαι that take genitives in two passages in Aratos (82, 758), and that Aratos has based his line on something like *Od.* 4.639 αὐτοῦ ἀγρῶν, with μέλιτός τε καὶ ἔργων as hendiadys for "The place where the honey is worked," i.e., the hive. If this is so, ἐν τῇ εὐδίᾳ could well be a corruption of a phrase meaning "near the hive."

46.341 ἐν τῇ εὐδίᾳ] Note below 47 ἐν τῷ μετοπώρῳ, an odd construction for *DS*, both examples probably taken from the same source.

46.342 λύκος ὠρυόμενος] Cf. Aratos 1124-28

καὶ λύκος ὁππότε μακρὰ μονόλυκος ὠρύηται,
ἢ ὅτ' ἀροτρήων ὀλίγον πεφυλαγμένος ἀνδρῶν
ἔργα κατέρχηται, σκέπαος χατέοντι ἐοικὼς
ἐγγύθεν ἀνθρώπων, ἵνα οἱ λέχος αὐτόθεν εἴη,
τρὶς περιτελλομένης ἠοῦς χειμῶνα δοκεύειν.

A significant difference in Aratos is that the wolf comes to farmland not for food, as seems implicit in *DS*, but, rather unrealistically, for shelter. In addition, Aratos' amalgamation of the two wolf sentences produces only one sign, storm within three days. Cf. Ael. *NA* 7.8 λύκοι δὲ φεύγοντες ἐρημίας καὶ εὐθὺ τῶν οἰκουμένων ἰόντες χειμῶνος ἐμβολὴν μέλλοντος ὅτι πεφρίκασι μαρτυροῦσι δι' ὧν δρῶσι, *Geop.* 1.3.11, *CCAG* 8.1.138.11 = Anon. Laur. 11.30.

46.343 τριῶν ἡμερῶν. λύκος] The Aldine's alteration greatly improves the sense of the second wolf sentence and provides a balance between the two, τριῶν ἡμερῶν ending the first and εὐθύς the second.

46.343-4 εἰσίῃ χειμῶνος ὥρᾳ] Phrased thus to distinguish "winter" from "storm." The ἤ of the codd. after this phrase may be due to a scribe who, taking εἴσω χειμῶνος as "within the winter," wanted to contrast this with εὐθύς, but εἴσω + gen. to indicate time is late (LSJ s.v. εἴσω II). The odd contrast between πρὸς τὰ ἔργα and εἴσω led Schneider (approb. Maass *Arati Phaenomena* xxvi) to emend the latter to εἰσίῃ, now in contrast with ὁρμᾷ. The sense remains exactly the same.

47

47.346 σφῆκες] Cf. Aratos 1064-67:

αὐτὰρ ὅτε σφῆκες μετοπωρινὸν ἤλιθα πολλοὶ
πάντη βεβρίθωσι, καὶ ἐσπερίων προπάροιθε
Πληϊάδων εἴποι τις ἐπερχόμενον χειμῶνα,
οἷος ἐπὶ σφήκεσσι ἑλίσσεται αὐτίκα δῖνος.

Since Aratos' wasps signal the onset of winter (see Kidd), we may assume that this is another place where *DS* has confused the two meanings of χειμών.

47.346 ὄρνιθες λευκοί] Cf. Pliny *NH* 18.363 *hiemem et albae aves cum congregabuntur*, Anon. Laur. 11.37 ὄρνιθες λευκοὶ καὶ πολλοὶ φανέντες χειμῶνα δηλοῦσι ~ *CCAG* 8.1.138.17. What are these white birds? Hort suggests "gulls, etc."; Rackham (in the Pliny Loeb) "perhaps egrets." Their presumably unusual appearance in cultivated fields (inland) does suggest shore birds, but this sign may be a variant of that found in 17.116, where birds identified not by species or color but simply as those escaping the islands for the mainland signaled rain; notice that in his allusion to the passage at 17.116 Aratos 1094-96, although not mentioning white birds (which he never refers to) adds a reference to farms: οὐδὲ μὲν ὀρνίθων ἀγέλαις ἠπειρόθεν ἀνήρ | ἐκ νήσων ὅτε πολλαὶ ἐπιπλήσσωσιν ἀρούραις | ἐρχομένου θέρεος, χαίρει.

47.348 τὰ ἐργάσιμα] Originally sc. χωρία, as in Pl. *Leg.* 639a, [Arist.] *Probl.* 924a1; Xen. *Cyr.* 1.4.16 and *Cyn.* 5.15 have the shortened phrase.

47.348 σπεύδοντα] It may be that this is an error for σπεύδουσι, but there are parallels for participle + καί + finite vb. (usually in this order) in *main* clauses; cf. Hdt. 1.116 καὶ κατέβαινε ἐς λιτάς τε καὶ συγγνώμην ἑωυτῷ κελεύων ἔχειν αὐτόν, Xen. *Cyr.* 1.3.1 ἔρχεται αὐτή τε ἡ Μανδάνη πρὸς τὸν πατέρα καὶ τὸν Κῦρον … ἔχουσα. For other examples of dangling participles in *DS*, see above, on 1.5 ἃ μέν … λαβόντες, 30.210 ὀδαξῶν.

47.349-50 Πάρνηθος … νέφεσι] Visible from Athens, as in Aristoph. *Clouds* 323-325 (quoted above, on 43.317-18). See G. V. Lalonde, "Topographical notes on Aristophanes," *Hesperia Suppl.* 20 (1982) 80 f., who notes the connection between Mt. Parnes, clouds, and bad weather in in the first version of the *Clouds:* Aristoph. fr. 394 K-A ἐς τὴν Πάρνηθ' ὀργισθεῖσαι φροῦδαι κατὰ τὸν Λυκαβηττόν, as well as in the schol. ad *Nu.* 323 πᾶσαι γὰρ αἱ τῶν ὀρέων κορυφαὶ διὰ τὸ ὕψος ἀεὶ συννεφεῖς φαίνονται.

47.349 Φύλης] An Attic town on the road to Thebes, between Mts. Parnes and Kithairon. Since it lies somewhat SW of Parnes, the two καί-clauses should be understood as hendiadys, or, at the very least, the second one acting exegetically of the first. The passes between these two mountains are 600-900 m above sea level, and the mountains themselves are ca. 1430 m high; see M. Cary, *The Geographic background of Greek and Roman history* (1949) 73-75, with map.

48

48.351 πνίγη] "Hot spells": cf. *Probl.* 910a5 f. πνίγη σφοδρὰ γίνεται πολλά.

48.351 γίνηται … ἰσχυρῶς] For exx. of copulative vbs + advv., cf. Homer *Il.* 9.324 κακῶς δέ τέ οἱ πέλει αὐτῇ, Parm. 28 B 1.32 δοκίμως εἶναι, 8.11, πάμπαν πελέναι, Emped. 31 B 4 κάρτα πέλει; Chantraine, *Grammaire homerique* 2.9.

48.351 ἀνταποδίδωσι] The recompense described here is a specific instance of the balance of polarities found throughout Greek thought; see G. E. R. Lloyd, "Hot and cold, dry an wet in early Greek thought," *JHS* 84 (1964) 92-106; repr. in D. Furley & R. E. Allan (eds.), *Studies in Presocratic philosophy*, vol. 1 (London 1970) 255-280.

49

49.357 πρῖνοι] See above, 45.332.

49.359 σπάλακα] An interesting choice of variants, each an unusual animal. Although there is no parallel passage in the literature on weather signs to help us decide, we go with the reading of V alone, which is the more common of the animals. The (ἀ)σπάλαξ, the blind-rat (*Spalax typhlus*), which is a kind of mole best known for its poor sight (τυφλότερος ἀσπάλακος, Diogenianus 8.25; Arist. *HA* 533a1 ff. gives the ἀσπάλαξ as his first instance of an animal deprived of one of the five senses). Since it lives in the ground (ἀσπαλάκων αὐτόχθονα φῦλα, Oppian *Cyn*. 2.612), the packing of soil rich in clay (to facilitate drainage; see next lemma) in the vessel could be seen as an attempt to recreate a dark home for it. Moles do make a squeaky noise, and Oppian op. cit. 615 (perhaps exaggerating) says that ἀσπάλακας βασιλῆος ἀφ' αἵματος εὐχετάασθαι | Φινέος. M's σπάκα, then, is no more than an interesting scribal error; according to Schol. ad. Hdt. 1.110 τὴν γὰρ κύνα καλέουσι σπάκα Μῆδοι, Herodian *Pros. Cath*. 3.1.524.26 et alibi σπάξ· ὁ κύων παρὰ Πέρσαις. Why Furlanus thought to suggest a third animal is unclear. His σκολόπακα (a variant of the ἀσκαλώπας), the wood-cock (*scolopax rusticola*) would barely be able to spread its wings in even the widest Greek pot. It should also be noticed that this is the only sign in *DS* that calls for preparation on the part of the observer.

The blind mole rat is sensitive to the earth's magnetic field, using it as a compass to guide themselves through their burrows. It is possible that the disturbance caused by an imminent electric *storm* perceived in a vessel that offered no escape would cause the animal to emit sounds of distress; winds and fair weather, which are what we have here, are harder to explain.

49.359 ἄργιλον] Usually spelled with two lambdas (and in Latin as *argilla*). In Greek sources, this appears as infertile earth of some sort; e.g., the soil of Arabia and Syria is said to be ἀργιλωδεστέρην τε καὶ ὑπόπετρον than that in Egypt (Hdt. 2.12.3); when it is mixed with worn-out soil the result is fertile (Th. *CP* 3.20.3); and water passes more readily down through mountain soil that is μικραὶ … ἢ σομφαὶ καὶ λιθώδεις καὶ ἀργιλώδεις (Arist. *Mete*. 352b9-11). It is also, more tellingly, the earth used by potters, i.e., soil rich in (as the name indicates) white clay

(Pliny *NH* 35.151 *fingere ex argilla similitudines*, Hor. *Epist.* 2.2.8 *argilla quivis imitaberis uda*).

49.359 πιθάκνην] A cask, which could be large enough for a homeless person to live in; Aristoph. *Eq.* 792 οἰκοῦντ' ἐν ταῖς πιθάκναισι.

49.361 μῦες] See above, 41.304, on squeaking and dancing mice. This sign falls into the group of animals fighting, usually for food, but seems to be unparalleled, despite its "demotic" fame. Maass, *Arati Phaenomena* (Berlin 1893) xxvi (followed by Kidd on Aratos 1123 and Mynors on Verg. *G.* 1.399 f.) conjectured σύες, thinking that *DS* was referring to the weather sign concerning pigs traceable to Demokritos, but in συσὶν ἐπὶ φορυτῷ μαργαινούσαις (Dem. B 147, quoted above, on 16.106 κόραξ) the key word is the last one, which here must have the sense "acting gluttonously" rather than merely "raging," as LSJ says; cf. LSJ s.v. μαργόομαι 2. And in this case, φορυτῷ refers to the sizable slops thrown to pigs; cf. Alkiphron *Epist. Parasit.* 3.4.5 βρωμάτων φορυτόν. There is nothing said in Demokritos, Aratos, Vergil, or Pliny (18.364) about their carrying them off, which is not what pigs do. See next lemma for the meaning of this word here.

49.362 φορυτοῦ] This can be anything light enough for a mouse to carry; in a man-made structure, where these mice would most likely be observed, it may mean small pieces of wood, reed, and other refuse (so schol. ad. Aristoph. *Ach*. 72); cf. Hesych. s.v. φορυτός· φρύγανα, ἄχυρα, καὶ ἀπὸ γῆς αἰρόμενος ὑπὸ ἀνέμου χόρτος, φρυγανῶδες, συρφετός, βόρβορος, ἀκαθαρσία.

50

50.363 εὐδίας] "Favorable Zeus," i.e., when he refrains from the sending of lightning, thunder, rain, or storm clouds. Aratos 899 Διὸς εὐδιόωντος is probably a learned allusion to this generally ignored etymology.

50.363-4 ἥλιος … ἀνιὼν λαμπρὸς … μὴ ἔχων σημεῖον] Cf. Aratos 822-824

μή οἱ ποικίλλοιτο νέον βάλλοντος ἀρούρας

κύκλος, ὅτ' εὐδίου κεχρημένος ἤματος εἴης,
μηδέ τι σῆμα φέροι, φαίνοιτο δὲ λιτὸς ἁπάντη.

Ptolemy *Tetrab.* 2.14.2 καθαρὸς μὲν γὰρ καὶ ἀνεπισκότητος καὶ εὐσταθὴς καὶ ἀνέφελος ἀνατέλλων ἢ δύνων εὐδιεινῆς καταστάσεώς ἐστι δηλωτικός, *Geop.* 1.2.2 = Anon. Laur. 3.1 καὶ ὁ ἥλιος καθαρὸς ἀνατέλλων εὐδίαν σημαίνει.

The σημεῖον could be a sunspot (as suggested by Wood), but more likely, because more common, it is atmospheric conditions that seem to mark the sun as it passes behind them. Since there is more atmosphere between viewer and sun at sunrise and sunset, there will be more of any irregularity therein as well (and at sunrise and -set the sun is not only easier to view directly, it appears magnified). The word ποικιλία used here by Aratos (and his imitators) is uninformative, but some lines later he spells it out: Consider (he says)

εἴ τί που ἢ οἱ ἔρευθος ἐπιτρέχει, οἷά τε πολλὰ
ἑλκομένων νεφέων ἐρυθαίνεται ἄλλοθεν ἄλλα,
ἢ εἴ που μελανεῖ. (834-836)

See also Ptolemy (immediately after the citation above) ποικίλον δὲ τὸν κύκλον ἔχων ἢ ὑπόπυρρον … . μέλας δὲ ἢ ὑπόχλωρος ἀνατέλλων ἢ δύνων μετὰ συννεφείας. Dust or even sea spray driven into the lower atmosphere by an approaching storm will produce a reddish sky at sunset (Kahl 139), which could explain Ptolemy's ὑπόπυρρον.

50.363-4 μὴ καυματίας] This sign is mentioned by Pliny *NH* 18.342 *purus oriens atque non fervens, serenum diem nuntiat*, and is probably what is meant by Ptolemy's εὐσταθής (see above), which means "calm, tranquil" in meteorological contexts (LSJ II 4).

50.365 σελήνη πανσελήνῳ] For the phrase, see above, on 12.79. For the particular idea expressed here, cf. Aratos 802-804 (observe the moon when it is full):

πάντη γὰρ καθαρῇ κε μάλ' εὔδια τεκμήραιο,
πάντα δ' ἐρευθομένῃ δοκέειν ἀνέμοιο κελέθους,
ἄλλοθι δ' ἄλλο μελαινομένῃ δοκέειν ὑετοῖο.

Ptolemy *Tetrab.* 2.14.4 (the moon) λεπτὴ μὲν γὰρ καὶ καθαρὰ φαινομένη καὶ μηδὲν ἔχουσα περὶ αὐτὴν εὐδιεινῆς καταστάσεώς ἐστι δηλωτική, *Geop.* 1.2.1 = Anon. Laur. 6 πανσέληνος δὲ οὖσα ἐὰν καθαρὰ φανῇ εὐδίαν σημαίνει, *CCAG* 8.1.139.22 f. εὔχρους ἐν πανσελήνῳ εὐδίαν σημαίνει.

50.365-6 δυόμενος ἥλιος … εἰς καθαρόν] Cf. Aratos 825-828
εἰ δ' αὕτως καθαρόν μιν ἔχει βουλύσιος ὥρη,
δύνει δ' ἀνέφελος μαλακὴν ὑποδείελος αἴγλην,
καί κεν ἐπερχομένης ἠοῦς ἔθ' ὑπεύδιος εἴη.
[Arist.] *Probl.* 26.8 (941a1) διὰ τί αἱ μὲν καθαραὶ δύσεις εὐδιενὸν σημεῖον, αἱ δὲ τεταραγμέναι χειμερινόν; Pliny *NH* 18.342 *si et occidit pridie serenus, tanto certior fides serenitatis*, Anon. Laur. 3 ~ *Geop.* 1.2.3 δυόμενος δὲ δίχα νεφῶν καθαρὸς καὶ τὴν ἐπιοῦσαν ἡμέραν εὐδίαν προκαταγγέλλει, *CCAG* 11.2.174.26 f. ἐὰν μέλλων δύνειν ὁ ἥλιος καθαρὸς καὶ ἀνεπιθόλωτος ("unpolluted") ἐπὶ τὴν δύσιν χωρήσῃ, εὐδίαν τῇ ἑξῆς ἡμέρᾳ σημαίνει.

50.365 χειμῶνος] Storm or winter? If the former it becomes a doublet of the very next sentence. On the other hand, this same word appears in the last clause of this chapter in the latter sense, as interpreted by Aratos 850 (see below), and note the same phrase above, 46.338.

50.367 χειμάζοντος] Since this verb is impersonal, an absolute construction might have been expected.

50.369 ὠχρός] Cf. Aratos 850 f. (the sun) εὔδιός κε φέροιτο, καὶ εἴ ποτε χείματος ὥρῃ | ὠχρήσαι κατιών. Ptolemy too 2.13.100 (quoted above) mentions a ὑπόχλωρος sun, but as a sign of rain or storm.

51

51.370 ὁ μείς] See above, cc. 5 f., on the importance of the moon for predicting weather. Cf. Aratos 783 f. (the moon) λεπτὴ μὲν καθαρή τε περὶ τρίτον ἦμαρ ἐοῦσα | εὔδιός κ' εἴη, *Geop.* 1.2.1 ~ Anon. Laur. 6 τριταία καὶ τεταρταία οὖσα ἡ σελήνη καὶ λεπτὴ καὶ καθαρὰ φαινομένη εὐδίαν δηλοῖ, *CCAG* 8.1.139.17 τριταία λεπτὴ καὶ καθαρὰ εὔδιος.

51.371 Ὄνου Φάτνη] See above, 23.155 f., 43.314. Aratos' roundup of signs produced by the Manger (892-908) has nothing similar, but cf. Theokr. 22.21 f. ἐκ δ' Ἄρκτοι τ' ἐφάνησαν Ὄνων τ' ἀνὰ μέσσον ἀμαυρὴ | Φάτνη, σημαίνουσα τὰ πρὸς πλόον εὔδια πάντα.

51.372 ἅλως] Solar or lunar? Probably the latter, as this looks like the converse of the sign at 31.229-31, where broken lunar halos figure. On lunar halos, see above on 31.219 ἅλῳ.

51.373 κοιλάδες] Hort, not unreasonably, conjectures that, just as the last clause (see previous lemma) seems to present material similar to that of 31.222, here too we should once again see a reference to the mackerel clouds found there (see n. ad loc.); this would be a simple error of iotacism. And Wood, although he translated the mss., professed ignorance as to its meaning. One could also add that κοιλάδες is usually a noun (an adjective elsewhere in Tryphiodoros 194, and even here κοιλάδος εὐνῆς could be understood as "the hollow of their bed"). Despite all this, we nonetheless retain the reading of the mss. because it almost certainly was read by Aratos, who understood it (perhaps mistakenly) as "thin, porous":

εἴ γε μὲν ἠερόεσσα παρὲξ ὄρεος μεγάλοιο
πυθμένα τείνηται νεφέλη, ἄκραι δὲ κολῶναι
φαίνωνται καθαραί, μάλα κεν τόθ' ὑπεύδιος εἴης. 990

Cf. also Verg. *G.* 1.397 *tenuia nec lanae per caelum vellera ferri*, *Geop.* 1.2.4 ἀερώδους νεφέλης ὄρει περιτεταμένης καθαρᾶς τῆς ἄκρας ὑπερφαινομένης τοῦ ὄρους εὐδίαν δηλοῖ. Kidd (who follows Hort in reading κηλάδες) translates as "a faint mist," but this may be exaggerated; and as the next chapter shows, ὀμίχλη is available for "mist."

51.373 Ὄλυμπος δὲ καὶ Ἄθως] See above, 43.320, where too these mountains are given as the chief but not exclusive locations to look to for weather signs.

51.374 σημαντικά] I.e., a source of signs/meaning, whatever they may be, and not = σημεῖα; see on 31 σημεῖον. This is precisely how Aristotle uses the word; cf., e.g., *Poet.* 1457a12 φωνὴ σημαντική, *An.* 420b32 σημαντικὸς … τις ψόφος ἐστὶν ἡ φωνή. Here the word is applied to ever-present mountains, which are sources of various signs. τὰ σ. seems to indicate that, at least among scientific observers, there was a group or list of mountains that would be viewed for signs; or at any rate a recognition that some mountains were good for signs, and others not.

51.375 πρὸς τὴν θάλασσαν αὐτά] The reading of the mss., αὐτήν, seems excessive, if indeed it makes sense at all ("down to the sea

itself"?); Wood and Hort ignore it. παραζωννύῃ, moreover, is need of an object, which αὐτά (sc. ὄρη) supplies. Our reading is more in accord with Aratos 991-993

> εὔδιός κ' εἴης καὶ ὅτε πλατέος παρὰ πόντου
> φαίνηται χθαμαλὴ νεφέλη, μηδ' ὑψόθι κύρῃ,
> ἀλλ' αὐτοῦ πλαταμῶνι παραθλίβηται ὁμοίη.

Cf. Pliny *NH* 18.356.

51.376-7 ὕσαντος πρὸς δυσμὰς χαλκῶδες] A copper color at sunset is often associated with rain. Mammatus clouds are particularly impressive this way (Kahl 74 f., with photograph), but these (and other coppery clouds) can occur without it having rained earlier. Aratos omits this sign.

52

52.379 ὁμίχλη] "Mist, fog" say LSJ, properly ignoring the modern distinction drawn by meteorologists between these two English words (technically, fog limits visibility to 1 km or less; mist is a cloudiness that allows for visibility greater than 1 km; Dunlop 150). The important ancient distinction was between this Greek word and one or another of the various words for cloud. See especially Arist. *Mete*. 346b32-35, where he describes what happens when ground water vaporizes. ἀναθυμίασις is the process and ἀτμίς is the first result, but further vaporization (and concentration) produces cloud, which is capable of producing rain. Mist is then said to be νεφέλης περίττωμα τῆς εἰς ὕδωρ συγκρίσεως and, as the mere residue of the cloud-making process, διὸ σημεῖον μᾶλλόν ἐστιν εὐδίας ἢ ὑδάτων· οἷον γάρ ἐστιν ἡ ὁμίχλη νεφέλη ἄγονος (sc. of producing rain; cf. *De Mundo* 394a19-21 ἔστι δὲ ὁμίχλη μὲν ἀτμώδης ἀναθυμίασις ἄγονος ὕδατος, ἀέρος μὲν παχυτέρα, νέφους δὲ ἀραιοτέρα. Since mist in fact is formed directly from ground level (bodies of water, or ground moist from recent rain), there is in fact no direct link with imminent rain, although rain may indeed follow. *DS*'s ὕδωρ οὐ γίνεται ἢ ἔλαττον is therefore correct.

Morning, "falling," mist is a sign of fair weather in cod. Mutin. 85 (*CCAG* 4.4.110), but rising it signals showers and rain: ὁμίχλη ἑωθινὴ ἐν μὲν τῇ γῇ καὶ τοῖς πεδίοις πίπτουσα εὐδίαν σημαίνει· πρὸς οὐρανὸν δὲ ἀνερχομένη νεφέλη γίνεται καὶ ὄμβρους καὶ ἀνέμους ἔχει συνεχεῖς· For more on falling mist, see below, 56.409-11; and for more detailed use of mist for weather predictions, see the entire passage of this codex copied in the introduction; above, p. 28.

52.380 γέρανοι] See above, 38.278-9, where deviations from their flying straight while migrating signal storm. Cf. Aratos 1010-12

καὶ δ' ἄν που γέρανοι μαλακῆς προπάροιθε γαλήνης
ἀσφαλέως τανύσαιεν ἕνα δρόμον ἤλιθα πᾶσαι,
οὐδὲ παλιρρόθιοί κεν ὑπεύδιοι φορέοιντο.

Other sources mention only the quietness of the cranes as they fly into fair weather; e.g. Arist. fr. 270.21 Gi. (Ael. *NA* 7.7) πετόμεναι δὲ ἄρα ἡσυχῆ αἱ αὐταὶ ὑπισχνοῦνται εὐημερίαν τινὰ καὶ εἰρήνην ἀέρος, Pliny *NH* 18.362 *grues silentio per sublime volantes serenitatem.*

52.381 πρὸ ἑαυτῶν] The reading of the codd. is illogical: they do not fly until, *while flying* (πετόμενοι), they see clear weather. With our change the sentence explains (γάρ) the preceding one exactly, and has the virtue of being true as well. Cf. Arat. 1010 προπάροιθε (preceding lemma) and Arist. *HA* 9.10 τὰ πόρρω (next lemma). Our particular reading keeps as close as possible to the paradosis, but of course any synonymous expression may have been corrupted.

52.381 καθαρὰ ἴδωσι] Elkins (above on 38.278 ἀποστραφῶσι; see Cronin "Authorship" 327) does not actually say that the rains that hold back cranes are actually seen by them in advance, but this does not seem an unreasonable supposition for anyone to make of these high-flying birds; cf. Pliny *NH* 10.58 *volant ad prospiciendum alte*, Hes. *WD* 449 ὑψόθεν ἐκ νεφέων, Antipater Sidonios 22.2 Gow-Page (*AP* 7.172) ὑψιπετῆ Βιστονίαν γέρανον. Arist. *HA* 9.10 (a detailed report on their activity in flight) takes this as a sign of the crane's intelligence: ἐκτοπίζουσί τε γὰρ μακράν, καὶ εἰς ὕψος πέτονται πρὸς τὸ καθορᾶν τὰ πόρρω, καὶ ἐὰν ἴδωσι νέφη καὶ χειμέρια, καταπτᾶσαι ἡσυχάζουσιν (614b19-21). Cf. Dionysios *De Aucupio* 2.18 κἂν χειμῶνος αἴσθοιντο, τῇ γῇ προσορμίζονται μέχρι σταθερᾶς πάλιν εὐδίας.

52.381 γλαῦξ] Probably the little (grey) owl, *Athene noctua*; see Thompson 76-78. Cf. Arist. fr. 270.21 Gi. (Ael. *NA* 7.7) εἰ δὲ εἴη χειμέρια, ᾄσασα γλαῦξ εὐδίαν μαντεύεται καὶ ἡμέραν φαιδράν, Aratos 999-1001 νυκτερίη γλαὺξ | ἤσυχον ἀείδουσα μαραινομένου χειμῶνος | γινέσθω τοι σῆμα, Verg. *G.* 1.402 f. *solis et occasum servans de culmine summo | nequiquam seros exercet noctua cantus*, Pliny *NH* 18.362 *sic et noctua in imbre garrula, Geop.* 1.2.6 γλαῦξ ᾄδουσα συνεχῶς ἐν νυκτί, *CCAG* 8.1.138.3 ἐν χειμῶνι ᾄσασα γλαῦξ εὐδίαν σημαίνει, Anon. Laur. 11.19.

According to the grammarians, the nominative singular receives a circumflex; see H. W. Chandler, *Greek Accentuation*[2] (Oxford 1881) § 566.

52.383 θαλαττία ... γλαῦξ] Thompson 76 can say only "unexplained."

52.384 κόραξ δὲ μόνος μέν] As Hort points out, it would appear that ravens croaking in a group will appear in a later clause, as in fact we find in Aratos 1003-06

> καὶ κόρακες μοῦνοι μὲν ἐρημαῖον βοόωντες
> δισσάκις, αὐτὰρ ἔπειτα μετ' ἀθρόα κεκλήγοντες,
> πλειότεροι δ' ἀγεληδόν, ἐπὴν κοίτοιο μέδωνται,
> φωνῆς ἔμπλειοι,

but since both single ravens and groups signal fair weather, Hort, in part working with a faulty text (see next lemma) is wrong to posit a lacuna (which is normally taken to be a scribal error) rather than regard it as a conscious decision of the compiler, who carelessly left in the μέν. Aratos would have read the original; see introduction, above.

52.385 κράξας] The ungrammatical κράξῃ was introduced into the printed editions through dittography by the Aldine, and then continued as subsequent editors gave their printers marked-up copies of printed texts. A copy of this sort is called an *edition belge*; see E. J. Kenney, *The Classical text* (Berkeley 1974) 26 n. 1; as another example of error arising from this practice, Burnet's OCT of Plato contains the same *vox nihili* σποπῶμεν (for σκοπῶμεν) as that found in Hermann's Teubner at *Phdr.* 260a9.

53

53.387 κορώνη] See above, 16.104-6 and 39.283 f. In the latter passage it is said that crows cawing late in the day signal storm, which fits in well with this passage; but it is also said there that if a crow caws twice quickly and then a third time this too signals storm. Assuming coherence and consistency between related signifiers, we must imagine that there was a clear difference between the two sound patterns.

53.387 ἔωθεν] It is tempting to print the highly poetic variant ἠῶθεν (only Homer and Hellenistic epicizers) as the lectio difficilior.

53.388 ὄρχιλος ἐξ ὀπῆς] The reverse of what is said in 39.281 f., but since birds are always leaving their nest for food, this cannot be interpreted too strictly. Perhaps we should understand "during a storm," i.e., the bird flying out at this time signals the end of the storm.

53.389 ἐξ ἑρκίων] Hort translates "from a hedge," which hardly seems like a significant action of the part of a bird; Wood's "out of enclosures" seems closer to the mark. Both, however, agree in offering three different starting points, whereas we prefer to take the latter two as exegetical of the first: ὀπή is any "cavity" the wren may be living in, but since they do not live in the ground (which this word can mean: τὰς ὀπὰς ἐν τῇ γῇ, Arist. *HA* 559a4, cf. 623a30), its more limited but still generic meaning of "nests" (which can of course be in trees) is narrowed down to the more observable nests in human dwellings, either those in the enclosure walls or those in the house itself. Cf. Apoll. Rh. 2.1073 f. ὡς δ' ὅτε τις κεράμῳ κατερέψεται ἑρκίον ἀνήρ | δώματος, where, however, ἑρκίον δωμάτων taken together = "house." Bart. omits this phrase.

For the wide variety of lairs wrens make for themselves, see D. A. Sibley, *The Sibley Guide to the Birds* (New York 2000) 384 (and note that they belong to the Linnaean family of *Troglodytidae*).

53.389 ἔξωθεν] Altogether unnecessary, but harmless.

53.390 βορεύοντος] A lovely hapax legomenon, one that Coray would annihilate with his conjecture βορείου ὄντος.

53.390 βορρᾶθεν] Not, as was the case with ἔξωθεν, unnecessary, but specifying the direction from which the gleam is seen. For this adverb with a noun, cf. Hipp. *Vict.* 2.37, where it appears once with ὄρη and again with κοῖλα.

53.390 ὑπόλαμψις] Elsewhere only in Hipp. *Epid.* 4.31, where two patients are said to have the area surrounding their hypochondria hard with a sheen beneath the skin (σκληρὸν δὲ καὶ κάτωθεν ἔχον ὑπόλαμψιν). The related verb ὑπολάμπω also has the sense of a diffuse gleam: ἔαρ ὑπέλαμπε (Hdt. 1.190.1), ὑπέλαμπεν ἡμέρα (Plut. *Ant.* 49).

As the example from Hdt. 1.190 shows, the gleam need not be reddish in color, nor is it here (unless λευκή is predicate).

53.391 ἐὰν πεφραγμένη] This verb, preserved or moderately mangled, in the mss., should be retained, as it offers a lively and precise metaphor which Schneider's bland τεταγμένη lacks. (Nor is his conjecture ἐναντία attractive.) The clearly defined cumulus cloud is imagined to have been fenced in.

53.391 νεφέλη ὀγκώδης] A cumulus cloud, whose modern Latin name was chosen to express this very bulkiness: "It may be allowable to introduce a Methodical nomenclature, applicable … to the Modifications of Cloud … Cumulus, convex or conical heaps, increasing upward from a horizontal base" (L. Howard, *On the Modifications of Clouds* [London 1803] 1 f.). Cumulus clouds, furthermore, as here, are often associated with fair weather; Dunlop 22. Bart. translates as *tumorosa*, which nicely conveys their lumpiness.

54

54.394 πρόβατα ὀψὲ ὀχευόμενα] See 40.295 f. for the converse, and Aratos 1071-74 cited in the commentary ad loc.

54.394 ἀποτελοῦσι τὸ σημεῖον] A unique variation of the usual formulae.

54.395 βοῦς ἐπὶ τὸ ἀριστερόν] See 41.300-02 for the converse.

54.396 κύων ὡσαύτως] But for this sign there is no converse; the dog rolling on the ground as a sign of wind in 29.198 presumably rolls in the familiar way, from side to side.

54.396 τέττιγες πολλοί] Cicadas have not been mentioned earlier because they are associated only with summer and warmth. Of the earlier references, note [Hes.] *Scutum* 393-395 τέττιξ | ὄζῳ ἐφεζόμενος θέρος ἀνθρώποισιν ἀείδειν | ἄρχεται, Plato *Phdr.* 230c θερινόν τε καὶ λιγυρὸν ὑπηχεῖ τῷ τῶν τεττίγων χορῷ, Th. fr. 355a (Ael. *NA* 3.38) ψυχροὶ δὲ ἄρα ὄντες τὴν σύγκρασιν οἱ τέττιγες εἶτα μέντοι πυρούμενοι τῷ ἡλίῳ ᾄδουσι; see further Davies and Kathirithamby, *Greek Insects* (London

1986) 113 f. Most of these and later sources associate the mere presence of the cicada, marked if by anything then by its sound, rather than great numbers with summer heat; and note Arist. *HA* 556b5 f., who takes the presence of many cicadas as a concomitant (not a sign) of rain (γίνονται δὲ πολλοὶ ὅταν ἐπομβρία γένηται; *HA* 5.30 is devoted to the cicada). There seems, then, to be no parallel passage to the sign in *DS*.

54.397 νοσῶδες] This has been correctly understood by Beavis 99: "Their presence in unusual numbers was seen as a sign of an especially *hot and therefore* unhealthy season," our emphasis indicating where Beavis has fleshed out the thought. That he is on the right track is supported by the ancient observatiuons that (i) cicadas hatched at the time of the summer solstice (Arist. *HA* 556b8) and (ii) solstices were times potentially dangerous to health (Hipp. *Aer.* 11). Perhaps Aristotle's statement (see above) about the association between many cicadas and rains forms a link in the causation here. On the medical use of weather prognostication, see above, Introduction, n. 2.

54.397 τὸ ἔτος] Although the evidence amassed by LSJ and other lexica is unanimous in understanding ἔτος as "year," weather signs, as we have seen, do not have such long-range powers; it is tempting, therefore, to follow Hort and Beavis (see above) and take it here = "season." Aristotle lends support: In discussing variation in rainfall he says that because of the increase and decrease, and expansion and contraction, of atmospheric exhalation, clouds and wind always form in their natural season (κατὰ τὴν ὥραν ἑκάστην); διὰ δὲ τὸ ἐνίοτε μὲν τὴν ἀτμιδώδη (sc. ἀναθυμίασιν) γίνεσθαι πολλαπλασίαν ὁτὲ δὲ τὴν ξηρὰν καὶ καπνώδη, ὁτὲ μὲν ἔπομβρα τὰ ἔτη γίγνεται καὶ ὑγρά, ὁτὲ δὲ ἀνεμώδη (*Mete.* 360b2-5). Here too, although "years" cannot be altogether ruled out (Lee so translates in the Loeb), "seasons" produces better sense. And ἀφυαί, small fry, which are are born and caught seasonally (*HA* 569b10), are best and appear in greatest amount ὁπόταν ἔνυγρον καὶ εὐδιεινὸν γένηται τὸ ἔτος (b21 f.). Cf. *Probl.* 862a4-6 διὰ τί, ὅταν ἐκ γῆς ἀτμὸς ἀνίῃ πολὺς ὑπὸ τοῦ ἡλίου, τὸ ἔτος λοιμῶδες γίνεται; ἢ ὅτι ὑγρὸν ἀνάγκη καὶ ἔπομβρον τὸ ἔτος σημαίνειν, καὶ τὴν γῆν ὑγρὰν ἀνάγκη εἶναι; and a few lines below, διὰ τί γίνεται τὰ ἔτη νοσώδη, ὅταν γένηται φορὰ τῶν μικρῶν βατράχων; (In the answer to this question ἐνιαυτός is used as a synonym for ἔτος, but this former word too often means part of a year; see below, on 56.406.)

54.397 ἔτος σημαίνουσι] At this point, at the very bottom of its page, V ends, with the comment καὶ ταῦτα μὲν περὶ τῶν καθόλου παρατηρήσεων ἡμεῖς γεγράφαμεν ὧδε: +.

54.397-8 λύχνος ... καιόμενος ἡσυχαῖος] For the converse, see 14.94 f.

54.398 ἐπ' ἄκρου] The change to the dative is uncalled for. ἄκρος can refer to either the tip or the point of something that does in fact have a tip or point (e.g., γλῶσσα, δάκτυλος, κορυφή), or to the outer extremity of something in two (πεδίον) or three dimensions (a body of water [τὸ ἄκρον is its surface], a stone, a human body [τὸ ἄκρον is its skin]). If the former here, then the spout of the lamp; if the latter, its whole surface. The related passage at 42.312 f., especially the phrase κέγχροις πολλοῖς κατάπλεως, suggests the latter.

54.399 λαμπρούς] Since κέγχρος can be masc. (e.g., Th. *HP* 1.12.2) or fem. (e.g., Arist. *Ph*. 250a20), there was no reason to alter the text here, esp. since it is masc. elsewhere in *DS* (25.170, 42.312).

54.399-400 περιγράψῃ λαμπρὰ γραμμή] The datives of the mss. were altered to nominatives by Schneider to provide a subject for the verb. (Furlanus' alteration of the verb from aorist to present is pointless.) περιγράφω regularly takes an accusative which is either the object to be surrounded (e.g., the shadow of the sun on the floor; Hdt. 8.137) or the mathematical shape surrounding this object (e.g., κύκλον; many exx. in Euclid); here the former, with ἐν κύκλῳ a substitute for the latter. Bart.'s *circumscribat splendida linea* allows for either nominative or ablative.

55

Aratos 1051-59 echoes this chapter:

τριπλόα δὲ σχῖνος κυέει, τρισσαὶ δέ οἱ αὖξαι
γίνονται καρποῖο, φέρει δέ τε σήμαθ' ἑκάστη
ἑξείης ἀρότῳ. καὶ γάρ τ' ἀροτήσιον ὥρην
τριπλόα μείρονται, μέσσην καὶ ἐπ' ἀμφότερ' ἄκρας·
πρῶτος μὲν πρώτην ἄροσιν, μέσσος δέ τε μέσσην 1055
καρπὸς ἀπαγγέλλει, πυμάτην γε μὲν ἔσχατος ἄλλων.

ὄντινα γὰρ κάλλιστα λοχαίη σχῖνος ἄρηται,
κείνῳ κ' ἐξ ἄλλων ἄροσις πολυλήϊος εἴη,
τῷ δέ γ' ἀφαυροτάτῳ ὀλίγη, μέσσῳ δέ τε μέσση.

A scholion on this passage, quoting from Plutarch's no longer extant work on Aratos, provides us with Th. fr. 415, which also links the farmer's plowing with the fruit of the *schinos* (and πρῖνος; see above, 45.332; for the meaning of the former, see next lemma): φησὶν οὖν ὁ Θ. ὅτι ὁ πρῖνος καὶ ὁ σχῖνος αὐχμηρὰ τῇ κράσει καὶ ξηρότερα τῶν ἄλλων πεφυκότα πολὺν καρπὸν οὐ φέρει, ἐὰν μὴ εἰς βάθος ὑγρανθῇ. εἰκότως οὖν τῇ τούτων εὐφορίᾳ καταμαντεύονται περὶ τῶν σπερμάτων οἱ γεωργοί, μιᾶς αἰτίας οὔσης δι' ἣν ἀμφοτέροις ἡ πολυκαρπία· εἰ δ' ὑπερβάλλει τοῦ καρποῦ τὸ πλῆθος, οὐκ ἀγαθὸν σημεῖον· ἄμετρον γὰρ ἐπομβρίαν καὶ πλεονασμὸν ὑγρότητος ἡ περὶ τὸν ἀέρα ἄνεσις καὶ θηλύτης δηλοῖ. ("Th. says that the kermes-oak and the *schinos* are by nature parched in constitution and drier than other [trees], and do not bear much fruit unless they are deeply watered. It is reasonable, then, that the farmers draw inferences about their crops when these [trees] bear much fruit; for there is a single reason on account of which there is much fruit in both cases. But if the amount of fruit is excessive, it is not a good sign; for the slackness and delicacy of the air indicate immoderate rainfall and an excess of moisture.") Maass says that this Theophrastos passage is the source for *DS*, but Martin ad loc. disagrees, arguing that it does not agree with what Theophrastos says in *CP* or *HP*. For a doxographical analysis of this passage, see Sharples' commentary. As Cronin "Authorship" 326 notes, these two trees are the only botanical signs in *DS*.

55.401 σχίνου] This word has two quite distinct references. (i) It may refer to the mastic (usually spelled mastich in the UK) or lentisc tree (*Pistacia lentiscus*), known for its resinous gum (μαστίχη; cf. Th. *HP* 9.1.2) and much favored by goats (Eupolis fr. 13.4 K-A, Theokr. 5.129, Babrius 3.2). This "is a common, usually small spreading, evergreen shrub or sometimes a tree to 8 m"; O. Polunin, *Trees and Bushes of Britain and Europe* (London 1976) 120; see id. & A. Huxley, *Flowers of the Mediterranean* (London 1967) 119. (ii) Or it may refer to the squill (σκίλλα), a small liliacious plant grown for several culinary and pharmacological purposes; see Polunin, *Flowers of Greece and the Balkans* (London 1980) 493 f., with plate 58 (1631, 1631a). The description of the latter in Th. *HP* 7.13.6 is close to that of the σχῖνος in *DS*: τῆς δὲ

σκίλλης καθ' αὐτόν, εἰς ὕστερον ἐπὶ τούτῳ τὸ ἄνθος ἀνίσχον προσκαθήμενον· ποιεῖται δὲ τὰς ἀνθήσεις τρεῖς, ὧν ἡ μὲν πρώτη δοκεῖ σημαίνειν τὸν πρῶτον ἄροτον, ἡ δὲ δευτέρα τὸν μέσον, ἡ δὲ τρίτη τὸν ἔσχατον· ὡς γὰρ ἂν αὗται γένωνται καὶ οἱ ἄροτοι σχεδὸν οὕτως ἐκβαίνουσιν. We therefore follow Sharples (whose comments ad frr. 415 and 417.14 survey more of the relevant ancient testimony than is done here) in taking as some sort of squill the σχῖνος of our passage as well as that in Aratos (*pace* Kidd, who takes it without argument as the mastic).

55.402 μέρη] Not "parts," but "turns, times"; LSJ s.v. II, citing, i.a., Plato *Rep*. 540b ὅταν δὲ τὸ μέρος ἥκῃ.

55.403-04 ὡς ἂν τούτων κλίνῃ κάλλιστα] Rather poorly expressed but probably to be left untouched. What is still wanted is a thought that goes "as each fruiting of the squill turns out (*simpliciter*, not "best"), so will turn out the corresponding plowing." Yet ὡς seems guaranteed by οὕτως, there are many parallels for a partitive τούτων referring back to a preceding clause, and the superlative κάλλιστα is protected by ἀδρότατος and Aratos 1057 (above). More difficult is the verb, as Hort, who altered to ἐκβαίνῃ (from the parallel passage in Th. *HP* 7.13.6, cited above), saw; for this intransitive use of the active in the sense "incline, tend (towards)" (LSJ s.v. IV), cf. [Arist.] *Physiog*. 812b2 f. οἱ δὲ μὴ ἄγαν μέλανες ἀλλὰ κλίνοντες πρὸς τὸ ξανθὸν χρῶμα εὔψυχοι. Aratos 1057-59 presents a fuller statement, either because he felt the same misgivings we do or because this fuller version was in his source. The compiler of *DS* probably excerpted clumsily here.

56

After the fourth major section, on fair weather, someone has added other signs, some of which would fit quite nicely in those on wind or rain. That some affect longer periods than those given earlier is not really a reason for distinguishing them, nor is the fact that the first predicts hail rather than wind, rain, storm, or fair weather a reason to segregate, since these were predicted above, 25.169 f. and 36.257 f. Similarly, in c. 57, some signs predict cold, but this too had been predicted earlier (44.324 f., 46.340, 48.354 f.).

56.406 τοιάδε σημεῖα] If the cold predicted at 57.418 f. is that of the onset of a cold spell, τοιάδε looks forward to the end of the work (except perhaps for the last sentence, on which see below).

56.406 ἐνιαυτῶν] Probably not whole years, which (Joseph in the Bible and the Farmer's Almanac excepted) are not usually able to be known so far in advance; more likely "seasons"; that is, ἐνιαυτός in the singular does regularly mean "year," but the plural often refers to seasons throughout one or more years; cf. *Od.* 1.16 ἔτος ἦλθε περιπλομένων ἐνιαυτῶν, Aristoph. *Ra.* 347 f. χρονίους ἐτῶν παλαιῶν ἐνιαυτούς.

56.409 χάλαζαν] See above, on 25.169 f. χάλαζα.

56.410 ὁμίχλαι πίπτωσι] See above, on 52.379. Since mist was believed to be formed as clouds were, it must descend to reach ground level.

56.411 ἀμφοτέρων ἀριθμουμένων] "With both first and last counted"; i.e., the seventh month is six months from now, the normal Greek way of expressing ordinals.

57

57.416 σημαίνει ... τὰ πνεύματα] As noted in the introduction (above, p. 34), occasionally *DS* employ winds as signs in themselves.

57.417 ἠοῦς] See Maass *GGA* (1893) 628.

57.417 μεσημβρίας] Here for the first time to indicate direction rather than time of day, as seems regular in Ionic; cf. Hekataios 1 F 108 *FGrHist*, Hdt. 1.6 etc. Elsewhere *DS* uses a form of βορρ- for "south."

57.418 πνεύματα] Winds change from signified to signifier, somewhat reflexively in part, since when they come from the north they signal "winds and cold," but this probably means that winds (which are not very cold) signal (with hendiadys) cold(er) winds to follow; cf. *Carmina Adespota* 1000 *PMG* πρὸ χείματος ὥστ' ἀνὰ ποντίαν ἄκραν βορρᾶ ζάεντος, Verg. *G.* 1.352 *agentis frigora ventos*.

57.419 κομήτας] At 34.245-7 comets signaled winds, and if many appeared drought as well. Here they seem to signal wind (which repeats 34.245) and rain (which cannot accompany drought). Cold, furthermore, which is already included among the "aforementioned" is added at the end.

57.419 Αἰγύπτιοι] It is a mystery why such an obviously Greek word as κομήτης (see Gilbert 655 n. 4) is credited to the Egyptians. Aristotle does, however, mention their views twice in his discussion of comets (*Mete*. 343b12, 28), so perhaps he credited them with the notion of calling such heavenly bodies "hairy." Or perhaps a disruption of the text was later patched up grammatically but with some loss of the original sense. Note also that Aelian's second chapter devoted to weather signs (*NA* 7.8) turns from Aristotle as a source (7.7) to "The Egyptians" (Αἰγυπτίων ἀκούω λεγόντων), who "assert that the antelope is the first creature to know when the Dog-Star rises, and testifies to the fact by sneezing. Note too that "Egyptian farmers have learned that crocodiles know in advance how far the Nile will flood and do not lay their eggs beyond this limit" (Plut. *Sollert. An*. 982c). M. Wellmann, "Ägyptisches," *Hermes* 31 (1896) 221-253, argues that Apion's *Aigyptiaka* (i c. AD) was the source for both Aelian and Plutarch's "Egyptian" material. It is quite likely that this last section of *DS* is an appendix of Apionic origin.

57.421 τοῖς δὲ ἄστροις] Schneider altered the sentence so as to leave σημαίνειν without a subject. The reading of most mss., however, can be retained if we allow for the construction of impersonal εἴωθε + dative, which, it seems, can be paralleled only by Aristoph. *Eccl*. 282-4 εἴωθ' ἐκεῖ | τοῖς μὴ παροῦσιν … | ὑπαποτρέχειν; see Ussher ad loc. for a defense. (Since our example has been emended away in modern editions, the Aristophanic passage was in danger of falling prey to the rule that *einmal ist keinmal*; now, however, *zweimal* should keep both preserved.)

57.422-3 ἰσημερίαις καὶ τροπαῖς … πρὸ αὐτῶν ἢ ὕστερον] This notion goes back to Demokritos: Pliny *NH* 18.231 (DK 68 B 14.4) *Democritus talem futuram hiemem arbitratur qualis fuerit brumae dies et circa eum terni, item solstitio aestatem, Geop*. 1.5.3; see Maass *GGA* (1893) 632 f. On Demokritos' interest in weather prediction, see Sider, "Demokritos on the Weather," in A. Laks and C. Louguet (eds.), *Qu'est-ce que la philosophie présocratique* (Villeneuve d'Ascq 2002) 287-302.

ΑΝΕΜΩΝ ΘΕΣΕΙΣ ΚΑΙ ΠΡΟΣΗΓΟΡΙΑΙ

ΕΚ ΤΩΝ ΑΡΙΣΤΟΤΕΛΟΥΣ ΠΕΡΙ ΣΗΜΕΙΩΝ

[ARISTOTLE] ON THE LOCATIONS

AND NAMES OF THE WINDS

Edited and Translated by Victor D'Avella

Manuscript sigla are as listed for *DS*.

Modern printed editions are as follows:

Bekker: Immanuel Bekker. *Aristoteles Graece*. Vol. 2 (Berlin 1831) 973.

Rose (three editions of *De Ventorum Situ*, all the same):
Valentin Rose. *Aristoteles Pseudepigraphus* (Leipzig 1863) 247-250. [fr. 232]
–. *Aristotelis qui ferebantur librorum fragmenta* (Leipzig 1886) 199-201. [fr. 251]
–. *Aristotelis opera*, ed. Academia Regia Borussica. vol. 5 (Berlin 1870) 1521 f.

ΑΝΕΜΩΝ ΘΕΣΕΙΣ ΚΑΙ ΠΡΟΣΗΓΟΡΙΑΙ
ΕΚ ΤΩΝ ΑΡΙΣΤΟΤΕΛΟΥΣ ΠΕΡΙ ΣΗΜΕΙΩΝ

973a1 Βορρᾶς. οὗτος ἐν μὲν Μαλλῷ Παγρεύς· πνεῖ γὰρ ἀπὸ κρημνῶν μεγάλων καὶ ὀρῶν διπλῶν παρ' ἄλληλα κειμένων, ἃ καλεῖται Παγρικά. ἐν δὲ Καύνῳ Μέσης. ἐν δὲ Ῥόδῳ Καυνίας· πνεῖ γὰρ
5 ἀπὸ Καύνου, ἐνοχλῶν τὸν λι|μένα αὐτῶν τῶν Καυνίων. ἐν δὲ Ὀλβίᾳ τῇ κατὰ Μάγυδον τῆς Παμφυλίας Ἰδυρεύς· πνεῖ γὰρ ἀπὸ νήσου ἣ καλεῖται Ἰδυρίς. τινές δὲ αὐτὸν Βορρᾶν οἴονται εἶναι ἐν οἷς καὶ Λυρνατιεῖς οἱ κατὰ Φασηλίδα.

Καικίας. οὗτος ἐν μὲν Λέσβῳ καλεῖται Θηβάνας· πνεῖ γὰρ
10 ἀπὸ Θήβης πε|δίου τοῦ ὑπὲρ τὸν Ἐλαιτικὸν κόλπον τῆς Μυσίας· ἐνοχλεῖ δὲ τὸν Μιτυληναίων λιμένα, μάλιστα δὲ τὸν Μαλόεντα· παρὰ δέ τισι Καυνίας, ὃν ἄλλοι βορρᾶν οἴονται εἶναι.

Ἀπηλιώτης. οὗτος ἐν μὲν Τριπόλει τῆς Φοινικῆς Ποταμεὺς
15 καλεῖται, πνεῖ δὲ ἐκ πεδίου ὁμοίου ἄλωνι μεγάλῃ, περιεχο|μένου ὑπό τε τοῦ Λιβάνου καὶ τοῦ Βαπύρου ὄρους· παρὸ καὶ Ποταμεύς καλεῖται. ἐνοχλεῖ δὲ τὸ Ποσειδώνειον. ἐν δὲ τῷ Ἰσσικῷ κόλπῳ καὶ περὶ Ῥωσσὸν Συριάνδος. πνεῖ δὲ ἀπὸ τῶν Συρίων πυλῶν, ἃς διέστηκεν ὅ τε Ταῦρος καὶ τὰ Ῥώσια ὄρη. ἐν δὲ τῷ Τριπολιτικῷ
20 κόπλῳ [ὁ] Μαρσεὺς,| ἀπὸ Μάρσου κώμης. ἐν δὲ Προκοννήσῳ καὶ ἐν Τέῳ καὶ ἐν Κρήτῃ καὶ Εὐβοίᾳ καὶ Κυρήνῃ Ἑλλησποντίας. μάλιστα δὲ ἐνοχλεῖ τόν τε τῆς Εὐβοίας Καφηρέα καὶ τὸν Κυρηναῖον λιμένα, καλούμενον δὲ Ἀπολλωνίαν· πνεῖ δὲ ἀφ' Ἑλλη-
25 σπόντου. ἐν δὲ Σινώπῃ Βερεκυντίας ἀπὸ τῶν κατὰ Φρυ|γίαν

1sq. ΑΡΙΣΤΟΤΕΛΟΥΣ ΠΕΡΙ ΘΕΣΕΩΝ ΚΑΙ ΠΡΟΣΗΓΟΡΙΩΝ ΤΩΝ ΑΝΕΜΩΝ Q : ἐκ τῶν ἀριστοτέλους σημείων L 3 Βορρᾶς PL : Βορᾶς M κρημνῶν *Bekk.* : κρηνῶν M 6 τῶν Καυνίων *Rose* : τὸν ἀκανίαν M 7 Μάγυδον *Rose* : μύγαλον M Ἰδυρεύς *Meineke* : γαυρεύς M 8 Ἰδυρίς *Meineke* : γαυρίς M 9 Λυρνατιεῖς *Rose* : λυρναντεῖς M 11 ἐλαιτικόν MQ : ἐλαιατικόν *cett.* 13 τισι Καυνίας *Rose* : τοῖς καυνίας MB : τῆς καυνίας SQP$^{a.c.}$: τοῖς καυνιοις P$^{p.c.}$: ἐν καυνίου L : αἰκαυνίαις *Bekk.* βορρᾶν P*Ald.*L : Βορέαν M 17 Ποσειδώνειον *Bekk.* : Ποσειδόνιον M : ποσειδόνοιον B 18 Συριάνδος] *tent.* Μυριανδεύς *Rose* 19 τὰ Ῥώσια *Rose* : ταὔροσία M 20 [ὁ] *secl. Bekk.* 21 Ἑλλησποντίας *Ald.*L : ἑλισποντίας M : ἑλισποντίας SQ 22 Καφηέα *Ald.*L : καιφηρεα M : καὶ φηρέα SQ : καιφηραία B 23 Κυρηναῖον P*Ald.*L : Κυρηναίων M 24 Βερεκυντίας *Bekk.* : βερεκυπτίας M

On the Locations and Names of the Winds

Borras: This wind is called Pagreus in Mallos, for it blows from lofty crags and twin mountains facing each other named Pagrika. At Kaunos, however, it is called Meses and in Rhodes Kaunias, for it blows from Kaunos. vexing the Kaunians' harbor. In Olbia along Magydos in Papmphylia it is called Idyreus, for it blows from the island called Idyros. There are others, however, who think that it is Borras, among whom number the Lyrnatians who dwell in Phaselis.

Kaikias: In Lesbos this wind is called Thebanas, because it blows from the plain of Thebes beyond the Elaitic bay in Mysia and vexes the harbor of the Mityleneans and the temple of Malian Apollo most of all. Among some it is known as Kaunias, which others think of as Borras.

Apeliotes: This wind is called Potameus in Tripolis in Phoenicia, and it blows from a plain that is similar to a large threshing floor and is surrounded by the mountains Libanos and Bapyros. For this reason too it is also called Potameus. It harries Poseidonion. But at the bay of Issos and around Rossos it is called Syriandos, for it blows from the Syrian gates which the Tauros and Rosian mountains divide. At the bay of Tripolis, however, it is called Marseus, from the village of Marsos. At Prokonnesos, Teos, Crete, Euboia, and Kyrene, it is called Hellespontias. Blowing from the Hellespont it batters most of all Kapheres in Euboia and the harbor of Kyrene, which is called Apollonia. In Sinope it is

973b1 τόπων πνέων. ἐν δὲ Σικελίᾳ Καταπορθμίας, πνέων| ἀπὸ τοῦ πορθμοῦ. τινὲς δὲ αὐτὸν Καικίαν οἴονται εἶναι, Θηβάναν προσαγορεύοντες.

Εὖρος. οὗτος ἐν μὲν Αἰγαῖς ταῖς κατὰ Συρίαν Σκοπελεὺς καλεῖται ἀπὸ τοῦ Ῥωσίου σκοπέλου, ἐν δὲ Κυρήνῃ Κάρβας ἀπὸ τῶν Καρβανῶν τῶν| κατὰ Φοινίκην· διὸ καὶ τὸν αὐτὸν Φοινικίαν καλοῦσί τινες. εἰσὶ δὲ οἳ καὶ Ἀπηλιώτην νομίζουσιν εἶναι.

Ὀρθόνοτος. τοῦτον οἱ μὲν Εὖρον, οἱ δὲ Ἀμνέα προσαγορεύουσιν. Νότος δὲ ὁμοίως παρὰ πᾶσι καλεῖται· τὸ δὲ ὄνομα διὰ τὸ νοσώδη εἶναι· ἔξω δὲ κάτομβρον, κατ' ἀμφότερα δὲ νότον.| Λευκόνοτος ὁμοίως· τὸ δὲ ὄνομα ἀπὸ τοῦ συμβαίνοντος· λευκαίνεται γάρ. Λίψ. καὶ οὗτος τὸ ὄνομα ἀπὸ Λιβύης, ὅθεν πνεῖ. Ζέφυρος. καὶ οὗτος τόδε τὸ ὄνομα διὰ τὸ ἀφ' ἑσπέρας πνεῖν. ἡ δὲ ἑσπέρα ... Ἰάπυξ. οὗτος ἐν Τάραντι Σκυλλητῖνος ἀπὸ χωρίου Σκυλλαντίου. κατὰ δὲ| Δορύλαιον τὸ Φρυγίας ὑπὸ δέ τινων Φαραγγίτης· πνεῖ γὰρ ἔκ τινος φάραγγος τῶν κατὰ τὸ Παγγαῖον. παρὰ πολλοῖς δὲ Ἀργέστης.

Θρακίας. κατὰ μὲν Θράκην Στρυμονίας. πνεῖ γὰρ ἀπὸ τοῦ Στρυμόνος ποταμοῦ, κατὰ δὲ τὴν Μεγαρικὴν Σκίρρων ἀπὸ τῶν Σκιρρωνίδων πετρῶν, ἐν δὲ Ἰτα|λίᾳ καὶ Σικελίᾳ Κιρκίας διὰ τὸ πνεῖν ἀπὸ τοῦ Κιρκαίου. ἐν δὲ Εὐβοίᾳ καὶ Λέσβῳ Ὀλυμπίας, τὸ δὲ ὄνομα ἀπὸ τοῦ Πιερικοῦ Ὀλύμπου· ὀχλεῖ δὲ Πυρραίους.

Ὑπογέγραφα δέ σοι καὶ τὰς θέσεις αὐτῶν, ὡς κεῖνται καὶ πνέουσιν, ὑπογράψας τὸν τῆς γῆς κύκλον ἵνα καὶ πρὸ ὀφθαλμῶν σοι| τεθῶσιν.

τέλος τῶν ἐν τοῖς ἀνέμοις προσαγορίων.

29 Ῥωσίου *Rose* : ῥωσίων M 30 Φοινίκην *Bekk.* : φοινίκων M 32 Ὀρθόνοτος M : Ὀρθόνοτον *Ald.* : ὀρθρόνοτος *Rose* 36 *post* γὰρ *lacunam posuit Causabon* 37 *post* ἑσπέρα *lacunam indicavit Causabon* 38 Σκυλλητῖνος *Rose* : Σκυλητῖνος M 39 Σκυλλαντίου *Rose* : σκυλαντίμου M δὲ Δορύλαιον τὸ *Rose* : δεοραλεοντο M *Ald.* *post* Φρυγίας *lacunam indicavit Rose* 40 Παγγαῖον M : πηγαῖον P*Ald.*L 44 Κιρκίας *Rose* : κίρκας M 45 Ὀλυμπίας P*Ald.*L : ὁλαμπίας M

called Berekyntias, blowing from the regions throughout Phrygia, and in Sicily Kataporthmias, blowing from the strait. Some, however, think that it is Kaikias, calling it Thebanas.

Euros: At Aigai in Syria this wind is called Skopeleus from the Rhosian mountain crag [Greek σκόπελος], but in Kyrene it is called Karbas after the Karbanes in Phoenicia; for this reason some also call the same wind the Phoenician wind, but there are also others who think that it is Apeliotes.

Orthonotos: Some call this wind Euros, others Amnes. Notos is given the same name by all. Its name is owed to the fact that that the wind brings sickness [Greek νόσος] and furthermore because it is rainy [i.e., νότιος]. There are therefore two reasons for its name. Likewise, Leukonotos is called the same by all. The name comes from an accidental property, since it whitens [Greek λευκός]. Lips: This name derives from the word "Libya," whence it blows. Zephyros: This wind also has its name on account of its being from the west; and the west…. Iapyx: This wind in Taras is called Skylletinos, from the place Skyllantion. At Dorylaion it is called Phrygias and by some Phrangites, for it blows from an ravine [Greek φάραγξ] at Pegaion, but among many it is known as Argestes. Thrakias is called Strymonias at Thrace [Thrakia], for it blows from the river Strymon, and at Magarike Skirron, from the Skirronides rocks. In Italy and Sicily it is known as Kirkas, on account of the fact that it blows from Kirkaios, and in Euboia and Lesbos as Olympias, whose name derives from Pierian Olympos, and it vexes the Pyrraioi.

I have written down for you their [sc. the winds'] locations, how they are situated and whence they blow. In addition, I have drawn the circumference of the earth, in order that they may be displayed before your eyes.

BIBLIOGRAPHY

Full references to modern authors cited by name alone can be easily be figured out in the bibliography proper. Some frequent abbreviations are:

Bart. = Bartholomaeus of Messina. See Kley, below.

CCAG = *Corpus Codicum Astrologorum Graecorum*.

DS = *De Signis*.

FHSG = W. W. Fortenbaugh, Pamela Huby, R. W. Sharples, and D. Gutas, *Theophrastus of Eresus: Sources for this Life, Writings, Thought and Influence*. 2 vols. Leiden 1992. All fragments of Theophrastus are cited by the numbers in these volumes.

K-A: Rudolf Kassel and Colin Austin, *Comicorum Graecorum Fragmenta*. Berlin.

K-G = R. Kühner and B. Gerth, *Ausführliche Grammatik der griechischen Sprache*, vol. 2, in 2 parts. Hannover and Leipzig 1898; repr. Darmstadt 1966.

PMG = D. L. Page, *Poetae Melici Graeci*. Oxford 1962.

RE = Pauly-Wissowa, *Real-Encyclopädie der classischen Altertumswissenschaft*.

RUSCH = Rutgers University Studies in Classical Humanities.

SH = *Supplementum Hellenisticum*, ed. Hugh Lloyd-Jones and P. Parsons. Berlin 1983.

SVF = *Stoicorum Veterum Fragmenta*, ed. H. von Arnim.

TrGF = *Tragicorum Graecorum Fragmenta*, ed. Bruno Snell et al. Göttingen.

Th. = Theophrastus (note that this abbreviation is never used to refer to the author of *DS*).

Thompson = either (i) D'Arcy W. Thompson, *A Glossary of Greek Birds*. London 1936; or (ii) id. *A Glossary of Greek Fishes*. London 1947.

W = M. L. West, *Elegi et Iambi Graeci*. 2nd ed. Oxford 1991-92.

I. Some Ancient Texts and the Editions from which they are cited

Anaxagoras: D. Sider, *Anaxagoras*, 2nd ed. Sankt Augustin 2005.

Antigonos: Alessandro Giannini, *Paradoxographorum Graecorum Reliquiae* (Milan 1966) 31-111.

Apollonios: *Historiae Mirabiles*, ed. A. Giannini, *Paradoxographorum Graecorum Reliquiae* (Milan 1966) 119-143.

Apollonios Rhodios: Scholia, ed. K. Wendel, Leipzig 1935.

Aratos, ed. D. Kidd, *Aratus. Phaenomena*. Cambridge 1997. See also Jean Martin, Paris 2002. Scholia et vitae: ed. J. Martin. Leipzig 1974.

Archilochos: M. L. West, *Elegi et Iambi Graeci*, vol. 1^2. Oxford 1992.

Aristophanes: *Scholia in Aristophanem*, ed. W. J. W. Koster, Groningen.

Pars IB, in *Acharnenses*, ed. Nigel G. Wilson. 1975.

Pars II.3, in *Aves*, ed. D. Holwerda, 1991.

Pars II.1, in *Vespas*, ed. W. J. W. Koster, 1978.

Pars III.1, in *Nubes*, ed. D. Holwerda, 1977.

Aristotle, fragments: O. Gigon, *Aristotelis Opera*, vol. 3, *Librorum deperditorum fragmenta*. Berlin 1987. (See also Rose, *Aristoteles Pseudepigraphus*, in bibliography)

Demokritos: W. Gemoll, *Nepualii fragmentum περὶ τῶν κατὰ ἀντιπάθειαν καὶ συμπάθειαν et Democriti περὶ συμπαθειῶν καὶ ἀντιπαθειῶν*. Programmschrift Striegau, 1884.

Dionysios Periegetes: A. Garzya, *Dionysii Ixeuticon seu de Aucupio*. Leipzig 1963.

Dionysios Thrax: Wilhelm Uhlig, *Dionysii Thracis Ars Grammatica*. Leipzig 1883.

Eudoxos: François Lasserre, *Die Fragmente des Eudoxos von Knidos*, Berlin 1966. (See also Blass, below.)

Geminus, *Calendarium*: C. Manitius, *Gemini Elementa Astronomiae* (Leipzig 1898) 210-233.

Geoponica, ed. H. Beckh. Leipzig 1895.

Hipparchos: C. Manitius, *Hipparchi in Arati et Eudoxi Phaenomena*. Leipzig 1894.

Horapollo: Heinz J. Thissen, *Des Niloten Horapollo Hieroglyphenbuch*. Munich 2001.

Kleostratos: Alberto Bernabé, *Poetae Epici Graeci*, part 1 (Leipzig 1987) 155-157.

Joh. Lydus, *De Ostentis*, ed. K. Wachsmuth (Leipzig 1863).

Nigidius Figulus: A. Swoboda, *P. Nigidii Figuli Operum Reliquiae*. Vienna 1888.

Poseidippos: Colin Austin and G. Bastianini, *Posidippi Pellaei quae Supersunt Omnia*. Milan 2002.

Poseidonios: Ludwig Edelstein and I. G. Kidd, *Posidonius*. 3 vols. Cambridge 1972-99.

Ptolemy, *Phaseis*, ed. J. L. Heiberg, *Claudii Ptolemaei Opera quae exstant omnia*, II. *Opera Astronomica Minora* (Leipzig 1907) 1-67.

——, *Tetrabiblos*, ed. F. Boll and E. Boer, *Claudii Ptolemaei Opera quae exstant omnia*, III, 1 (Leipzig 1940) 1-213.

Suetonius: *Praeter Caesarum libros reliquiae*, ed. A. Reifferscheid (Leipzig 1860) 233-237.

Theophrastos:

Fragments: FHSG (see above, abbreviations)

Opuscula:

De Ventis: Victor Coutant and V. L. Eichenlaub, *Theophrastus De Ventis*. Notre Dame 1975.

Metaphysica. A. Laks and G. W. Most, *Théophraste. Métaphysique*. Paris 1993 [Budé].

De Sudoribus and *De Lassitudine*. W. Fortenbaugh, R. W. Sharples, and M. G. Sollenberger (eds., respectively), *Theophrastus of Eresus:* On Sweat, On Dizziness, *and* On Fatigue. Leiden 2003.

Meteorology: Hans Daiber, "The *Meteorology* of Theophrastus in Syriac and Arabic Translation," in Fortenbaugh and Gutas 166-293.

De Lapidibus. D. E. Eichholz, *Theophrastus De Lapidibus*. Oxford 1965.

Varro Atacinus: Willy Morel and K. Büchner, *Fragmenta poetarum Latinorum epicorum et lyricorum praeter Ennium et Lucilium*. Leipzig 1982.

Vegetius: M. D. Reeve, *Vegetius: Epitoma Rei Militaris*. Oxford 2004.

II. Texts of and Commentaries on Περὶ Σημείων

1497 Aldus Manutius, with the aid of Alexander Bondinus. [Works of Aristotle, Theophrastus, and others.] 5 vols. Venice 1495-98: Aldus Manutius. Vol. 2 (1497) ff. 261r–267r.

DS begins with the heading, as if it were the entire title, Περὶ σημείων ὑδάτων καὶ πνευμάτων. Internal headings are Περὶ σημείων ἀνέμων, Π. σ. χειμῶνος, and Π. εὐδίας σημείων. On this volume, see the Introduction, p. 49 f.

1541 Simon Grynaeus. *Θεοφράστου … τὰ μέχρι νῦν Σωζόμενα ἅπαντα. Theophrasti … Opera, quae … adhuc restant, omnia.* Basel: Johannes Oporinus, pp. 239-44.

Grynaeus printed a few conjectures alongside the text in the margin. This volume was printed with two different prefaces, first with one by H. Gemusaeus and again with one by Joachim Camerarius, who praises the recently deceased Grynaeus. This is the first time *DS* was printed with Theophrastus as author, and from this point on, all printed editions ascribe the work to Theophrastus. Gemusaeus does so without question: listing the works printed he says: *Item de aquarum et ventorum signis liber unus* [= *DS* in toto], *quem priores* [in primis, Aldus] *incerti autoris inscripserunt.* Camerarius does not touch upon the work's authorship.

1552 J. B. Camotius. *Θεοφράστου περὶ φυτῶν ἱστορίαν καὶ περὶ φυτῶν αἰτίων, καί τινα ἄλλα αὐτοῦ βιβλία περιέχων τόμος VI. Theophrasti Historiam de Plantis et de Causis Plantarum et quosdam alios ipsius libros continens tomus VI.* Venice: Aldi filii. Pp. 583-596.

This is vol. 6 of Camotius' *Ἀριστοτέλους πᾶσαν λογικήν, ῥητορικήν, καὶ ποιητικὴν πραγματείαν περιέχων. Aristotelis omnem logicam, rhetoricam et poeticam disciplinam continens.* 6 vols. 1551-53. *DS* is given chapter numbers, but not those set later by Wimmer. The text is essentially that of the Aldine, but careless errors occur.

1593 Fredericus Bonaventura. *Anemologiae pars prior, id est De affectionibus, signis, causisque ventorum ex Aristotele, Theophrasto, ac Ptolemaeo tractatus.* Urbino: Apud Bartholomaeum & Simonem Ragusios fratres. Pp. 35-60 (Bonaventura's Latin translation), 223-442 (his commentary).

Part 1 of this work contains translations and lengthy commentaries on Theophrastus *On Winds* and on *DS* (the latter omitted in

the description in *Pre '56 Imprints*). Although Bonaventura lists Theophrastus as author in his table of contents, he is aware that *DS* (which he thinks of as "iv libelli") *appareant ex peripateticis fontibus fuisse hausta*, and allows for the possibility that the author may be Aristotle (*neque enim horum fortasse Opusculorum* [= *DS*] *autor est Theophrastus, cuius tamen autoritas est tanta, sed ipsemet Aristoteles*), on the basis of D.L.'s having listed such a work among Aristotle's titles and the fact that many of the mss. acribe *DS* to him. Nonetheless, throughout his commentary Bonaventura consistently refers to the author as Theophrastus. We have not seen the Venice 1594 printing (so rare that even the Marciana does not possess a copy), which, since the page numbers for *DS* are the same, is likely to be unchanged. For more on this edition, see Schmitt (below) 287-290, 293 f.

1605 Daniel Furlanus. *Theophrasti Eresii Peripateticorum post Aristotelem principis* … , interpretibus Daniele Furlano cretensi, Adriano Turnebo. Hanau: Marnius. Pp. 109-130.

Text and facing Latin translation on each page. Each of the four sections of *DS* is followed by textual notes.

1613 Daniel Heinsius. *Θεοφράστου τοῦ 'Ερεσίου ἅπαντα. Theophrasti Eresii Graece et Latine opera omnia*. Leiden: H. van Haestens. Pp. 416-440, but Theophrastus' *De Igne* is printed on pp. 420-437, between *De Signis Ventorum* and *De Signis Tempestatis*.

Th. *De Ventis*, missing from the table of contents, is printed immediately before *DS*. Furlanus' Latin translation faces Heinsius' Greek text, which has no chapter numbers. For the most part, Heinsius' Greek text follows that of Furlanus.

1818-21 Johann G. Schneider. *Θεοφράστου 'Ερεσίου τὰ Σωζόμενα. Theophrasti Eresii quae supersunt omnia*. Leipzig. 1 (1818) 782-800 (text); 2 (1818) 466-476 (Furlanus' Latin tr.), 599-605 ("secundae curae"); 4 (1818) 719-756 (commentary); 5 (1821) lvii-lviii (addenda et corrigenda), 163-173 (commentary with notes on Bartholomaeus' Latin translation; cf. below, sect. III).

DS = fragmentum VI. (It is still fragment 6 in the TLG.) Schneider inserts chapter numbers in each of the four sections of *DS*, beginning with no. 1 every time.

1862 Friedrich Wimmer. *Theophrasti Eresii Opera quae supersunt omnia*. Vol. 3. *Fragmenta*. Leipzig (Bibliotheca Teubneriana). Pp. xxii-xxiii (app. crit.), 115-130 (text).

DS = fragmentum VI. Wimmer adopts Schneider's chapter divisions, but establishes the modern system of reference to this text by numbering them continuously from 1 to 57.

1866 Friedrich Wimmer: *Θεόφραστος. Theophrasti Eresii Opera quae supersunt omnia*. Paris. Pp. xx (app. crit.), 389-398 (text).

Didot edition, with facing Latin translation. There are only a few minor differences between Wimmer's two editions.

1894 James G. Wood. *Theophrastus of Eresus on Winds and on Weather Signs, Translated with an Introduction and Notes*, edited by G. J. Symonds. London 1894.

Wood based his translation on the texts of Schneider and Wimmer.

1926 Arthur Hort: *Theophrastus: Enquiry into Plants and Minor Works on Odours and Weather Signs*. Vol. 2. Cambridge, Mass. and London. (Loeb Classical Library, 79). Pp. 390-433.

Note that *Odours* and *Weather Signs* do not appear on the spine of the book.

III. Translations of Περὶ Σημείων

In addition to those in the editions listed above (1593, 1605, 1613, 1818-21, 1866, 1894, 1926), a thirteenth-century (between 1258 and 1266) Latin translation was produced by Bartholomaeus of Messina. We have seen this only in the edition of Kley (see below), and none of the ten mss. or the four sixteenth-century editions. For its value for reconstituting the Greek text of *DS*, see above, p. 43. See Schmitt (below) 292-294 for a bibliographical account. Nor have we seen the unpublished Latin translation (1574-75) of Jacobus Dalechampius (Paris BN lat. 11, 857); see Schmitt 293.

IV. Secondary Literature

Armstrong, Edward A. *The Folklore of Birds*. London 1958.

Arnott, William G. "Notes on *gavia* and *mergi* in Latin authors," *Classical Quarterly* 14 (1964) 249-262.

Arrighetti, Graziano. "Problemi di letteratura meteorologica greca," *Maia* 15 (1963) 399-441; esp. 419-441, "Struttura e composizione del 'de signis'."

Aujac, Germaine. "Les prévisions météorologiques en Grèce ancienne," in Cusset (below) 13-25.

Bastianini, Guido, and Claudio Gallazzi. *Posidippo di Pella. Epigrammi (P.Mil.Vogl. VIII 309)*. Milan 2000.

Beavis, Ian C. *Insects and Other Invertebrates in Classical Antiquity*. Exeter 1988.

Bing, Peter. "Aratus and his audiences," *Materiali e Discussioni* 31 (1993) 99-109.

Blass, Friedrich. *Eudoxi Ars Astronomica qualis in charta Aegyptiaca superest*. Kiel 1887.

Böhme, Johannes. *De Theophrasteis quae feruntur περὶ σημείων excerptis*. Diss. Halle (Hamburg) 1884.

Böker, Robert. "Wetterzeichen," *RE* Supplb. 9 (1962) 1609-92.

Bolkestein, Hedrik. *Theophrastos' Charakter der Deisidaimonia als religionsgeschichtliche Urkunde*. Giessen 1929 = Religionsgeschichtliche Versuche und Vorarbeiten, 21.2.

Boll, Franz. "Fixsterne," *RE* 6 (1909) 2407-31.

Bouffartigue, Jean. "Les prévisions météorologiques tirées de l'observation des animaux: Études des sources antiques," in Cusset (below) 397-413.

Bowen, Alan C., and B. R. Goldstein. "Meton of Athens and astronomy in the late fifth century B.C.," in Erle Leichty et al. (eds.), *A Scientific Humanist: Studies in Memory of Abraham Sachs* (Philadelphia 1988) 39-81.

Bowra, C. M. "Signs of storm (Archil. fr. 56 [D])," *Classical Review* 54 (1940) 127-129.

Brubaker, L. "The Vienna Dioskorides and Anicia Juliana," in Littlewood and Maguire 189-214.

Burkert, Walter. *Lore and Science in Ancient Pythagoreanism*, tr. E. L. Minar, Jr. Cambridge, Mass. 1972.

Burnyeat, Myles. "The origins of non-deductive reasoning," in Jonathan Barnes et al. (eds.), *Science and Speculation* (Cambridge 1982) 193-238.

Burnikel, Walter. *Textgeschichtliche Untersuchungen zu neun Opuscula Theophrasts*. Palingenesia, 8. Wiesbaden 1974.

Calderón, Esteban. "A propósito de ὀλολυγών (Arato, *Phaen*. 948), *Quaderni Urbinati di Cultura Classica* 67 (2000) 133-139.

Carapiperis, Leon N. *The Etesian Winds*. Vol. 1. *The Opinions of the Ancient Greeks on the Etesian Winds*. *Ἐθνικὸν Ἀστεροσκοπεῖον Ἀθηνῶν. Ὑπομνήματα*, Ser. II, *Μετεωρολογικά*, 9. Athens 1962.

Cardon, Bartley L. "An unusual lunar halo," *American Journal of Physics* 45 (1977) 331-335.

Capelle, Wilhelm. *Berges- und Wolkenhöhen bei griechischen Physikern*. Leipzig 1916.

Cary, Max. *The Geographic Background of Greek and Roman History*. Oxford 1949.

Clay, Jenny Strauss. "ΑΚΡΑ ΓΥΡΕΩΝ: Geography, allegory, and allusion (Archil. fr. 105 W)," *American Journal of Philology* 103 (1982) 201-204.

Collins, Derek. "Reading the birds: *Oiônomanteia* in early epic," *Colby Quarterly* 38 (2002) 17-41.

Cook, Arthur B. *Zeus: A Study in Ancient Religion*. 3 vols. Cambridge 1925-41.

Cosenza, Mario E. *Biographical and Bibliographical Dictionary of the Italian Humanists and of the World of Classical Scholarship in Italy, 1300-1800*. Boston 1962.

Courtney, Edward. *The Fragmentary Latin Poets*. Oxford 1993.

Cramp, Stanley, et al. *Handbook of the Birds of Europe, the Middle East, and North Africa: The Birds of the Western Palearctic*, 1. Oxford 1977.

Cronin, Patrick. "The authorship and sources of the περὶ σημείων ascribed to Theophrastus," in Fortenbaugh and Gutas (1992) 307-345. [= Cronin "Authorship"]

——. "Weather lore as a source of Homeric imagery," *Hellenica* 51 (2001) 7-24.

Cumont, Franz et al. *Catalogus Codicum Astrologorum Graecorum*. Vol. 4.4. *Codices Italici*. Brussels 1903.

——. *Catalogus Codicum Astrologorum Graecorum*. Vol. 8, part 1. *Codices Parisini*. Brussels 1929.

Cunningham, Maurice P. "A note on Latin poetic imitation," *Classical Bulletin* 30 (1953/4) 41-44.

Cusset, Christophe (ed.). *La Météorologie dans l'antiquité: Entre science et croyance*. Saint-Étienne 2003.

Daiber, Hans. "The *Meteorology* of Theophrastus in Syriac and Arabic translation," in Fortenbaugh and Gutas (1992), 166-293.

Davies, Malcolm, and J. Kathirithamby. *Greek Insects*. London 1986.

Denniston, J. D. *Greek Particles*. 2nd ed. Oxford 1966.

Dicks, D. R. "Solstices, Equinoxes, and the Presocratics," *Journal of Hellenic Studies* 86 (1966) 26-40.

Diller, Aubrey. *The Tradition of the Minor Greek Geographers*. New York 1952.

Dirlmeier, Franz. Review of Kley (below), *Gnomon* 14 (1938) 129-137.

Doody, Aude. "Finding facts in Pliny's Encyclopaedia: The *summarium* of the *Natural History*," *Ramus* 20 (2001) 1-22.

Dunlop, Storm. *Weather Photoguide*. London 1996.

Durán, Martí. "Los ἄκρ' ἀγυρέων y la borrachera simpótica en el fragmento 105 West de Arquíloco," *Faventia* 23 (2001) 41-49.

Elkins, Norman. *Weather and Bird Behaviour*. Calton (UK) 1988.

Emlyn-Jones, C. J. "ἔτος and ἐνιαυτός in Homeric formulae," *Glotta* 45 (1967) 156-161.

Erren, Manfred. *Die Phainomena des Aratos von Soloi: Untersuchungen zum Sach- und Sinnverständnis*. Hermes Einzelschriften 19. Wiesbaden 1967. Note esp. ch. 8, "Die Wetterzeichen," 227-300.

——. *P. Vergilius Maro:* Georgica. Bd. 2, *Kommentar*. Heidelberg 2003.

Fakas, Christos. *Der hellenistische Hesiod: Arats* Phainomena *und die Tradition der antiken Lehrepik*. Wiesbaden 2001.

Fiedler, Karl G. *Reise durch alle Theile des Königreiches Griechenland*. Leipzig 1841.

Foerster, Richard. *De Aristotelis quae feruntur physiognomonicis recensendis*. Kiel 1882.

Fortenbaugh, William W., and Dimitri Gutas (eds.). *Theophrastus: His Psychological, Doxographical, and Scientific Writings*. RUSCH, 5. New Brunswick 1992.

Fortenbaugh, William W., and Robert W. Sharples (eds.). *Theophrastean Studies: On Natural Science, Physics, and Metaphysics, Ethics, Religion, and Rhetoric*. RUSCH, 3. New Brunswick 1988.

Fortenbaugh, William W., and Georg Wöhrle (eds.). *On the* Opuscula *of Theophrastus. Akten der 3. Tagung der Karl-und-Gertrud-Abel-Stiftung vom 19.–23. Juli 1999 in Trier*. Stuttgart 2002.

Fotheringham, J. K. "Cleostratus," *Journal of Hellenic Studies* 39 (1919) 164-184.

Fraser, Peter M. *Ptolemaic Alexandria*. 3 vols. Oxford 1972.

Freeland, Cynthia A. "Scientific explanation and empirical data in Aristotle's *Meteorology*," *Oxford Studies in Ancient Philosophy* 8 (1990) 67-102.

Garzya, Antonio. "Sull'autore e il titolo del perduto poema 'Sull'Aucupio' attributo ad Oppiano," *Giornale Italiano di Filologia* 10 (1957) 156-160.

Gemoll, Wilhelm. *Untersuchungen über die Quellen, den Verfasser und die Abfassunsgzeit der Geoponica*. Berliner Studien für classische Philologie und Archäologie, 1.1. Berlin 1883; repr. Walluf bei Wiesbaden 1972.

——. *Nepualii fragmentum περὶ τῶν κατὰ ἀντιπάθειαν καὶ συμπάθειαν et Democriti περὶ συμπαθειῶν καὶ ἀντιπαθειῶν*. Programmschrift Striegau, 1884.

Gigon, Olof. *Aristotelis Opera*. Vol. 3, *Librorum deperditorum fragmenta*. Berlin 1987.

Gilbert, Otto. *Die meteorologischen Theorien des griechischen Altertums*. Leipzig 1907; repr. Hildesheim 1967.

Gillespie, W. E. *Vergil, Aratus, and Others: The Weather-sign as a Literary Subject*. Diss. Princeton 1938.

Graf, Fritz. *Magic in the Ancient World*, tr. F. Philip. Cambridge, Mass. 1997.

Grayeff, Felix. *Aristotle and his School*. London 1974.

Greenler, Robert. *Rainbows, Halos, and Glories*. Cambridge 1980.

Grilli, Alberto. "Virgilio e Arato (a proposito di Georg. 1.187 ss.)," *Acme* 23 (1970) 145-184.

Hagemeijer, Ward J. M., and M. J. Blair (eds.). *The EBCC Atlas of European Breeding Birds*. London 1997.

Handrinos, George, and T. Akriotis. *The Birds of Greece*. London 1997.

Hankinson, R. J. *Cause and Explanation in Ancient Greek Thought*. Oxford 1998.

Hannah, Robert. "From orality to literacy? The case of the parapegma," in Janet Watson (ed.), *Speaking Volumes: Orality and Literacy in the Greek and Roman World* (Leiden 2001) 139-159.

——. "Euctemon's *parapegma*," in Christopher J. Tuplin and T. E. Rihll (eds.), *Science and Mathematics in Ancient Greek Culture* (Oxford 2002) 112-132.

Hanson, Ann E. "Fragmentation of the Greek medical writers," in G. W. Most (ed.), *Collecting Fragments / Fragmente sammeln*. Aporemata 1 (Göttingen 1997) 289-314.

Harder, F. "*Acredula*—ὀλογυγών," *Glotta* 12 (1923) 137-144.

Harlfinger, Dieter. "Die handschriftliche Verbreitung der Mirabilien," in Helmut Flashar, *Aristoteles, Mirabilia* (Berlin 1972) 62-66.

——. *Die Textgeschichte der pseudo-aristotelischen Schrift* ΠΕΡΙ ΑΤΟΜΩΝ ΓΡΑΜΜΩΝ: *Ein kodikologisch-kulturgeschichtlicher Beitrag zur Klärung der Überlieferungsverhältnisse im Corpus Aristotelicum*. Amsterdam 1971.

Harlfinger, Dieter, and Dieter Reinsch. "Die Aristotelica des Parisinus gr. 1741: Zur Überlieferung von Poetik, Rhetorik, Physiognomik, De signis, De ventorum situ," *Philologus* 114 (1970) 28-50.

Haslam, Michael. "Hidden signs: Aratus *Diosemeiai* 46 ff., Vergil *Georgics* 1.424 ff.," *Harvard Studies in Classical Philology* 94 (1992) 199-204.

Hauser, Albert. *Bauernregeln: Eine schweizerische Sammlung*. Zurich 1975.

Heninger, S. K., Jr. *A Handbook of Renaissance Meteorology*. Durham, N.C. 1960.

Heeger, Maximilian R. *De Theophrasti qui fertur περὶ σημείων libro*. Diss. Leipzig 1889.

Hershbell, Jackson P. "Democritus and the beginnings of Greek alchemy," *Ambix* 34 (1987) 5-20.

Hercher, R. "Michaelis Pselli Περὶ ὠμοπλατοσκοπίας καὶ οἰωνοσκοπίας ex codice Vindobonensi," *Philologus* 8 (1853) 166-168.

Hoffmann, Philippe. *Un mystérieux collaborateur d'Alde Manuce: L'Anonymus Harvardiensis*. Rome 1985 = Mélanges de l'École Française de Rome, 97.

Howard, Luke. *On the Modifications of Clouds*. London 1803.

Hunter, Richard L. "Written in the stars: Poetry and philosophy in the *Phainomena* of Aratus," *Arachnion* 2 (1995), http://www.cisi.unito.it/arachne/num2/hunter.html.

Inwards, Richard. *Weather Lore: A Collection of Proverbs, Sayings, and Rules concerning the Weather*. London 1898.

Jermyn, L. A. S. "Weather-signs in Virgil," *Greece and Rome* 20 (1951) 26-37, 49-59.

Jocelyn, Henry D. "Ancient scholarship and Virgil's use of Republican Latin poetry, II," *Classical Quarterly* 15 (1965) 126-144.

Kádár, Zoltán. *Survivals of Greek zoological illuminations in Byzantine manuscripts*. Budapest 1978.

Kahl, Jonathan D. W. *National Audubon Society First Field Guide to Weather*. New York 1998.

Kaibel, Georg. "Antike Windrosen," *Hermes* 20 (1885) 579-624.

——. "Aratea," *Hermes* 29 (1894) 89-123, esp. sect. 3, on Aratos' weather signs and *DS*, 102-120.

Kazhdan, Aleksandr. "Geoponika," in: *Oxford Dictionary of Byzantium* (A. Kazhdan et al., eds.), Oxford (1991) 2.834.

Kenney, E. J. *The Classical Text*. Berkeley 1974.

Kidd, Douglas. *Aratus. Phaenomena*. Cambridge 1997.

Kingsley, Peter. "Meetings with Magi: Iranian themes among the Greeks, from Xanthus of Lydia to Plato's Academy," *Journal of the Royal Asiatic Society* 3.5,2 (1995) 173-209.

Kley, Walter. *Theophrasts Metaphysisches Bruchstück und die Schrift περὶ σημείων in der lateinischen Übersetzung des Bartholomaeus von Messina*. Diss. Berlin (Würzburg) 1936.

Kroll, Wilhelm. "Lehrgedicht," *RE* 12 (1925) 1842-57.

——. "Bolos und Demokritos," *Hermes* 69 (1934) 228-232.

——. "Nigidius (2)," *RE* 17 (1936) 200-212.

——. "Plinius (5) der Ältere," *RE* 21 (1951) 271-439.

Kullmann, Wolfgang, J. Althoff, and M. Asper (eds.). *Gattungen wissenschaftlicher Literatur in der Antike*. Tübingen 1998.

Lalonde, Gerald V. "Topographical notes on Aristophanes," *Hesperia Suppl*. 20 (1982) 77-81.

Langholf, Volker. *Medical Theories in Hippocrates: Early Texts and the "Epidemics."* Berlin 1990.

La Penna, Antonio. "Esiodo nella cultura e nella poesia di Virgilio," in *Hésiode et son influence* (*Entretiens Hardt* 7) (Vandœuvres-Genève 1962) 213-270 (repr. in G. Arrighetti [ed.] *Esiodo: Letture critiche* [Milan 1975] 215 ff.).

——. "Esiodo," in *Enciclopedia Virgiliana* (Rome 1984) 1.386-38.

Lasserre, François. *Die Fragmente des Eudoxos von Knidos*. Berlin 1966.

Laurenti, R. "La questione Bolo-Democrito," in *L'Atomo fra scienza e letteratura*, Università di Genova, Facoltà di Lettere (1985) 55-74.

Lehoux, Daryn R. *Parapegmata, or Astrology, Weather, and Calendars in the Ancient World*. Diss. Toronto 2000. [= Lehoux *Parapegmata*]

——. "Impersonal and intransitive ἐπισημαίνει," *Classical Philology* 99 (2004) 78-85.

——. "Observation and prediction in ancient astrology," *Studies in History and Philosophy of Science* 35 (2004) 227-246.

——. *Astronomy, Weather, and Calendars in the Ancient World*. Cambridge, forthcoming 2007.

Lenz, F. "P. Terentius (88) Varro," *RE* 5A (1934) 692-704.

Leszl, Walter. "I messaggi degli dei e i segni della natura," in Giovanni Manetti (ed.), *Knowledge through Signs: Ancient Semiotic Theories and Practices* (Bologna 1996) 43-81.

——. *I primi atomisti*. Forthcoming.

Littlewood, Antony, and H. Maguire (eds.). *Byzantine Garden Culture*. Washington D.C., 2002.

Lloyd, G. E. R. *Magic, Reason, and Experience*. Cambridge 1979.

——. *Aristotelian Observations*. Cambridge 1996.

——. "Hot and cold, dry and wet in early Greek thought," *Journal of Hellenic Studies* 84 (1964) 92-106; repr. in David J. Furley and R. E. Allan (eds.), *Studies in Presocratic Philosophy*, vol. 1 (London 1970) 255-280.

Lobel, Edgar. *The Greek Manuscripts of Aristotle's* Poetics. Supplements to the Bibliographical Society's Transaction, 9. Oxford 1933.

Ludlum, David McW., R. L. Holle, and R. A. Keen. *Clouds and Storms*. New York 1998.

Ludwig, W. "Die Phainomena Arats als hellenistische Dichtung," *Hermes* 91 (1963) 425-448.

Maass, Ernst. *Aratea*. Berlin 1892.

——. *Arati Phaenomena*. Berlin 1893.

——. Review of Heeger (above). *GGA* (1893) 624-642.

——. *Commentariorum in Aratum reliquiae*. Berlin 1898.

McCartney, E. S. (a series of articles on Greek and Roman weather lore, with varying titles) *Classical World* 14 (1921) 89-93, 97-100; 17 (1924) 105-108; 20 (1926) 43-49, 51-54; 22 (1928) 25-31, 33-37; 23 (1929) 2-8, 11-15; 24 (1930) 11-16, 18-29; 25 (1932) 183-192, 200-208, 212-216; 27 (1933) 1-6, 9-13, 17-22, 25-29; 28 (1934) 1-7, 9-12, 17-23, 25-31.

Mansfeld, Jaap. *The Pseudo-Hippocratic Tract Περὶ Ἑβδομάδων Ch. 1-11 and Greek Philosophy*. Assen 1971.

Marriott, Paul J. *Red Sky at Night, Shepherds' Delight: Weather Lore of the English Countryside*. Oxford 1981.

Martin, Jean. *Aratos. Phénomènes*. 2 vols. Paris 2002 [Budé].

Martini, A., and D. Bassi. *Catalogus codicum graecorum Bibliothecae Ambrosianae*. Milan 1906.

Maxwell-Stuart, Peter C. "Theophrastus the traveller," *Parola del Passato* 51 (1996) 241-267.

Mioni, Elpidio. *Aristotelis codices graeci qui in bibliothecis Venetiis adservantur*. Padua 1958.

——. *Bibliothecae Divi Marci Venetiarum Codices Graeci manuscripti*. Vol. 1.2. Rome 1972.

Moraux, Paul. *Les listes anciennes des ouvrages d'Aristote*. Louvain 1951.

Moraux, Paul, D. Harlfinger, D. Reinsch, and J. Wiesner. *Aristoteles Graecus: Die griechischen Manuskripte des Aristoteles*. Vol. 1. *Alexandrien-London*. Berlin 1976.

Morsch, Hans. *De Graecis auctoribus in Georgicis a Vergilio expressis*. Diss. Halle 1878.

Morton, Jamie. *The Role of the Physical Environment in Ancient Greek Seafaring*. Leiden 2001.

Müller, Carl Werner. *Gleiches zu Gleichem: Ein Prinzip frühgriechischen Denkens*. Wiesbaden 1965.

Müller, Wilhelm. *Über den Sprachgebrauch des Theophrastus*. Programmschrift. Arnstadt 1878.

Mugler, Charles. *Dictionnaire historique de la terminologie optique des grecs*. Paris 1964.

Neugebauer, Otto. "Astronomische Papyri aus Wiener Sammlungen. II. Über griechische Wetterzeichen und Schattentafeln. Institut für österr. Geschichtsforschung, Pap. graec. Nr. 1," *Sitzungsb. d. Österr. Akademie d. Wissensch.*, Phil.-hist. Kl., 240.2 (Vienna 1962) 29-44.

——. *A History of Ancient Mathematical Astronomy*. Part 2. Berlin 1975.

Nilsson, Martin P. *Primitive Time Reckoning*. Lund 1920.

Nock, Arthur D. "The lizard in magic and religion," *Essays on Religion and the Ancient World* (Oxford 1972) 1.271-276.

Obrist, Barbara. "Wind diagrams and medieval cosmology," *Speculum* 72 (1997) 33-84.

——. *La cosmologie médiévale. Textes et images:* I. *Les fondements antiques*. Florence 2004.

Oliphant, S. "ἡ ὀλολυγών – What was it?" *TAPA* 46 (1916) 85-106.

Parry, William E. *Journal of a Voyage for the Discovery of a Northwest Passage from the Atlantic to the Pacific*. London 1821; repr. New York 1968.

Pfeiffer, Erwin. *Gestirne und Wetter im griechischen Volksglauben und bei den Vorsokratikern*. Diss. Heidelberg (Leipzig) 1914.

Phillips, J. H. "The Hippocratic physician and ἀστρονομίη," in François Lasserre and P. Mudry (eds.), *Formes de pensée dans la collection hippocratique* (Geneva 1983) 427-434.

Pollard, John. *Birds in Greek Life and Myth*. London 1977.

Polunin, Oleg. *Trees and Bushes of Britain and Europe*. London 1976.

——. *Flowers of Greece and the Balkans*. London 1980.

Polunin, Oleg, and A. Huxley. *Flowers of the Mediterranean*. London 1967.

van Raalte, Marlein. *Theophrastus. Metaphysics, With an Introduction, Translation and Commentary*. Leiden 1993.

Regenbogen, Otto. "Theophrastos," *RE* Supplb. 7 (1940) 1354-1562.

Rehm, Albert. "Etesiai," *RE* 6 (1907) 714-717.

—— . *Das Parapegma des Euktemon*. Part 3 of Franz Boll, *Griechische Kalender*, Sitzungsb. d. Heidelb. Akademie d. Wissensch., Phil.-hist. Kl. (1913.3).

——. *Griechische Windrosen*, Sitzungsb. d. Bayer. Akademie d. Wissensch., Phil. Kl. 1916.3.

——. "Episemasiai," *RE* Supplb. 7 (1940) 175-198.

——. Review of Zuretti (below), in *Byzantinische Zeitschrift* 40 (1940) 222-225.

——. *Parapegmastudien. Mit einem Anhang: Euktemon und das Buch De signis*. Abh. d. Bayer. Akademie d. Wissensch., Phil.-hist. Kl. n.F. 19 (1941). Munich.

Reifferscheid, August. *C. Suetoni Tranquilli praeter Caesarum libros reliquiae*. Leipzig 1860; repr. Hildesheim 1971.

Richter, Gisela M. A. *The Furniture of the Greek, Etruscans, and Romans.* London 1966.

Robins, R. H. "The authenticity of the *Techne*: The *status quaestionis*," in Vivien Law and I. Sluiter (eds.), *Dionysius Thrax and the* Techne Grammatike (Münster 1995) 13-26.

Rodgers, Richard. "Κηποποιΐα: Garden making and garden culture in the Geoponika," in Littlewood and Maguire (above) 159-175.

Roehrig, Arminius. *De P. Nigidio Figulo capita duo*. Diss. Leipzig 1887.

Rose, Valentin. *Aristoteles Pseudepigraphus*. Leipzig 1863.

Salem, Jean 1996, *La légende de Démocrite*. Paris 1996.

Samuel, Alan E. *Greek and Roman Chronology: Calendars and Years in Classical Antiquity*. Munich 1972.

Sandbach, F. H. "Ἄκρα Γυρέων once more," *Classical Review* 56 (1942) 63-65.

Scarborough, John. "Nicander's toxicology, II: Spiders, scorpions, insects and myriapods, Part I," *Pharmacy in History* 21 (1979) 3-34.

——. "Nicander *Theriaca* 811: A note," *Classical Philology* 75 (1980) 138-140.

Schlottmann, Wilhelm. *De Auctoribus quibusdam in Plini Naturalis Historiae libro xviii.* Rostock 1893.

Schmitt, Charles B. "Theophrastus," in Paul O. Kristeller and F. E. Cranz (eds.), *Catalogus Translationum et Commentariorum*. Vol. 2 (Washington 1971) 239-322.

Sharples, Robert W. "Some aspects of the secondary tradition of Theophrastus' *opuscula*," in Fortenbaugh and Sharples (above), 41-64.

——. *Theophrastus of Eresus: Sources for his Life, Writings, Thought and Influence. Commentary*. Vol. 3.1. *Sources on Physics (Texts 137-223)*. Leiden 1998.

Sibley, David. *The Sibley Guide to the Birds.* New York 2000.

Sicherl, Martin. *Griechische Erstausgaben des Aldus Manutius: Druckvorlagen, Stellenwert, kultureller Hintergrund*. Paderborn 1997.

Sider, David. "The structure of Plato, *Republic* VI," *Rivista di Studi Classici* 24 (1976) 336-348.

——. "Hesiod and Vergil," *Vergilius* 34 (1988) 15-24.

——. "On *On Signs*," in Fortenbaugh and Wöhrle 99-111.

——. "Demokritos on the Weather," in A. Laks and C. Louguet (eds.), *Qu'est-ce que la philosophie présocratique?* (Villeneuve d'Ascq 2002) 287-302.

——. "Posidippus on weather signs and the tradition of didactic poetry," in K. Gutzwiller (ed.), *The New Posidippus: A Hellenistic Poetry Book* (Oxford 2005) 158-176.

——. *Anaxagoras*, 2nd ed. Sankt Augustin 2005.

Silvester, Norman L. "Notes on the behaviour of certain plants in relation to the weather," *Quarterly Journal of the Royal Meteorological Society* 52 (1926) 15-24.

Smyth, Herbert W. *Greek Grammar*. Cambridge, Mass. 1956.

Steinmetz, Peter. *Die Physik des Theophrastos von Eresos*. Palingenesia, 1. Bad Homburg 1964.

Tannery, Paul. *Recherches sur l'histoire de l'astronomie ancienne*. Paris 1893.

Taub, Liba. "Destini della scienza greca: Eredità e longevità degli strumenti scientifici," in S. Settis (ed.), *I Greci: Storia, cultura, arte, società*. Vol. 3, *I Greci oltre la Grecia* (Turin 2001) 889-930.

——. *Ancient Meteorology*. London 2003.

Theander, C. "ΛΥΚΑΒΑΣ, ΛΥΚΑΜΒΗΣ," in Axel Nelson (ed.), *Symbolae Philologicae O. A. Danielsson octogenario dicatae* (Uppsala 1932) 349-351.

Thompson, D'Arcy W. "The Greek winds," *Classical Review* 32 (1918) 49-56.

——. *A Glossary of Greek Birds*. London 1936.

——. "Archilochus, fr. 56 [D]," *Classical Review* 55 (1941) 67.

——. *A Glossary of Greek Fishes*. London 1947.

Thorndike, Lynn. *A History of Magic and Experimental Science*. New York 1934.

Threatte, Leslie. *The Grammar of Attic Inscriptions*. 2 vols. Berlin 1980, 1996.

Vogt, Sabine. *Aristoteles:* Physiognomonica. Berlin 1999.

Wærn, Ingrid. *Γῆς ὄστεα: The Kenning in pre-Christian poetry*. Uppsala 1951.

Wagner, Ewald, and P. Steinmetz. *Der syrische Auszug der Meteorologie des Theophrast*. Akademie d. Wissensch. u. d. Lit. in Mainz. Abh. d. geistes- u. sozialwiss. Kl. Wiesbaden 1964.

Walkinshaw, Lawrence. *Cranes of the World*. New York 1973.

Waschkies, Hans-Joachim. *Von Eudoxos zu Aristoteles: Das Fortwirken der eudoxischen Proportionentheorie in der aristotelischen Lehre vom Kontinuum*. Amsterdam 1977.

Wathelet, Paul. "La météorologie dans les comparaisons homériques," in Cusset (above), 203-216.

Waszink, Jan H. "Bolos," *Reallexikon für Antike und Christentum*, Stuttgart, 2 (1954) 502-508.

Webb, E. J. "Cleostratus redivivus," *Journal of Hellenic Studies* 41 (1921) 70-85.

Wellmann, Max, "Aegyptisches," *Hermes* 31 (1896) 221-253.

——. "Bolos (3)," *RE* 3 (1897) 676 f.; Supplb. 1 (1903) 255.

——. "Die Georgika des Demokritos," *Abh. d. Preussischen Akademie d. Wissensch.*, Phil.-hist. Kl. (1921.4) Berlin.

——. "Die Φυσικά des Bolos Demokritos und der Magier Anaxilaos aus Larissa," *Abh. d. Preussischen Akademie d. Wissensch.*, Phil.-hist. Kl. (1928.7) Berlin.

Wender, Dorothea. "From Hesiod to Homer by Way of Rome," *Ramus* 8 (1979) 59-64.

Wenskus, Otta. "Columellas Bauernkalender zwischen Mündlichkeit und Schriftlichkeit," in Kullmann et al. 253-262.

Wenskus, Otta. *Astronomische Zeitangaben von Homer bis Theophrast*. Stuttgart 1990.

Wessely, C. "Bruchstücke einer antiken Schrift über Wetterzeichen," *Sitzungsb. d. Wiener Akademie d. Wissensch.*, Phil.-hist. Kl. 142.1 (1900).

Whitehead, Jessie M. "Fifth century manuscripts of Aristotle," *Harvard Library Notes* 28 (1938) 143-144.

Wilkinson, L. P. *The Georgics of Virgil: A Critical Survey*. Cambridge 1969.

Wilson, Nigel G. "The manuscripts of Theophrastus," *Scriptorium* 16 (1962) 96-102.

Wood, James G. *Theophrastus of Eresus on Winds and on Weather Signs, Translated with an Introduction and Notes*, edited by G. J. Symonds. London 1894.

Wöhrle, Georg. *Anaximenes aus Milet: Die Fragmente zu seiner Zeit*. Stuttgart 1993.

Zuretti, Carlo O. *Catalogus Codicum Astrologorum Graecorum*. Vol. 11. *Codices Hispanienses*. Part 2. *Codices Scorialenses Matritenses Caesaraugustani*. Brussels 1934. [reviewed by Rehm 1940; see above]

INDEX OF IMPORTANT WORDS

GENERAL INDEX

References are to page numbers and (when the number has the form nn.nnn) to lemmata in the commentary.

INDEX OF ANCIENT TEXTS CITED

References are to page numbers and (when the number has the form nn.nnn) to lemmata in the commentary.

PHILOSOPHIA ANTIQUA

A SERIES OF STUDIES ON ANCIENT PHILOSOPHY

EDITED BY

K.A. ALGRA, F.A.J. DE HAAS
J. MANSFELD, D.T. RUNIA

13. Nicolaus Damascenus. *On the Philosophy of Aristotle.* Fragments of the First Five Books, Translated from the Syriac with an Introduction and Commentary by H. J. Drossaart Lulofs. Reprint of the 1st (1965) ed. 1969. ISBN 90 04 01725 9
14. Edelstein, L. *Plato's Seventh Letter.* 1966. ISBN 90 04 01726 7
17. Gould, J. B. *The Philosophy of Chrysippus.* Reprint 1971. ISBN 90 04 01729 1
18. Boeft, J. den. *Calcidius on Fate.* His Doctrine and Sources. 1970. ISBN 90 04 01730 5
20. Bertier, J. *Mnésithée et Dieuchès.* 1972. ISBN 90 04 03468 4
21. Timaios Lokros. *Über die Natur des Kosmos und der Seele.* Kommentiert von M. Baltes. 1972. ISBN 90 04 03344 0
23. Iamblichus Chalcidensis. *In Platonis dialogos commentariorum fragmenta.* Edited with Translation and Commentary by J. M. Dillon. 1973. ISBN 90 04 03578 8
24. Timaeus Locrus. *De natura mundi et animae*. Überlieferung, Testimonia, Text und Übersetzung von W. Marg. Editio maior. 1972. ISBN 90 04 03505 2
26. Gersh, S. E. *Κίνησις ἀκίνητος*. A Study of Spiritual Motion in the Philosophy of Proclus. 1973. ISBN 90 04 03784 5
27. O'Meara, D. *Structures hiérarchiques dans la pensée de Plotin*. Étude historique et interprétative. 1975. ISBN 90 04 04372 1
28. Todd, R. B. *Alexander of Aphrodisias on the Stoic Physics.* A Study of the *De Mixtione* with Preliminary Essays, Text, Translation and Commentary. 1976. ISBN 90 04 04402 7
29. Scheffel, W. *Aspekte der platonischen Kosmologie*. Untersuchungen zum Dialog 'Timaios'. 1976. ISBN 90 04 04509 0
31. Edlow, R.B. *Galen on Language and Ambiguity.* An English Translation of Galen's *De Captionibus* (On Fallacies), With Introduction, Text and Commentary. 1977. ISBN 90 04 04869 3
34. Epiktet. *Vom Kynismus.* Herausgegeben und übersetzt mit einem Kommentar von M. Billerbeck. 1978. ISBN 90 04 05770 6
35. Baltes, M. *Die Weltentstehung des platonischen Timaios nach den antiken Interpreten.* Teil 2. Proklos. 1979. ISBN 90 04 05799 4
39. Tarán, L. *Speusippus of Athens.* A Critical Study with a Collection of the Related Texts and Commentary. 1982. ISBN 90 04 06505 9
41. O'Brien, D. *Theories of Weight in the Ancient World*. Four Essays on Democritus, Plato and Aristotle. A Study in the Development of Ideas 2. Plato: Weight and Sensation. The Two Theories of the 'Timaeus'. 1984. ISBN 90 04 06934 8
45. Aujoulat, N. *Le Néo-Platonisme Alexandrin: Hiéroclès d'Alexandrie.* Filiations intellectuelles et spirituelles d'un néo-platonicien du Ve siècle. 1986. ISBN 90 04 07510 0
46. Kal, V. *On Intuition and Discursive Reason in Aristotle.* 1988. ISBN 90 04 08308 1
48. Evangeliou, Ch. *Aristotle's Categories and Porphyry.* 1988. ISBN 90 04 08538 6
49. Bussanich, J. *The One and Its Relation to Intellect in Plotinus.* A Commentary on Selected Texts. 1988. ISBN 90 04 08996 9
50. Simplicius. *Commentaire sur les Catégories.* Traduction commentée sous la direction

de I. Hadot. I: Introduction, première partie (p. 1-9, 3 Kalbfleisch). Traduction de Ph. Hoffmann (avec la collaboration d'I. et P. Hadot). Commentaire et notes à la traduction par I. Hadot avec des appendices de P. Hadot et J.-P. Mahé. 1990. ISBN 90 04 09015 0

51. Simplicius. *Commentaire sur les Catégories.* Traduction commentée sous la direction de I. Hadot. III: Préambule aux Catégories. Commentaire au premier chapitre des Catégories (p. 21-40, 13 Kalbfleisch). Traduction de Ph. Hoffmann (avec la collaboration d'I. Hadot, P. Hadot et C. Luna). Commentaire et notes à la traduction par C. Luna. 1990. ISBN 90 04 09016 9
52. Magee, J. *Boethius on Signification and Mind.* 1989. ISBN 90 04 09096 7
54. Fortenbaugh, W.W., et al. (eds.) *Theophrastes of Eresos.* Sources for His Life, Writings, Thought and Influence. 1992. ISBN 90 04 09440 7 *set*
55. Shankman, A. *Aristotle's* De insomniis. A Commentary. ISBN 90 04 09476 8
56. Mansfeld, J. *Heresiography in Context.* Hippolytos' *Elenchos* as a Source for Greek Philosophy. 1992. ISBN 90 04 09616 7
57. O'Brien, D. *Théodicée plotinienne, théodicée gnostique.* 1993. ISBN 90 04 09618 3
58. Baxter, T.M.S. *The Cratylus.* Plato's Critique of Naming. 1992. ISBN 90 04 09597 7
59. Dorandi, T. (Hrsg.) *Theodor Gomperz. Eine Auswahl herkulanischer kleiner Schriften (1864-1909).* 1993. ISBN 90 04 09819 4
60. Filodemo. *Storia dei filosofi. La stoà da Zenone a Panezio* (PHerc. 1018). Edizione, traduzione e commento a cura di T. Dorandi. 1994. ISBN 90 04 09963 8
61. Mansfeld, J. *Prolegomena.* Questions to be Settled Before the Study of an Author, or a Text. 1994. ISBN 90 04 10084 9
62. Flannery, S.J., K.L. *Ways into the Logic of Alexander of Aphrodisias.* 1995. ISBN 90 04 09998 0
63. Lakmann, M.-L. *Der Platoniker Tauros in der Darstellung des Aulus Gellius.* 1995. ISBN 90 04 10096 2
64. Sharples, R.W. *Theophrastus of Eresus.* Sources for his Life, Writings, Thought and Influence. Commentary Volume 5. Sources on Biology (Human Physiology, Living Creatures, Botany: Texts 328-435). 1995. ISBN 90 04 10174 8
65. Algra, K. *Concepts of Space in Greek Thought.* 1995. ISBN 90 04 10172 1
66. Simplicius. *Commentaire sur le manuel d'Épictète.* Introduction et édition critique de texte grec par Ilsetraut Hadot. 1995. ISBN 90 04 09772 4
67. Cleary, J.J. *Aristotle and Mathematics.* Aporetic Method in Cosmology and Metaphysics. 1995. ISBN 90 04 10159 4
68. Tieleman, T. *Galen and Chrysippus on the Soul.* Argument and Refutation in the *De Placitis* Books II-III. 1996. ISBN 90 04 10520 4
69. Haas, F.A.J. de. *John Philoponus' New Definition of Prime Matter.* Aspects of its Background in Neoplatonism and the Ancient Commentary Tradition. 1997. ISBN 90 04 10446 1
71. Andia, Y. de. *Henosis.* L'Union à Dieu chez Denys l'Aréopagite. 1996. ISBN 90 04 10656 1
72. Algra, K.A., Horst, P.W. van der, and Runia, D.T. (eds.) *Polyhistor.* Studies in the History and Historiography of Ancient Philosophy. Presented to Jaap Mansfeld on his Sixtieth Birthday. 1996. ISBN 90 04 10417 8
73. Mansfeld, J. and Runia, D.T. *Aëtiana.* The Method and Intellectual Context of a Doxographer. Volume 1: The Sources. 1997. ISBN 90 04 10580 8
74. Slomkowski, P. *Aristotle's* Topics. 1997. ISBN 90 04 10757 6
75. Barnes, J. *Logic and the Imperial Stoa.* 1997. ISBN 90 04 10828 9
76. Inwood, B. and Mansfeld, J. (eds.) *Assent and Argument.* Studies in Cicero's *Academic Books.* Proceedings of the 7th Symposium Hellenisticum (Utrecht, August 21-25, 1995). 1997. ISBN 90 04 10914 5
77. Magee, J. (ed., tr. & comm.) *Anicii Manlii Severini Boethii* De divisione liber. Critical Edition, Translation, Prolegomena, and Commentary. 1998. ISBN 90 04 10873 4

78. Olympiodorus. *Commentary on Plato's* Gorgias. Translated with Full Notes by R. Jackson, K. Lycos & H. Tarrant. Introduction by H. Tarrant. 1998. ISBN 90 04 10972 2
79. Sharples, R.W. *Theophrastus of Eresus*. Sources for his Life, Writings, Thought and Influence. Commentary Volume 3.1. Sources on Physics (Texts 137-223). With Contributions on the Arabic Material by Dimitri Gutas. 1998. ISBN 90 04 11130 1
80. Mansfeld, J. *Prolegomena Mathematica*. From Apollonius of Perga to Late Neo-platonism. With an Appendix on Pappus and the History of Platonism. 1998. ISBN 90 04 11267 7
81. Huby, P. *Theophrastus of Eresus*. Sources for His Life, Writings, Thought and Influence. Commentary Volume 4. Psychology (Texts 254-327). With Contributions on the Arabic Material by D. Gutas. 1999. ISBN 90 04 11317 7
82. Boter, G. *The* Encheiridion *of Epictetus and Its Three Christian Adaptations.* Transmission and Critical Editions. 1999. ISBN 90 04 11358 4
83. Stone, M.E. and Shirinian, M.E. *Pseudo-Zeno. Anonymous Philosophical Treatise.* Translated with the Collaboration of J. Mansfeld and D.T. Runia. 2000. ISBN 90 04 11524 2
84. Bäck, A.T. *Aristotle's Theory of Predication*. 2000. ISBN 90 04 11719 9
85. Riel, G. Van. *Pleasure and the Good Life*. Plato, Aristotle, and the Neoplatonists. 2000. ISBN 90 04 11797 0
86. Baltussen, H. *Theophrastus against the Presocratics and Plato.* Peripatetic Dialectic in the *De sensibus*. 2000/ ISBN 90 04 11720 2
87. Speca, A. *Hypothetical Syllogistic and Stoic Logic.* 2001. ISBN 90 04 12073 4
88. Luna, C. *Trois Études sur la Tradition des Commentaires Anciens à la Métaphysique d'Aristote.* 2001. ISBN 90 04 120074 2
89. Frede, D. & A. Laks (eds.) *Traditions of Theology.* Studies in Hellenistic Theology, its Background and Aftermath. 2001. ISBN 90 04 12264 8
90. Berg, R.M. van den. *Proclus' Hymns.* Essays, Translations, Commentary. 2001. ISBN 90 04 12236 2
91. Rijk, L.M. de. *Aristotle – Semantics and Ontology.* 2 volumes.
    Volume I. General Introduction. The Works on Logic. 2002. ISBN 90 04 12324 5
    Volume II. The Metaphysics. Semantics in Aristotle's Strategy of Argument. 2002. ISBN 90 04 12467 5
92. Finamore, J.F. & J.M. Dillon. *Iamblichus* De Anima. Text, Translation, and Commentary. 2002 ISBN 90 04 12510 8
93. Fortenbaugh, W.W., R.W. Sharples, & M.G. Sollenberger. *Theophrastus of Eresus.* On Sweat, on Dizziness and on Fatigue. 2003. ISBN 90 04 12890 5
94. Tieleman, T. *Chrysippus'* On affections. Reconstruction and Interpretation. 2003. ISBN 90 04 12998 7
95. Görler, W. *Kleine Schriften zur hellenistisch-römischen Philosophie*. Herausgegeben von C. Catrein. 2004. ISBN 90 04 13736 X
96. Polito, R. *The Sceptical Road.* Aenesidemus' Appropriation of Heraclitus. 2004. ISBN 90 04 13742 4
97. Fortenbaugh, W.W. *Theophrastus of Eresus*. Sources for his Life, Writings, Thought and Influence. Commentary Volume 8. Sources on Rhetoric and Poetics (Texts 666-713). 2005. ISBN 90 04 14247 9
98. Perkams, M. & R.M. Piccione (Hrsg.) *Proklos. Methode, Seelenlehre, Metaphysik*. Akten der Konferenz in Jena am 18.-20. September 2003. 2006. ISBN 90 04 15084 6
99. Schäfer, C. *Philosophy of Dionysius the Areopagite*. An Introduction to the Structure and the Content of the Treatise *On the Divine Names*. 2006. ISBN 90 04 15094 3
100. Delcomminette, S. *Le* Philèbe *de Platon*. Introduction à l'Agathologie Platonicienne. 2006. ISBN 90 04 15026 9
101. Fortenbaugh, W.W. *Aristotle's Practical Side*. On his Psychology, Ethics, Politics and Rhetoric. 2006. ISBN-10: 90 04 15164 8, ISBN-13: 978 90 04 15164 2

102. Brancacci, A. & P.-M. Morel (eds.). *Democritus: Science, The Arts, and the Care of the Soul*. Proceedings of the International Colloquium on Democritus (Paris, 18-20 September 2003). 2007.
ISBN-10: 90 04 15160 5, ISBN-13: 978 90 04 15160 4
103. Huby, P. *Theophrastus of Eresus*. Sources for his Life, Writings, Thought and Influence. Commentary Volume 2. Logic. With Contributions on the Arabic Material by Dimitri Gutas. 2007.
ISBN-10: 90 04 15298 9, ISBN-13: 978 90 04 15298 4
104. Sider, D. & C.W. Brunschön (eds.). *Theophrastus of Eresus*. On Weather Signs. 2007.
ISBN-10: 90 04 15593 7, ISBN-13: 978 90 04 15593 0