



Astrometeorology in the Middle Ages

Author(s): Stuart Jenks

Source: *Isis*, Vol. 74, No. 2, (Jun., 1983), pp. 185-210

Published by: The University of Chicago Press on behalf of The History of Science Society

Stable URL: <http://www.jstor.org/stable/233102>

Accessed: 14/05/2008 21:46

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/action/showPublisher?publisherCode=ucpress>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is a not-for-profit organization founded in 1995 to build trusted digital archives for scholarship. We enable the scholarly community to preserve their work and the materials they rely upon, and to build a common research platform that promotes the discovery and use of these resources. For more information about JSTOR, please contact support@jstor.org.

Astrometeorology in the Middle Ages

by Stuart Jenks*

ASTROMETEOROLOGY IS A USEFUL TERM to denote the attempt to predict the weather by means of astrological calculations. Here I shall examine medieval astrometeorological texts by Western Latin authors from the period of scientific translations from the Arabic in the twelfth century up to the advent of printing, which greatly multiplied the number of texts. I shall determine who were the intended audiences of these authors and analyze the codicological evidence for the transmission of their treatises in order to surmise who was sufficiently interested in the subject to invest in a manuscript containing astrometeorological materials. Such investments were significant: one manuscript, for example, changed hands in 1403 for a sum sufficient to buy nearly 520 liters of barley, enough to feed a family of four for a year.¹

Evidence of the practice of astrometeorology in the Middle Ages is rare, but we can occasionally catch a glimpse of an astrometeorological consultation. The Monk of St. Denis, for instance, tells the story of a duel during the reign of Charles VI of France (1380–1422), in which the court astrologers had been consulted by one of the participants. They had advised him to see to it that his arms were manufactured at a specified time, when the weapons and armor would receive virtue from a particularly favorable constellation of planetary influences. They had also assured him that the weather on the date set for the duel would be especially fine, and of course that his adversary, and not he, would fall. As the Monk of St. Denis relates with evident *Schadenfreude*, it rained heavily on the appointed day, and the monarch and his princes prevented the quarrel from proceeding further.²

Another glimpse of astrometeorological practice can be caught outside the charmed circle of royal and ducal courts, with their coteries of astrological

* Grunewaldstraße 82, D-1000 Berlin 62, Federal Republic of Germany.

For their advice, criticism, and suggestions I wish to thank Professor Dr. Dietrich Kurze, Dr. Mitchell Ash, Dr. Charles Burnett, Professor Bert Hansen, Virginia Murphy, and Professor André Goddu.

¹ MS OBcm 105, fol. 1r (see the appendix, containing a checklist of astrometeorological MSS and a list of abbreviations used for libraries and MSS) states that the MS in question was bought for 1½ ducats—or 36½d—on 9 June 1403. For the rate of exchange see Raymond de Roover, *The Bruges Money Market around 1400* (Brussels: Paleis der Academiën, 1968), p. 124. For its buying power, see London, Public Record Office, E 122/95/27 m 1.

² *Chronique du religieux de Saint-Denis, contenant le règne de Charles VI de 1380 à 1422*, 6 vols. (Paris, 1839–1852), Vol. I, pp. 394–396, as cited by Lynn Thorndike, *A History of Magic and Experimental Science*, Vol. IV (New York: Columbia Univ. Press, 1934), p. 590. See also Joshua D. Lipton, “The Rational Evaluation of Astrology in the Period of Arabo-Latin Translation, ca. 1126–1187 A.D.” (Ph.D. diss., Univ. California, Los Angeles, 1978), pp. 205–222, for some 12th-century examples of astrological practice, and especially p. 210 on the difficulties of learning about the practice of astrology in premodern times.

advisors. In Chaucer's *Miller's Tale* Nicholas, a poor arts scholar at Oxford who has delved into astrology, convinces his carpenter landlord that a worldwide flood is imminent, a conclusion he has reached by looking at the moon. The credence the carpenter gives to an astrometeorological prediction by an Oxford student is more plausible than it might at first seem: in the fourteenth century Merton College, Oxford, was one of the most remarkable centers of astrological research in the Western world. Numbered among its fellows were such illustrious scholars as John of Eschenden (fl. 1338–1379), William Rede (fl. 1337–1369) and Richard of Wallingford (fl. 1292–1336), all of whom either wrote or assiduously collected astrometeorological tracts. To judge from the surviving works by fellows of the college, astrological research at Merton at this time also focused on the invention of astrological instruments, calendar reform, medicine (especially plague), and the interpretation of the significance of such phenomena as conjunctions and eclipses. Chaucer was in a position to know about these developments, since he was a neighbor of a graduate of Merton from 1373 to 1387 in London, sent his son Louis to Oxford, and also wrote the first English-language treatise on the use of the astrolabe for him.³

I. POPULAR ASTROMETEOROLOGICAL TEXTS

While references to astrometeorological practice may be rare, the theoretical literature on the subject from the twelfth through the fifteenth century is substantial enough—in terms of both the numbers of treatises and their popularity—to constitute a significant genre of astrological writing in the Middle Ages. I have examined some 142 manuscripts in libraries in France, the Federal Republic of Germany, the German Democratic Republic, Austria, England, Canada, and the United States, in addition to numerous, on the whole reasonably accurate descriptions of many more codices containing astrometeorological treatises, and I have located 108 such works of varying length, approximately 60 percent of which are anonymous. Nonetheless, I have by no means located every manuscript containing astrometeorological literature. No one could, for the simple reason that many such treatises were copied off *ad hoc* into the quarto notebooks typically used by students and professors. Since they did not spring to the eye with neat incipits and explicits, they escaped the diligence of cataloguers of medieval manuscript collections. Experience indicates that in any given library two out of three astrometeorological treatises are uncatalogued or falsely catalogued, even though the manuscript collection may be meticulously described. Much astrometeorological literature remains to be discovered.

While most of the anonymous treatises, some of which are really only brief notes and scribbings, have only come down to us in one or at most two manuscripts, many of the treatises by known authors are transmitted in a considerable

³ On the general subject of Chaucer and astrology (but without direct mention of the *Miller's Tale*) see J. D. North, "Kalenderes Enlumyned ben They: Some Astrological Themes in Chaucer," *Review of English Studies*, 1969, 20:129–154, 257–283, and 418–455, and the reply by Hamilton Smyser, "A View of Chaucer's Astrology," *Speculum*, 1970, 45:359–373. For Chaucer's treatise see Geoffrey Chaucer, *The Equatorie of the Planetis*, ed. D. J. Price, with R. M. Wilson (London: Cambridge Univ. Press, 1955). For the Merton College graduate Ralph Strode (Chaucer's neighbor) and Louis's education at Oxford, see North, "Kalenderes," p. 134, n. 1.

number of codices (see Table 1). Of the twelve most popular, seven were written by Western Latin authors and the rest by Arab astrologers. The transmission of these treatises is analyzed in more detail in Table 2.

Although the correlation of popularity with numbers of copies is notoriously perilous, the conclusion seems inescapable that some authors of astrometeorological treatises enjoyed a considerable vogue. Table 2 also suggests that most of the copies of astrometeorological tracts were executed in the fourteenth and fifteenth centuries, whereas all of the most popular treatises had been written by the middle of the fourteenth century. The explanation of this discrepancy is likely to lie in the rise of astrology to a more prominent position in university curricula in the late fourteenth and fifteenth centuries. One can also detect a rough correspondence of astrometeorological copying with the rhythm of establishment of university chairs in astrology and thus, presumably, with the corresponding increase in the number of academically trained astrologers.⁴ The suspicion that academically stimulated interest lay behind the increase in copying is confirmed by changes in the type of astrometeorological texts copied. In the fifteenth century the copying of the simpler treatises aimed at beginners falls off, but the more complex and demanding treatises were copied more often. The complex treatises were not only more sophisticated and demanding than the beginner's guides, but also more expensive in terms of material and of human labor because of their greater length: a scribe would be able to copy off Robert Grosseteste's treatise in a few folios, but a work such as that of John of Eschenden or of Firminus of Bellavalle could take up to 150 to 200 folios. That copying of such complex and expensive treatises increased in the fifteenth century, despite the expense, betrays academic interest. This is confirmed by the choices made by fifteenth-century printers, who brought out incunabular editions of the complex treatises, but overlooked the simpler tracts.⁵

In view of the enormous numbers of manuscripts and tracts involved, I have

Table 1. Breadth of transmission of astrometeorological texts (108 treatises)

Number of MSS	Number of treatises	Percentage of treatises
1 only	74	68.5
2	12	11.1
3	5	4.6
4	1	0.9
5	2	1.9
6–10	6	5.6
11–20	2	1.9
21–30	4	3.7
over 30	2	1.9

⁴ See Richard LeMay, "The Teaching of Astronomy in Medieval Universities, Principally at Paris in the Fourteenth Century," *Manuscripta*, 1976, 20:197–217, esp. p. 215. On the individual astrological chairs see Heinrich Suter, *Die Mathematik auf den Universitäten des Mittelalters* (Programm der Kantonschule in Zürich) (Zurich, 1887): for Florence (founded by 1387), p. 37; for Padua (by 1420) and Ferrara (15th century), p. 56; for Vienna (2 chairs by the mid-15th century), p. 52. For Cracow (also 2 chairs by mid-15th century), see Hastings Rashdall, *The Universities of Europe in the Middle Ages*, ed. F. M. Powicke and A. B. Emden, Vol. II (Oxford: Oxford Univ. Press, 1936), p. 293, and Richard LeMay, "The Late Medieval Astrological School at Cracow and the Copernican System," *Studia Copernica*, 1978, 16:337–354, on pp. 338–342.

⁵ See Natalie Z. Davis, "Printing and the People," in *Society and Culture in Early Modern France* (Stanford: Stanford Univ. Press, 1975); and Elizabeth L. Eisenstein, *The Printing Press as an Agent of Change: Communications and Cultural Transformations in Early-Modern Europe*, 2 vols. (Cambridge: Cambridge Univ. Press, 1979).

Table 2. Textual transmission of astrometeorology: Numbers of treatises copied per century

Author (and/or work)	Incipit numbers ^a	Century					Total
		12th	13th	14th	15th	?	
Alkindi, <i>De pluviiis</i>	33, 59, 89, 109	0	3	17	13	1	34
Robert Grosseteste (fl. 1235–1253)	3, 7, 27	—	2	17	13	1	33
Hermann of Carinthia (fl. 1138–1143)	32, 134, 141	1	3	13	9	2	28
<i>Liber novem iudicum</i>	5, 75	3	8	9	5	1	26
Alkindi, <i>Saturnus in Ariete</i>	111–113	0	2	5	17	0	24
John of Eschenden (fl. 1338–1379)							
(and Johannes de Ponte)	19, 25, 39, 43, 68, 71	—	—	8	11 ^b	2	21
Ja'far Indus	110, 150, 155	0	5	10	4	1	20
Guido Bonatti (fl. 1233–ca. 1300)	31, 119	—	0	5	11 ^b	0	16
Leopold of Austria (fl. 1271)	38, 57, 84	—	0	3	7 ^b	0	10
Perscrutator (Robert of York; fl. ca. 1325)	46, 55	—	—	5	5	0	10
Firminus of Bellavalle (fl. ca. 1338)	29, 36, 48, 74, 93, 106	—	—	1	8 ^b	0	9
Alkindi, <i>Apertio portarum</i>	13	0	2	3	4	0	9
Others		2	17	49	67	6	141
TOTAL		6	42	144	172	17	381

^a Numbers refer to the checklist of MSS given in the appendix.^b Also printed in the 15th century.

limited myself in this paper largely to the Western Latin authors of astrometeorological treatises, leaving aside (save for statistical purposes) the anonymous tracts and those by Arabic authors in Latin translation. Of the Western authors we can identify, approximately half are university professors of astrology (John of Eschenden, Martin Król of Zorawica, Bartholomeus of Parma, William Merle) or otherwise men of the academy (Richard of Wallingford, Robert Grosseteste, John Duns Scotus). The other identifiable authors are court astrologers of the Staufen in Italy (Guido Bonatti) and of the French royal court (Firminus of Bellavalle); two twelfth-century translators from the Arabic, both based in Spain (Hermann of Carinthia, John of Seville); one Austrian prince (Leopold of Austria); and two Benedictine monks (Cuno of Würzburg, Engelbert of Admont) and two Dominican friars (Albertus Magnus; Robert of York, known as Perscrutator). Although Hermann of Carinthia and John of Seville flourished in the twelfth century and Martin Król taught astrology at Cracow in the fifteenth century, most of these authors lived in the thirteenth and fourteenth centuries; as noted above, all of the most popular treatises had been written by the middle of the fourteenth century.

II. ELEMENTARY AND PROFESSIONAL TREATISES

The treatises may be broadly classified in two groups according to the audience their writers intended to reach: professional colleagues with considerable training and experience, or beginners. Several factors can help determine the intended audience. One is the organization of the treatises: when writing for professional colleagues, astrometeorologists organize their information according to the astral phenomena observed, whereas for beginners they first present the basics of astrological prediction quite generally and then organize their meteorological presentation according to the different types of weather to be predicted.

The tone and approach of the treatises also betray the author's intended audience. Some are simply more or less organized collections of rules clearly intended for beginners: if such-and-such happens, then it will rain. Hermann of Carinthia notes, for instance, at the beginning of *Liber imbrium*:

Whenever the investigator concerned with heavy rainfall approaches the question, he may expect a reliable conclusion from the following. For when the sun is in the southern hemisphere and Venus is under its rays, and the moon is in application to it, all of these things presage the coming of torrential rainfall on the same day and in the very same hour. It is exactly the same when Mercury is burning [i.e., under the rays of the sun], if the moon is in application to it or in opposition to it and remains in Scorpio. Again this is judged to result from the conjunction of Mars and Venus in Scorpio. Indeed, if the sun is in Aquarius, the moon in application or in opposition to it and if Venus remains there, in that hour rain will fall.⁶

⁶ Cited from OBr D.1227, fol. 106ra, collated with V 2436, fols. 134vb–136va; see appendix, Nos. 32, 134, and 141, for other MSS. On Hermann of Carinthia see Charles S. F. Burnett, "Arabic into Latin in Twelfth Century Spain: The Works of Hermann of Carinthia," *Mittelateinisches Jahrbuch*, 1978, 13:100–134 and the literature cited there. The Latin original is as follows (my editing from the cited MSS): "Quotiens igitur de imbrum lapsu sollicitus inquisitor accesserit ex subscriptis certissimum manat iudicium. Sol enim in emisperio australi et Venus sub radiis eidem Luna applicante ipsa die et eadem hora imbres portendunt futuros. Non minus quoque Mercurio adusto si Luna eidem applicet aut eidem opposita et in Scorpione commoretur. Hoc idem etiam inter Martis et Veneris sub

In *De impressionibus aeris* Robert Grosseteste begins with a long discussion of the basics of astrology, telling the beginner that there are seven planets, what their natures are (Saturn is cold and dry, Jupiter moderately warm and moist, and so forth), and what influence the various signs of the zodiac exercise on the planets. Having dealt with the *testimonia* (influences) of the signs of the zodiac on the various planets, Grosseteste then turns to a consideration of the influences of the planets on one another, according as they are in opposition, conjunction, trine aspect (i.e., separated by 120°), quartile aspect (90°), or sextile aspect (60°).⁷ There follows a discussion of the movement of the planets along the zodiac, which leads into an analysis of the influence of the moon on the tides. Finally, Grosseteste broaches the subject of weather prediction. First he says that one must locate the positions of all the planets in the astrological tables. As an example he gives the following positions for the planets (ignoring the movement of the moon, some 11° or 12°, in the space of a day) on 15 April 1249:

Sun: 22° Aries	Mars: 28° Aquarius
Moon: 21° Aries	Venus: 17° Taurus
Saturn: 10° Scorpio	Mercury: 1° Taurus
Jupiter: 1° Aquarius	

When a planet is in its house (i.e., the sign in which it was created, Leo in the case of the sun), Grosseteste says, in its exaltation, in its triplicity (i.e., a sign of the same nature as the planet itself), and so forth, it receives *testimony*, or influence, from the sign, which reinforces the influence of the nature of the planet. In the contrary case of a sign of a different nature or of another planet with a different nature in the same sign, as Grosseteste's demonstration shows, all of the testimonies cancel each other out. Predicting the weather is therefore a relatively simple process of counting the testimonies and determining the net balance of influences on the earth: the planet with the most testimonies will determine the weather. In the present case, Grosseteste says, the sun, which is naturally temperate and moderately warm and dry, is in its exaltation (Aries), whence it has four testimonies, and in its triplicity (Aries), whence it has three more testimonies, making seven in all. If there are no countervailing influences from the other planets, the sun will make the weather on earth conform to its moderately warm and dry nature. Now Venus, which is warm and moist, is in its house (Taurus) and therefore has five testimonies, but because Mercury (cold and dry) is also in Taurus, where it has two testimonies, Venus loses two of its testimonies, and because Saturn (cold and moist) is in opposition to Venus and is retrograde, Venus loses its last three testimonies and therefore has no effect whatever on the weather. Jupiter (warm and moist) being in Aquarius, lacks testimony, but because it is not retrograde when it first enters the night sky, it is "like a boy, who gives rise to hopes," and thus it aids the sun. Mars (warm and dry), also in Aquarius and thus lacking testimony, is however also processive on first entering the night sky and thus aids the sun in respect of dryness and warmth. Finally the moon (cold and moist) is in Aries and lacks testimony.

Scorpione conventus iudicabit. Sole etiam in Aquario, Luna illi applicante, aut in eius oppositione locata etiam Venus ibidem commoretur, in ipsa hora pluvie aderunt."

⁷ For a useful glossary of astrological terms see North, "Kalenderes," pp. 135–137.

Therefore there is no influence contrary to that of the sun, and consequently the weather should be warm and dry, which, Grosseteste adds in a modest little Q.E.D., indeed happened.⁸

Most of the Western Latin authors of astrometeorological treatises were, however, writing not for beginners but for their professional colleagues, and accordingly they dispense with instruction in the basics of astrology and launch directly into a presentation of the rules for weather prediction. Bartholomeus of Parma, for instance, begins his *Iudicium particulare* thus: "With regard to the conjunction of the sun and the moon, consider the ascendant sign and its nature, which mansion the moon is in, and the nature of the lord [of the moon], the sign where it is, and the nature of the planets which are in the ascendant with their lords and their aspects. . . ." That Guido Bonatti means to address professionals appears from the conditions with which he hedges his instructions. Guido continually reminds his readers of the limits of what an astrologer can safely predict, of the phenomena with which he must exercise more caution, and of the things he must consider in making his predictions. When considering the hour of torrential rainfalls and winds, for instance:

. . . you [the astrometeorologist] ought to know the hour of conjunction, if your considerations relate to conjunctions, or the hour of prevention [i.e., the mutual cancellation of influences], if you are considering preventions; and you ought to see by how many degrees the completion of the conjunction, application, prevention, or quartile aspect stands off from the aforesaid places, for rain or a change of weather will occur within that many days or hours, depending on which signs were the place of the aspects, applications, or conjunctions. For if they were in the fixed signs, they signify days, and if in the common signs, hours. And if of the mobile signs, they signify hours, but they foretell the aforesaid things more quickly than the common mobile [signs]; indeed the arrival of these things is hastened along by one sixth if the swift course of the moon or even the increase of its light is not lacking. And still even if one of them is present, it will hasten the arrival, but less than this. But when you find the moon in a position of opposition, conjunction, or prevention, or in quartile aspect, or if its course be slower according to the sign or place where it was, then it will delay the arrival of the aforesaid events. . . .¹⁰

⁸ For the Latin text see Ludwig Baur, ed., *Die philosophischen Werke des Robert Grosseteste* (Beiträge zur Geschichte der Philosophie des Mittelalters), Vol. IX (Münster-in-Westfalen: Aschendorff, 1912), Pt. 1, pp. 49–50.

⁹ Cited from V 5438, fol. 116va (my editing). The Latin original reads: "In coniunctione Solis et Lune, considera signum ascendens et eius naturam, qua mansione sit Lune et naturam domini, signum in quo ipse est et naturam planetarum qui sunt in ascendente vel cum domino eius vel eius aspectum." On the mansions of the moon and other terms see Stefan Weinstock, "Lunar Mansions and Early Calendars," *Journal of Hellenistic Studies*, 1950, 69:48–69; and David Pingree, "The Indian and Pseudo-Indian Passages in Greek and Latin Astronomical and Astrological Texts," *Viator*, 1976, 7:141–195.

¹⁰ Cited from Cp 227, pp. 121–122; PBN 7443, fol. 215r–v, and the Augsburg incunabulum fol. EE 3 (my editing; see appendix, No. 31): "Oportet te scire horam coniunctionis si coniunctionalis fuerit consideratio tua, vel horam preventionis si preventionalis fuerit tua consideratio quot gradibus complementum coniunctionis aut applicationis seu preventionis seu tetragoni destiterit a locis predictis quoniam usque ad tot dies vel horas prout de quibus signis fuerint aspectus sive applicationes vel coniunctiones pluviarum effectus sive aeris mutatio deveniet. Nam si fuerint de signis fixis dies si de communibus horas significabunt ac si de mobilibus horas sed citius quam communia mobilia predicta procedunt, festinabit et si predictorum eventus pro 6^a parte si velox, Lune trahis vel etiam ipsius augmentum luminis ubi defuerit aut si unum illorum tamen affuerit eventus ad 1^a hec festinabit. Cum autem in oppositi gradus coniunctionis vel preventionis loco Lunam inveneris vel tetragoni vel fuerit cursus eius tardior sed signum vellocior in quo fuerit ut dictum est de festinatione tardabit predictorum eventus."

We have come a long way from the mere counting up of testimonies in Grosseteste's treatise. The astrologer must consider the swift motion of the moon, which Grosseteste had treated as if it remained stationary on 15 April 1249. Moreover, Guido makes no concessions to the unsophisticated. He takes it for granted that his readers are capable of understanding the problem of astrological weather prediction theoretically, rather than being limited to simply applying a collection of rules to a set of tables. In the end the astrologer can rely on the accuracy of his weather predictions only if he considers all of the relevant factors that may impinge on the weather.

Generally, Western Latin authors preferred this practical, if demanding, approach. These authors emphasize rules, not general astrological theory. Although they are not loath to quote the great Arab astrologers in support of a particular point, very little of the science of the day enters into their treatises. Only the Dominican Robert of York (Perscrutator), writing in 1325, scornfully rejects books full of tables and rules but devoid of intellectual understanding. He bases his discussions of meteorology instead on a series of highly original observations on the movers (*motores*) that cause the four elements to form compounds, on the decomposition and reconstruction of compounds, and on the implanting of form (*figura, forma*) on compounds.¹¹ Only after this theoretical discussion does Robert turn to the subject of weather. Whatever audience Robert of York intended to reach, however, not all of those who actually copied his treatise were receptive to his intellectual ambitions. One English manuscript (BL MS Add. 10362) rather airily dismisses the first half of Robert's treatise, with its intellectually ambitious theories, as "prolixity" and commences copying precisely where the theory leaves off and the rules begin.

In the fourteenth century the mere compilations of useful information, scarcely digested, are balanced by two treatises written by John of Eschenden and Firminus of Bellavalle. These two authors collect and compare the authorities on each meteorological phenomenon and iron out the differences. Firminus begins his *Repertorium prognosticon de mutatione aeris* with a clear statement of purpose. The ancients, he says, have written so many things about weather prediction that the contemporary astrologer would have a difficult time wading through this material and extricating the truth from the disagreements of the authorities. Therefore Firminus has decided to collect the dicta of the ancients and bring them into agreement when they contradict one another, supplying references to his sources so that his readers can consult them independently. The usefulness of his work, Firminus says, lies in the ease and rapidity with which many different authorities can be compared, and experience will show which dicta are the most useful and suited to "our times and climates."¹² Nor does Firminus fail to carry out his purpose. In nearly every chapter he presents the results of his systematic ransacking of the astrometeorological literature,

¹¹ M 11067, fol. 81va: "Neque enim ex libris eorum aliquid neque ex alicuius doctrina didici preter tabulas sive regulas nudas quarum intellectum ratione experimento ministrante Deo dante denudavi." This summary of Perscrutator's argument, though supplemented in minor ways from M 11067, fols. 73ra–81va, owes much to Thorndike's discussion: see Thorndike, *A History of Magic*, Vol. III, pp. 110–114, esp. p. 109, n. 22.

¹² Firminus of Bellavalle, *Repertorium prognosticon de mutatione aeris* (Venice, 1485) (GW 2530–2531); this summary is from fol. A2r. See also the summary in Thorndike, *History of Magic*, Vol. III, pp. 272–273.

compares the dicta of the various authorities on the subject under discussion, and settles any differences of opinion. Firminus's work is, in sum, a *repertorium*, or handbook; useful because it is systematic, judicious, and complete.

John of Eschenden moves beyond Firminus's *Repertorium* to present the only known astrological *summa*, the *Summa iudicialis de accidentibus mundi*. John's work is distinguished by its logical character and especially by its method of argument in the individual chapters on weather prediction. Throughout these chapters Eschenden first carefully defines the problem under discussion, summarizes (with cross references to his own work) the state of the discussion of the problem, quotes the texts he will comment upon in the present chapter, discusses them, and draws a quick conclusion for the astrologer, usually signaled by a sentence beginning with *debes* ("you ought to") or *unde* ("whence"). Far from being "long-winded and garrulous," the *Summa iudicialis* is the product of a precise and systematic mind which raises up piece by piece a structure of thought.¹³ Whereas Firminus produced a mere handbook of authorities without contradictions, John presents an intellectual structure into which all of the authorities can be seen to fit without contradiction.

III. A POTENTIAL READING PUBLIC FOR ASTROMETEOROLOGY—FARMERS

The authors of the various astrometeorological treatises saw themselves as serving the practical needs of the public they addressed, in particular of those in need of useful handbooks, by drawing upon the theoretically useful, but verbose, recondite, and occasionally contradictory Arab masters (so, at least, Firminus describes them).¹⁴ Which reading public was it ultimately, whose practical needs are reflected in these treatises? When I began my research, I assumed that the types of weather discussed in these treatises would be an index of what people wanted to have predicted for them or of the sorts of phenomena they wanted to be forewarned about, and that this in turn would provide information on their attitudes toward weather in general. Most tracts, however, discuss rain at great length, but spend much less time on weather phenomena of greater economic significance for Northern Europe (where the vast majority of weather tracts were copied), such as floods, early frosts, and the like—if indeed they deal with these subjects at all. With the sole exception of William Merle's *De prognosticatione aeris*, rather a special case, the treatises address economic concerns surprisingly rarely. They do, however, discuss a number of phenomena we would classify as nonmeteorological, such as earthquakes and the aurora borealis.

The explanation of this combination of economic blindness and curious catholicity of meteorological discussion must be that our authors are writing not for farmers, but for astrologers—for their professional colleagues. When one thinks of the cost of manuscripts in the Middle Ages and of the level of literacy among the rural populace, this will be self-evident.¹⁵ Not that the population of

¹³ Quoting Thorndike, *History of Magic*, Vol. IV, p. 330; see also pp. 329–334. On John of Eschenden's *Summa* generally, but without consideration of weather prediction, see J. D. North, "Astrology and the Fortunes of Churches," *Centaurus*, 1980, 24:181–211, on pp. 192–197.

¹⁴ Firminus, *Repertorium*, preface.

¹⁵ See Davis, "Printing and the People," pp. 210ff; Eisenstein, *The Printing Press*, pp. 63–65; and R. A. Houston, "The Development of Literacy: Northern England, 1640–1750," *Economic History Review*, 2nd Ser., 1982, 35:199–216.

the countryside was incapable of predicting the weather: William Merle and others record the "farmers' rules" for weather prediction, but it is worth noting that these rules are of a wholly different order than astrometeorological treatises. Farmers' rules suffice only to predict the weather for the ensuing twenty-four hours or so, whereas an astrologer could make a long-term forecast as well as predict the weather on any given day far in the future. Moreover, it would be impossible for anyone without an educational background highly unusual for a great landowner, not to speak of the peasants, to use an astrometeorological treatise to predict the weather. Such tracts would mean nothing to anyone who was not well versed in mathematics and astronomy, proficient in the use of astrological and astronomical instruments, and able to work easily with astrological tables. Such skills were not easy to come by, as we can judge from the few astrological students' notebooks which have come down to us.

Perhaps the best example of such a notebook belonged to one John Gylbert, who studied astrology with Master Nicholas Collys in London in the mid-fifteenth century.¹⁶ If one can generalize from this one notebook, the first task of an astrology student was to copy out his tables. Gylbert's Master Nicholas seems to have instructed him as he copied, for the tables are littered with little notes containing suggestions and tips on how to use them and the pitfalls one must guard against. Gylbert also copied snippets of tracts on the construction and use of astrological instruments and extracts from works on professional questions, such as nativities (treatises on how to foretell the fate of the newborn by casting their horoscopes), judgments (treatises on how to give advice to those asking questions by looking at the stars at the moment the question is posed), and the like. Suffice it to say that the education of an astrologer required time and effort, and that virtually no one could understand astrological treatises without such an education.

The impression that astrometeorology was a learned, indeed fiercely technical and demanding science, far above the level of understanding of any farmer or landowner, is confirmed by a look at the manuscripts containing astrological treatises on weather prediction. By taking a manuscript as a unit and examining its entire contents, we can make a guess about the type of person who might have commissioned the codex. What sort of material (other than astrometeorology) is contained in these manuscripts, and to whom could it have appealed? Although we should exercise caution in drawing conclusions from the answers to these questions, the answers are significant, not least in their consistency. The materials contained in the 142 manuscripts I have analyzed may be classified in five categories: basic Arab astrological literature; material of interest to specialists, such as treatises on elections, nativities, judgments, and astrological instruments; astromedical literature; Latin university literature—treatises on the fine points of using astronomical tables, written by medieval Latin academic authors; and tracts on geomancy, calendar reform, or calculation of movable feasts, and astrological business treatises. Clearly none of this material would have any direct appeal for farmers, with the possible exception of the business treatises. These, however, treat of the proper times for middlemen and traders to buy and sell wine, grain, and olive oil, thus betraying their Southern origins.

¹⁶ OBa 191 (fols. 1–82).

How relevant these treatises might seem to a peasant in the Île de France or to a landowner in Norfolk is very much open to question.

To approach the problem the other way around, there is no connection in the transmission of texts between manuscripts containing astrometeorology and codices containing tracts on husbandry, such as Walter of Henley's *Oeconomica*, nor is there a single instance of estate accounts being bound up by chance in manuscripts containing astrometeorological tracts. And I have found no evidence whatsoever of a manuscript containing astrometeorology having been commissioned by a landowner for agricultural purposes. One is forced to conclude that, whatever was being written for landowners and farmers in the Middle Ages, it was not being copied into astrometeorological manuscripts. As far as the manuscript tradition is concerned, agriculture and weather prediction by means of astrology have nothing to do with one another.

The evidence from the transmission of the texts thus supports the tentative conclusion based on the type of weather forecasts contained in the astrometeorological treatises themselves. In fact, no one seems to have written astrometeorological literature specifically for farmers during this period. Even the *iudicium anni* ("Judgment for the Year") literature, which after small beginnings in the fourteenth century swelled to enormous proportions with the advent of the printing press, seems to have been aimed at professional astrologers (although we cannot exclude the possibility that one or another landowner may have bought these little pamphlets). Most of the prognostications for the year, however, are in Latin, and not even in the vernacular *iudicii anni* do the authors attempt to speak to the interests of agriculturalists in any direct way. As G. Hellmann has pointed out, the prognostications discuss conjunctions, eclipses, harvests, diseases, wars, and the fates of princes and peoples, cities and regions, as well as of the Pope and the Turks.¹⁷ Weather prediction comes normally at the end and is kept extremely brief: it takes up fifteen to twenty lines in a pamphlet of eight to sixteen pages.

Despite the evidence that astrometeorological literature was neither written for agriculturalists nor collected by them, it is clear from Chaucer and from other sources that astrologers were consulted on the weather, but we have no way of knowing just who consulted these specialists or what their motives were. Nor do we have any way of determining just how accurate that advice was, as there exists no documentation that would permit us to compare the predictions made by astrometeorologists with the actual weather. Specific weather predictions are few and far between, and the dearth of geographically and chronologically precise and reliable meteorological data for the medieval period is well known.

IV. THE ACTUAL READING PUBLIC OF ASTROMETEOROLOGY—PROFESSIONAL ASTROLOGERS AND OTHERS

In order to determine who was in fact interested in astrometeorology, it is worth applying positively the method used negatively in the last section, in order to sketch a tentative picture of the sorts of people sufficiently interested to have an

¹⁷ G. Hellmann, "Die Wettervorhersage im ausgehenden Mittelalter (XII. bis XV. Jahrhundert)," in *Beiträge zur Geschichte der Meteorologie* (Veröffentlichungen des Königlich Preussischen Meteorologischen Instituts, 296) (Berlin, 1917), pp. 167–229, on p. 206.

astrometeorological text copied. This is a perilous and uncertain undertaking. The method cannot account for lost manuscripts and is likely to overrepresent manuscripts from universities, monasteries, and any institution with a continuous history relatively free of cataclysms such as fire and war. Further, only the manuscripts with varied contents reveal anything about those who commissioned them: the more varied, the more revealing. The effort is nonetheless worth making, especially for those codices with a hodgepodge of pieces.

To begin with a specific example, Robert Grosseteste, who wrote for beginners, ended up in everybody's quarto notebook. We possess thirty-three manuscripts of his *De impressionibus aeris* (see appendix, Nos. 3, 7, 27) and it appealed to those in a university milieu, as shown by the number of standard university textbooks copied into the same manuscripts. His work also appealed to those interested in the practical business of astrological prediction, as the numerous tables copied along with Grosseteste's treatise suggest. It was also attractive to academically trained physicians, as the presence of introductions to astrology for medical doctors (the most common being by Arnaldus de Villanova and Pseudo-Hippocrates) in the manuscripts indicates.

This method of analysis reveals three groups of people collecting astrometeorology: professional astrologers in and out of a university milieu, but definitely in practice; academically trained physicians; and monks, who put together books of reference filled with the latest and most reliable astrological literature, but who had no clear intention of actually practicing the art (see Table 3). Collectors of astrometeorology, even the best educated, were rather catholic in their tastes and seldom shunned the simpler treatises. In every century from 1100 to 1500 are to be found professional astrologers who copied both simple tracts intended for beginners and material intended for readers like themselves. Judging from these manuscripts, the professionals also compiled books of reference, including general astrological treatises and tracts on specialized professional questions, such as nativities, elections, judgments, astrometeorology, and the like. In the course of their professional careers, they sorted out the more useful and reliable treatises.¹⁸

I have chosen to examine in detail the patterns of copying in the fourteenth and fifteenth centuries, when more tracts were copied than ever before, to judge by the numbers of surviving manuscripts.¹⁹ During these centuries there appears to be a shift in the intended uses of the manuscripts. The criteria used to differ-

¹⁸ Lipton, *Rational Evaluation*, p. 181, came to the same conclusion for the 12th century.

¹⁹ The following MSS have been analyzed (see appendix for abbreviations): Ba F.III.8; Bbr 1461-1484; Bc 20; Be 483; BLa 66; BLad 10362, 23770, 26768; BLc App. VI; BLh 1612, 2558, 5082; BLr 6.E.V, 12.C.VIII, 12.E.XXV, 12.G.VIII; BLs 636, 702, 3277; Bs folio 192; Cambrai 168; Cc 424; Cambridge, Gonville & Caius 141; Cp 204, 227; Cpe 86; Ct 1144, 1418; CUL Gg.6.3, Hh.6.11, Ii.I.1, Ii.I.13; Cracow UL 565; Cues 208, 212; Dijon 1045; Ea folios 37, 207a, 346, 379, 381, 383, 391, 394, 395; Ea quartos 21, 143, 345, 352, 355, 361, 372, 374, 383, 386; Ea octavos 82, 84; Florence BN J.III.28; Lyon 329; Madrid, Escorial O.II.9; Milan, Ambrosiana A.201.inf., O.331.inf; Montreal, McGill UL 134; M 27, 59, 125, 221, 228, 275, 2841, 8950, 11067, 25013; Nuremberg, Stadtbibl. Cent. V.64; Oxford, All Souls 332; OBa 191.I; OBau F.5.29; OBb 369, 463, 464, 472, 714; OBcm 105, 396, 517; OBd 47, 48, 68, 147, 167, 176, 194, 225; OBIm 594; OBs 15, 17, 25; Oo 23; Ouc 41; Pa 880, 1129; PBN 7316, 7316A, 7329, 7440, 7443, 13014, 16089, 16204, 18504; PBNna 3034; Pr 433, 1144; Ravenna 356; V 2359, 2428, 2436, 3011, 3124, 3162, 3528, 4146, 5206, 5239, 5295, 5296, 5307, 5309, 5336, 5371*, 5387, 5438, 5508, 5517; W 2734, 2816. Examined, but not included in these statistics because they were not executed between 1300 and 1500, were PBN 7413 (II), 10271; BLh 531; BLs 268; Clr 15.



*Robert Grosseteste, author of *De impressionibus aeris*, who "ended up in everybody's quarto notebook." From British Library MS Royal 6.E.V. Courtesy the British Library.*

entiate between intended uses are the following. Barring clear evidence to the contrary, I have assumed that the larger a book is, the more likely it is to have been intended as a reference book, and conversely, that smaller codices were probably intended for practical use: large folio volumes are not easily slipped into a saddle bag or purse or hung from the girdle by a cord. Similarly, any manuscript with a chain on it—a sure sign of a sojourn in a library—was counted as a reference work. Finally, the contents of manuscripts counted heavily in their classification: copies of massive treatises running to one or two hundred folios were considered to have been intended for reference, but books filled with excerpts, astrological tables, and notes and scribblings were assumed to have been intended for practical use. These criteria are clearly fallible, and my classifications represent educated guesses. Similarly, mere survival is a bad criterion for gauging peaks and valleys in manuscript production, but there is no better one: medieval library catalogues are no more likely to represent the situation than the chance survival of manuscripts.²⁰

To judge from the results of this analysis (see Table 3), copying apparently swung from the production of codices destined for practical use in the fourteenth century to the transcription of reference manuscripts in the fifteenth century. However, the apparent shift from smaller to larger codices in the same period

²⁰ Aside from normal wear and tear (not instantly fatal to parchment), damp, and neglect, there is no inherent reason why a 12th-century MS should not enjoy a long life. The major caesura in the MS tradition occurred when the monasteries were dissolved, whether as a result of the advent of Protestantism or in the wake of the French Revolution. I am also somewhat skeptical of the argument that shifts of taste somehow affected transmission. Michael de Leone, for example, a canon of Neumunster in Würzburg (ca. 1300–1353), preserved German *Minnesang* despite its running counter to his own literary tastes.

Table 3. *Sitz im Leben* of manuscripts containing astrometeorology

Probable owner	Intended use	Century			
		14th		15th	
		N	(%)	N	(%)
University astrologers	Practical	13		8	
	Reference	12		14	
	Total	25	(34.2)	22	(33.3)
Other professional astrologers	Practical	14		3	
	Reference	4		6	
	Total	18	(24.7)	9	(13.6)
Academic physicians	Practical	3		4	
	Reference	7		9	
	Total	10	(13.7)	13	(19.7)
Monks	Practical	2		0	
	Reference	5		10	
	Total	7	(9.6)	10	(15.2)
Not identifiable	Practical	0		1	
	Reference	13		11	
	Total	13	(17.8)	12	(18.2)
TOTALS: Practical		32	(43.8)	16	(24.2)
Reference		41	(56.2)	50	(75.8)

NOTE: Percentages reflect the numbers of MSS in relation to the total for that century. Independent parts of MSS bound together by chance are counted separately as two (or more) separate MSS if both (or all) parts contained astrometeorology.

(see Table 4),²¹ points to a more complex explanation. Paper was becoming increasingly available in the fifteenth century. English customs accounts, in particular the London customs accounts, indicate that literally reams and reams of paper were entering England at this time.²² Much of this paper is designated as *paper spendabile*, or disposable, throw-away. The availability of so much paper of this type made the production of personal notebooks practicable. Too individual to be of interest to succeeding generations and more than likely to be thrown away when no longer needed, these smaller notebooks would have tended not to survive, whereas the folio reference books had better luck.

²¹ Maddeningly, there is no consistent standard by which formats are classified: what Erfurt classifies as a quarto would be called a folio in the British Library. I have arbitrarily based classification as folio, quarto, or octavo on European paper sizes. These classifications correspond well enough to those librarians typically use when cataloguing manuscripts. In addition, I have given codices cut down in the process of binding in modern times (e.g., a borderline MS with its superscriptions chopped in half by a 19th-century binder) the benefit of the doubt.

²² London, Public Record Office, E122.

Table 4. Format of fourteenth- and fifteenth-century manuscripts

	Folio		Quarto		Octavo		Uncertain		Total MSS
	N	(%)	N	(%)	N	(%)	N	(%)	
14th century	26	(35.6)	37	(50.7)	5	(6.8)	5	(6.8)	73
15th century	30	(46.9)	24	(37.5)	1	(1.6)	9	(14.0)	64

NOTE: MSS larger than DIN-A 4 (210 × 295 mm) were classed as folios; MSS between DIN-A 4 and DIN-A 5 (148.5 × 210 mm) were classed as quartos; and smaller MSS were classed as octavos.

Moreover, smaller codices are easier to conceal, and therefore to steal from libraries. While not being able to prove the contention conclusively, therefore, I am persuaded that the total production of astrometeorological manuscripts probably increased from the fourteenth to the fifteenth century, but that the smaller volumes have not come down to us. I also think that the number of manuscripts produced for practical purposes originally surpassed that of the reference codices.

The apparent decline in the numbers of manuscripts produced by professional astrologers can be explained in the same way, particularly since the prime criterion for the identification of such a codex is the presence in it of astrological tables. If my reasoning from the increased availability of paper to the increased production of *ad hoc* manuscripts is correct, then it follows that manuscripts containing astrological tables would tend to be underrepresented in the statistics in Table 3, for professional astrologers could afford to discard out-of-date tables and notebooks whose usefulness was past. Among surviving manuscripts the number of reference manuscripts produced by professional astrologers actually increases from the fourteenth to the fifteenth century, although the total number of manuscripts they produced and the proportion of that total to the total production of astrometeorological codices declines markedly in the fifteenth century. We may plausibly conclude that professional astrologers produced far more astrometeorological codices than have survived and are represented in Tables 3 and 4.

Finally, Table 3 also indicates that academically trained physicians and monasteries accounted for substantially more manuscripts containing astrometeorological literature in the fifteenth century than in the previous century. Lynn White has described the reliance of medieval physicians on astrology:

In order to diagnose and treat the disease of a patient, a physician of that period felt required to cast a nativity of the afflicted person based on exact information about the time of his birth. For ordinary cases there were little portable handbooks that would give a quick approximation of the astrological context and thus enable the medical man to examine a specimen of urine and then prescribe diet, baths, drugs and bleedings.²³

²³ Lynn White, jr., "Medical Astrologers and Late Medieval Technology," *Viator*, 1975, 6:295-297, on pp. 296-297. See also LeMay, "The Teaching of Astronomy," pp. 200-206, 215-217; and Russell Hope Robbins, "Medical Manuscripts in Middle English," *Speculum*, 1970, 45:393-415.

It is not surprising that academic physicians, who were accustomed to depending upon astrological handbooks and tables and whose interests were demonstrably very wide ranging, should have developed an interest in astrometeorology.

Why monasteries would collect such manuscripts is less clear. Nor is it obvious why all religious orders were not equally represented. If we may roughly correlate interest with the numbers of surviving manuscripts, then the Benedictines, Dominicans, and Franciscans would seem to have been especially drawn to astrological weather forecasting.²⁴ We might be tempted to speculate that the Benedictines were interested in astrometeorology as a means of improving the efficiency of estate management, and that the Franciscans and Dominicans, the major university teaching orders, picked up an interest in astrometeorological tracts because they were in the vicinity of universities.

Such speculations, however, would probably be false. First, by the fifteenth century most of the great ecclesiastical estates had been broken up. Agricultural needs, therefore, are unlikely to have prompted a Benedictine monastery to collect astrological material in order to predict the weather. Indeed, the Benedictine monasteries that actually collected weather tracts tend to be urban: St. Augustine's at Canterbury (OBb 464) in the fourteenth century and St. Maximin at Trier (Bs folio 192) in the fifteenth century are good examples. Second, the manuscript evidence tends to militate against the university thesis for the Franciscans and Dominicans. While an occasional manuscript surfaces that belonged to the Dominicans at Oxford or Florence,²⁵ most of the manuscripts from these two orders—from the contemporary scientific point of view the most challenging and interesting examples—come from houses or priories located far from any *studium generale* or university.

One such manuscript, now in the Bavarian State Library in Munich, came to the Munich collection from the Cathedral Library in Passau, but was originally written by the Franciscan friar Theodericus Ruffus, in the priory of Grönenberg near Osnabrück. Between 1445 and 1450 Ruffus copied nearly every major introductory compilation of astrology, as well as tract after tract on astrological medicine, judgments, elections, astrological instruments, and the latest Latin university literature and textbooks on astrology. One should not underestimate his achievement. Grönenberg is far from the nearest university (Cologne), and Ruffus set himself the task of transcribing some of the most demanding, fearfully technical, and scientifically advanced material that his age had to offer.²⁶

²⁴ The following are Franciscan MSS: M 11067 (Grönenberg near Osnabrück), Ouc 41 (Shrewsbury), CUL ii.I.1 (Bakewell), OBs 15 (Doncaster), OBs 25 (unknown but English; see rear flyleaf), M 8950 (Munich). The Dominican MSS are Ba F.III.8 (Basel), BLr 12.E.XXV (Oxford), OBcm 105 (*olim Johannis Thom* . . . OFP), Florence BN J.III.8 (San Marco, Florence). The Benedictine MSS are OBb 464 (St. Augustine, Canterbury), Bs folio 192 (St. Maximin, Trier), V 3011 (must be OSB in a German-speaking area). Other monastic MSS are Bbr 1461–1484 (Cologne, St. Barbara, Carthusian), OBcm 517 (Monastery ss. Quadraginta in Treviso near Venice), M 2841 (Aldersbach, Cistercian), OBb 463 (some connection with the mendicant orders in Catania in Sicily is clear; see fol. iii v), BLs 702 (perhaps donated by an Austin friar; see fol. 1r), CUL Hh.6.11 (Ramsey Abbey, Hunts. or Cambs., Cistercian), OBd 47 (some connection with the mendicant orders in Ferrara or in the vicinity seems clear; see fol. 188v).

²⁵ For the Oxford MS, BLr 12.E.XXV, see *Catalogue of Western Manuscripts in the Old Royal and King's Collections*, ed. G. F. Warner and J. F. Gilson, Vol. II (London, 1921), p. 59–61. For Florence BN J.III.28 (formerly San Marco 180), see Axel Anthon Björnbo, "Die mathematischen Sanmarcohandschriften in Florenz," *Bibliotheca Mathematica*, 1912, 3rd Ser., 12:106–111.

²⁶ For a description of this MS, see *Catalogus codicum latinorum bibliothecae Regiae Monacensis*, Vol. IV. Pt. 2 (Munich, 1892), pp. 6–7. Theodericus Ruffus identifies himself in a number of expli-

Not only did he have to procure the texts to be copied, but he had to understand them in order to produce the accurate texts of what is now Munich Clm 11067. As the condition of the one remaining manuscript of Cuno of Würzburg's treatise shows (see appendix, No. 54), a copyist who is not in a position to grasp intellectually the material he transcribes will produce a text whose mistakes and oversights betray his lack of understanding.²⁷

Nor is Ruffus's the only astrological manuscript produced by provincial mendicants to achieve such high intellectual standards. The Dominicans in Basel at the turn of the fourteenth century counted among their number an unsung but assiduous observer of the heavens and collector of astrometeorological treatises (Ba F.III.8).²⁸ The Franciscans at Shrewsbury, near the Welsh border, produced a manuscript in the fourteenth century which included most of the university texts on astronomical observation and construction and use of astrological instruments (Ouc 41). Fifteenth-century Franciscans at Doncaster in Yorkshire (Os 15) and their fourteenth-century counterparts at Bakewell in the Peak District (Derbyshire, CUL Ii.I.1) both produced intellectually ambitious manuscripts that combined the still-valid Arab texts on astrology with the more current Latin literature on the subject, which was coming out of the university research centers. This list of scientifically demanding provincial astrological manuscripts produced by the mendicant orders would doubtless be a good deal longer, if it were not limited to codices containing astrometeorology. Even in its brevity, this evidence serves to suggest that the intellectual life of mendicant and Benedictine monasteries and priories far off the beaten track could, on occasion, be exhilarating indeed, and that contact with intellectual developments at the most advanced of universities could be successfully maintained.

V. CONCLUSION

Astrometeorology constituted a significant genre of astrological writing and copying in the Middle Ages. Although the vast majority of astrometeorological treatises were copied only once, some enjoyed sufficient popularity to bring the average number of copies to 3.5. Five of the dozen most popular treatises were written by the great Arab astrologers and the rest by Western Latin authors before 1350. Judging by the tone, approach, and degree of sophistication of astrological knowledge necessary to understand these treatises, we can divide them into two groups, those aimed at beginners and those aimed at professional astrologers. It is clear that astrometeorologists were not writing for farmers, and that agriculturalists did not collect such writings.

In analyzing the actual reading public of astrometeorology, we have utilized the variety in the contents of 139 codices of the fourteenth and fifteenth centuries to

cits, e.g., fol. 118va: "Expliciunt flores Albumazar de revolutionibus annorum qui interpretantur pater familias. Completus anno Domini M^occcc^oxlv decima nona die mensis Decembri per me fratrem Theodericum Ruffi in Gronenbarch hora 4^a post meridiem."

²⁷ See, e.g., Nuremberg, Stadtbibliothek, Cent. V, 64, fol. 94va, where the scribe read 255 as "et 55." Because Cuno himself observed and calculated accurately, it is possible to correct the scribal errors by comparing the planetary positions as calculated in modern times (for these see North, "Kalenderes," p. 131, n. 2). The scribe's other errors are, unfortunately, not so easily remedied.

²⁸ See Lynn Thorndike, "A Weather Record for 1399-1406 A.D.," *Isis*, 1940, 32(2):304-323 (publ. 1949); Fritz Klemm, "Über die Frage des Beobachtungsortes des Baseler Wettermanuskriptes von 1399-1406," *Meteorologische Rundschau*, 1969, 22:83-85; and the literature cited there.

make tentative identifications of actual readership in over 80 percent of the cases in each century. While this is a substantial percentage, the identifications are in some cases very tentative indeed. In any event, the entire transmission of astrometeorology took place within the circle of Latin speakers. Whatever the levels of literacy in late medieval and early modern Europe, Latinity was certainly never widespread. The Latin-speaking public in the towns, however, was far from negligible: if we consider the numbers of monks, clergy, lawyers and canon lawyers, notaries, scribes, and assorted university graduates in a large town in the late Middle Ages, we might reasonably conclude that perhaps 10 percent to 20 percent of that populace was capable of understanding Latin. Even if that percentage was in reality only 5 percent, that would still constitute a substantial potential reading public for astrometeorology.

When one compares the actual reading public of astrometeorology in the late Middle Ages with the target audience of professional astrologers apparently envisaged by the Western Latin authors, one notices that astrometeorology also attracted the attention of academically trained physicians and monks. The intellectual attainments of medical astrologers have been described elsewhere; here we have stressed the level of intellectual sophistication prevailing at provincial monasteries, particularly those of the mendicant and Benedictine orders. The introduction of paper may have made the production of codices economically more feasible, but the conclusion seems inescapable that the reading public of astrometeorology was also expanding.

The reading public of astrometeorology was also changing in character. Although the simpler astrometeorological tracts aimed at beginners continued to be copied, they were overtaken by copies of the more sophisticated, longer treatises. If copying does reflect demand, then the astrometeorological reading public gradually came to demand the intellectually sophisticated works, despite their relative expense. The survival of increasing numbers of such works may, therefore, support the conclusion that the level of intellectual sophistication in the actual reading public of astrometeorology rose over the course of the fourteenth and fifteenth centuries.

APPENDIX: CHECKLIST OF ASTROMETEOROLOGICAL TREATISES (BY INCIPIT)

ABBREVIATIONS

Ba	Basel, Universitätsbibliothek	BN	Bibliothèque Nationale, Biblioteca Nazionale, etc.
Bbr	Brussels, Bibliothèque Royale	Bs	Berlin (West), Staatsbibliothek Preussischer Kulturbesitz, MSS lat.
Bc	Boston, Harvard School of Medicine, Countway Library	c	century
Be	Bern, Stadtbibliothek	Carmody	Francis J. Carmody, <i>Arabic Astronomical and Astrological Sciences in Latin Translation</i> (Berkeley/Los Angeles: Univ. California Press, 1956); cited by page no.
Bibl.	Bibliothek, Bibliothèque, Biblioteca, etc.	Cc	Cambridge, Corpus Christi College MSS
BLa	London, British Library, Arundel MSS	Ccl	———, Clare College MSS
BLad	———, Additional MSS	Ce	———, Emmanuel College MSS
BLc	———, Cottonian MSS		
BLh	———, Harleian MSS		
BLr	———, Royal MSS		
BLs	———, Sloane MSS		

Cp	Cambridge, Pembroke College MSS	OBr	Oxford, Bodleian Library, Rawlinson MSS
Cpe	———, Peterhouse College MSS	OBs	———, Savile MSS
Ct	———, Trinity College MSS	Occ	———, Corpus Christi College MSS
Cues	St. Nikolaus-Hospital (Cusanusstift) MSS (Bernkastel-Kues, F.R.G.)	Oo	———, Oriel College MSS
CUL	Cambridge, University Library	OFP	Order of Friars Preachers
Ea	Erfurt (G.D.R.), Wissenschaftliche Allgemeinbibliothek, Amploniansche MSS	OSB	Order of St. Benedict
GW	<i>Gesamtkatalog der Wiegendrucke</i> (Leipzig/Wiesbaden: Otto Harrassowitz, 1925—); cited by item no.	Ouc	Oxford, University College MSS
Hain	Ludwig Hain, <i>Repertorium bibliographicum</i> (Stuttgart, 1826–1838; rpt., 4 vols., Milan, 1948)	Pa	Paris, Bibliothèque de l' Arsenal MSS
LNI	<i>Liber novem iudicum</i> (No. 75)	PBN	———, Bibliothèque Nationale, MSS lat.
M	Munich, Bayerische Staatsbibliothek, Codex latinus monacensis (C1m)	PBNna	———, nouvelles acquisitions MSS
OBa	Oxford, Bodleian Library, Ashmolean MSS	Pr	Prague, University Library MSS
OBau	———, Auct. MSS	TK	Lynn Thorndike and Pearl Kibre, eds., <i>A Catalogue of Incipits of Mediaeval Scientific Writings in Latin</i> (The Mediaeval Academy of America Publication, 29) 2nd. ed. (Cambridge: Mediaeval Academy of America, 1963); cited by column no.
OBb	———, Bodleian MSS	UL	University Library
OBcm	———, Canonici Misc. MSS	V	Vienna, Österreichische Nationalbibliothek, Codex Vindobonensis
OBd	———, Digby MSS	Vap	Vatican, Biblioteca Apostolica, Palatine MSS
OB1m	———, Laudian Misc. MSS	W	Wolfenbüttel, Herzog-August-Bibliothek MSS

Other abbreviations as usual in *Isis* style.

INDEX OF INCIPITS

Manuscripts are arranged alphabetically by depository (as abbreviated), with depositories that have been abbreviated as on the list above preceding as a group those that are spelled out.

1 *A tertia die Augusti*—weather notes accompanying astronomical tables for 1269–1270: TK 5; BLr 7.F.VIII, fols. 176v–177v, in margin, 13th c

2 *Ad cognoscendum per signum*: TK 32; BLad 10362, fols. 36r–37r, 13th–14th c

3 *Ad denotandum diversam aeris*—excerpt from Robert Grosseteste, *De impressionibus aeris* (see also No. 7), viz., the predictions for 15 Apr. 1249 and July 1255: TK 35; BLh 1612, fol. 10r, 14th c

4 *Ad habendam pronosticationem*: Bs folio 192, fols. 95vb–96ra, 15th c

5 *Ad perfectam eorum que in hoc*—Alkindi, alias Dorochius, *De aeris qualitatibus*: Carmody 111 (as Ch. 488 of LNI, No. 75); TK 56; for MSS see No. 75

6 *Ad perfectam notitiam iudiciorum*—Richard of Wallingford, *Exafrenon pronosticorum temporis*: TK 56; for MSS see Richard of Wallingford, *An Edition of His Writings with Introductions, English Translations, and Commentary*, ed. J. D. North, Vol. I (Oxford: Oxford Univ. Press, 1976), pp. 182–243

7 *Ad precognoscendam diversam aeris*—Robert Grosseteste, *De impressionibus aeris*: TK 57; Bc 20 (Ballard 7), fols. 156r–159v, 14th c; BLc Ottonis D.X, fols. 57v–58v, 14th c; BLr 6.E.V, fols. 240r–241r, 14th c; BLr 12.E.XXV, fols. 166v–169r, 1300; CUL Gg.6.3, fols. 134r–138v, 14th c; Ea folio 394, fols. 147r–148r, 14th c; Ea quarto 345, fols. 50r–52r, 14th c; M 11067 (the tract is no longer in this MS but is listed in the contemporary table of contents), 1445–1448; OBb 464, fols. 122v–125v, 1318; OBcm 517, fols. 28v–31r, 15th c; OBd 48, fols. 182r–188v, 15th c; OBd 98, fols. 156r–157v, 1400; OB1m 594, fols. 159vb–160rb, 1300; OBs 17, fols. 46r–49v, 1300; OBs 25, fols. 200r–221v, 1340; Ouc 41, fols. 33r–34v, 14th c; PBN 7413 (II), fols. 44rb–48rb, 13th c; Pr 1144 (VI.F.7), fols. 101r–102r, 1446; V 5239, fols. 29v–31v, 1400; V 5508, fols. 202r–204r, 1300; Vap 1340, fols. 207ra–209vb, 15th c.; Vap 144, fols. 216v–220r, 13th c; Vap 1438, 1469; Baltimore, Garrett 95, fols. 131r–134v, 15th c; Bologna UL 154 (132), fols. 28v–31r, 14th c. Perhaps: PBN 7326, 14th c; PBN 7327, fols. 43

ff., 14th c; PBN 7441, 15th c; Florence BN Magliabech. XX.14, 15th c. Ed. L. Baur, "Die philosophischen Werke des Robert Grosseteste: VI: De impressionibus aeris seu de prognosticatione." *Beiträge zur Geschichte der Philosophie des Mittelalters*, 1912, 9:41–51

8 *Ad sciendum pluviam futuram—De natura lune in significando pluviam*: TK 61; OBb 790, fol. 74r, 14th c

9 *Alius est modus pronosticandi*: TK 82; Ea quarto 345, fols. 52v–53r, 14th c

10 *Anni revolutionem sic iudicabis—Albumasar, Liber imbrium*: Carmody 100–101; TK 101; PBN 7316, fols. 167r–168v, 14th c

11 *Anno domini 1443 fluenti sol prima—De dispositione aeris*: TK 103; PBN 7443, fols. 117v–119r, 1443

12 *Anno nonagesimo nono Augusto coniunctio*: TK 104; Ba F.III.8, fols. 116ra–222v, 15th c

13 *Apertio portarum dicitur—Alkindi, De impressionibus aeris*: Carmody 81; TK 112 (as an anon. *Iudicium de pluviis et ventis*); Bc 20 (Ballard 7), fols. 184r–185v, 14th c; Ccl 15, fol. 6v, 1280; Ea quarto 363, fols. 75r–75v, 13th–14th c; M 2841, fol. 13r–v, 15th c; OBb 464, fol. 127r–v, 1318; PBN 18504, fols. 187v–191r, 14th c; Pr 433 (III.C.2), fols. 167r–169v, 15th c; V 3162, fols. 233r–234v, 15th c; V 5438, fol. 117ra–rb, 1430

14 *Ascendente anni in primis—Alkindi, alias Dorochius, Tractatus de annotum peste et salute et imbribus*: Carmody 85 & 111 (as Ch. 489 of LNI, No. 75); TK 150; for MSS see No. 75

15 *Atque hic ut certis possimus—weather prediction in verse*: TK 159; PBN 18081, fols. 238v–239v, 13th c

16 *Attende ad hoc quod—Messehala, Liber super annona (de motibus)*: Carmody 36; TK 160; Ce 70, fols. 147v–149r, 15th c; Ea quarto 372, fols. 56r–60r, 14th c; OBcm 517, fols. 17vb–20ra, 13th c; W 2841, fols. 378r–380v, 15th c; Dijon 1045 (116), fols. 191r–195v, 15th c

17 *Betonica sic legitur—Alfraganus, De signis tonitruum*: Carmody 116; TK 177; BLs 282, fol. 106r–v, 14th c; Ct 1081, fols. 70v–76v, 15th c

18 *Carissime et reverendissime, quoniam fide—John of Eschenden, De tribus coniunctionibus*, prediction for 1368–1374; TK 192; OBa 192.I, fols. 12r–16r, 15th c; OBa 383, fols. 79r–80r, 15th c

19 *Causa enim que me—prologue of Johannes de Ponte, Abbreviatio of John of Eschenden's Summa iudicialis* (Nos. 43, 71): TK 196; for MSS see No. 25

20 *Delum inspectum—Distichon de pluvia*: OBa 191.I, fol. 46r, 15th c

21 *Clara dies Pauli bona tempora*: TK 226; Bc 20 (Ballard 7), flyleaf, 14th c; V 3011, fol. 15v, 15th c

22 *Cometes licet appareat—De impressionibus aeris*: TK 236; Montreal, McGill UL 134, fols. 24v–25r, 14th c

23 *Compestiva namque imbrium ventorum—*

Aomar, *De hora pluvie*: Carmody 111 (as Ch. 484 of LNI); TK 238; for MSS see No. 75

24 *Considera signum ascendens—extract from Bartholomeus of Parma's Iudicium particulare*: TK 252; see No. 65

25 *Convenerunt astrologi—Johannes de Ponte, Abbreviatio of John of Eschenden's Summa iudicialis* (Nos. 43, 71): TK 263; PBN 7335, fols. 1r–100r, 14th c

26 *Cotidianos rursus imbres—Alkindi, alias Dorochius, De quotidianis imbribus*: Carmody 111–112 (as Ch. 493 of LNI); TK 271; for MSS see No. 75

27 *Cum dispositionem aeris—excerpt from Robert Grosseteste, De impressionibus aeris* (No. 7), viz., predictions for 15 Apr. 1249 and July 1255: Cc 424, fols. 20v–21r, 14th c; OBa 191.I, fols. 55v, 15th c; PBN 7443, fols. 7r–v, 1437

28 *Cum fuerit in hora—John of Seville, De mutatione aeris* (extract from *De quattuor partibus astronomie*, TK 1277); Carmody 170; TK 299; V 2436, fols. 136v–138r, 14th c

29 *Cum in multis voluminibus—Firminus of Bellavalle, Repertorium prognosticon de mutatione aeris*, prologue (see also Nos. 48, 74, 93, 106): TK 306; Be 483, fols. 76r–104v, 15th c; Cp 227, pp. 5–107, 15th c. Ed.: Venice, 1485 (GW 2530–2531)

30 *Cum Luna fuerit—Albumasar, De pluviis*: TK 315; Ccl 15, fol. 6v, 1280

31 *Cum mihi videatur—Guido Bonatti, De imbribus et de aeris mutationibus* (Pt. 6 of *Liber introductorius*): TK 318; Bbr 1461–1484, fols. 32r–60v, 15th c; BLa 66, fols. 33r–248r, 1490; Cp 227, pp. 116–132, 15th c; Cpe 86, fols. 234v–240v, 15th c; Ct 1418 (0.9.6), fols. 126r–153v, 15th c; Ea folio 381, fols. 1r–132v, 14th c; M 59, fols. 120r–125v, 15th c; OBs 15, fols. 344va–347va, 15th c; Pa 1129, fols. 207r–274v, 15th c; PBN 7443, fols. 1r–4r, 212r–219v (fragment: the last few chs. are missing), 1437; PBN 7329, fols. 35r–39r (fragment), 1361–1380; V 2539, fols. 162r–166v, 14th c; W 2734, fols. 1r–263v, 14th–15th c; Ravenna 356, fols. 18r–23v, 15th c. Perhaps Ea quarto 383, fols. 1r–134v, 14th c (but whether Pt. 6 was transcribed is uncertain). Eds.: Augsburg: Erhard Ratdolt, 1491 (Hain 3461; GW 4643); Venice: M. Sesse, 1506; Basel: J. Parcus, 1550

32 *Cum multa et varia—Hermann of Carinthia, Liber imbrium*: Carmody 85–87; TK 319; BLh 531, fol. 135v–138r, 15th c; BLr 12.E.XXV, fols. 170r–172v, 1300; BLs 636, fols. 77r–78r, 15th c; Bs folio 192, fol. 96ra–rb, 15th c; Ccl 15, fols. 1r–2r, 1280; Ct 1185, fols. 116r–118r, 16th c; Cues 212, fols. 251r–253v, 1416–1430; Ea quarto 365, fols. 50r–52r, 12th c; Ea quarto 361, fols. 127r–128r, 14th c; Ea quarto 374, fol. 86r–v, 14th c; M 11067, fols. 94ra–96rb, 15th c; OBa F.5.29, fols. 29r–30v, 14th c; OBb 464 (Barnard 2458), fols. 120r–122v, 1318; OBcm 396, fols. 91v–92v, 14th c; OBd 176, fols. 67r–70v, 14th c; OBr D.1227, fols. 106ra–108rb, 14th c; Occ 233, fol. 122r,

15th c; PBN 7329, fols. 73v–75v, 1370; PBN 7440, fol. 33r–v, 14th c; PBNna 3091, fols. 106v–107r, 13th c; Pr 433 (III.C.2), fols. 54v–56r, 184v–186v, 15th c; V 2436, fols. 134vb–136va, 14th c; Cambrai 168, fols. 104r–106v, 14th c; Dijon 1045, fols. 187r–190v, 15th c; Madrid BN 10063, date uncertain; Parma, Bibl. Palat., MS Pal. fondo Parm. 720, fols. 430r–432r, 13th c; Rome, Boncompagni 107/4, fol. 63r–v, 14th c; Venice, St. Mark's Cl.XXI.107, fols. 53r–56r, 15th c

33 *Cum substantia Veneris sit*—extract from Alkindi, *De pluviis*, Ch. 8: TK 345; PBN 7316A, fols. 68rb–69va, 14th c (see also Nos. 89, 109, 111)

34 *Cum volueris scire mutationem aeris*—*De mutatione aeris*: TK 357; V 5206, fols. 45r–53r, 15th c

35 *Cum volueris scire quod sit*: BLs 636, fols. 128r–130r, 15th c

36 *De dispositione aeris et eius accidentibus*—a pastiche of excerpts from Firminus of Bellavalle, *Repertorium* (see also Nos. 29, 48, 74, 93, 106), Messehala, *Liber in radicibus revolutionum* (TK 1116), and Albertus Magnus, *De proprietatibus electorum* (TK 1262): TK 371; Ba F.III.8, fols. 92r–103r, 15th c

37 *De eo quod non sit in duodecim signis*—Zael ben Bris (Sahl), *Liber temporum*, trans. John of Seville (see also No. 117): Carmody 44; TK 373; BLs 2030, fols. 73r–76v, 13th c; OBcm 396, fols. 84va–89ra, 14th c. Ed.: Venice, 1493 (Hain 13544)

38 *De mutatione aeris prescire intendens*—Leopold of Austria, *Compilatio de astrorum scientia*, Tract 6 (on meteorology) (see also No. 57): Carmody 170–171; TK 381; Ea folio 383, fols. 52r–54r, 1363; OBb 472, fols. 142r–144r, 1437; W 2816, fols. 178r–181v, 1461. Eds.: Augsburg: E. Ratdolt, 1489 (Hain 10042); Venice, 1520; Carmody's edition of a 14th-c French translation (Berkeley: Univ. California Press, 1947) does not include the section on weather prediction

39 *De nativitatibus prophetarum*—excerpt from Johannes de Ponte, *Abbreviatio* of John of Eschenden's *Summa iudicialis*: TK 381; Lyons 329 (Delandine 262), fols. 80r–164v, 1488

40 *De natura communi signorum*—Aomar, *De pluviis*: Carmody 111 (as Ch. 482 of LNI); TK 381; for MSS see No. 75

41 *De tempestatum presagiis tractaturi*—Pliny the Elder, *De presagiis temporum*, Bk. 18, Chs. 78–90, of his *Natural History* (see also Nos. 91, 99, 103, 143, 144): TK 392; V 2436, fols. 138ra–139rb, 14th c. Ed.: Pliny L'Ancien: *Histoire naturelle, livre 18*, ed. Henri Le Bonnic (Paris: Société d'Édition "Les Belles Lettres," 1972), pp. 170–178.

42 *Designa ista vasta in terra*—Fra Hecctoris, *Contra tempestates*: TK 404; V 5336, fol. 30v, 15th c

43 *Dicit Iulius Firmicus*—John of Eschenden, *Summa iudicialis*: TK 419; for MSS and ed. see No. 71

44 *Dicit Messehala si Luna se prius*—*De*

pronosticatione frumenti seu bladi: TK 419; BLs 702, fol. 10v, 15th c

45 *Die dominica si nativitas evenerit*: TK 477; BLh 2558, fol. 191ra, 14th c

46 *Dixit Perscrutator anno Christi 1325* (1337)—Perscrutator (Robert of York, OFP), *De impressionibus aeris*: TK 455; BLad 10362, fols. 32r–35v (2nd half of the tract), 14th c; Bs folio 192, fols. 121rb–127rb, 15th c; CUL II.I.1, fols. 13r–24v, 14th c; Ea folio 395, fols. 98r–104r, 1373; M 275, fols. 144r–154v, 15th c; M 11067, fols. 73ra–81va, 1445–1449; Pa 880, fols. 18r–33r, 1445; PBN 13014, fols. 9ra–14ra, 14th c; Milan, Bibl. Ambrosiana D.331 inf., fols. 38ra–45rb, 15th c. Eds.: of Bk. 7, Lynn Thorndike, *A History of Magic and Experimental Science*, Vol. III (New York: Columbia Univ. Press, 1934), pp. 679–681; ed. Jenks (in preparation)

47 *Dixit Ptolomeus quod ad ea*—*Experimenta de aeris mutatione*: TK 457; M 2841, fol. 52r–v, 15th c

48 *Duodecim sunt signa*—Firminus of Bellavalle, *Repertorium* Ch. 1 (see also Nos. 29, 74, 93, 106): TK 475; Ea folio 395, fols. 75r–98r, 139r–141v, 1373

49 *Eorum que generantur*—*De impressionibus aeris secundum sententiam Aristotelis*: TK 500; Madrid, Escorial, La Real Bibl. O.II.9, fols. 57v–61r, 15th c; Vatican, Ottobon 1814, fols. 5r–10r, 15th c

50 *Et quia astrorum domini*—*De aeris dispositione secundum diversitatem temporum*: TK 522; M 2841, fols. 197r–220r, 15th c; M 25013, fols. 1r–19r, 15th c; V 5307, fols. 202r–211r, 15th c

51 *Et scito quod tempora*—Zael ben Bris (Sahl), *Liber mutationum temporum*: TK 524; Venice, St. Mark's VIII.74, fols. 108r–113v, 15th c

52 *Etenim predictis difficilioribus*—Hyginus, *De presagiis tempestatum* (part of his *Astromomia*): TK 526; Montpellier, Bibl. de l'École de Médecine 334, fols. 47r–48v, 9th c

53 *Ex conventu itaque vel oppositione*—Aomar, *De qualitate aeris et temporum*: Carmody 111 (as Ch. 482 of LNI); TK 531; for MSS see No. 75

54 *Felix inquam nimium*—Cuno Morantem of Würzburg, OSB, *Iudicia de impressionibus que fiunt in aere*: TK 554; Nuremberg, Stadtbibl. Cent. V. 64, fols. 92va–102rb, 15th c. Ed. Jenks (in preparation)

55 *Frater qui se ipsum vocat Perscrutatore*—*De mutatione aeris* (= a summary of No. 46): TK 569; V 5239, fols. 98r–101v, 14th–15th c

56 *Fumo humido ad superiora*—*De tonitruis et fulminibus*: Ea quarto 345, fol. 28v, 14th c

57 *Gloriosus Deus et sublimis*—Leopold of Austria, *Compilatio de astrorum scientia*, introduction: Carmody 171; TK 588; Blad 23770, fols. 47r–90va, 1350; Ea folio 391, fols. 1r–69v, 14th c; M 275, fols. 62r–132v, 15th c; M 11067, fols. 1ra–56vb, 1445–1449; Pa 1129, fols. 1r–159v, 15th c; V 5309, fols. 1r–62r, 15th c; Klagenfurt,

Bischöfl. Bibl. XXIX.e.12, fols. 1r–115r, 15th c. For eds. see No. 38

58 *Gradibus igitur ab Ariete*—tract on weather and commerce: Ea quarto 365, fols. 48v–49r, 14th c

59 *Hec scientur ex gradu coniunctionis—De quattuor temporibus anni et de mutatione aeris* (Ch. 8 of Alkindi, *De pluviis*; see also Nos. 89, 109): TK 604; Ea quarto 386, fol. 11r–v, 14th c

60 *Hec sunt consideranda ad hoc*—William Merle, *Regule ad futuram aeris temperiem pronosticandam*: TK 604; OBd 176, fols. 3r–4r, 14th c

61 *Hoc est quoddam bonum notabile—De precognoscendo hiemis habitu*: TK 630; Ea quarto 21, fols. 115v–116v, 14th c

62 *Hoc scire ab ascendente—De quatuor temporibus caloris et frigoris*: Cues 212, fols. 368v–372r, 1416–1430

63 *Iam cum videris parvulis cornibus—De pluviis*: TK 647; Vatican 643, fol. 99r–v, 12th c

64 *In aeris mutatione est—De mutatione aeris*: TK 663; Vatican 6280, fols. 147r–148v

65 *In coniunctione Solis et Luna*—Bartholomeus of Parma, *Iudicium particulare de mutationibus aere*: TK 668; Bs folio 192, fols. 127v–128v, 15th c; Ccl 15, fol. 6v, 1280; Cp 204, fol. 74r–v, 15th c; OBb 464, fols. 126v–127r, 1318; V 5438, fols. 116va–117va, 15th c

66 *In pronosticationibus primo*—prediction of hot and cold weather: BLad 10362, fols. 37v–38r, 13th–14th c

67 *In quoque signo fit tonitruum*—Hermes Trismegistus, excerpt on weather prediction: Carmody 68; TK 715; OBcm 517, fol. 20ra–rb, 13th c

68 *Incipit opusculum abbreviatum*—Johannes de Ponte, *Abbreuiatio* of John of Eschenden's *Summa iudicialis* (cf. Nos. 43, 71): TK 733; for MSS see Nos. 25 & 39

69 *Incipiunt prognostica—De quattuor temporibus anni*: TK 739; Vap 1367, fol. 172r

70 *Inspice planetas inferiores*—Messehala, *In pluviis et ventis epistola*, trans. Drogo: Carmody 37; TK 752; Be 483, fols. 69r–70v, 15th c; PBN 7316A, fols. 69v–71v & shortened version on fols. 51ra–52vb, 1334; Stalingrad, Academy of Sciences, AB-III, fols. 152v–154v, 13th–14th c. Ed.: *Catalogus codicum astrologicum graecorum*, Vol. 12 (Brussels, 1936) pp. 210–216 (from Stalingrad MS)

71 *Intentio mea in hoc libro*—John of Eschenden, *Summa iudicialis de accidentibus mundi*: TK 761; BLh 5082, whole vol., 15th c; Ea folio 207a, fols. 1r–254v, 14th c; Ea folio 379, fols. 99r–159r, 14th c; Ea quarto 383, fols. 1r–134v, 14th c; M 221, fols. 1r–222v, 1488; OBa 576 (copy of lost Merton College MS) 15th c; OBb 369, fols. 1r–385v, 15th c; OBb 714, fols. 1r–236v, 14th c; OBd 225, fols. 1–243, 14th c; OBs 25, fols. 1r–163v (begins with Bk. 2), 15th c; Oo 23, fols. 1r–226v, 14th c; PBNna 3034, fols. 1r–306vb (2nd part), 15th c; V 4146,

fols. 1r–199v, 15th c; V 5387, fols. 1r–256v, 1366; Vap 1443; Cracow UL 565 (Dd.III.17), pp. 1–282, 1414; Milan, Bibl. Ambrosiana A.inf. 201, fols. 1r–125v, 15th c; Naples Oratoriana XV.xi (Mandarini, chart. 49), fols. 1r–141v, 15th c. Perhaps: Philadelphia, Univ. Pennsylvania 598; Ed.: Venice, 1489 (Hain 6685)

72 *Inter Arabum astrologos*—Alkindi, alias Dorochius, *De imbribus*: Carmody 111 (as Ch. 490 of LNI); TK 765; for MSS see No. 75

73 *Iris est impressio generata—De iride, rore, pruina*: TK 777; Ea folio 346, fols. 17r–18v, 14th c

74 *Item volens scire naturam aeris*—excerpt from Firminus of Bellavalle, *Repertorium*, Bk. 3, Chs. 6–16 (see also Nos. 29, 48, 93, 106): PBN 7316, fols. 167r–168v, 14th c

75 *Liber novem iudicum*: Carmody 107–112; TK list chs. under individual incipits—Chs. 249–260 deal with harvests & prices, Chs. 482–494 with weather prediction; Ba F.III.8, fols. 77va–79vb (Chs. 482–491) 14th–15th c; BLh 531, fol. 134v (Ch. 492) 13th c; BLr 12.G.VIII, fols. 1r–78v, 14th c; BLs 268, fols. 1r–129v, 16th c; BLs 636, fols. 78v–83v (Chs. 482–494 with weather prediction; Ba F.III.8, Cp 227, pp. 107–116, 14th–15th c; CUL Ii.I.13, fols. 133r–156r, 14th c; Ea octavo 82, fols. 173r–176v (Ch. 482), 13th c; M 228, fols. 47r–70v, 14th c; M 11067, fols. 118r–122v, 15th c; OBd 149, fols. 205r–216v, 13th c; OBd 47, fols. 104r–154v (use with caution: cf. Carmody 112), 13th c; OBs 15, fols. 109r–175r, 15th c; PBN 7329, fols. 63r–66r (Chs. 249–261), 15th c; PBN 7344A, fols. 1r–52r, 13th–14th c; PBN 7440, fols. 48ra–144rb, 14th c; PBN 18504, fols. 191v–194r (Ch. 490), 14th c; V 2428, fols. 1r–160v, 12th c; V 2436, fols. 139vb–142rb, 14th c; V 5517, fols. 1r–269v, 1484; Dublin, Trinity College 368, fols. 43r–137v, 12th c; Florence BN J.III.28 (S. Marco 180), fols. 20r–66r, 14th c; Madrid, BN 10009, fols. 145r–209r, 13th c; Oxford, All Souls College 332, frags. 4 & 6 (formerly Oxford, Queens College 389), 12th c; Vatican lat. 6766, fols. 1r ff., 13th–14th c; Eds.: Venice: Peter Lichtenstein, 1509; Basel: Henricus Petrina, 1571

76 *Ne ingratitude cuius—De mutationibus aeris*: TK 906; Dresden, Sächsische Landesbibl. N.100, fols. 174r–185r, 15th c

77 *Ne te in astrorum iudiciis*—Guido (Bonatti?) *De dispositione aeris*: TK 907; Pr 1144 (VI.F.7), fols. 103v–112r, 15th c; Cracow UL 573 (Dd.III.37), fols. 360r–371v, 15th c

78 *Necesse est potestas signorum—De prognosticatione aeris*: TK 909; Vap 1340, fols. 207ra–209rb, 15th c

79 *Nocte rubens celum*: TK 914; M 5595, fol. 36r, 1482; M 13582, fol. 126r, 14th c

80 *Nota signum aquarum*: TK 944; Occ 233, fols. 116r–117r, 13th–14th c

81 *Notandum quod dies*—William Merle, *Descriptio temperiei aeris Oxoniis*: OBd 176, fols. 4r–9r, 14th c. Ed.: Merle's MS Con-

siderationes temperiei pro septem annis (London: privately printed, 1891)

82 *Nunc de signis imbrium—De presagiis pluviarum*: TK 963 (TK 1149 also lists the incipit *Ptolomeus namque in tertio*, but this is the same tract); PBN 16089, fols. 269va–270ra, 14th c

83 *Omnes sapientes astrorum—Super rerum caristia*: TK 988; BLs 702, fol. 10v, 15th c

84 *Omnis mutatio aeris—Leopold of Austria, Compilatio de astrorum scientia*, Tract 6 (on meteorology) (see also Nos. 38, 57): TK 999 lists V 5309, fol. 62r, 15th c as a separate tract, but this MS contains the whole of Leopold's treatise

85 *Opusculum istud est de pronosticatione—William Merle, De pronosticatione aeris*: TK 1017; Bc 20 (Ballard 7), fols. 136r–150v, 14th c; Bs folio 192, fols. 87v–95v, 1445; OBd 147, fols. 125r–138r, 14th c; Occ 293, fols. 88r–93v, 13th c

86 *Pallida Luna pluit—De Luna que est temporum mutationis significatio*: TK 1025; M 27, fol. 48v, 15th c. Ed. *Hortulus anime* (Nuremberg: Koberger, 1519), fol. 19v

87 *Papilio habet 2 sidera—Tractatus de dispositione segetum in omni tempore anni*: Ea quarto 361, fol. 52r, 14th c

88 *Passiones aeris que a philosophis—Albertus Magnus, OFP, De impressionibus aeris*, Bk. 4 of *Philosophia pauperum*: TK 1028; M 8001, fols. 138vb–144ra, 14th c; V 5371*, fols. 40ra–45vb, 15th c. Ed.: Albertus Magnus, *Opera Omnia*, ed. Auguste Borguet, Vol. 9 (Paris, 1891), pp. 659–686

89 *Philosophi concordaverunt—Ch. 1 of Alkindi, De pluviis*, trans. Agozont; Carmody 79–81; TK 1040; Ccl 15, fols. 8r–13r, 1280; Cues 208, fols. 53v–58v, 14th c; Cues 212, fols. 227r–234v, 1416–1430; Ea folio 395, fols. 127v–134r, 14th c; Ea quarto 352, fols. 6r–11v, 13th–14th c; Ea quarto 374, fols. 88v–96v, 14th c; Ea octavo 84, fols. 53r–65r, 14th c; M 125, fol. 292r–v, 15th c; M 11067, fols. 86r–94r, 15th c; OBd 68, fols. 124r–135v, 14th c; PBN 7332, fols. 5r–15v, 15th c; V 2436, fols. 198r–206r, 14th c; Jena UL El. folio 72, fols. 48v–49r, 15th–16th c. Ed.: Charles S. F. Burnett (forthcoming)

90 *Pluviarum itaque dux—Dorochoius, De hora pluvie*: Carmody 111 (as Ch. 486 of *LNI*); TK 1056; for MSS see No. 75

91 *Predicta ratione ventorum—Pliny the Elder, De presagiis temporum*, Bk. 18, Chs. 78–90, of his *Natural History* (see also Nos. 41, 99, 103, 143, 144): TK 1082; OBd 176, fols. 60v–61r, 14th c. Ed.: see No. 41

92 *Presagia tempestatis cum fulgur*: TK 1084; Florence BN J.X.20, fols. 38r–40v, 1400

93 *Primo oportet te scire—excerpts from Firminus of Bellavalle, Repertorium*; Bks. 1 & 2 (see also Nos. 29, 48, 74, 106): Ba F.III.8, fols. 92ra–99vb, 15th c

94 *Pro imbrium quidem cognitione*: PBN 7316, fol. 154v, 14th c

95 *Pro rerum venalium statu—De dispositione rerum venalium*: Ea quarto 361, fols. 129v–131r, 14th c; Ea quarto 365, fol. 48v, 14th c

96 *Propositio prima. Inter xii signa—Judicia de pluviis et de qualitatibus anni* (seems to be shortened version of No. 50): TK 1140; V 5296, fols. 125r–129v, 15th c

97 *Ptolomeus namque in tertio libro*: see No. 84

98 *Ptolomeus quando Iupiter fuit—De caristia et fame vel habundantia et utilitate*: TK 1149; Vatican Ottobon 1826, fol. 64r, 15th c

99 *Purus oriens atque non fervens—Pliny the Elder, De presagiis temporum*, Bk. 18, Chs. 78.2–90, of his *Natural History* (see also Nos. 41, 91, 103, 143, 144): TK 1153; BLc Galba E.IV, fol. 176r, 13th c; BLs 2030, fols. 108v–110r, 13th c; Cp 227, pp. 180–182, 14th–15th c; OBb 464, fols. Iv–IIIv, 1318; OBd 176, fols. 68rb–69va, 14th c. Eds.: see No. 41

100 *Qualitas aeris et temporum*: TK 1157; Ba F.III.8, fols. 77va–79vb, 15th c

101 *Quando Luna est in combustione—De pluviis*: TK 1169; OBcm 517, fol. 10rb, 15th c

102 *Qui mutationis aeris—Engelbert of Admont, De causis et signis mutationis aeris et temporum*: TK 1209; Admont, Stiftsbibl. 392, fols. 13ra–15vb, 1380; Admont, Stiftsbibl. 589, 1370

103 *Qui tempestatum serenitatisve—Pliny the Elder, De presagiis temporum*, Bk. 18, Chs. 78–90, of *Natural History* (see also Nos. 41, 91, 99, 143, 144): TK 1211. Eds.: see No. 41

104 *Quia astrorum dominia*: TK 1213; despite the incipit this tract is the same as No. 50; M 25013, fols. 1r–19r, 15th c

105 *Quia enim Sol et Luna*: TK 1217; V 3528, fols. 176v–180v, 15th c

106 *Quia in multis voluminibus—Firminus of Bellavalle, Repertorium*, prologue (see also Nos. 29, 48, 74, 93): TK 1220; Cp 227, pp. 5–107, 15th c; M 59, fols. 282r–308v, 15th c; PBN 7482, fols. 34r–156v, 15th c

107 *Quoniam creator vidit—Note de origine ventorum*: Ea quarto 361, fol. 52v, 14th c

108 *Quotiens igitur de pluviis—De aeris mutatione et pluviis*: PBN 7316, fols. 154v–156r, 15th c

109 *Rogatus fui—prologue to Alkindi, De pluviis*, trans. Agozont (see also No. 89): Carmody 79–81; TK 1364; BLc App. VI, fols. 53v–63v, 15th c; Cues 208, fols. 53v–58v, 1310; Cues 212, fols. 227r–234r, 1416–1430; Ea folio 395, fols. 127v–134r, 1373; Ea quarto 374, fols. 88v–96v, 14th c; Ea quarto 352, fols. 6r–11v, 1411; M 125, fols. 292r–293r, 1486; M 8950, fols. 142r–156r, 15th c; M 11067, fols. 86r–94r, 1445–1450; OBd 68, fols. 124r–135v, 14th c; OBd 176, fols. 61r–63v, 14th c; PBN 7316A, fols. 57vb–69va, 14th c; PBN 7440, fol. 8vb, 14th c; PBN 16204, pp. 371–386, 13th c; Pr 433 (III.C.2), fols. 167r–169v, 15th c; Pr 1144 (VI.F.7), fols. 113r–122v, 1447; V 2436, fols. 198r–206r, 14th c; Vap 1340, fols. 192r–203r,

15th c; Cambridge, Gonville & Caius College, MS 141, pp. 639–656, 14th c. Ed.: Paris: Kerver, 1540

110 *Sapientes Indi de pluviis*—Ja'far Indus, *De pluviis et ventis*: Carmody 87–88; TK 1377; OBd 176, fols. 69vb–70rb, 14th c; OBd 194, fols. 147v–151v, 15th c; PBN 7316, fols. 177v–178v, 14th c; PBN 16204, pp. 386–387, 13th c

111 *Saturnus in Ariete sub radiis Solis facit*—Alkindi, *De pluviis*: Carmody 81–82; TK 1383; CUL Mm.4.43, fols. 272v–273r, 13th c

112 *Saturnus in Ariete sub radiis pluuias facit*—Alkindi, *De pluviis* (see also No. 111): Carmody 81–82; TK 1383; Ba F.III.8, fols. 58va–59rb, 15th c; Cp 204, fol. 67r–v, 15th c; Cues 212, fol. 350r–v, 1416–1430; Ea quarto 343, fols. 183r–184r, 14th c; M 125, fol. 292rb–vb, 1486; M 27, fols. 209r–210r, 15th c; M 588, fols. 113va–115ra, 14th c; OBb 147, fols. 117v–118v, 14th c; PBN 7413 (II), fols. 28va–30rb, 13th c; PBN 7443, fols. 137v–138v, 1437; V 3162, fols. 225r–226v, 14th c

113 *Saturnus sub radiis in Ariete facit pluuias*—Alkindi, *De pluviis* (see also No. 111); Carmody 81–82; TK 1385; BLa 66, fols. 78v–80r, 15th c; BLad 15107, fol. 60v, 15th c; BLh 702, fols. 8r–9v, 15th c; Bs folio 192, fol. 128r–v, 15th c; Ea quarto 374, fols. 87r–88r, 14th c; M 228, fols. 261r–262r, 14th c; M 958, fol. 1r, 1489; M 27001, fols. 150v–156r, 15th c; OBcm 517, fols. 20rb–21va, 15th c; Cracow UL 793, fol. 94r, 1459; Leipzig UL 1472, fols. 106r–110v, 1486; Leipzig UL 1486, fols. 259r–260v, 14th c

114 *Scias/Scies hoc ex utriusque (particulis) superioribus*—Albumasar, *Capitulum de gravitate et levitate annone*, Ch. 1 of his *De duodecim capitulis*: TK 1386 & 1405; Ba F.III.8, fol. 56rb–vb, 15th c; M 51, fol. 34ra–va, 1487; OBb 790, fols. 46r–52v, 14th c

115 *Scias ho immediocriter—De pluviis, tonitruis, chorascatonibus et ventis*: TK 1386; Ct 1144 (0.II.40), fols. 7v–8v, 15th c

116 *Sciendum quod quarti anni*: TK 1398; OBd 167, fol. 78r–v, 14th c

117 *Scito quod mutatio*—Zael ben Bris (Sahl), *Liber temporum*, trans. John of Seville (see also No. 37); Carmody 44; TK 1410; for MSS & eds. see No. 37

118 *Si autem de imbrum*—Alkindi, alias Dorochius, *De imbrum cognitione per singulos menses*: Carmody 111 (as Ch. 492 of LNI); TK 1442; for MSS see No. 75

119 *Si autem de pluviis*—extract from Guido Bonatti, *De imbribus* (see also No. 31): TK 1442; Be 483, fols. 112r–116v, 15th c

120 *Si autem de temporis mutatione*: TK 1442; CUL Ii.I.13, fol. 79v, 14th c

121 *Si de imbrum agnitione (cognitione)*—Alkindi alias Dorochius, *De imbrum cognitione per singulos menses*; Carmody 111 (as Ch. 492 of LNI); TK 1445; for MSS see No. 75

122 *Si dispositionem ad aliquem—De prog-*

nosticatione tempestatis: TK 1446; Ea quarto 386, fols. 160v–162v, 14th c

123 *Si fuerit in Sagitario—Canones ad calculandum de aeris serenitate*: TK 1449; CUL Gg.6.3, fols. 112r, 14th c

124 *Si fuerit colera rubea*: TK 1449; PBN 7029, fols. 65v–68v, 14th c

125 *Si fuerit Kal. Januarii die dominico*: TK 1449; M 26666, fol. 159r, 15th c

126 *Si fuerit Kalendas Januarii dominicus dies*: TK 1449; M 22053, fol. 21v, 9th c

127 *Si in Arietem tonuerit—De tonitruorum effectibus*: TK 1451; Vatican, *Regina Sueviae* 567, fol. 18rb

128 *Si in autumnno boves*—Martin Król of Zorawica, *Experimenta astrologica*: TK 1451 gives his name as Martinus Rex as in the MSS, but “rex” is a fashionable humanist translation of the Polish surname (król = king = rex); M 2841, fols. 220v–222v, 15th c; M 25013, fols. 20r–21v, 1487

129 *Si in die dominico fuerit Kalende Januarii—Esdras propheta*: Tk 1451; BLs 1620, fols. 45r–55r, 13th c

130 *Si in dominico die fuerit Kalende Januarii—Supputatio quam supputavit Ezras propheta in templo Salomonis*: Göttingen UL App. dipl. 10.E.III, No. 4, 12th c

131 *Si quis igitur aeris mutationes*: TK 1460; Ct 1444 (0.II.40), fols. 61v–62v, 15th c

132 *Si quis scire voluerit—De mutationibus aeris secundum astrologiam*: TK 1462; Ea folio 37, fols. 51r–52r, 13th–14th c (TK 1462 lists another MS—V 2296, fol. 99v—but this is a treatise on judicial astrology, not astrometeorology)

133 *Si Saturnus fuerit in Ariete sub radiis*: TK 1464; OBb 790, fols. 66r–67v, 14th c

134 *Si sol fuerit in emisperio australi*: TK 1465 lists this as a separate *Presagia pluviarum*, but it is an excerpt from No. 32

135 *Si vis scire in quibus annis—De abundantia vel penuria rerum*: OBcm 577, fol. 10rb–vb, 15th c

136 *Si vis scire pluuias*: PBN 7316, fol. 168v, 14th c

137 *Signum quod ostendit Dominus*—signs of weather attributed to the prophet Ezra: TK 1506; CUL Hh.6.11, fol. 67r, 15th c

138 *Sol igitur quotiens ingreditur—Jergis, De pluviis*: Carmody 112 (as Ch. 494 of LNI); TK 1514; for MSS see No. 75

139 *Sol igitur Scorpiionis vicesimo gradu—Aomar, De pluvia, fulgore, tonitruo et vento*: Carmody 111 (as Ch. 483 of LNI); TK 1514; for MSS see No. 75

140 *Sol igitur vicesimum gradum*: TK 1514 lists this as a separate tract *De pluvia, fulgore, tonitruis et vento*, but it is the same as No. 139

141 *Sol in hemispherio australi*: TK 1514 lists this as a separate tract *De imbribus*, but it is an excerpt from No. 32

142 *Sol itaque primum Libre*—Alkindi, alias Dorochius, *De pluviis per quartas anni*: Car-

modity 111 (as Ch. 491 of *LNI*); TK 1515; for MSS see No. 75

143 *Sol purus sed non fervens*—Pliny the Elder, *De presagiis temporum*, Bk. 18, Chs. 78–90 of his *Natural History* (cf. Nos. 41, 91, 99, 103, 144): TK 1515; Pr 433 (III.C.2), fols. 57v–58v, 15th c

144 *Sol purus oriens sed non fervens*—Pliny the Elder (same tract as No. 143): TK 1515; Ea quarto 355, fol. 15r–v, 13th–14th c

145 *Sol quidem tropicum ingrediens*—*De pluviis*: TK 1515; BLs 636, fol. 76v, 15th c

146 *Sol quotienscumque vel Luna*: TK 1515; M 9501, fol. 293r, 13th c; M 22239, fol. 3v, 13th c

147 *Sole in primum Libre et Capricorni*—Dorochoius, *De pluviis in quartis anni* (same tract as No. 142): Carmody 111 (as Ch. 491 of *LNI*); TK 1516; for MSS see No. 75

148 *Sole in trante in Arietem*: TK 1516; Vap 1376, fols. 286v–293rb, 15th c

149 *Stelle sunt in celo xxviii*—*Dispositio stellarum*: TK 1528; PBN 3660A, fols. 51r–52r, 15th c

150 *Superioris discipline inconcussam*: Ja^cfar Indus, *De imbribus*, prologue: Carmody 85–87; TK 1546; for MSS see No. 155

151 *Temperiem autem quedam sibi*—William Merle, *De pronosticatione aeris*, Ch. 1: TK 1556; for MSS & eds. see No. 85

152 *Temperies aeris quidem sibi*: TK 1556 erroneously reads Ch. 1 of No. 151 in Occ 293, fol. 88r, as this incipit, but it is the same as Nos. 85 & 151; for MSS & eds. see No. 85

153 *Temperies causas pluviarum*: TK 1557; BLs 702, fols. 31v–32r, 15th c

154 *Tempestiva itaque imbrum*—Dorochoius, *De hora pluvie et ventorum, caloris et frigoris*: Carmody 111 (as Ch. 484 of *LNI*); TK 1557; for MSS & eds. see No. 75

155 *Universa astronomie iudicia*—Ja^cfar Indus, *De imbribus* (see also No. 150): TK 1602; M 11067, fol. 96r–v (the remainder of the tract, originally on fols. 97r–110v, is no longer in the MS) 1445–1450; Ccl 15, fols. 2r–6r, 1280; CUL Ii.I.13, fols. 61v–63r, 14th c; Ea quarto 361,

fols. 128r–129r, 14th c; Ea quarto 365, fols. 44r–48v, 13th–14th c; Ea quarto 374, fols. 96v–98r, 14th c; Ea octavo 82, fols. 169r–173v, 13th c; OBb 463, fols. 20r–24v, 14th c; OBb 464, fols. 200r–204v, 1318; OBr D.1227, fols. 102ra–106ra, 14th c; OBcm 105, Part 5, fols. 64r–70r, 13th–14th c; OBd 167, fols. 72r–74r, 14th c; OBs 15, fols. 175v–177v, 15th c; PBN 7329, fols. 66v–75v, 15th c; PBN 7440, fols. 44r–47v, 14th c. Eds.: Venice, 1507, C1r–C4r; Paris, 1540

156 *Ut noscat lector*—*Observationes Latino-Germanice de tempestate et ubertate totius anni ex die in quem indicunt prognosticatione*: TK 1621; V 5295, fols. 14v–15v, 15th c

157 *Utrum de impressionibus meteoricis*—John Duns Scotus, *Questiones meteorologicæ*: TK 1640; Ea quarto 342, fols. 69ra–130ra, 14th c; OBcm 462, fols. 69r–133r, 15th c. Ed.: John Duns Scotus, *Opera omnia*, Vol. IV (Paris 1891), pp. 3–263.

158 *Valent quidem in significatione*—*Iudicium aeris*: TK 1679; Vap 1438, fols. 35v–36r, 1469

159 *Ventorum cogitatio ex pluviarum*—*Experta cogitatio imbrum et ventorum*: TK 1684; Cp 227, fols. 177r–178r, 15th c; CUL Kk. 4.7, fol. 115vb, 15th c; Ea quarto 361, fol. 129v, 14th c

160 *Vide per quot gradus equales*: TK 1693 lists this as a separate tract on weather prediction, but it is part of John of Seville's *Tractatus pluviarum* (No. 162); BLs 636, fol. 78r–v, 15th c

161 *Videndum itaque tibi est*—Peter Alfonsi, *Responsio Petri naturalis de generatione nubium et pluviarum*: OBA 191.I, fol. 34v, 15th c

162 *Volens aeris scire naturam*—John of Seville, *Tractatus pluviarum et aeris mutationis*, the end of Bk. 1 of his *Epitome* (TK 203, 1066, 1706) (see also No. 160): TK 1706; Ct 1144 (O.II.40), fol. 110r–v, 15th c; M 27, fols. 211r–213r, 15th c; OBb 464, fol. 126r–v, 1318; PBN 7316A, fols. 45ra–47rb, 13th c; PBN 7328, fols. 72v–74r, 14th–15th c.

INDEX OF AUTHORS

Albertus Magnus, *De impressionibus aeris* 88
 Albumasar, *Capitulum de gravitate et levitate annone* 114
 ———, *De pluviis* 30
 ———, *Liber imbrum* 10
 Alfraganus, *De signis tonitruum* 17
 Alkindi, *De aeris qualitativibus* (*LNI* 488) 5
 ———, *De imbribus* (*LNI* 490) 72
 ———, *De imbrum cognitione* (*LNI* 492) 118, 121
 ———, *De impressionibus aeris* (*Apertio portarum*) 13
 ———, *De pluviis* (Rogatus fui) 33, 59, 89, 109, 111, 112, 113

Alkindi, *De pluviis per quartas anni* (*LNI* 491) 142, 147
 ———, *De quotidianis imbribus* (*LNI* 493) 26
 ———, *Tractatus de annotum* (*LNI* 489) 14
 Aomar, *De hora pluvie* (*LNI* 484) 23
 ———, *De pluviis* (*LNI* 482) 40, 53
 ———, *De pluvia, fulgore, tonitruo, et vento* (*LNI* 483) 139, 140
 Bartholomeus of Parma, *Iudicium particulare* 24, 65
 Cuno Morantem of Würzburg, OSB, *Iudicia de impressionibus* 29
 Dorochoius, *De aeris qualitativibus* (*LNI* 488) 5
 ———, *De hora pluvie* (*LNI* 486) 90

- Dorocheius, *De hora pluvie et ventorum, caloris et frigoris* (LNI 484) 154
 ———, *De imbribus* (LNI 490) 72
 ———, *De imbrum cognitione per singulos menses* (LNI 492) 118, 121
 ———, *De pluviis per quartas anni* (LNI 491) 142, 147
 ———, *De quotidianis imbribus* (LNI 493) 26
 ———, *Tractatus de annotum* (LNI 489) 14
 Engelbert of Admont, *De causis et signis mutationis aeris* 102
 Firminus of Bellavalle, *Repertorium* 29, 36, 48, 74, 93, 106
 Guido (Bonatti?), *De dispositione aeris* 77
 Guido Bonatti, *De imbribus et de aeris mutationibus* 31, 119
 Fra Hectoris, *Contra tempestates* 42
 Hermann of Carinthia, *Liber imbrum* 32, 134, 141
 Hermes Trismegistus, excerpt on weather prediction 67
 Hyginus, *De presagiis tempestatum* 52
 Ja'far Indus (Gafar), *De imbribus* 150, 155
 ———, *De pluviis et ventis* 110
 Jergis, *De pluviis* 138
 John Duns Scotus, *Questiones meteorologicæ* 157
 John of Eschenden, *De tribus coniunctionibus* 18
 ———, *Summa iudicialis* 43, 71
 John de Ponte, *Abbreviatio* 19, 25, 39, 68
 John of Seville, *De mutatione aeris* 28
 ———, *Tractatus pluviarum* 160, 162
 Leopold of Austria, *Compilatio de astrorum scientia* 38, 57, 84
Liber novem iudicum 5, 14, 23, 26, 40, 53, 72, 75, 90, 118, 121, 139, 140, 142, 147, 154
 Martinus Rex (Król) de Zorawica, *Experimenta astrologica* 128
 Messehala, *In pluviis et ventis epistola* 70
 ———, *Liber super annona* 16
 Perscrutator (Robert of York, OFP), *De impressionibus aeris* 46, 55
 Peter Alfunsi, *Responsio Petri naturalis* 161
 Pliny the Elder, *De presagiis temporum* 41, 91, 99, 103, 143, 144
 Richard of Wallingford, *Exafrenon pronosticorum temporis* 6
 Robert Grosseteste, *De impressionibus aeris* 3, 7, 27
 Robert of York, OFP: see Perscrutator
 Sahl: see Zael ben Bris
 William Merle, *De pronosticatione aeris* 85, 151, 152
 ———, *Descriptio temperiei aeris Oxoniis* 81
 ———, *Regule ad futuram aeris temperiem* 60
 Zael ben Bris, *Liber mutationum temporum* 51
 ———, *Liber temporum* 37, 117

ZEITLIN-VER BRUGGE PRIZE

The History of Science Society announces the sponsorship, through the generosity of Jacob Zeitlin and Josephine Ver Brugge of Los Angeles, of its prize to encourage the publication in *Isis* of original research of the highest standard. Consisting of \$250 and a certificate, this prize is given annually, on the recommendation of the Committee on *Isis*, to the author of the best article in *Isis* in three years prior to the award.

Prize winners:

- 1979 Robert Nye, "Heredity or Milieu: The Foundations of European Criminological Theory," *Isis*, 1976, 67:335-355
 1980 Thomas L. Hankins, "Triplets and Triads: Sir William Rowan Hamilton on the Metaphysics of Mathematics," *Isis*, 1977, 68:175-193
 1981 Linda E. Voigts, "Anglo-Saxon Plant Remedies and the Anglo-Saxons," *Isis*, 1979, 70:250-268
 1982 Timothy Lenoir, "Kant, Blumenbach, and Vital Materialism in German Biology," *Isis*, 1980, 71:77-108.

The next award will take place in December 1983, and articles published in *Isis* between March 1980 and December 1982, inclusive, will be eligible.