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Phocis and *Boeotia. The Locrians entered the region during the Dark Ages, and were themselves driven into their three regions by the later incursion of the Phocians. By the 5th cent. BC the Eastern Locrians had created an advanced federal government (see FEDERAL STATES), that included annual officials, the highest of whom was an *archos*, and a federal assembly of 1,000 members. There was also a federal judiciary. The government was probably an oligarchy, with its capital at Opus, the modern Atalanti. Western Locris had a looser federal government in which the political authority of tribes and cities were not then definitely demarcated. (See *SEG* 12. 480 for Western Locris as a federal state in the 4th cent. BC.) The Eastern and Western Locrians retained a strong bond of *kinship, and inscriptions prove that they retained political contact with each other. They also jointly contributed two members to the Delphic *amphictiony.

The Locrians sent one colony to Italy, known as Epizephyrian Locri (see LOCRI EPIZEPHYRII). During the *Persian War the Locrians fought with the Greeks against Xerxes at the battle of Thermopylae, but were forced to serve with the Persians at the battle of *Plataea. Although the Eastern Locrians took the side of Sparta during the *Peloponnesian War, notably by supplying troops to the Boeotians at the battle of *Delion and ships during the Ionian War (see PELOPONNESIAN WAR), the Western Locrians first joined Athens, but later supported Sparta. A Locrian dispute with Phocis figured prominently in the outbreak of the *Corinthian War, during which Locris supported those opposing Sparta. It allied itself with Boeotia during the Theban hegemony (i.e. 371–362; see THEBES (1)). Eastern Locris was the scene of heavy fighting during the Third *Sacred War, having been repeatedly invaded by the Phocians. It vacillated between loyalty to Macedonia and Rome during the Second Macedonian War. After 146 BC Locris remained loyal to Rome. Although Naupactus in Western Locris throve until the Venetian period, Eastern Locris declined in prosperity and population during the late Roman empire.

L. Lerat, *Les Locriens de l'ouest* (1952); J. M. Fossey, *The Ancient Topography of Opountian Lokris* (1990). J. Bu.

locus amoenus, 'charming place, pleasance', a phrase (Cic. *Fin.* 2. 107; Isid. *Etym.* 14. 8. 33, etc.) used by modern scholars to refer to the literary topos of the set description of an idyllic landscape, typically containing trees and shade, a grassy meadow, running water, song-birds, and cool breezes. The tradition goes back to *Homer's descriptions of the grotto of *Calypso and the garden of *Alcinous (1) (*Od.* 5. 55 ff., 7. 112 ff.); the rural setting for the dialogue in *Plato (1)'s *Phaedrus* was much imitated. In *Theocritus and *Virgil's *Eclogues* such landscapes form the backdrop for the songs and loves of shepherds. *Horace criticizes the fashion for such descriptions (*Ars P.* 16 ff.). This perfect nature is also the setting for the innocence of the *golden age and the blessedness of the Elysian Fields (see ELYSIUM); among real places the vale of *Tempe in Thessaly was idealized as a *locus amoenus*. There was an analogous fashion for ideal landscapes in Roman wall-*painting. In later antiquity and the Middle Ages such descriptions develop into free-standing poems (e.g. Petron. *Sat.* 131; Tiberianus 1). See GARDENS.

E. Curtius, *European Literature and the Latin Middle Ages*, trans. W. Trask (1953), 195 ff.; G. Schönbeck, *Der locus amoenus von Homer bis Horaz* (1962). P. R. H.

Locusta (Lucusta), a noted poisoner of Gallic origin, was employed by Agrippina the Younger (*Iulia Agrippina) to poison *Claudius and by *Nero for *Britannicus. Nero took with him on his flight a poison prepared by her. *Galba executed her.

*PIR*² L 414. A. M.

logic, the science of reasoning, developed among the Greeks as a result of their interest in arguments of all kinds, not only those occurring in philosophy and mathematics, but also those occurring in politics and the lawcourts. The comparison of valid and invalid arguments leads both to the abstraction of logical form from many arguments of a similar verbal pattern, and to the analysis of logical constants, i.e. the propositional connectives such as 'not' and 'if', and the quantifiers, 'every' and 'some'. Both processes may be observed within the context of philosophical argument in many of *Plato (1)'s dialogues, e.g. the *Parmenides* and the *Sophist*. *Aristotle at the end of the *Sophistical Refutations* claims to have been the first to study the technique of argument (*dialectic) systematically; in this work and in the *Topics* it can be seen how the study of argument-forms is gradually disengaged from the practical study of argument-winning.

Aristotle's main contributions to logic are, first, his theory of the four forms of general categorical statement (every S is P; no S is P; some S is P; some S is not P) and of the relations between them, developed in the *On Interpretation*; and secondly, based on this theory, the doctrine of the categorical syllogism, presented in the *Prior Analytics*. Two features distinguish the *Prior Analytics* as the first great work of formal logic: the use of schematic letters (A, B, C) to stand in place of terms ('animal', 'white', 'swan'), which immensely simplifies the presentation of formal argument, and the development of syllogistic as a system, a system namely of deductive inference. By the theory of reduction, the syllogistic moods are shown to be interconnected, so that all can ultimately be reduced to two, later called *Barbara* and *Celarent*. The syllogistic mood *Barbara* looks like this: 'A belongs to every B; B belongs to every C; therefore A belongs to every C.' Aristotle also made a beginning in the study of modal logic, i.e. the logic of propositions expressed or characterized by the use of the words 'necessary', 'possible', etc.; but his technical equipment was insufficient for this task, and his treatment is unsatisfactory. Aristotle's successor, *Theophrastus, attempted to render the theory of modal syllogisms consistent by what came to be known as the *peiorem* rule—without complete success. He also developed a theory of wholly hypothetical syllogisms, their prototype being syllogisms composed of three conditional propositions. These, he thought, were in some way reducible to categorical syllogisms, but his method has not survived.

In the Hellenistic period, largely independently of Aristotle's term logic, a tradition of logic developed which resembles the modern logic of propositions, and which was systematized by the Stoics. Its beginnings may be traced back to the Megarics (i.e. members of the *Megarian school), who, like Aristotle's contemporary *Eubulides, seem to have been mainly concerned initially with the study of logical puzzles. But two Megarics or Dialecticians, *Diodorus (2) Cronus and *Philon (6) of Megara, went further, and developed their own theories of the modalities (both precursors of the Stoic one; see STOICISM) and of conditional propositions. Philon anticipated some modern logicians by giving a truth-functional definition of the connective 'if . . . then . . .'. By far the greatest logician of this second tradition was the Stoic *Chrysippus. But his numerous works are almost entirely lost, and Stoic logic in general has to be reconstructed from fragments. Chrysippus' logic is based on the propositional connectives 'either . . . or . . .' (exclusive disjunction), 'both . . . and . . .', 'if . . . then . . .', and the prefixed negative 'it is not the case

that . . .' The conjunction and the negation were defined as truth-functional. The Stoics used variables, but the values of their variables were propositions ('It is day'), not terms, and the signs they employed were ordinal numbers ('the first', 'the second'), not letters. They, too, elaborated the core of their logic as a system of deductive inference. The resulting hypothetical syllogistic was grounded on five types of indemonstrable arguments (ἀναπόδεικτοι λόγοι) as basic syllogisms and four ground rules (θέματα) by the use of which all other syllogisms were claimed to be reducible to the indemonstrables. The form of the first indemonstrable (later called *modus ponens*) was expressed as follows: 'If the first, then the second; but the first; therefore the second.' Later Stoics introduced further propositional functions, notably the inclusive disjunction (*vel*), and tried to simplify deduction by reducing the number of ground rules.

The two systems of logic, term logic and logic of propositions, were considered as rivals by the Stoics and Peripatetics, each maintaining to cover the whole ground of logic. On either side there were attempts to 'reduce' elements of the competing doctrine to their own—with limited success. It is a moot point whether Aristotle's syllogistic implicitly presupposes a logic of propositions; in any case, because of Aristotle's narrow concept of a proposition, his system covers only part of logic.

In later antiquity, especially among Platonists, some conflation—and some confusion—of the two distinct traditions can be observed. Many Stoic elements found their way into the works of the commentators on Aristotle like *Alexander (14) of Aphrodisias, *Ammonius (2), and *Philoponus, and into the logical writings of *Apuleius and *Boethius. *Galen, in the 2nd cent. AD, made an attempt to synthesize the two systems; but his major work on logic is lost so that we cannot say how successful he was. And he professes to have introduced a third kind of syllogism, named 'relational syllogisms'; one type of simple relational syllogism has the form 'M is equal to N; N is equal to O; therefore M is equal to O'. Such syllogisms are frequent in mathematical reasoning, but again not much is known about Galen's treatment of them.

Inductive logic was comparatively little developed in antiquity. Aristotle discusses ἐπαγωγή in the *Topics* and in the *Posterior Analytics*, but he seems generally to mean by this term what was later called intuitive induction. There is, however, some attempt to formulate principles of scientific research in the Hippocratic writings (see HIPPOCRATES (2)) and in the later medical literature, in particular among the Empiricists. Similarly, some later Epicureans (see EPICURUS) developed a theory of inductive inference.

W. and M. Kneale, *The Development of Logic* (1984); I. M. Bochenski, *Ancient Formal Logic* (1951), and *La Logique de Théophraste* (1947); J. Łukasiewicz, *Aristotle's Syllogistic from the Point of View of Modern Formal Logic* (1957); B. Mates, *Stoic Logic* (1961); G. Patzig, *Aristotle's Theory of the Syllogism* (1968; Ger. orig. 1959); J. Corcoran (ed.), *Ancient Logic and its Modern Interpretations* (1974); M. Frede, *Die stoische Logik* (1974), and 'Stoic vs Aristotelian Syllogistic' and 'The Ancient Empiricists', both in his *Essays in Ancient Philosophy* (1987); P. H. and E. A. De Lacy, *Philodemus on Methods of Inference* (1977); J. Brunschwig (ed.), *Les Stoiciens et leur logique* (1978); M. Burnyeat, 'The Origins of Non-deductive Inference', and D. Sedley, 'On Signs', in J. Barnes and others (eds.), *Science and Speculation* (1982); T.-S. Lee, *Die griechische Tradition der aristotelischen Syllogistik in der Spätantike* (1984); K. Hülser, *Die Fragmente zur Dialektik der Stoiker* (1987–8); P. M. Huby, in W. W. Fortenbaugh (ed.), *Theophrastus of Eresus: Sources for his Life, Writings, Thought and Influence* (1992).

S. Bo.

logistai (λογισταί) in Athens in the 5th and 4th cents. BC were public auditors. Three distinct bodies with this title are known:

1. In the 5th cent. 30 *logistai* supervised payments to and from the sacred treasuries.

2. Ten *logistai*, selected by lot from the members of the *boulē*, checked magistrates' accounts each prytany (see PRYTANEIS).

3. Ten *logistai* and ten advocates (συνήγοροι), selected by lot from all citizens, examined the accounts of magistrates at the end of their term of office and brought them before a jury, as the first part of the *euthyna*. Presumably the *logistai* presided in court and the advocates were the prosecutors. If the jury found a magistrate guilty of theft or of accepting bribes, the penalty was a fine of ten times the amount of the offence; if merely of 'malefaction' (ἀδίκιον), which may mean causing loss of public money by neglect or inadvertence, the penalty was a fine simply of the amount lost. See also CURATOR REI PUBLICAE.

M. Piérart, *Ant. Class.* 1971, 526–73.

D. M. M.

logistics (Greek, military) In the ancient world, moving and supplying troops was most easily done by sea, and the Greeks believed their 'history' began with an overseas expedition—the Trojan War (see TROY). Certainly, by the 6th cent. BC the *Spartans were capable of attacking *Samos, and in the 5th the Athenians launched seaborne expeditions as far as *Egypt and *Sicily. In the latter case, *Thucydides (2) provides us with details of some of the preparations, including conscripting bakers from mills in Athens (6. 22).

On land, unless they were cavalry, troops went on foot—*Xenophon (1) and his comrades marched anything from 29 (*An.* 1. 2. 10) to 47 km. (1. 2. 6) a day (18–29 mi.) on the way to *Cunaxa until they were near the enemy—and were housed either in skin tents (cf. *An.* 1. 5. 10) or in the open. Foraging was common (cf. e.g. Xen. *Hell.* 2. 4. 25–6, 4. 1. 16), but in friendly or neutral territory food was bought (e.g. Xen. *An.* 1. 5. 6, 2. 5. 30; 1. 5. 10; see MARKETS AND FAIRS). Where there was a likelihood that no provisions would be available, arrangements would be made to carry them (cf. e.g. Xen. *Cyr.* 6. 2. 25 ff.), and there are examples of supply-lines being organized where an army remained in one place for any length of time, for example during the *Plataea campaign (Hdt. 9. 39. 2).

On land ox-carts, pack-animals, and human bearers were used to carry supplies, and Xenophon gives a vivid idea of what these might include (*Cyr.* 6. 2. 30 ff.). Wagons (ἅμαξαι) are often mentioned (see TRANSPORT, WHEELED), and could carry more than pack-animals—Xenophon reckons the average load 'per yoke' as 25 talents (*Cyr* 6. 1. 54—i.e. about 920 kg. or 2,030 lb.). But they could not go everywhere, and Xenophon and his comrades, for example, burned their wagons before their long march home (*An.* 3. 3. 1). The term most frequently used for the animals employed—*hupozugia* (lit. 'beasts under the yoke')—obviously included oxen, but also mules and *horses (Xen. *Oec.* 18. 40), and is sometimes used in addition to 'wagons' clearly to mean 'pack-animals'. Human bearers are usually termed *skeuophoroi* ('baggage-carriers'). *Philip (1) II and *Alexander (3) the Great of Macedonia tended to restrict the size of baggage-trains, and to rely on the soldiers themselves, and their servants, for carrying equipment and supplies; for pack-animals, horses, mules, and *camels were used in preference to oxen or donkeys.

Food consumed obviously varied with circumstances (see FOOD AND DRINK). Xenophon mentions wheat, barley, and chestnut bread, meat, including boiled beef and ass meat (*An.* 2. 1. 6), olives, dates, raisins, vegetables, pickled dolphin, and dolphin fat used instead of olive oil. Most interestingly, the daily rations allowed to the Spartans trapped on Sphacteria, under armistice

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