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Review by: Harry Hine

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## BOOK REVIEWS

*Ancient Meteorology*. By LIBA TAUB. London and New York: Routledge, 2003. Pp. [xiv] + 271. £17.99 (paper).

“Meteorology,” like the names of various other branches of knowledge, has changed its meaning since antiquity. To modern ears it indicates primarily weather forecasting, or more widely the study of weather and climate, but Greek *meteōrologia* (the study of the things above) embraced not only what we call meteorological or atmospheric phenomena, but also certain astronomical phenomena, including comets and shooting stars (hence our use of “meteor” and “meteorite”), and terrestrial phenomena such as rivers, seas, and earthquakes, which were thought to have causes similar to those of the other meteorological phenomena. This *meteōrologia* was normally the province of philosophers and technical writers. But there was also a tradition of weather-forecasting lore, of which our earliest representative is Hesiod, and which for the most part was preserved by different writers from those who dealt with *meteōrologia*.

One great merit of Liba Taub’s book is that it brings together these two traditions, ancient weather prediction and ancient *meteōrologia*. As she says (p. 9), the last book-length treatment of ancient meteorology was by Otto Gilbert in *Die meteorologischen Theorien des griechischen Altertums* (1907, reprint Hildesheim, 1967). The differences between that book and hers are significant. Gilbert’s book is 746 pages long, and is aimed at the specialist scholar who knows Greek and Latin, whereas T.’s has 271 pages, and is aimed at readers interested in the history of science, as well as classical scholars and students. So T. translates all Greek and Latin, provides clear, basic introductions to the wide range of authors, genres, and technical terms encountered, and gives extensive illustrative quotations from key authors. (One may add that the book is well supplied with photographs and diagrams.) More significant is the difference in content and approach. Gilbert spends over a third of his book on ancient theories of the elements, from prephilosophical beginnings down to the Stoics, and the rest of the book treats meteorology proper, proceeding by topic, and adopting a doxographic approach, reviewing all the different theories on the topic in chronological order. T., however, does not attempt any such systematic doxographic coverage; she is selective in the topics she covers, yet at the same time her scope is much wider. For a start, as already said, she covers weather prediction in antiquity, as well as meteorological theory; and she offers “a brief (and not complete) history of ancient meteorology” (p. 3). She proceeds writer by writer more often than topic by topic, exploring the different motives that writers had for writing on meteorological topics, and the different ways in which they both depended on and reacted to the literary and intellectual traditions within which they worked.

Chapter 1, “Ancient Meteorology in Greece and Rome: An Introduction,” explains the aims of the book, to cover ancient attempts at both prediction and explanation of weather phenomena. The meaning of *meteōra* in ancient Greek is briefly discussed,

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then the “subplots” of T.’s work are described: the format and genre of the ancient works that deal with meteorology, in particular the important role of poetic works; and the attitudes of the ancient writers to their predecessors. The treatment of weather in the Homeric epics and Hesiod is sketched in, and used to illustrate the problem of the relationship between mythological and scientific explanation. Hesiod (and to a lesser extent Homer) contains the seeds of the later tradition of astrometeorology, prediction of weather from the seasonal movements of the stars, a tradition carried on in astrometeorological *parapēgmata* (lists of star phases and associated weather predictions, p. 8) and in agricultural and medical writers (though T. does not attempt to cover medical meteorology; see p. 206, n. 21). Parallel to this is the philosophical tradition of explanation, starting with the Presocratics, and represented, among other extant works, by works of Aristotle, Lucretius, Seneca, and Pliny the Elder, some of whom incorporated explanation of meteorological phenomena within a wider ethical program, aiming to remove fear or to promote moral improvement.

T. then briefly reviews earlier work on ancient meteorology, namely, that of Gilbert, already mentioned, and Charles Kahn’s view that after the Presocratics there was very little real development in what was essentially a conservative philosophical tradition. While acknowledging conservative aspects of ancient meteorology, T. stresses that the tradition was not static, and in particular that some later writers became interested in methodological questions and in discussions about the reliability of the tradition. She looks at the likely readership for ancient meteorological texts, and the problem of whether they ever reached the farmers and sailors to whom the predictive traditions might have been of most direct use. Finally there are some brief remarks about the climate of the Mediterranean regions (but one should stress that this is not a book about ancient climate).

Chapter 2, “Prediction and the Role of Tradition: Almanacs and Signs, *Parapēgmata* and Poems,” looks at various ancient approaches to weather prediction. There were two broad categories of weather signs: seasonal ones, which linked particular weather to particular seasons, star movements, or calendar dates; and short-term ones, linking particular observable events to short-term weather patterns (as in our “Red sky at night, shepherd’s delight,” for example). Seasonal signs might require one to make direct observations, of the motion of the stars or of the seasonal behavior of birds, for example; or they could be tied to a written calendar, where meteorological phenomena were associated with particular days of the year, in which case no direct observation was required. T.’s discussion first looks at astrometeorology, the tradition of correlating astronomical phenomena with meteorological ones. Such a tradition is found in Babylonian texts from as early as the second millennium B.C.E., though it is not clear that the Greeks knew of this tradition before the third century B.C.E.; but there is an independent Greek tradition going back to Hesiod, for whom astronomical observation indicates not only the season but also what activities the farmer needs to pursue.

Next, T. discusses *parapēgmata*, of which there are several fragmentary inscriptions in stone, with holes for a peg to be moved along day by day (photographs of several are provided), and also some written examples preserved in papyri or manuscripts. Some stone examples seem to list only astronomical events, but others also include meteorological ones. T. argues, from the size and cost of the stone *parapēgmata*, that they were public monuments with a public function; but it is hard to

guess how widespread they were. (It would here have been worth including the Augustan *solarium*, one of the surviving fragments of which records, in Greek, that the etesian winds stop at the start of Virgo.<sup>1</sup> This is a huge public monument, and the use of Greek in a Roman monument arguably gives an interesting slant on the perception of scientific authority.) T. points out that both epigraphic and literary *parapēgmata* can contain references to named sources, which indicates that individual writers and astronomers had produced their own *parapēgmata* and that appeal to named authorities was presumably deemed to confer authority on the later document. The work *On Weather Signs* attributed to Theophrastus (probably an early product of the Peripatetic school, in T.'s view) is another in which sources are regularly cited, though it also includes signs that seem to derive from popular lore; and Ptolemy's *Phases of the Fixed Stars and Collection of Weather Signs* also names sources regularly. T. sees this frequent naming of predecessors as a distinguishing feature of the *parapēgma* tradition, for it is not a feature of surviving astronomical or philosophical texts to anything like the same extent. She regards the practice as a demonstration of one's learning and credibility: "[b]y naming the individual the parapegmatist asserts the reliability and specialist source of his information" (p. 30). (Interestingly, though T. does not draw attention to it, the *parapēgmata* sometimes mention different views of the same phenomenon: for example, on p. 24 T. quotes from one of the Miletus *parapēgmata*, "The Hyades invisible in the evening, indicate hail and westerly wind blowing according to Euctemon, but according to the Indian . . ." Unfortunately the text is defective, but "the Indian" seems to have said something slightly different. In the literary *parapēgmata* one regularly finds slight discrepancies between different authorities, on matters such as the date of the cessation of the etesian winds. In such cases the practice of citing different sources could perhaps suggest the provisional nature, or even the unreliability, of the information.)

T. goes on to discuss the problem that the observers cited were operating at different times and in different places, and questions how far the *parapēgma* writers were aware of this as a problem. Some, notably Pliny, Geminus, and Ptolemy, emphasized that it was crucial to know exactly where and when the observations were made, and that the observations were not necessarily transferable, but others seem to have assumed that meteorological signs were uniform over time and space. (Again the Augustan *solarium* is relevant, for the etesian winds were irrelevant to Rome. One might also compare occasional ancient ignorance of the fact that sundials would only work accurately at a specific latitude; cf. Plin. *HN* 7.214 for a classic example.) The next subsection, "On Weather Signs," reviews the ancient debate on whether or not there was a causal connection between sign and phenomenon, and then is mostly taken up with a review of individual authors and works, including Columella, the Peripatetic *On Weather Signs* (T. points out the impracticality of the work's arrangement, by phenomenon predicted; an arrangement by sign would be more useful), Aratus and his Latin translators, Vergil, and John Lydus.<sup>2</sup>

1. See E. Buchner, *Die Sonnenuhr des Augustus* (Mainz, 1982), 63–66.

2. In this chapter there appear to be some indications of lack of final revision: e.g., there is some repetition in the paragraph on *parapēgmata* at the bottom of p. 20 and top of p. 21; p. 37 text to n. 106, on Geminus' discussion of the heat of the dog days, overlaps awkwardly with p. 41 text to n. 115; the question of the significance and purpose of the stone *parapēgmata* is aired three times (pp. 24–25, 31–32, 41–43), and slightly different things are said each time, without cross-reference: a single more coherent discussion might have worked better.

Chapter 3, “Explaining Difficult Phenomena,” moves on from prediction to explanation. After a few pages on the meteorological theories of the Presocratics, illustrating the problems of interpreting the evidence of later writers, the bulk of this chapter is devoted, deservedly, to Aristotle’s *Meteorologica* (only Books 1–3; the subject matter of Book 4 lies outside T.’s scope), and the last section to Theophrastus. T. does not try to summarize all the arguments of the *Meteorologica*, but is particularly interested in Aristotle’s methodology, and in the place of the *Meteorologica* within his wider philosophical program. She shows how in the *Meteorologica* Aristotle deals more or less exclusively with material and efficient causes of phenomena. Elsewhere he talks about the final causes of rain, distinguishing between regular seasonal rain, which has a purpose, and chance rain, which does not; in the *Meteorologica* he does not raise these broader issues. T. explains how, in Aristotle’s theory, the motion of the heavens heats the lower regions (the efficient cause of meteorological phenomena); she also explains the nature of his two exhalations (the material causes). Aristotle’s somewhat sporadic reporting and use of observational data on specific phenomena are examined, then his habit of starting a topic by reviewing the *endoxa* (reputable opinions) of his predecessors, which, T. argues, “indicates that he regards science as a cumulative group enterprise, in which the work of others in the community (predecessors and contemporaries) is shared and contributes to the larger effort to understand” (pp. 95–96). The role of signs (*sēmeia*), analogy, experiment, and diagrams in the *Meteorologica* is reviewed. T. sees the references to diagrams as indicating that the *Meteorologica* started life in the lecture hall, and that the diagrams were there used as visual aids. (She does not speculate on whether the original manuscripts of the work might have contained the diagrams.) She focuses particularly on the discussion of the rainbow, where, as Reviel Netz has shown (*Deduction in Greek Mathematics: A Study in Cognitive History* [Cambridge, 1999]), the geometrical diagrams “are included as a necessary part of the explanation” (p. 113), alongside the exhalations.

Theophrastus’ writings on meteorology are less fully preserved than Aristotle’s. *On Weather Signs* is of uncertain authorship and *On Winds* may be incomplete; but the discovery of Syriac and Arabic versions of the lost *On Meteorology* (or *On Metar-siology*, as some evidence has it) in the twentieth century extended our knowledge of Theophrastus very considerably, while raising problems about how close these later versions are to the Theophrastean original. Nevertheless significant developments from Aristotle are evident: the exhalations are no longer so central, but are on a par with the elements as material causes; there is greater use of analogy; and Theophrastus allowed that several different explanations of some phenomena were possible. So there is a greater air of provisionality about his meteorology, and he calls for further research where things are particularly uncertain.

Theophrastus was particularly influential on later meteorological thinking, as T. shows in chapter 4, “Meteorology as a Means to an End: Philosophers and Poets,” but unlike Aristotle and Theophrastus, later writers tended to include meteorology within a broader ethical program. T. starts with Epicurus and Lucretius, and their use of physical explanation as part of the argument that frightening phenomena are not caused by the gods and are not to be feared. The next section looks at the early Stoics and at Manilius, who deals briefly with meteorological phenomena of various sorts, particularly comets. Though his poem has counter-Lucretian elements, it shares a concern to show that the universe is explicable, and that comets, even when

they portend disaster, are part of the natural world that is shaped by the divine spirit. In discussing Seneca's *Natural Questions*, while T. acknowledges that he had a long-standing interest in the natural world, and that the work contains powerful descriptive passages, she still argues that "his primary aim was to inspire ethical improvement" (p. 141). His ideas are reviewed in detail, with attention to his use of analogy, his reference to experiment, and his avoidance of mathematical explanations—"abrupt and, perhaps, ironic" (p. 154).<sup>3</sup> The chapter concludes with discussion of the pseudo-Aristotelian *On the Cosmos*, which contains a wide-ranging though summary treatment of meteorological topics. T. believes that the author very likely relied on handbooks or epitomes and that the work is therefore a useful indicator of the sort of information that was available to nonspecialist readers.

The fifth and final chapter, "An Encyclopedic Approach," has the elder Pliny at its center, but it begins with an interesting survey of meteorological literature from late antiquity, via the medieval and early modern periods, up to the nineteenth century; at the end, it returns to the modern period and the way that Pliny was continuously used as a guide to weather lore, until at least the late eighteenth century. Pliny is unique among surviving ancient writers in providing both a weather almanac, in Book 18, and a discussion of the causes of meteorological phenomena, in Book 2. T. discusses the sources and methods of both sections of the work, bringing into focus Pliny's use of traditional material, his distinctive blend of skepticism and credulity, and some contradictions in his approach. Pliny forms an apt conclusion for T.'s book, displaying that critical engagement with the work of predecessors that is characteristic of ancient meteorological writing. And yet, though he deals with prediction and explanation of weather, he, like most of his predecessors, never really explores the relationship between the two activities: "the relationship between cause and effect, between ability to explain and success in prediction is not made clear, and is usually not addressed" (p. 188).

T.'s book, like the authors she describes, works within a tradition: it may be nearly a century since the last major book that was entirely devoted to ancient meteorology, but T.'s impressive thirty-page bibliography displays the enormous amount of scholarly interest generated by various aspects of her subject in the intervening period. It is a significant and valuable achievement to have brought together in one volume the fruits of work by those who have approached ancient meteorology from various standpoints—of ancient philosophy, science, agriculture, literature, archaeology, and epigraphy—and produced a coherent synthesis that can illuminate all these fields. She acknowledges that there are areas she has not covered (including medical meteorology and the Aristotelian commentators), and sometimes her argument might be taken further. For instance, she more than once points out that the ancient texts are not very user-friendly if someone wants to use them for practical weather forecasting, and raises the question whether the weather-forecasting literature was ever seen by farmers or sailors or others who would make practical use of it (cf. p. 12). Skepticism on the last point is probably in order. Regarding agriculture, it is worth noticing that Cato never talks about weather signs in the *De agricultura*, nor does he ever refer to a stellar calendar. He may be a better guide to what the average farmer did than later agricultural writers. Regarding sailors, Vegetius says that they know about weather

3. Why ironic? His avoidance might perhaps be seen in the context of widespread Roman lack of interest in mathematics; cf. A. Wallace-Hadrill, "Greek Knowledge, Roman Power," *CP* 83 (1988): 233.

signs, but only from experience, not from books (*Mil.* 4.41.7: *haec gubernatores se scire profitentur, sed eatenus quatenus eos peritiae usus instituit, non altior doctrina formavit*). From a practical point of view, local knowledge was all-important: Seneca says that the wise sailor will consult local expertise on currents and what weather clouds indicate (*Ep.* 14.8). The bookish Cicero could joke that according to Aratus he could expect rain when the frogs were noisy (*Att.* 15.16a), but I imagine that the farmers and sailors had little use for the literature of weather prediction. Occasionally, though, one catches glimpses of weather forecasting in the real world: T. cites Pliny's interesting story that clothing sellers adjusted their prices according to long-range weather forecasts derived from the appearance of the Pleiades (Plin. *HN* 18.225) and Seneca's story of the official hail forecasters of Cleonae (*Q. Nat.* 4b.6–7); but such stories are notable for their rarity in T.'s book, naturally enough: her aim is not to chart the practice of farmers or sailors or clothes merchants. Such matters might, however, repay investigation. It is to be hoped that T.'s fine book will encourage further work on topics related to ancient meteorology.

Harry Hine  
University of St. Andrews

*Old Age in the Roman World: A Cultural and Social History.* By TIM G. PARKIN. Baltimore and London: Johns Hopkins University Press, 2003. Pp. [xiii] + 495. \$55.00 (cloth).

What did it mean to be old in the Roman world? What position did the elderly occupy in the community, and what expectations did they have of support or respect from younger members of that community? To what extent were those expectations met? What impact did differences in wealth, sex, or family circumstances have upon the experiences of individuals, and how does this affect characterizations of the elderly as a recognizable group in Roman society? It is these questions, and many others besides, that Tim Parkin sets out to address.

P.'s stated objectives are somewhat more modest. He begins by identifying a disjunction in current scholarship between "a history of attitudes toward older people" and "the history of aging itself" (p. 2). P.'s interest lies in the latter project, with the ultimate aim of presenting "various aspects of aging and older people in the Roman world" (p. 273). The book comprises four parts, which are further divided into nine chapters. It begins with a broad-ranging introduction to the problems inherent in a study of old age in the Roman world. Many of these are, of course, familiar to social historians of the period: difficulties of quantification; Roman authors' lack of interest in the questions that the present study seeks to answer; the limitations imposed by literary, philosophical, comic, or other topoi connected with old age in the ancient sources; the patchy and incomplete nature of those sources in any case. In each instance, P. acknowledges the difficulty, then offers a clear statement of the strategy he intends to adopt in addressing or circumventing the disjunction between his own objectives and those of his sources. Underpinning his approach is a commitment to reading *through* the ancient sources in pursuit of the societal attitudes that they reveal, reinforce, or argue against (p. 7, P.'s emphasis):