

THEORY AND CONTEXT OF THE DIDACTIC POEM: SOME CLASSICAL, MEDIAEVAL, AND LATER CONTINUITIES

Robert M. Schuler and John G. Fitch

"The ancients have left us no rules or observations concerning this species of poetry," begins Joseph Warton's "Reflections on Didactic Poetry," which he appended to his translation of Virgil's *Georgics* in 1753.¹ By the time Warton was writing, England had entered a new age of scientific thought and was witnessing both a remarkable burgeoning of scientific poetry and a corresponding interest in the genre by literary theorists.² It was, of course, to the classical Didactic poets -- Hesiod, Aratus, Lucretius, Virgil, Manilius, and others -- that the neo-classical poets turned for models.³ As for critics like Addison and Warton, they too had to rely on the practice of classical poets in order to discover the "rules" for the Didactic genre, since there was no well-defined body of critical canons on it. No *Poetics* devoted to the *Lehrgedicht* has emerged from the sands of Egypt or the ashes of Herculaneum, nor is likely to. But ancient critics are more forthcoming on the general question of the relationship between poetry and truth, which is a central issue for Didactic poetry. Occasionally, too, these critics make judgments about particular practitioners of Didactic, and so reveal their opinion of the nature of such poetry. One purpose of this essay is to piece together the evidence of these clues. It will also be instructive to study, if only cursorily, some of the more general cultural attitudes -- about education, about science, about literature -- which implicitly fostered the writing of this kind of poetry.

Such an examination of the intellectual and cultural context of Didactic seems particularly worthwhile since modern critical attitudes offer little guidance in appreciating such poetry.⁴ The current predisposition is to equate poetry with lyrical utterance; long instructional poems on technical subjects are out of fashion, to say the least. Indeed, since the Romantic Movement many critics have believed poetry to be by its very nature alien to discursive reason and especially to science.⁵ An extreme but not untypical example is the critic I.A. Richards, who considers that while scientific truth is concerned with correspondence to reality, poetry is devoid of any truth of reference, and that "truth" in poetry can refer only to the "internal necessity" or "rightness" of the poem. Less extreme, but of the same tendency, is the belief of Northrop Frye that, "In literature, questions of fact or truth are subordinated to the primary literary aim of producing a structure of words for its own sake."⁶ In antiquity, on the other hand, although several thinkers were as sceptical as modern critics about the co-existence of poetry and objective truth, there was also a vigorous and long-lived tradition which regarded poetry as a special source of truth, and so encouraged the composition of Didactic.

Since theory and practice interact, it will be necessary to examine briefly the actual practice of Didactic poets,⁷ in order to understand the relationship in their work between poetry and instruction. A final aim is to pursue, though again only briefly, some of the mediaeval and Renaissance survivals of the ancient criticism and to offer a preliminary account of the cultural conditions, analogous to those in classical times, which favoured the composition of scientific poetry in the later periods.

Throughout its long history, perhaps nothing is more striking about Didactic poetry than the continual discrepancies between the efforts of literary critics to denigrate, formalize, or confine the genre, and the luxuriant growth it enjoyed at the hands of its exuberant practitioners. To understand this paradox, we must begin at the beginning, not only of western literature, but also of European science.

I

It is not unusual to begin a history of science course with a reference to the *Works and Days* of Hesiod (eighth century B.C.) as the first western record of agricultural and weather lore. But Hesiod also shares with Homer the title of earliest known European poet.⁸ In the preceding centuries in

Greece, as in other pre-literate societies, inherited knowledge, and indeed anything of importance, was regularly transmitted in verse for mnemonic purposes.⁹ Thus poetry had a central social and educational function; poetry and knowledge were virtually synonymous.

It has been suggested that in fact Homer and Hesiod represent the culmination of two related oral traditions by which two different kinds of knowledge had been conveyed: narrative saga which recorded the history of the race, and non-narrative folklore which preserved "scientific," religious, and other information necessary for daily life.¹⁰ These two traditions must have shared not only a common educational function but also a common poetic heritage, reflected in the close similarities of metre, dialect, and phraseology between their earliest surviving representatives. It should be noted, too, that as a result of these close similarities between the two traditions, Didactic was virtually never distinguished as a separate genre in antiquity.¹¹ All lengthy hexameter poems in the high style were described by the Greeks as *epê* and their authors as *epikoi*, "epic" poets; and the Romans took over this classification (or absence of it).¹² Nevertheless, there can be no doubt that the later separation of the genres is justified by a self-evident distinction in subject-matter: epic in our sense is primarily devoted to heroic narrative, while Didactic is primarily concerned with teaching technical or scientific material.¹³

The parallel social functions of the two early traditions, and their shared poetic heritage, will explain features which they have in common. For example, when viewed as a means of preserving socially important information, rather than as a mere literary convention, the catalogue, used extensively in both epic and Didactic poem, takes on a new significance. Genealogies, lists of ships, or mythical exploits of heroes or gods served the social and educational purpose of preserving a glorious past. Similarly, an educational function is present in geographical catalogues, such as the list of rivers in the twelfth book of the *Iliad* and Hesiod's *Theogony* (340 ff.), in lists of tabus and observances necessary for success in crop-growing, and in catalogues of practical instructions to farmers such as one finds throughout the *Works and Days*.¹⁴

In this early poetry, the poet's special knowledge is explained as coming from a divine source, normally the Muses (e.g. *Odyssey* 8, 488 f.). The poets are emphatic that their knowledge does not derive from their personal experience. Hesiod has done virtually no seafaring himself, but he can give instruction in it because the Muses have taught him (*Works and Days*

648 and 660-2).¹⁵ In a similar vein, Homer contrasts the ignorance of mortals with the Muses' omniscience, which they impart to the bard (*Iliad* 2, 484 ff.). The claim to authoritative expression by virtue of inspiration is repeated by the line of Didactic poets, though it soon takes on a symbolic rather than literal significance.¹⁶

However, the poet conveys not only information but also values. Homer reflects the values of an aristocratic heroic code, though as a great poet he also displays the universality of vision which enables him to suggest the limitations of such a code. Hesiod is much concerned to give advice not only about agricultural details but also about such matters as how to choose a wife. In fact, although technical instruction is characteristic of Didactic, it would be wrong to regard the *Works and Days* as solely a technical manual, as a modern work on farming would be. In the first place, farming was not a specialized activity as it is today; for the great majority of Hesiod's audience in rural Boeotia, "How to Succeed in Farming" was equivalent to "How to Succeed in Life." Secondly, Hesiod is less concerned with the techniques of farming than with the right attitudes and qualities: timeliness,¹⁷ hard work, and justice. Thirdly, hard work and justice are commended not simply as means to success but as attitudes enjoined on mankind by the will of Zeus. Thus in Hesiod technical instruction is closely associated with moral advice, and that in turn is closely associated with an overall worldview, albeit mythical-religious rather than philosophical.

By the time that Parmenides and Empedocles wrote their philosophical poems in the fifth century, great changes had taken place in intellectual culture: philosophical thinking had become established as opposed to mythological, and prose had become an established medium for philosophy, having been employed by the first philosophers in the sixth century. Thales (if he wrote anything down himself), Anaximander, and Anaximenes had written in prose, as had the later philosopher and cosmologist Heraclitus. But Parmenides and Empedocles were responsible for establishing philosophical and scientific poetry as a genre.¹⁸ Why were their speculations couched in verse, when an established tradition of scientific prose was available to them? Primarily, no doubt, because they wished to assume the poet's mantle of authority and inspiration. In these writers, philosophy is by no means entirely separated from religion;¹⁹ their tone is oracular, far removed from the dialectical tone of a Socrates. But while Parmenides' verse is flat, that of Empedocles has qualities which make the marriage of philosophy and poetry more successful. The first is an emotional commitment to his

theme, in which he resembles Hesiod: "Fools! for they have no far-reaching thoughts" is his vigorous condemnation of his philosophical opponents.²⁰ The second quality is an ability to harness the best resources of Homeric poetry to the technicalities of his subject. Aristotle speaks of him with admiration as "Homeric and powerful in diction, being full of metaphor and using the other instruments of poetry."²¹ In his observations of a household vessel working on the principle of a pipette, we see how the traditional Homeric simile drawn from everyday life has been transformed into the scientific analogy based on careful observation.²²

When education ceased to be a purely individual matter and schools began to be established in the sixth century B.C., the poets and above all Homer formed an important part of the curriculum. They retained that position throughout antiquity.²³ The consequent notion that the poet is actually a teacher was current by the fifth century.²⁴ This was perhaps an unfortunate formulation in so far as it implied, at a time when thought had become more systematic and education more formalized, that the poet taught in a systematic and formal fashion; inevitably it was rejected, as we shall see, by those who perceived that Homer in particular did no such thing, and the result was a somewhat sterile debate on the subject. Nevertheless, it remained the conventional view throughout antiquity that the poet is, at least potentially, an educator.

Within this viewpoint little distinction is made between education in facts and in values; as we have seen, this matches the actual practice of Homer and Hesiod, who offer both. Sometimes the emphasis is placed on the skills and factual information imparted by poets. In this vein, Aristophanes makes Aeschylus say that Orpheus had benefitted the state by teaching religious rites and the duty of refraining from killing, Musaeus by providing cures for diseases, Hesiod by instructing farmers in weather, the seasons and tillage, and "divine Homer" by teaching practical knowledge of warfare (*Frogs* 1030-6).²⁵ Similarly the rhapsode Ion claims, in the Platonic dialogue named after him, that by virtue of his knowledge of Homer he is master of a wide variety of skills, particularly generalship (540D ff.), though Socrates compels him to modify his claims. Even in the Augustan Age, Homer is regarded as a source of factual information by the geographer Strabo. Though Strabo had covered much of the known world in his own travels with Roman administrators, the sources for his work are mostly books, of varying accuracy. The first two books of his *Geography* are devoted to an

interpretation of the geographical references in Homer (whom he considered a "philosopher") and a critique of the geographical treatise of Eratosthenes, who, as we shall see, had questioned Homer's authority on such matters. Such was the scientific attainment of the man known to the Middle Ages as "The Geographer", as Homer (and later Virgil) was "The Poet."²⁶

Elsewhere we find more emphasis on the moral value of studying the poets. One of the participants in Xenophon's *Symposium* (3.5) recalls that his father compelled him to learn every line of Homer, out of a desire to make him a virtuous man. Plato makes Protagoras say that children, after they have mastered their letters, read and learn poetry; the purpose is moral, that they be moulded by admonitions and by praises of great men of the past (*Protagoras* 325E-326A). In the *Phaedrus* (245A) Plato has Socrates himself say that the poet by virtue of his inspiration adorns the deeds of the ancients and so educates later generations. One may doubt whether this is Plato's considered opinion, in view of his attacks elsewhere on poetry; the context suggests rather that it is a conventional view which is not expected to cause the reader any difficulty or surprise.²⁷

The vigorous tradition of allegorical interpretation in the ancient world may be seen as a direct result of the conviction that the poet has lessons to teach. This approach was already flourishing by the late fifth century, when some critics assumed that doctrines about the physical nature of the world, like those familiar from the Presocratics, must be present in hidden form in Homer. Later the method was employed by certain members of the Stoic school; a prominent example was Crates of Mallos (fl. 160 B.C.), founder of the Pergamene school of criticism and author of the first formal treatise on grammar. This literary critic's notion of geography, derived from an allegoresis of Homer in light of a Stoic physics, influenced cartography for a millenium and a half.²⁸ Crates' influence, like that of Strabo and of Aratus (of whom more later), illustrates a recurrent tendency for science to be dominated by literature. Grammarians working under Crates' influence produced the allegorical interpretations found in the *Homeric Questions* attributed to "Heraclitus": "if Zeus binds Hera (for example), this means that aether is the boundary of air, and the two 'anvils' are the other two elements." The long and vital tradition of scientific allegoresis of myth, which in effect turned the epic into a didactic poem, lasted well into the seventeenth century.²⁹

As rationalistic and critical thought first gained ground in Greece, there were inevitably challenges to the traditional notion of the poet as educator. Some of the earliest attacks are on the morality implicit in the myths recounted by Homer and other poets. This might seem scarcely relevant to Didactic poetry, but in fact, as we have seen, factual and moral teaching are closely associated in early poetry, and an attack on either aspect would cast a shadow over the poet's authority. Probably writing in the sixth century, Xenophanes complains that "Homer and Hesiod have attributed to the gods everything that is a shame and reproach among men, theft and adultery and deceit of one another."³⁰ Since he himself propounded a reformed theology in verse, Xenophanes certainly accepted that poetry *could* convey truth; but the ultimate authority now rested in reason, not in poetry *per se*. At the end of the next century, we find several of Euripides' tragic characters attacking the morality of the very myths upon which their dramas are based.³¹ Such criticisms recur in thinkers of the next generation: Isocrates complains of the poets' outrageous lies concerning the behaviour of the gods (*Busiris* 38-40), and one of Plato's grounds for criticism of poetry in the *Republic* (377E-378E) is that it contains myths which are untrue to the nature of the gods, and, even more important, un conducive to virtue since they encourage imitation of the immoral behaviour attributed to the gods.

These, however, were merely criticisms of certain myths told by the poets. A much more fundamental attack on poets' traditional authority came from those who questioned the relationship between poetry and truth. Such critics were not in general hostile to poetry itself (though Plato is perhaps an exception) but considered the traditional view to be inadequate or misleading. "Poets compose for pleasure, not truth," says an anonymous fifth-century sophist.³² The sophist Gorgias (ca. 483-376 B.C.) expounds a similar view in his *Encomium of Helen*. He emphasizes the power of utterance, of the word (*logos*), whether in the metrical form of poetry or in prose. The word does not aim at truth; on the contrary, its power is emotional, and it works by a kind of magic. "It is through words that inspired songs bring pleasure and chase away pain. The power of song, together with the soul's judgment, persuades and moves as if by magic. Magic is based on two things, errors of soul and deception of the mind." One can scarcely imagine a theory of poetry more inimical to Didactic. Gorgias takes a similar view of rhetoric: a speech persuades its audience not by its truth but by the

skill with which it is composed. Indeed, if the audience were in full possession of the facts about past, present, and future, rhetoric could have no power over them.³³

After the fifth century, the separation of truth from poetry (and often from rhetoric) recurs repeatedly in criticism. In Theophrastus, Aristotle's successor as head of the Lyceum in the last quarter of the fourth century, we find a less extreme version than that seen in Gorgias. Theophrastus distinguishes between "audience-orientated discourse" and "truth-orientated discourse": poetry and rhetoric belong to the former class, philosophy to the latter. But the orientations are not mutually exclusive; though the philosopher's discourse is primarily truth-oriented, he must also be concerned to persuade the audience of his doctrines, as Theophrastus acknowledges. There is none of the Gorgianic insistence that poetry and rhetoric are by their nature incompatible with truth.³⁴

In the Hellenistic Age (third century B.C. on), the view that poetry aims at pleasure rather than truth was upheld by several prominent *litterati*, among them Callimachus, the scholar-poet, and Eratosthenes, chief librarian of the Museum at Alexandria. According to Eratosthenes (275-194 B.C.), poetry should be judged solely by the delight it gives, and it is no part of its purpose to instruct. Consequently (in contrast to the traditional view of Homer) the poet has no use for expert knowledge of military strategy, agriculture, or rhetoric. Eratosthenes illustrated this point in his *Geographica* by demonstrating the inaccuracy of several of Homer's geographical references, and thus aroused the ire two centuries later of Strabo, who, as we have seen, leapt to the defence of Homer's geography.³⁵

One of the latest Greek critics of the anti-didactic school is Philodemus, who lived in Rome and later at Herculaneum in the first century B.C.³⁶ Philodemus is prepared to accept that Homer knew his facts and may therefore convey information in an incidental way; here his attitude is somewhat different from that of Eratosthenes. But it is no part of the poet's purpose to teach facts, or, for that matter, to teach morality. In a remarkable anticipation of modern critical attitudes, Philodemus believed that poetry is an autonomous activity, which serves no ulterior purpose and must be judged by criteria of its own. He takes a parallel view of artistic prose, which he distinguishes clearly from political and forensic prose: the latter are intended to persuade, but artistic prose ("epideictic" or

"sophistic") has no such purpose, nor will training in it improve the learner either morally or philosophically.

So far as we know, the first to decide on a compromise between the two extremes of "poet as teacher" and "poet as pleasure-giver" was the third-century B.C. critic Neoptolemus of Parium, who said that the poet should delight his audience *while* instructing them.³⁷ The possibility of the two purposes coexisting also became an important element in rhetorical theory (though not necessarily from Neoptolemus). Thus Cicero defines the duties of the orator as *docere, delectare, movere*: to instruct, to entertain, and to stir the emotions. At any rate, Neoptolemus' compromise, given memorable expression by Horace, was to have a lasting influence on mediaeval and later criticism.³⁸

But we have not yet taken account of the most famous attack on the "poet as teacher" tradition, that of Plato, who directs a variety of arguments against poetry and its high status in Greek society. Part of the attack concerns the alleged ill effects on morality of certain kinds of poetry (tragedy and epic), but we shall be more concerned here with Plato's critique of the traditional association between poetry and knowledge. This takes two forms. The first is that of the *Apology* and *Ion*: since poets cannot give any rational account of the principles by which they compose, it is evident that poetry is a matter not of knowledge but only of a sort of irrational inspiration. The possibility that such inspiration might contain a higher knowledge is not entertained; Plato implicitly assumes that that which cannot be reduced to discursive reason is not knowledge. One consequence is that he rejects the ancient notion of the poet as master of every craft; for a craft can be explained in rational terms, but the poet's activity is of another kind.

Plato's other critique, in the last book of the *Republic*, is based on the concept of *mimesis*, i.e. the artist's or poet's "imitation" or "representation" of reality. As the painter copies the surface appearance of things, without having any knowledge of their inner workings, so the poet merely "imitates" everyday reality, without understanding. Furthermore, everyday reality is itself only a pale reflection of the perfect world of the Forms. Thus poetry is doubly derivative, a copy of an imperfect copy. Plato's notion that the artist in whatever medium merely copies reality, rather than generalizing from it, is clearly inadequate, and led to a long series of attempts to improve on it,³⁹ beginning, as we shall

see, with Aristotle. Furthermore, if Plato were attempting a complete theory of literature, we could object that poetry such as that of Empedocles is not mimetic, but concerned with a philosophical interpretation of reality.⁴⁰ But in fact Plato is clearly using an *ad hoc* argument against the two forms of poetry which had most prestige in his own day, namely tragedy and epic: his discussion concludes that "those who attempt tragic poetry, in epic or drama, are mimetic in the highest degree" (602B).

Clearly these views demanded a response, and one of the first answers was provided by Plato's pupil, Aristotle. He accepts the definition of poetry as mimesis, but rejects the negative connotations which Plato attached to the term. Morally and emotionally, tragedy does not have the ill effects which Plato ascribed to it: on the contrary, it contributes to the audience's psychological health by purging the potentially dangerous emotions of pity and fear. Cognitively, the poet does not simply imitate reality in a derivative fashion: rather he reaches a higher level of generality than that of everyday reality, portraying not just "what happened" but "the sort of thing that might be expected to happen." Therefore, in the famous phrase, "poetry is a more philosophical and serious matter than history, for poetry tends to give general truths while history gives particular facts" (*Poetics* 51a36-51b7).

However, these generalizations of poetry still concern events: they illustrate, in Aristotle's words, "what sort of man will, in probability or necessity, do what sort of things." Poetry remains in essence mimetic; though "more philosophical" than history, it is still not philosophy. Like most makers of systems and definitions, Aristotle is intolerant of what will not fit into them. At the very beginning of the *Poetics* he denies that non-mimetic poetry is poetry at all, and places a specific anathema on Empedocles: "and in fact if [writers] put out some medical or scientific work in verse, people customarily give them that name [i.e. poet]. Yet Homer and Empedocles have nothing in common except their metre; hence the proper thing is to call the one a poet, the other a scientific writer rather than a poet . . ." (47b16-20). This rejection of Empedocles is all the more striking since elsewhere, as we have seen, Aristotle speaks of his poetry with admiration and cites him frequently.⁴¹ But in the *Poetics* Aristotle had to insist that hexameters do not a poem make. In later centuries this denial of the name of poet to Empedocles was to become a *cause célèbre*.

After Empedocles, Didactic poetry had ceased to be composed. The poets of the fourth century B.C. perhaps agreed with Aristotle that it was no part of their role to convey facts.⁴² But although the majority of Greek critics in later centuries concurred, for various reasons, in this view, the Hellenistic Age witnessed a remarkable revival of Didactic. The earliest examples come from Menecrates of Ephesus (born ca. 340 B.C.), whose *Works* clearly indicates by its title a debt to Hesiod, and who also wrote on bee-keeping. In the next generation Aratus (ca. 315-240) wrote his extraordinarily popular *Phaenomena* on the heavens, no doubt inspired in part by the Hesiodic *Astronomy*. The prolific Nicander, who probably belongs to the second century B.C., wrote on farming, on beekeeping, on various poisons and their antidotes, and on prognosis and cure of disease.

How can this unexpected revival of Didactic be understood? Part of the explanation lies in the literary fashions of the age, which inclined to the archaic and *recherché*, and to cultivation of the smaller genres as opposed to the ambitious scope of the epic. Hesiod was very much in vogue for all these reasons.⁴³ Furthermore there was a cult of the learned poet, fostered by the fact that literary activity was largely centred on the great libraries of the period, above all the Museum at Alexandria. In what better way could the poet demonstrate his learning and versatility than by expounding recalcitrant technical material in elegant verse?

It must also be remembered that the educational system continued to enshrine the notion of poetry as an educational medium, despite the doubts expressed repeatedly by literary critics. Greek culture remained incorrigibly literary -- more specifically, poetic -- in nature; readers found scientific and technical material highly unpalatable unless it was sweetened by the honey of the Muses. Many of the Hellenistic Didactic poems were not, in fact, original compilations but merely versifications of existing prose treatises. Poetry had long since ceased to be a natural medium for original philosophical-scientific thinking. As used by the Didactic poets of this period, it became simply a means by which to humanise such material and make it acceptable in a literary culture. Didactic poets were no longer teachers in the grand manner of Hesiod and Empedocles; they tended to select a small subject and to teach it without the missionary zeal of the earlier poets.

The *Phaenomena* of Aratus exemplifies many of these tendencies and enables us to understand better the popularising scientific poem. It

versifies two prose scientific texts, the *Phaenomena* of Eudoxus, on heavenly bodies and their movements, and the *Semeia* (*Weather-Signs*) of Theophrastus. The willingness of Aratus and others to undertake the versification of prose treatises is indicative not only of the educational climate but also of the ease with which scientific ideas flowed between prose and verse. Not only did Aratus, for example, serve as a precedent for the treatment of weather-signs in Latin verse by Varro Atacinus and Virgil, he was also used as a source by later prose writers interested in weather-signs.⁴⁴ The same kind of mutual borrowing between prose and verse writers on science, and the habit of versifying prose tracts, continued well into seventeenth-century England.⁴⁵

The immense popularity of Aratus' poem seems extraordinary to us today: we know the names of no fewer than twenty-seven commentators on it, and it was a major impetus for the cultivation of Didactic in the Roman world via Cicero's paraphrase of it, the first of four Latin versions.⁴⁶ Though not without literary merit,⁴⁷ it is a straightforward, unadorned work. Aratus makes no pretence of writing what we might call major poetry, but aims simply to give in accurate form the useful information which he finds in his sources. No doubt the ancients admired the patient skill with which he adapted the language of poetry to scientific material that was much more rigorous and technical than that handled by Empedocles.⁴⁸

While he had studied mostly grammar and philosophy and was essentially a literary man, the fact that he had written on scientific subjects earned him the reputation of a scientist, even though his material was borrowed. Such was the current view of science that one of his biographers could rail against Hipparchus, a genuine scientific luminary, for refusing to call Aratus a mathematician. The chagrin of a historian of science best conveys the oddity of the situation:

The case of Hipparchus is an ironical one. He was the greatest astronomer in antiquity, yet his fame in his own day was overshadowed by that of a poet, Aratus, who had composed a didactic poem on the constellations to clarify allusions in classical poetry. Because of the vogue of the poem, Hipparchus wrote a commentary on it, undertaking to correct its errors. Of all the truly remarkable researches and publications credited to Hipparchus, the one work to be preserved was this commentary, its fortunes determined not by its intrinsic merits, which were considerable, but by the popularity of a poem.⁴⁹

II

The Romans were less given to literary theorising than the Greeks; their criticism is more rhetorical and stylistic, and we find little discussion by them of the questions whether poetry is mimetic or didactic, whether it aims to give pleasure or instruction. But presuppositions about such questions certainly influenced the ways in which poetry was written. It would be difficult to imagine Catullus, for example, penning a Didactic work. On the other hand, Cicero's *Aratea*, his Latin paraphrase of Aratus, clearly reflects his conviction that literature should be useful rather than frivolous. The *Aratea* must, in fact, be seen as only one product of Cicero's lifelong devotion to the task of transferring Greek philosophical-technical knowledge into Latin. Others took up the task, no doubt inspired in part by Cicero's example. Between the publication of the *Aratea* (probably in the 80's B.C.) and the end of Nero's reign (A.D. 68) we find a steady stream of works on technical subjects in verse or in prose, based for the most part on Greek sources. Among Didactic poems of this period one may mention: Lucretius on Epicurean philosophy and science; Varro Atacinus on geography and astronomy; Aemilius Macer on birds, beasts, and herbs; Virgil on farming; Grattius on hunting; Manilius on astrology; Columella on gardening; and perhaps the anonymous authors of the poems on sea-fishing (later attributed to Ovid) and on the volcano Etna.⁵⁰

This presentation of technical material in literary guise was of course inspired in part by the example of Hellenistic and earlier Greek Didactic. It may also be seen as reflecting a characteristic Roman tendency (though this, too, has deep roots in Greek civilisation) to regard such subjects as astronomy and medicine as parts of general intellectual culture, rather than as the province of the specialist. Only a small minority of students thought especially inclined were given specialised instruction in scientific subjects, while the majority pursued a literary and rhetorical curriculum.⁵¹ Consequently among the Romans, if we exclude engineers and technicians, there were really no "professional" scientists of the likes of Eudoxus or Hipparchus. As a result of this educational system there was a definite demand for handbooks which presented science in a popular (and preferably literary) guise. The low level of scientific knowledge was to continue in the Middle Ages in the Latin West with only occasional exceptions, such as Boethius and Bede, until Graeco-Arabic science became available for study in the twelfth century.⁵²

The view of science as part of general culture is embodied in the *Disciplinae* of Varro (1st century B.C.),⁵³ an encyclopaedia of the nine *artes* appropriate to a liberal education. They are: grammar, dialectic, rhetoric, geometry, arithmetic, astronomy, music, medicine, architecture. Of these nine arts the first seven formed the basis for the mediaeval *trivium* and *quadrivium*, and in this way the encyclopaedic tradition continued to hold sway for many centuries. But few Romans could match Varro's genuine polymathy, and the great majority relied perforce on the second- or third-hand knowledge of the handbooks.

In Cicero we find an ideal of encyclopaedic learning similar to that of Varro, but with an important difference: rhetoric is not merely one of the arts embraced in a liberal education but the central art to which all others are ancillary. Cicero's ideal orator is not only a skilful speaker but also a man of general wisdom, informed by knowledge of philosophy, history, law, and science. However, these subjects are not cultivated for their own sakes but in pursuit of that overall intellectual and moral competence which enables the orator to play a leading role in society. This has a more direct relevance to poetry than might be supposed, since for Cicero, as for most critics in the rhetorical tradition,⁵⁴ poetry is a sister art to rhetoric, distinguished only by surface features of metre and diction. A passage from the dialogue *De Oratore* (1,16) is of great significance for our theme:

Indeed, if it is agreed in learned circles that a man who knew no astronomy -- Aratus to wit -- has sung of the heavenly spaces and the stars in verse of consummate finish and excellence, and that another who was a complete stranger to country life, Nicander of Colophon, has written with distinction on rural affairs, using something of a poet's skill and not that of a farmer, what reason is there why an orator should not discourse most eloquently concerning those subjects which he has conned for a specific argument and occasion? The truth is that the poet is a very near kinsman of the orator, rather more heavily fettered as regards rhythm, but with ampler freedom in his choice of words, while in the use of many sorts of ornament he is his ally and almost his counterpart; in one respect at all events something like identity exists, since he sets no boundaries or limits to his claims, such as would prevent him from

ranging whither he will with the same freedom and license as the
 orator.⁵⁵

Not only can the orator use science but also his use of it is authorized by the success of the *Didactic* poets! This endorsement of *Didactic*, along with the virtual identification of orator and poet, would help underpin both the mediaeval view of poetry as a branch of rhetoric and the Renaissance penchant for writing scientific poetry.

The dangers of Cicero's programme are obvious: first, the overconfidence of the assumption that the orator or poet can master any subject; second, the tendency to subordinate all judgments to rhetorical criteria. The latter danger is illustrated by the comments of Quintilian on the *Didactic* poets. Quintilian (fl. A.D. 85) was a major force in education both in his own day and in later ages, and his comments deserve our attention for that reason. They occur in his reading list for prospective orators (*Institutio Oratoria* 10,1,37 ff.). After extolling the consummate power of Homer, he turns to other "epic" poets and first to Hesiod, who is criticized (probably in relation to the *Theogony*) for his catalogues of proper names: "yet his precepts are mingled with useful sentiments. His expressions are harmonious, his style is far from being despicable, and he carries away the palm in the middling manner [i.e. style]."⁵⁶ As those of an influential educator, Quintilian's unfavorable remarks on the *Phaenomena* of Aratus are particularly interesting, since Latin translations of this poem were among the most popular scientific school textbooks. "Both the subject and the manner of Aratus is lifeless; he introduces no variety, no sentiment, no characters, no speech. His abilities, however, are equal to the work he attempted." When he turns to the Latin poets (10,1,85 ff.), Quintilian naturally begins with Virgil, who stands closest of all "epic" poets to Homer; he continues: "Now follows a long interval; for though by all means we ought to read Macer and Lucretius, yet they do nothing towards meliorating our diction; I mean that storehouse of eloquence which I require to be furnished. Both of them treated their subjects elegantly, but Macer is too creeping, and Lucretius too crabbed [*difficilis*]."

Two points deserve attention in these comments. First Quintilian still assumes that the study of poetry must play an important part in education, despite the fact that the kind of education he has in mind is rhetorical. Second, his judgments of individual poets are partial and blinkered. He

fails to acknowledge that Hesiod's lists of names may have had an important social and educational function in their time, or that characters and speech might not be appropriate to Aratus' purpose. Admittedly Quintilian confesses that his sole criterion is the usefulness of poets as rhetorical models; but there is an evident danger of such judgments by an eminent authority being viewed as absolute, and of rhetoric being taken as the sole criterion of literary excellence. Nevertheless, even such back-handed commendations of Didactic poets were to be cited eagerly by Renaissance humanists in their attempt to validate scientific poetry.⁵⁷

The traditions of encyclopaedic knowledge and rhetorical training had a very considerable influence on the status and practice of Didactic in the imperial period and in the Middle Ages. Another powerful influence, albeit of a different kind, was exerted by the two preeminent practitioners of Latin Didactic, Lucretius and Virgil. The poems they produced did more than any formal criticism of antiquity to stimulate instructional poetry in later ages. From these texts, especially the *Georgics*, were derived the critical canons that finally emerged into something like a well-developed theory of Didactic poetry in the late seventeenth and early eighteenth centuries. It will be worthwhile to examine both what Lucretius says explicitly about the relationship of poetry to instruction, and what is implicit in the practice of both poets about this relationship.⁵⁸

Lucretius (ca. 98-ca. 54 B.C.) in his *De Rerum Natura* expounds the system of the Greek philosopher Epicurus and in particular the atomic theory which Epicurus adopted from earlier thinkers as the physical part of his overall philosophy. Lucretius defends his decision to write poetry on such apparently recalcitrant material on two grounds, which deserve scrutiny. The first is that poetry actually clarifies obscure subjects: "I shed on dark corners the bright beam of my poetry" (4,8). This claim often seems paradoxical to readers accustomed to the obscurity of modern poetry, but if one reads the dull, abstract prose of Epicurus himself, there can be no doubt that Lucretius' poetic version of it does add clarity, brightness, and sharpness. This is due in no small measure to his addition of concrete illustrations. It is due also to the vividness of his language, with its metaphors, its vigorous turns of phrase, its alliteration which tends to invigorate rather than lull the reader. To this we must add Lucretius' emotional commitment to his theme, which stimulates the reader as any good teacher will do. Finally, Lucretius has an "orientation to the audience"

(in Theophrastus' phrase). He is constantly aware of his audience and concerned to shape each argument so as to make the greatest possible impact on that audience.

Lucretius' other justification is that poetry acts like honey smeared on the rim of a cup containing bitter medicine: the honey of poetry makes the bitter but beneficial dose of doctrine more palatable (1,936-50). Most modern critics have rightly felt uncomfortable about his formulation, which reduces poetry to mere prettification. In fact, the relationship between poetry and science in Lucretius is much more integral than his statement would suggest. Science not only provides him with intellectual understanding, it also fills his imagination and sharpens his perceptions, so that the poet's activity is in harmony with, indeed to some extent united with, the activity of the scientist. Great poetry, which most readers have felt Lucretius' poetry to be, cannot arise out of a calculated desire for adornment but springs from a deeper level of the poet's mind. Why then did Lucretius speak of poetry as a mere coating of honey? Almost certainly because he felt the need to justify his use of verse, in view of the fact that his master Epicurus not only wrote in austere prose himself but advised his disciples to give a wide berth to anything smacking of literature.⁵⁹ Perhaps Epicurus was influenced by the scepticism of earlier Greek philosophers and poets about whether poetry and truth could coexist. Lucretius' argument, at any rate, is an effective polemical self-justification, since it makes poetry entirely ancillary to doctrine; but it does not do justice to the real importance of poetry in his work.

To many readers Lucretius is the touchstone of the viability of Didactic and of the possibility of a rapprochement between science and poetry.⁶⁰ What is the key to the success of his teaching? First and foremost, that it is impassioned teaching as opposed to cool exposition. He has a passionate interest in the atomic theory itself, which informs both his intellect and his imagination. But he also has a passionate concern for the moral and philosophical implications of the theory. This is conveyed particularly in the so-called "digressions": the attacks on false religion and its influence; the vehement criticisms of rival theories; the praise of Epicurus as a saviour of mankind from darkness -- all of these are designed to impress upon the reader how vitally important it is that he take in the technical argument. Lucretius' purpose is to persuade, not to expound a body of knowledge which has no further significance. As a result

of his commitment to the task his own persona is a definite presence in the poem, and his insistence that the reader engage with his teaching creates a dramatic situation: "I will keep after you, and ask you . . ."; "Come now, mark my words"; "However much you may drag your feet, yet you must admit . . ." (1,980 f., 2,730 f., 1,398 f.). All this suggests that there is an important distinction between major and minor examples of Didactic poetry in antiquity. Technical details become part of major poetry only through the passion of a Lucretius or the sensibility of a Virgil and through being linked to broad non-technical themes.

The failure of Manilius makes an instructive contrast to the success of Lucretius, for their poems are comparable in length and in intellectual ambition. Manilius wrote a Didactic poem in the reigns of Augustus and Tiberius (early 1st c. A.D.) on the subject of astrology, which was widely regarded in the ancient world as a serious branch of science. Like Lucretius, he has unbounded enthusiasm for his subject. As in Lucretius, the technical theme is linked with an overall philosophy -- in Manilius' case, Stoicism -- and its general importance is brought out by "digressions" such as that on predestination in Book 4. But Manilius' exposition of his highly technical material is cool and objective, lacking Lucretius' intense awareness of his audience. Often, indeed, one feels that Manilius is caught up in his own fascination with the complexities of his subject and the challenge of expressing it in verse, and that he lacks any great desire to make converts: he speaks of himself as composing neither in the crowd nor for the crowd, but alone, for the heavens to hear, or for that small number capable of knowledge of the stars (2,137-49; cf. 1,13-15).

Virgil's *Georgics* is a relatively short work which nevertheless took seven years to write (36-29 B.C.). It is a complex and sophisticated poem which shies away from easy definitions. Ostensibly its purpose is to give instructions in farming, and indeed in some sections it is so lucid and detailed that one could go out today and follow them without difficulty (e.g. 2,226-58 on recognition of types of soil). Nevertheless certain features prevent us from regarding it as simply a manual of instruction.⁶¹ First, it is selective rather than comprehensive; Virgil knew that those wanting more detail could turn to the recently-published prose *De Re Rustica* by the indefatigable Varro. Second, topics are not always demarcated off from each other in a business-like way; on the contrary, within each individual book Virgil will sometimes glide from one subject to another in such a fashion that one can scarcely identify where one ends and the next

begins. Indeed, it has been suggested that this is not a Didactic poem at all, but a descriptive one.⁶² But the poem eludes simple definitions of this kind. Undoubtedly Virgil, himself brought up on a farm, has a contemplative delight in the details of the countryside, but it would be wrong to dismiss the didactic purpose. No doubt Virgil knew that one can learn piecemeal as well as systematically, and that learning can be stimulated by delight. One may, however, redefine Virgil's didactic purpose as in large measure to commend the activities he writes about. Farming was associated with the traditional Roman virtues exemplified by the legendary Cincinnatus; the association is clear in the great praise of the farmer's life at the end of Book 2. Both those virtues and the activity of farming itself had been eroded by the political conflicts of the first century B.C. With the establishment of peace under Octavian, Virgil wished to suggest the possibility of a return to a more stable way of life.

In addition to the contrast between moral standards and degeneracy, there are other contrasts which run through the poem and help to give it the resonance of major poetry: civil order against chaos and death against rebirth (culminating in the myth of Aristaeus, Orpheus, and Eurydice which ends the work). Clearly, then, the purpose of the work goes well beyond its ostensible aim of technical instruction. Virgil differs from Varro in much more than the medium employed; or rather one should say that Virgil's use of poetry is inseparable from the fact that his teaching is of a different kind from Varro's -- it is both more and less.

Finally, Horace claims our attention, since he not only composed a quasi-Didactic work, the *Art of Poetry*, but also made theoretical remarks on the function of a poet. He gives marmoreal expression to Neoptolemus' compromise between the apparently opposing goals of pleasure and teaching: *omne tulit punctum, qui miscuit utile dulci*, "he who blends pleasure with profit wins every vote" (*Art of Poetry* 343). In an earlier and simpler age, poets had general authority. "In olden days this was wisdom, to draw a line between public and private rights and between things sacred and profane, to check indiscriminate unions and make rules for married life, to build towns and to inscribe laws on wooden tablets; and so honour and fame fell to bards and their songs as divinely inspired" (*ibid.* 396-401).⁶³ Nowadays, Horace implies, poets can no longer claim such wide authority, but it is still very much part of their function to give moral instruction, particularly to the young (*Epistles* 2,1,126 ff.).

Nevertheless, as a sophisticated Augustan Horace is acutely aware that teaching must be conveyed with a light touch. "Whenever you instruct, be brief . . . when the mind is full, every word in excess is wasted" (*Art of Poetry* 335 and 337). Consequently his own *Satires* and *Epistles* are often humorous and ironic, and above all conversational in tone. Somewhat more surprisingly, he adopts a similar tone for the more technical instruction of the *Art of Poetry*. This style is so different from the high epic style traditional in Didactic, and the purpose of the work is so elusive, that we have preferred to call it quasi-Didactic.⁶⁴ What the poem does manifest clearly is an almost painful awareness of the pitfalls involved in the enterprise of instructing in verse.

The sheer literary power of *De Rerum Natura* and *Georgics* helps account for both the popularity of these poems with contemporaries and their influence on the Didactic poets of the Renaissance and Enlightenment, who were eager to establish the scientific poem as a respectable genre. There are, however, two other explanations for the continued cultivation of scientific poetry. One reason for the striking popularity of minor Didactic (i.e. that without the literary merit of a Virgil or a Lucretius) in both Hellenistic and Roman times was what Professor Stahl calls the "aura of uncanniness" that science itself held for versifying popularizers and their audience:

It seemed to them related to matters of revealed knowledge, the occult, the exotic, the arts of the astrologer and soothsayer. Nature appeared to them, as to initiators of worshippers of the Eleusinian and Orphic mysteries, to be jealously guarding her secrets. These might be disclosed as readily by poets and philologists as by speculative philosophers and men who had actually investigated natural phenomena.⁶⁵

While Christianity may have dispelled some of these associations, along with, for instance, the oracular value of the scientific poems of Parmenides and Empedocles, it did not thereby destroy the poet's special place in the scheme of things or completely rob science of its mysterious and occult properties. In the Middle Ages scientists like Albertus Magnus and Roger Bacon suggest that scientific knowledge should not be made available to the masses, because it is the province of a select few (the alchemists from the second through the seventeenth century are even more

adamant in preserving nature's secrets for a divinely chosen elect). In the Renaissance apologists for poetry invoked Neoplatonic explanations of poetic inspiration, compared the poet's creation of a "golden world" to the work of God in Genesis, and cited the Bible's use of verse and metaphor (especially Christ's parables and the allegorical visions of *Revelations*) to lend a special dignity to the poet. All these tendencies are epitomized in the Renaissance metamorphosis of Urania, the muse of astronomy, into the "Christian muse" *par excellence* and in the humanists' claim that the poets were the first to observe the secret workings of nature.

A second and more specific explanation for the continuity of scientific poetry from ancient to later times which can be mentioned here lies in the handbook mentality perpetuated by the Middle Ages in its characteristically encyclopaedic approach to knowledge, both sacred and profane. Even with the enormous changes that took place in the Renaissance, in both literature and science, this tradition continued to be influential. Encyclopaedic poems (dealing with science, theology, philosophy, and general knowledge) like Palengenius' *Zodiacus Vitae* (1531?) and Du Bartas' *Les Semaines* (1578, plus later enlargements) are good examples; both were translated in Elizabethan times and left deep impressions on poets like Spenser and Milton. While their epics can in no way be called handbooks or encyclopaedias, these humanist poets nevertheless owe some allegiance to the mediaeval tradition.⁶⁶

III

From the end of the Roman Empire throughout the Middle Ages, the literary and scientific climate remained consistently favorable toward Didactic and especially toward scientific poetry. The following discussion, selective and brief, will offer some explanation for this. We will then turn, by way of conclusion, to the watershed of the late Middle Ages and early Renaissance, where the recovery of classical Didactic greatly stimulated the writing of scientific poetry, at the same time when the recovery of classical criticism (especially Aristotle's *Poetics*) revived the old controversies over the acceptability of such poetry.

One reason science and poetry were so compatible in the early Middle Ages is that both science and literary theory had remained relatively static since the age of Augustus.⁶⁷ Thus the associations between them, implicit or explicit, that had solidified in Hellenistic and Roman times remained firm. Even though we have no extant text of Varro's fundamental

work, the compendious *Disciplinae* (see above, p.14), we can find the science available to Cicero, Virgil, and Ovid -- and the science that was to prevail for over a thousand years in the Latin West -- in the *quadrivium* sections of encyclopaedias of the seven liberal arts like Martianus Capella's *De Nuptiis Philologiae et Mercurii* (ca. A.D. 410-439). This work, perhaps the most popular school text of the entire Middle Ages, is the epitome of early mediaeval science, but it also reflects the endemic character of Roman science, as the province of schoolmasters and grammarians rather than professional scientists and as "a subject for the school textbooks of grammarians and rhetors and for polished gentlemen who wanted a smattering of it for a better grasp of literature and philosophy."⁶⁸

Of the formal literary theory of the ancients, all that made its way into the early Middle Ages was some of the grammatical and rhetorical teaching which had been the basis of Roman education (via the works of Cicero and Quintilian, but poorly understood). To this could be added the rhetorical and grammatical works of fourth-century philologists and the encyclopaedic treatises of Martianus Capella, Macrobius, Cassiodorus, and Isidore of Seville.⁶⁹ Poetry itself, however, had ceased to be studied as a distinct discipline and was usually considered as an adjunct to one of the established *artes*, most commonly grammar or rhetoric.⁷⁰ Thus, ironically, poetry joined science as yet another province of the reigning philologists and grammarians.

Poetry and science were further linked by these same scholars in their propagation of another ancient literary habit: that of reading great works of the past, especially epic, as compendia of knowledge of all kinds. Virgil was the chief author exploited now, but Ovid too, through both literal and allegorical readings of the *Metamorphoses*, was an important source for mediaeval scientific writers.⁷¹ Poetry in the Christian Middle Ages came to be seen as a mixture of rhetoric, theology, allegory, and universal knowledge. This conception is anticipated in the early encyclopaedias like Macrobius' *Saturnalia*, a work contemporary with Martianus' *De Nuptiis*, where Virgil is regarded as the culmination of a small, fixed canon of "Ancients" (including Homer, Plato, and Cicero) who were read for what they could teach about rhetoric, religion, philosophy, and science; Virgil, for example, is *omnium disciplinarum peritus*, "an authority in all branches of learning" (1,16,12).⁷²

These general attitudes toward poetry and science are embodied and made explicit in the encyclopaedias of the seven liberal arts. As we saw in Cicero's educational program, the appropriateness of a marriage between the eloquence of the orator or poet and scientific learning was taken for granted in Republican times. In the Middle Ages, this relationship between the arts of language (*trivium*) and the mathematical sciences (*quadrivium*) was even more thoroughly worked out:

For medieval scholars, as for the early Pythagoreans, subjects like arithmetic and geometry seemed to have a universal application, and the rhetorical arts were found as useful in expounding quadrivium subjects as in literary subjects. A discipline like metrics seemed to belong as appropriately to grammar or rhetoric as to the mathematics of harmony Dialectic is called the sister of Geometry because the proofs of geometric propositions are, like dialectic, a form of logical reasoning The setting [Books I and II] and trivium books [III-V] in Martianus' work contain many references and allusions to quadrivium elements [Books VI-IX].⁷³

In addition to the subject matter and organization of the *De Nuptiis* and similar encyclopaedias, the usual literary form of these works, allegory written in mixed prose and verse, helped unite poetry and science still more closely. One could cite not only the cases of direct influence, but also the general borrowing between verse and prose, a practice continued in scientific writing from Hellenistic times.⁷⁴ Thus in form, structure, and substance the encyclopaedias encouraged the incorporation of scientific materials into allegorical and Didactic poetry.

Thanks to the fourth-century grammarian Diomedes we have, in addition to these influences from the practice of scientific and poetic writing, a rudimentary but important genre theory which explicitly recognizes Didactic poetry. Although his definition of poetry allows both truth and fiction as proper subjects, and utility and pleasure as proper ends, the criterion by which Diomedes differentiates the poetic kinds is neither subject matter nor ultimate purpose, but rather the rhetorical mode of a poem: the degree to which the personal utterance of the poet is represented. Thus there are three major "kinds" of poetry, each of which is divided into various sub-genres. First, the dramatic genre, in which only the characters

speak, whether in stage dramas or in dramatic pastorals, with four subordinate genres: *tragica*, *comica*, *satyrica*, *mimica*; second, the narrative genre, in which the poet alone speaks, with three sub-genres: *angelitice*, containing "sentences" (e.g. Theognis and *chrias*), *historice*, containing narratives and genealogies (e.g. Hesiod's catalogue of women), and *didascalice*, the Didactic poem (e.g. Empedocles, Lucretius, Aratus, Virgil's *Georgics* 1-3 and the first part of 4); third, the mixed genre, in which both the poet and dramatic characters speak, with two sub-genres: *heroica species* (*Iliad*, *Aeneid*) and *lyrica species* (Archilochus and Horace).⁷⁵

The basis for this classification is found in both Plato (*Republic* 3, 392D) and Aristotle (*Poetics*, 1447a-1448b), but the mediaeval version in Diomedes is little more than "a crude system of pigeonholes" by which poems could be categorized, more or less successfully. That it was an unsatisfactory system (requiring, e.g., the sorting of Virgil's *Eclogues* and *Georgics* -- the Aristaetus story [4,314-558] being "mixed" rather than "narrative" -- into two different classes) did not prevent it from being highly significant for poetic theory throughout the Middle Ages; even in Renaissance France it remained influential, the *Ars grammatica* being printed in Paris in 1492 and again in 1527.⁷⁶ However imperfect was Diomedes' scheme of genres, it made a clear place for the Didactic poem and named its most illustrious exponents.

Another and perhaps even more generally pervasive theory of genres, and one that singled out the Didactic poem for praise, was that based on the canon and biography of the Middle Ages' chief literary treasure, Virgil. The chronological sequence of the *Eclogues*, *Georgics*, and *Aeneid* was regarded not only as the progression of the great poet's own career but also as the embodiment of a hierarchy "grounded in the nature of things -- a hierarchy not only of poetical genres [pastoral, georgic/Didactic, epic], but also of social ranks (shepherd, farmer, soldier, and kinds of styles (plain, middle, grand)." Mediaeval scholars extrapolated this scheme, known as the *rota Virgillii*, from Aelius Donatus' fourth-century commentary on Virgil, and the idea became a commonplace through the Renaissance and eighteenth century. Both Spenser and Milton were familiar enough with it to see themselves fulfilling the apprenticeship of writing pastorals before taking on the epic,⁷⁷ and Alexander Pope deliberately identifies the first two stages of his career in these terms before passing to the mock-epic.⁷⁸ In this scheme, then, if the *Georgics* could not claim place with the *Aeneid*, at least Didactic ranked only just below the epic.

These rhetorical and generic assessments of the Didactic poem persisted in Europe throughout the Middle Ages. With the "twelfth-century renaissance," however, came not only a renewed interest in Graeco-Arabic science and letters, but also new developments in the literary treatment of science, especially in complex mythological expositions of natural philosophy. This phenomenon is only now being studied by mediaevalists, and we cannot attempt even a summary of their findings here. It must suffice to say that the large number of Latin scientific poems, both those of a straightforward, pragmatic nature and those in the form of elaborate cosmic myth, testifies to the vitality of the Didactic poem, both before and after the twelfth century.⁷⁹ The genre's robustness is likewise apparent in the later mediaeval vernacular literatures, as the instructive example of fifteenth-century England shows. Most of the extant manuscripts of Middle English scientific poems are from this century, and it is clear that Didactic poetry was sinking deep roots in the popular language. Here we also find some interesting analogues to the theory, practice, and cultural contexts of Didactic which we have observed from ancient times.

Two kinds of secular Didactic poetry from the century after Chaucer's death (1400) can be distinguished: first, shorter poems, usually anonymous, which derive from gnomic folk sayings and which use some kind of verse form to aid the memory or give a charm-like quality, being frequently transcriptions of much older forms, and collectively resembling both the pre-Hesiodic folk poetry thought to have preserved useful information for the race, and the weather proverbs and metrical charms of the early Romans;⁸⁰ second, longer poems which have both a utilitarian purpose and some literary pretension,⁸¹ where we again detect the influence of the rhetorical conception of poetry, now restated by the major theorists of the high Middle Ages, Matthew of Vendôme, Geoffrey of Vinsauf, and John of Garland.⁸² Their shared view that poetry was little more than metrical speech, or writing of a highly embellished kind, is readily seen in the practice of a poet like John Lydgate (1370?-1451?), encyclopaedist and popularizing versifier *par excellence* of the late Middle Ages.

As the bibliographical studies of H.S. Bennett have shown, instruction of one kind or another is the major constituent of fifteenth-century English verse.⁸³ Lydgate's output exemplifies this tendency, not only in the moral admonition which finds its way into almost all he wrote, but also in the direct scientific instruction of such poems as the *Secrees of Old*

Philosoffres, the *Pageant of Knowledge*, and the *Dietary*. The first of these (a total of 2730 lines) is a verse translation, completed after Lydgate's death by Benedict Burgh, of French and Latin prose versions of the *Secreta Secretorum*; hence it parallels the work of Hellenistic and Roman versifiers of prose handbooks of science and other useful information.⁸⁴ The *Pageant* (312 lines in the longest version) is a verse encyclopaedia of scientific, practical, and moral lore, and is again in the popularizing tradition.⁸⁵ The *Dietary*, 80 lines of rules for health which are known to have been memorized by school-children, is not only Lydgate's most widely disseminated poem, but "far and away the most popular 'information' piece of verse in Middle English."⁸⁶ It survives in 55 manuscripts, a number exceeded in the whole corpus of Middle English poetry only by the *Prick of Conscience* (117 MSS) and the *Canterbury Tales* (64 MSS).⁸⁷

Even when the scriptorium gave way to the printing house, these Didactic poems still held their own. The *Secrees* and *Dietary*, as well as a shorter medical poem by Lydgate, "Doctrine for the Pestilence" (24 lines), were all printed by 1515. These poems -- and there are many others like them -- reflect the sober pragmatism of the first decades of English printing, a time when a large body of traditional knowledge was first being made available to an English-speaking readership which had no French or Latin: "All the evidence of marginal comment and annotations, of distribution, popularity and ownership of books, confirms that this is what the reading public wanted, and the temper of the age finds its fullest expression in Caxton, in the overwhelmingly didactic and practical nature of early printed books."⁸⁸ As in Hellenistic times, readers were eager for knowledge, especially pragmatic and scientific knowledge in poetic form.

Just when this kind of traditional learning was first being disseminated in England through the printing press, the Renaissance humanists were beginning their great publishing ventures on the continent. Editions and translations of classical, scientific texts, including the poems of Aratus, Lucretius, Manilius, and others, were among the first printed books.⁸⁹ The accessibility of these poems was an important stimulus to the writing of scientific poetry, both in Latin and the vernacular, as was the increase of scientific knowledge itself as the sixteenth century progressed. The great humanist scholar and poet George Buchanan, for example, continually revised his long astronomical poem *De Sphaera* (which contained many Lucretian and Virgilian echoes) in light of the latest theories and discoveries of

Copernicus and Brahe.⁹⁰ Also newly available for study were the literary theories of many of the ancient authors we have touched on here, and not surprisingly the old controversies over Didactic poetry were replayed, first on the continent and then in England: virtually every known critical position of antiquity could find an eager disciple among the ranks of the humanists. The following comments include a sampling of these.⁹¹

Aristotle's theory of mimesis was at the centre of most Italian Renaissance criticism, and the concept was constantly being re-interpreted to accommodate the predispositions of each critic. The debate raged not only over Aristotle's test case, Empedocles, but also over Virgil, Lucretius, and especially Dante, who had incorporated a good deal of abstract doctrine (science, philosophy, theology) in his poems. Among the stricter Aristotelians, who rejected Didactic because it failed to be mimetic, were Sperone Speroni, Benedetto Varchi, Ludovico Dolce, Pier Vettori, Bernardino Partenio, Antonio Minturno, and Tasso. On the other side were the "anti-Aristotelians," those who rejected mimesis as a *sine qua non* and who were unequivocally in favor of Didactic poetry: Francesco Patrizi, Bernardino Tomitano, and J.C. Scaliger (though the latter was considered an arch-Aristotelian by later critics). Patrizi was able to find support for the scientific poets of antiquity in the praise accorded them by Cicero, Quintilian, and Horace;⁹² this approbation was in turn used to validate contemporary Neo-Latin poems inspired by the ancient originals such as Pontano's *Urania* and Fracastoro's *Syphilis*. But Patrizi carried his disagreement with Aristotle so far as to exalt Empedocles above Homer.

Such extreme positions were not unusual, nor was the proliferation of arguments in between the strict Aristotelians and the "anti-Aristotelians." Paolo Beni, for example, tried to show that Aristotle's mimesis was really the Platonic desideratum of "simple narration," and on that basis he called Hesiod's *Works and Days* and Virgil's *Georgics* "mimetic." G.P. Capriano insisted on mimesis for true poetry, but allowed that "natural things" could be imitated "with fictions, adumbrating and veiling them with the appearances and accidents of the senses [i.e. in myth]." Thus he rejected Empedocles and Lucretius as genuine poets not because they failed to imitate but because they did not write fictions, and he asserted that this is what Aristotle had said. Capriano, like the seventeenth-century Englishman Henry Reynolds,⁹³ approved the Stoic conception of myth as embodying scientific truth, a position we saw in Crates of Mallos. Ludovico

Castelvetro, who also believed his theory squared with Aristotle, rejected Empedocles et al. because they did not invent anything new, invention (rather than imitation) being for him the mark of a true poet. Going further, Castelvetro disallowed any kind of instruction as an end of poetry and insisted its sole purpose was to give pleasure. Thus, while he asserted that Cicero, Quintilian, and Horace proved that they did not understand Aristotle when they called Empedocles a good poet, Castelvetro himself, claiming to follow Aristotle, ended up in the extreme estheticism of Callimachus, Eratosthenes, and Philodemus.⁹⁴ Here Castelvetro was radically out of tune with the pervasive didacticism of his age, however, and we must realize, as Professor Hathaway reminds us, that generally speaking even those who considered themselves strict Aristotelians could not "exclude completely from the realms of poetry poets whose subject matter was abstract doctrine or speculation. Although not rejecting the limitation of poetic subject matter, they struggled valiantly to discover under what conditions the blanket proscription did not obtain."⁹⁵

In sixteenth- and seventeenth-century France, we might add, Jacques Auguste de Thou, Jean Jacques Boissard, Boileau, and René Rapin wrote enthusiastically of Didactic poetry (perhaps because most of them practised it themselves), and in England one finds a spectrum of thought similar to that of Renaissance Italy, from the whole-hearted acceptance by George Puttenham (1589) to the absolute rejection of Didactic by Thomas Hobbes (1650).⁹⁶

Nor did this repeating cycle of critical praise and blame cease with the seventeenth century, when the Royal Society put forward its program for a streamlined English prose as the proper medium of the new science. As Warton's desire for classical dicta on the genre suggests, another growth of scientific poetry and of critical writing on it was taking place in eighteenth-century England. Toward the end of that century, even at the same time when Erasmus Darwin's influential *Botanical Garden* was being published (1789, 1792), Lessing was excluding Lucretius from the rank of poets, as Coleridge was to do a few years later in a famous letter to Wordsworth (30 May 1815). The latter had hoped for the union of poetry and science in the second edition of the *Preface to the Lyrical Ballads* (1800), but his poems seem to despair of such a possibility: "Our meddling intellect / Mis-shapes the beauteous form of things: / We murder to dissect" (*The Tables Turned*). Poe's sonnet *To Science* also speaks of murder; here Science

is a "Vulture, whose wings are dull realities," and she preys "upon the poet's heart."

Clearly, the debate is not over even today,⁹⁷ nor can one predict the future, either for the critical reputation of Didactic poetry or for the writing of it. Our survey of the cultural contexts of the Didactic poem has shown, however, that despite a variety of formal literary criticism, scientific poetry has flourished (except in the twentieth century) whenever there has been a significant explosion of scientific knowledge, or when, for whatever reasons, there was a demand for popularized versions of the prevailing knowledge.⁹⁸

As a little chapter in the history of thought and literary criticism, this essay has, we hope, gone further. In 1916 Professor Roy Hack reached this conclusion about the treatment of the dramatic genres in Aristotle and Horace: "The definition of the genres, with their imposing air of finality, actually varied in terms according to the subjective prejudices and the dominant interests of each critic; but they were always made out of the same materials and by the same method."⁹⁹ While, as we have seen, few of the ancient or mediaeval critics gave rigid definitions for the Didactic genre, we take the point to be that any critical theory or individual pronouncement is based ultimately on "subjective prejudices" and "dominant interests." It is surely these that account for the diverse critical judgments on the Didactic, from ancient to modern times, and it is these that the present essay has endeavoured to discover.

University of Victoria

NOTES

¹*The Works of Virgil*, trans. Christopher Pitt and Joseph Warton, 4 vols., (London 1753) I, 393. Warton's essay is largely based on Addison's "Essay on the *Georgics*," in John Dryden's trans. of *The Works of Virgil* (London 1697).

Sections I and II of this article are by both authors, Section III by Dr. Schuler alone. The following works will be cited in footnotes by the author's name only: G.M.A. Grube, *The Greek and Roman Critics* (London 1965); D.A. Russell, *Criticism in Antiquity* (London 1981); William H. Stahl, *Roman Science: Origins, Development and Influence to the Later Middle Ages* (Madison, Wisc. 1962). We should like to thank the anonymous referee of *Florilegium* for a learned and detailed critique of our article.

² The 18th-century Didactic poem has received considerable critical attention. An excellent study is William Powell Jones, *The Rhetoric of Science* (Berkeley and Los Angeles 1966). Studies concerned specifically with georgic poetry (i.e. that branch of Didactic devoted to work and life in the countryside) include Dwight L. Durling, *Georgic Tradition in English Poetry* (Morningside Heights, N.Y. 1935); Marie Loretto Lilly, *The Georgic: A Contribution to the Study of the Vergilian Type of Didactic Poetry* (Baltimore 1919); John Chalker, *The English Georgic* (London 1969). In addition to Addison and Warton, another important contemporary discussion is Joseph Trapp, "Of Didactic or Preceptive Poetry," Lecture XV in his *Lectures on Poetry Read in the Schools of Natural Philosophy at Oxford* (London 1742) 187-201; the *Lectures* were first published in Latin in 1711 as *Praelectiones Poeticae*.

³ Since "didactic" is often applied in a general sense to literature which instils political or moral ideas, we use "Didactic" to refer to poetry of the specific genre under consideration, characterized by its teaching of technical or scientific material.

⁴ Alexander Dalzell observes that one half of recent literary studies of Lucretius are concerned with imagery, the element in Didactic poetry most accessible to the "New Criticism." This point, made in an unpublished lecture on "The Criticism of Didactic Poetry," is based on Professor Dalzell's bibliographies of Lucretius studies since 1945 (*Classical World*, vols. 66 and 67). We are grateful to Professor Dalzell not only for making his lecture available but also for reading an early draft of this essay. Needless to say, he bears no responsibility for any errors that may remain.

⁵ Throughout this essay we have emphasized the scientific Didactic poem, even though the genre supported such subjects as conduct in social and religious life (Hesiod, *Theogony*), hunting (Grattius "Faliscus," *Cynegetica*), and the art of poetry (Horace). The most important poems for the later history of the genre were those on scientific subjects, and the

critical problems for these have always been greater. Thomas Sprat, historian of the Royal Society, thought in 1667 that the new science could revitalize poetry (see Durling [at n. 2] 19). André Chénier (1762-94) recommended science as a subject for poetry (as in his *Hermès*), as did Wordsworth (see p. 28, below) and Ernest Renan (*L'Avenir de la Science*, 1849); cf. also Matthew Arnold and C. Day Lewis.

⁶ The views of I.A. Richards are expressed particularly in *The Principles of Literary Criticism* (London 1924) ch. 35, "Poetry and Beliefs," and in *Science and Poetry* (London 1925). The quotation from Northrop Frye comes from the section "Symbol as Motif and as Sign" in the second essay of his *Anatomy of Criticism* (Princeton 1957).

⁷ Alister Cox, "Didactic Poetry," in *Greek and Latin Literature: A Comparative Study*, ed. John Higginbotham (London 1969), gathers the important criticism and scholarship on the practice of the genre, with a good bibliography. The classical Didactic is also treated in W. Kroll's article, "Lehrgedicht," Pauly-Wissowa, *Real-Encyclopädie der klassischen Altertumswissenschaft* XII, cols. 1842-57; also, Smith Palmer Bovie, "Didactic Poetry," *Princeton Encyclopedia of Poetry and Poetics*, ed. Alex Preminger (2nd ed., Princeton 1974) 190-93. A useful collection of statements bearing on Didactic by Greek and Roman critics and poets is provided by E. Pöhlmann, "Charakteristike des römischen Lehrgedichts," in *ANRW* I,3 (1973) 813-901.

⁸ We use the names Homer and Hesiod to designate the works associated with them.

⁹ Rosemary Harriott, *Criticism and Poetry before Plato* (London 1969) 106. Because of the primacy of rhythm in verse, "prose is normally a late and sophisticated development in the history of a literature" (Northrop Frye, "Verse and Prose," *Princeton Encyclopedia of Poetry and Poetics*, p. 885).

¹⁰ The *Works and Days* is by no means an isolated example of Didactic poetry before the Presocratics. Apart from the pre-Hesiodic tradition, at which we can only guess, we have notices or fragments of several Didactic poems attributed in antiquity to Hesiod, including the *Astronomy*, *Precepts of Chiron*, and *Great Works*. See the edition of Hesiod in the Loeb Classical Library, pp.xix-xx and 64-77.

¹¹ The first influential distinction between narrative epic and Didactic is that of the fourth-century A.D. grammarian Diomedes (see below, pp. 23-24). There is also an attempt at a distinction in the brief and

obscure post-Aristotelian treatise known as the *Tractatus Coislinianus*; see Grube 144 ff.

¹² Thus the first-century B.C. Greek critic Dionysius of Halicarnassus classifies as writers "in epic poetry" both Antimachus of Colophon, who wrote on such themes as the mythical history of Thebes, and Empedocles, who wrote on science and philosophy (*On Composition* 22). In the following century the Roman critic Quintilian discusses Hesiod, Aratus, et al. under the rubric of "other epic poets" (i.e. than Homer) (*Institutio Oratoria* 10, 1,52 ff. and 85 ff.).

¹³ The Didactic genre can also be clearly distinguished from poetry which is didactic only in the more general, moral, or social sense, since that tends to be written in different styles or forms (e.g. the elegiacs of Theognis and Solon or the shorter hexameter poems in conversational style of Horace's *Satires* and *Epistles*).

¹⁴ Frederick A.G. Beck, *Greek Education 450-350 B.C.* (London 1964), 39-42. Later, of course, the catalogue did become a stock literary device. For a study of the catalogue in later Latin poetry, where frequently "the poet's motive is to display and exhaust his knowledge of a particular field [and] to transmit such knowledge in poetic form," see Harry E. Wedeck, "The Catalogue in Late and Medieval Latin Poetry," *Medievalia et Humanistica* 13 (1960) 3-16.

¹⁵ In another context, Hesiod suggests that the Muses sometimes choose not to tell the truth: "We know how to speak many plausible lies, but we know how to utter the truth when we will" (*Theogony* 27 f.). This has often been taken as a distinction between imaginative fiction (i.e. epic) and factual exposition (Didactic). But against this it has been argued that the Greeks did not doubt that the basic plot of the Homeric epics was historical, so that such a distinction could not have occurred to Hesiod: so M.L. West in his commentary on the *Theogony* (Oxford 1966) 162. Perhaps Hesiod has in mind specific poetic versions of myths which he cannot accept.

¹⁶ See further Russell ch. 5, "The Poet and his Inspiration."

¹⁷ Timeliness is the main point of the "farmer's almanac" in lines 383-618. For example, Hesiod does not explain how to prune vines -- severely or lightly? -- but only warns us to do the task before the swallows return in spring (lines 564-70).

¹⁸ Unfortunately the role of Xenophanes (ca. 570-475 B.C.) in the development of philosophical Didactic is uncertain, since it is possible

that he wrote only short pieces rather than a treatise: see G.S. Kirk and J.E. Raven, *The Presocratic Philosophers* (Cambridge 1960) 166 f. But there can be no doubt that his treatment of philosophical subjects in verse influenced Parmenides and Empedocles.

¹⁹ Parmenides has been instructed in wisdom by a goddess (though this is meant to be understood allegorically rather than literally), while Empedocles claims to be immortal, as a result of having escaped the wheel of rebirth: see Kirk and Raven frags. 342 and 478 (with English translation at foot of page).

²⁰ Kirk and Raven frag. 414; cf. e.g. Hesiod *Works and Days* 40 "Fools! they do not know how much greater is the half than the whole."

²¹ In a fragment of his work *On Poets*, cited by Diogenes Laertius (8,57). But in the *Poetics* Aristotle's theory of mimesis forced him to deny Empedocles the name of poet: see below, pp. 10.

²² Kirk and Raven frag. 453.

²³ H.I. Marrou, *A History of Education in Antiquity*, trans. G. Lamb (New York 1956) 42 and 162 ff. In the first century A.D. we find Plutarch still assuming as a matter of course, in his essay on "How the Young Should Study the Poets", that the poets *will* be studied.

²⁴ Its first appearance is in Heraclitus (frag. 47 Diels, "Hesiod is a teacher for most men"), where however it is meant ironically. Another early appearance is in Aristophanes' *Frogs* (405 B.C.) 1054 f.: "Little children have a teacher who gives them advice, while young men have the poets". For Heraclitus' criticisms of Hesiod see Harriott (at n. 9) 113.

²⁵ The passage is discussed by Beck (at n. 14) 119 and by Harriott (at n. 9) 105-6. Even if Aristophanes does not necessarily agree with his character's views (see Harriott *op. cit.* 108-9), they are clearly meant to be representative.

²⁶ Stahl 60 f.

²⁷ Russell (75 f.) regards the whole defence of madness (including inspiration) in 244A-245A as an *ad hoc* argument used to support a paradoxical main proposition.

²⁸ Stahl 41.

²⁹ The example from "Heraclitus" is quoted from J. Tate, "Allegory, Greek," in the *Oxford Classical Dictionary* (2nd ed., Oxford 1970). On allegory see also Russell, 95-8, with further bibliography at n. 32. For

the continuation of Stoic allegoresis of myth as science in the Renaissance and seventeenth century, see A.M. Cinquemani, "Henry Reynolds' *Mythomystes* and the Continuity of Ancient Modes of Allegoresis in Seventeenth-Century England," *PMLA* 85 (1970) 1041-49.

³⁰ Kirk and Raven frag. 169.

³¹ Euripides *Heracles* 1341 ff.; *Trojan Women* 969 ff.; *Iphigenia Among the Taurians* 380 ff.

³² Russell 85.

³³ The passage quoted is section 10 of the *Encomium*; see also sections 11 and 13 in Grube 18 f.

³⁴ On Theophrastus see Grube 103-9.

³⁵ Eratosthenes is discussed by Auguste Couat, *Alexandrian Poetry under the First Three Ptolemies, 324-222 B.C.*, trans. J. Loeb (London/New York 1931) 97 n.2, and by Grube 127 f. For his scientific accomplishments see Stahl 38-41.

³⁶ On Philodemus' theory of art see the sympathetic account in Grube 193-206, and L.P. Wilkinson, "Philodemus and Poetry," *Greece and Rome* 2 (1932) 144-51.

³⁷ See C.O. Brink, *Horace on Poetry II, The "Ars Poetica"* (Cambridge 1971) 352.

³⁸ See below p. 19. A compromise of a different kind was reached by Isocrates, the fourth-century B.C. teacher of rhetoric: while some poets, including Homer and the tragedians, aim at pleasure, others genuinely impart advice, and here he names Hesiod, Theognis and Phocylides (*To Nicocles* 42-9). The reference to advice, and the coupling of the last two poets with Hesiod, suggest that Isocrates has in mind the moral admonitions of these poets rather than their imparting of facts.

³⁹ Even within the later Platonic school there were more favourable views of art and poetry than those expressed by Plato himself. From the first century B.C. on we find the view that the artist creates on the basis of an image in his mind (not simply by imitating particulars), as the Demiurge created the universe on the basis of the Forms which existed in His mind. Later the Neoplatonists Plotinus and Proclus believe that the arts actually ascend to the very Principles (*logoi*) from which nature derives (see Russell 105 f.).

⁴⁰ For certain kinds of poetry that Plato may have found admissible, see Grube 52; and for the view that Plato attacked mimetic poetry only, see

Albert A. Anderson, "The Quarrel Between Poetry and Philosophy," *Topic 28* (1974) 18-32, esp. 22.

⁴¹ For a discussion of Aristotle's ambivalence towards Empedocles see Gerald F. Else, *Aristotle's Poetics: the Argument* (Cambridge, Mass. 1957), 50-3.

⁴² The only Didactic known to us from the fourth century B.C. is a spoof on the genre, the *Hedypatheia* of Archestratus, a contemporary of Aristotle. This was "a sort of gastronomical Baedeker" (*Oxford Classical Dictionary*, 2nd ed., p. 97), with instructions on where to find the finest food and how to prepare it.

⁴³ Couat (at n. 35) 97 n.2.

⁴⁴ William E. Gillespie, *Vergil, Aratus, and Others: the Weather-Sign as Literary Subject* (diss. Princeton 1938) 63.

⁴⁵ See Robert M. Schuler, *English Magical and Scientific Poems to 1700: An Annotated Bibliography* (New York 1979) items 52, 57, 172, 173, 355, 368, 369, 568, 590.

⁴⁶ Aratus continued to be translated and commented upon until the fifth century A.D. With the Renaissance he was again edited and frequently cited in discussions of scientific poetry.

⁴⁷ See T.B.L. Webster, *Hellenistic Poetry and Art* (London 1964) 33 f. We should remember that Aratus was not only translated by Cicero, but admired by poets as good as Lucretius, Virgil, and Ovid.

⁴⁸ For an interesting analysis of how Aratus met the problem of technical and scientific terminology in verse, see Couat (at n. 35) 503-9. Lucretius mentions this problem directly: he tells how he had to invent new words and repeatedly refers to the difficulty of expressing his subject in verse.

⁴⁹ Stahl 8; and see ch. 3, "Hellenistic Handbook Traditions," for a survey of this movement, to which Stahl credits the "subsequent decay of science." Couat (at n. 35) 472-73, also points out that it was the fault of Hellenistic poets generally that in their eagerness to satisfy the demand for versified science they relied uncritically on handbooks as their source material.

⁵⁰ The dates of the two anonymous works are uncertain. Ovid tells of poems on more frivolous subjects such as dice-games and ball-games, which he regards as precedents for his own *Art of Love* (*Tristia* 2,471 ff.). The original example of such light Didactic seems to have been Archestratus'

Hedypatheia (see n. 42), of which Ennius (239-169 B.C.) had made a Latin version.

⁵¹ Marrou (at n. 23) 281 f., 434 f. It is indicative that when Quintilian recommends that the teacher of literature should gain a smattering of science, the purpose is that he should be able to expound poets such as Empedocles and Lucretius (*Institutio Oratoria* 1, 4, 4).

⁵² Stahl 251. On the general level of Roman science see *ibid.* 70 f.: "Even the most intellectually curious Romans, like Lucretius, Cicero, Seneca, and Pliny, were satisfied to obtain their knowledge of Greek science from manuals and made no original contributions. Latin handbook science was outdated from the beginning since it was a synthesis of Greek investigations and theories that were a century, or even two or three centuries, old by the time they had been introduced at Rome. And because of most Latin compilers' lack of aptitude for theoretical studies, handbook traditions of Greek science suffered further deterioration each time they passed through the hands of a new compiler."

⁵³ This is the great polymath Marcus Terentius Varro, not the Didactic poet Publius Terentius Varro Atacinus mentioned earlier.

⁵⁴ For Gorgias in the fifth century B.C. poetry is "discourse (*logos*) with metre" (*Encomium of Helen* 9); it differs from rhetoric only in being metrical. A similar attitude is found four centuries later in Dionysius of Halicarnassus, who settled in Rome ca. 30 B.C.: the more rhythmical prose becomes, the more closely it approaches poetry, and the more poetry breaks up its rhythms, the closer it comes to prose (*On Composition* 26); if you remove the metre from Alcaeus' poetry, what is left is political rhetoric (*On Imitation*; see Grube 211). For Cicero's view see *Orator* 67-8 and 201-2.

⁵⁵ Trans. E.W. Sutton and H. Rackham (London/Cambridge, Mass. 1942) 51-53. The speaker is Lucius Crassus, who was Cicero's tutor in rhetoric; but the views he is made to express in the dialogue are generally Cicero's own. Later Antonius expresses the opposite view, i.e. that oratory does not necessarily embrace other arts. The illustrations he uses are of passing interest: one cannot conclude, he says, from the example of Publius Crassus (another member of the same *gens*) who combined eloquence with legal learning, that law is an integral part of oratory, any more than one can deduce from the example of Empedocles that all philosophers are necessarily poets.

⁵⁶ The translation is that of W. Guthrie, *Quintilian's Institutes of Eloquence* (London 1805). The quotations here and below come from vol. II, pp. 242, 243, 251. On the lack of distinction between narrative and Didactic under the term "epic," see above nn. 11 and 12.

⁵⁷ For the example of the humanist Francesco Patrizi (who also claims that Cicero and Horace passed favorable judgments on Empedocles) see Baxter Hathaway, *The Age of Criticism: The Late Renaissance in Italy* (Ithaca, N.Y. 1962) 72 f.

⁵⁸ In addition to Cox (at n. 7), who condenses most of the recent scholarship (pp. 134-45 [Lucretius]; pp. 145-53 [Virgil]), two sources are particularly helpful: the volume of essays on Lucretius, ed. D.R. Dudley (London 1965), and L.P. Wilkinson, *The Georgics of Virgil* (Cambridge 1969). On the 18th-century revival of Didactic in theory and practice, see above n. 2.

⁵⁹ Fragment 163 in Usener's *Epicurea*. The term used is *paideia*, "culture," but the phrasing of Plutarch *Moralia* 15D suggests that Epicurus had poetry particularly in mind.

⁶⁰ For the variety of response through history, see George D. Hadzsits, *Lucretius and his Influence* (1935; rpt. New York 1963), and the articles listed by Alexander Dalzell in *CW* 67 (1973-4) 101-111. One reason Lucretius had perhaps relatively less impact on Renaissance Didactic poetry than say Manilius, and Virgil, at least before the revival of atomism in the 17th century, was the highly unfavorable opinion of Epicureanism held by the Church; see, e.g., Hadzsits chs. 10 and 11. This is not to deny his stylistic influence on Neo-Latin didactic poets, which has been pointed out by James R. Naiden, *The Sphera of George Buchanan (1506-1582), A Literary Opponent of Copernicus and Tycho Brahe* (Philadelphia 1952) ch. 2.

⁶¹ Debate began early on the question whether Virgil really intended to teach. In the first century Seneca opines that "his aim was not to teach farmers but to delight readers" (*Epistles* 86, 15), an oversimplification influenced by the traditional pleasure/truth dichotomy. Seneca's contemporary Columella in his agricultural treatise cites Virgil frequently and with veneration, but a younger contemporary, Pliny the Elder, spends much time in correcting Virgil's factual errors: see Wilkinson (at n. 58) 210-213. The Middle Ages and Renaissance often took the practical aspects of the *Georgics* seriously. Not only is the poet Samuel Daniel said to have retired to practise farming according to the *Georgics*, but even prose

treatises on natural history or veterinary science cite the poem; see John Maplet, *A Greene Forest, or a natural history* (London 1567); and Leonard Mascall, *The countryman's jewel: or the Government of Cattel* (London 1600). And of course many poems on gardening, themselves meant to be taken seriously as practical treatises, cite Virgil; e.g. René Rapin's *Hortorum libri IV* (Paris 1666). (For later views of the practicality of Virgil's instructions, see Wilkinson *op. cit.* 305-9). Just as important for later Didactic poetry is the fact that literary critics up to the mid-eighteenth century saw Virgil as the culmination of a direct line of descent through Hesiod, Empedocles, Aratus, and Lucretius. This is the opinion, e.g., of Addison, Warton, and Trapp (see nn. 1 and 2).

⁶² So Wilkinson (*op. cit.* 4) with sensible caution: "If the *Georgics* has to be assigned to a *genre*, it is Descriptive Poetry." Addison in his famous essay (at n. 1) had already emphasized this quality of the *Georgics*, as Wilkinson acknowledges.

⁶³ The passage is reminiscent of Aristophanes *Frogs* 1032 ff. (cf. n. 25).

⁶⁴ But for how the *Ars Poetica* and the "instructional" poems of Ovid relate to the mainstream of Didactic, see Cox (at n. 7) 153-55.

⁶⁵ Stahl 254. Stahl goes on to say that opinions "ascribed to early sources came to carry greater weight than those of presumably less gifted contemporary men, and were enhanced with a mystical quality if the traditions were oral, not written. This attitude had much to do with the widespread practice of attributing discoveries of say the Hellenistic Age to remote personages like Asclepius, Homer, or Pythagoras." One might add Hermes Trismegistus to the list and note that in the Renaissance all these generalizations are more or less applicable, especially to the occult sciences. Alchemy in particular follows this pattern, having come into its own during late Hellenistic times and having its origin attributed to just such a "remote personage," Thrice-Great Hermes. It is perhaps no accident that in Middle English Didactic poetry, as well as in that between 1500 and 1700, alchemy is the most popular subject; see R.M. Schuler, *English Magical and Scientific Poems* (New York 1979), Introduction and Index of Subjects.

⁶⁶ The material in the last two paragraphs is developed more fully in R. M. Schuler, "Theory and Criticism of the Scientific Poem in Elizabethan England," *English Literary Renaissance*, forthcoming.

⁶⁷ On the codification of scientific knowledge, see William H. Stahl, *Martianus Capella and the Seven Liberal Arts*, vol. I: *The Quadrivium of Martianus Capella: Latin Traditions in the Mathematical Sciences, 50 B.C.-A.D. 1250* (New York/London 1971) 4.

⁶⁸ *Ibid.* 5.

⁶⁹ Some crude philosophical criticism, deriving from Hellenistic sources, was available, but it was general and undeveloped. For the general theories of Jerome, Augustine, Diomedes, and Isidore, see J.W.H. Atkins, *English Literary Criticism: The Medieval Phase* (London 1952) 30, and ch. 1, on which the background material here is based.

⁷⁰ For the survival of this view of poetry until the later Middle Ages, see Atkins, *op. cit.* 135 and 171.

⁷¹ Simone Viarre, *La Survie d'Ovide dans la littérature scientifique des XII^e et XIII^e siècles* (Poitiers 1966). Also important was the didactic *Halieutica* attributed to Ovid; see Viarre, *passim*.

⁷² Ernst Robert Curtius, *European Literature and the Latin Middle Ages*, trans. Willard R. Trask (1953; rpt. New York and Evanston 1963) 443-45; Thomas Whittaker, *Macrobius: or Philosophy, Science, and Letters in the Year 400* (Cambridge 1923) 21-30; and Domenico Comparetti, *Virgil in the Middle Ages*, trans. E.F.M. Benecke (London 1895), esp. ch. 5, for Virgil's universal learning as assessed by various commentators. Fulgentius the mythographer continues the "tradition of omniscience and infallibility which Macrobius in particular had cultivated for the poet" in his *The Exposition of the Content of Virgil According to Moral Philosophy* (ca. A.D. 500). In the first section of this work the *Eclogues* and *Georgics* are said to be so full of "mystical matters" and such "profundities of almost every art" (including prophecy, music, physiology, botany, magic, astrology, physiognomy, medicine, and divination), that Fulgentius thinks the full exposition of these works to be beyond his capacity; see also *Fulgentius the Mythographer*, trans. Leslie George Whitbread (Kent, Ohio 1971) 106 and 119 f.

⁷³ Stahl (at n. 67) 25.

⁷⁴ The *De Nuptiis* exerted direct influence on such 12th-century works as Bernard Silvester's *Cosmographia* and Thierry of Chartres' *Eptateuchon*; see below, esp. n. 79. For the importance of Martianus as a source of general science, see Stahl (at n. 67) 67-70, where other verse encyclopaedias of the seven liberal arts are also given.

⁷⁵ Diomedes, *Ars Grammatica* III, as explicated in Curtius (at n. 72) 439-41; see also Atkins (at n. 68) 31-33 and Pöhlmann (at n. 7) 828-31, who quotes and discusses Diomedes' text. Servius, Virgil's commentator who was roughly contemporary with Diomedes, uses a similar distinctive term for Didactic: he refers to the *Georgics* as *didascalici (libri)*, and implies that Hesiod's *Works and Days* and Lucretius' poem belong to the same type (Thilo and Hagen's edition of Servius, III, p. 129; Pöhlmann *op. cit.* 832).

⁷⁶ Curtius *op. cit.* 441 and n.24; W.F. Patterson, *Three Centuries of French Poetic Theory* (Ann Arbor, Mich. 1935) I, 620 and 626.

⁷⁷ Curtius *op. cit.* 201 n. 35; 231f. For the survival of "Virgil's wheel" into the Renaissance and the critical problems it caused, see Annabel M. Patterson, *Hermogones in the Renaissance: Seven Ideas of Style* (Princeton 1970) esp. 29-31. For a full discussion of mediaeval and Renaissance uses of the *Georgics*, see Wilkinson (at n. 58) ch. 10, "The *Georgics* in After Times." See also William A. Sessions, "Spenser's *Georgics*," *English Literary Renaissance* 10 (1980) 202-38; Anthony Low, "Milton, *Paradise Regained*, and *Georgic*," *PMLA* 98 (1983) 152-69.

⁷⁸ Brian O Hehir, *Expans'd Hieroglyphicks: A Critical Edition of Sir John Denham's Coopers Hill* (Berkeley and Los Angeles 1969) 11.

⁷⁹ An especially good recent study is Brian Stock, *Myth and Science in the Twelfth Century: A Study of Bernard Silvester* (Princeton 1972). The *Hortulus* of Walafrid Strabo (9th century) is the best known of the early verse herbals. Other examples of the practical, straightforward type are the *De Viribus Herbarum*, 2269 lines, attributed to Macer Floridus (composed between the 9th and 12th centuries); the *Liber Lapidum* (or *Liber de Gemmis*) of Marbod of Rennes (1035-1123); the many medical poems by Urso of Calabria (fl. ca. 1175); the poems on urines and pulses by Urso's student, Gilles of Corbeil (ca. 1140-1224); and the Salernitan poems, the *Questiones Physicales* (ca. 1200) and the ubiquitous *Regimen Sanitatis Salernitanum* (earliest parts date from ca. 1250; it remained popular through the 17th century). Latin alchemical poetry from the British Isles (one of the only bodies of mediaeval Latin Didactic poetry to have received any systematic attention) is listed in Dorothea W. Singer, *Catalogue of Latin and Vernacular Alchemical MSS in Great Britain and Ireland dating from before the XVI Century* (Brussels 1928-31), II, 511-85. Accounts of some individual authors are found in F.J.E. Raby, *A History of Secular Latin Poetry in the Middle Ages* (2nd ed., Oxford 1957).

Some Mythologized scientific poems are Bernard Silvester's *Cosmographia*,

Alan of Lille's *Anticlaudianus*, and William of Conches' *Philosophia Mundi*. An interesting text is the *Liber de Novem Scientiis*, written ca. 1150, which is in both prose and verse; ed. Kenneth F. Williams (Chicago 1938). Lynn Thorndike has shown the widespread use of verse in prose scientific treatises from the 12th to the 14th centuries, in "Unde Versus," *Traditio* 11 (1955) 163-93.

⁸⁰ On the latter, which writers like Varro and Macrobius claimed to be among the most ancient Latin writings, see H.J. Rose, *A Handbook of Latin Literature* (3rd ed., London 1954) 5-6. While the proverbs, some as old as the second century A.D., in the *Dicta Catonis* are primarily moral in nature, this compendium (which was well known in the Middle Ages and Renaissance) contains these references to the Didactic:

If perchance you fain would acquaint yourself with farming, read Virgil; but if your struggle rather is to know the virtue of herbs, this is the poetry that Macer offers you; if you long to know of Roman and Punic warfare, you will seek Lucan, who has recounted the combats of Mars; if your fancy is to have a love-affair or by reading learn how to love, make for Ovid. But if your serious aim is a life of wisdom, hear what you may learn of things that ensure a course of life divorced from vice. Come then and, as you read, learn what wisdom is.

(Prologue to Book II, trans. J. Wight Duff and Arnold M. Duff, *Minor Latin Poets* II [rev. ed., 1935; rpt. Cambridge, Mass./ London 1982] 603 f.).

Over a dozen Old English verse charms survive, and some of those in Middle English belong to ancient oral traditions. For examples see K. Müllenhoff and W. Scherer, *Denkmäler deutscher Poesie und Prosa aus dem VIII-XII Jahrhundert* (rev. E. Steinmeyer) (4th ed., Berlin and Zurich 1974) II, 47; George Lyman Kittredge, *Witchcraft in Old and New England* (Cambridge 1929) 396 n. 145; and William George Black, *Folk-Medicine: A Chapter in the History of Culture* (London 1883) 78 f. We are grateful to Ralph Hanna III, of the University of California, Riverside, for these references.

⁸¹ For a list which includes about 200 Middle English poems of both kinds, see Schuler, *English Magical and Scientific Poems* (at n. 65). See also Roscoe E. Parker, "Some Relations between the Literature of Science

and Early English Prose," *Science and Literature*, ed. S.C. Aston et al. (Oxford 1955) 110-14.

⁸² The latter two were Englishmen; for their theories, see Atkins (at n. 69) 91 ff. *et passim*. Atkins does point out (pp. 171-76) that a more philosophical view of poetry, inspired by Boccaccio's *De Genealogia Deorum*, was available and that some early 16th-century English writers show some awareness of it.

⁸³ See especially his "Science and Information in English Writings of the Fifteenth Century," *MLR* 39 (1944) 1-8; some other relevant studies are cited in Derek Pearsall, *John Lydgate* (Charlottesville, Va. 1970) 81 n.35.

⁸⁴ See *Lydgate and Burgh's Secrees of Old Philosoffres*, ed. Robert Steele (London 1894) EETS, E.S. 66; Richard Pynson printed this as *The Gouvernaunce of Kynges and Prynces* in 1511. See also *Secretum Secretorum: Nine English Versions*, ed. M.A. Manzalaoui (Oxford 1977) EETS 276; and C.B. Schmitt and W.F. Ryan, eds., *Pseudo-Aristotle "The Secret of Secrets": Sources and Influences*, (London 1983).

⁸⁵ Ed. in Henry Noble MacCracken, *The Minor Poems of John Lydgate* (London 1934) EETS, O.S. 192, pp. 724-34.

⁸⁶ Rossell Hope Robbins, ed., *Secular Lyrics of the XIV & XV Centuries* (2nd ed., Oxford 1955) 251; text on pp.73-76 (also in MacCracken [at n. 85] 703-7). Robbins' anthology includes several examples of what he calls "Practical Verse," pp.58-84.

⁸⁷ See Rossell Hope Robbins and John L. Cutler, *Supplement to the Index of Middle English Verse* (Lexington, Ky. 1965) xii and 521.

⁸⁸ Pearsall (at n. 83) 68; see also pp.69 f. for the social and political reasons for this phenomenon.

⁸⁹ See Arnold Klebs, "Incunabula Scientifica et Medica," *Osiris* 4 (1937) 1-359; and Margaret B. Stillwell, *The Awakening Interest in Science during the First Century of Printing* (New York 1975).

⁹⁰ On both these points, see James R. Naiden (at n. 60) esp. chs. 1 and 2. For an edition of a Jacobean English verse translation of Book I of the *Sphera*, see Robert M. Schuler, *Three Renaissance Scientific Poems (Studies in Philology* 75 [1978] "Texts and Studies").

⁹¹ The following two paragraphs are based largely on Hathaway (at n. 57) 20-22 and ch. 4, "Were Empedocles and Lucretius Poets?" This excellent account shows how deeply criticism was entangled in the more general

philosophical debates of the Italian Renaissance.

⁹² See n. 57.

⁹³ See n. 29.

⁹⁴ In addition to Hathaway's remarks, see H.B. Charlton, *Castelvetro's Theory of Poetry* (Manchester 1913) 41-42 and 66 ff.

⁹⁵ Hathaway (at n. 57) 80.

⁹⁶ A useful summary of French and English criticism on the Didactic is in Durling (at n. 2) 9-16. See also Albert Marie Schmidt, *La Poésie scientifique en France au seizième siècle* (Paris 1938); and Schuler (at n. 66). A sequel covering the 17th century is in progress.

⁹⁷ See the discussions and bibliographies in Max I. Baym, "Science and Poetry," *Princeton Encyclopedia of Poetry and Poetics* 742-53; and G.S. Rousseau, "Literature and Science: The State of the Field," *Isis* 69 (1978) 583-91. The latter points out that after a significant upsurge of interest in the study of the relations between literature and science, recently this trend has weakened.

⁹⁸ A few modern examples of the genre can be found in Victoria Sackville-West's *The Land* (1926); *Songs of Science: an Anthology*, comp. Virginia Shortridge (Boston 1930); and Walter Garstang, *Larval Forms and Other Zoological Verses*, ed. Sir Alister Hardy (Oxford 1951), but these are anomalies. Perhaps the need of the populace to "know about science" today is being satisfied by publications like *Scientific American* and *Psychology Today*, by television documentaries, or even by science fiction. Whatever reasons lie behind the absence of a popular scientific poetry, they are beyond the scope of this essay, though it may suggest some avenues of approach to the question.

⁹⁹ Roy K. Hack, "The Doctrine of Literary Forms," *HSCP* 27 (1916) 60. This stimulating attack on the whole concept of generic definition shows, among other things, how the critical assessment of Horace's *Ars Poetica* varied radically, depending on whether critics assumed the work to be an epistle or a Didactic poem.