PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

The Olive in the Mediterranean: Its Culture and Use [and Discussion]

J. Boardman, Kathleen M. Kenyon, E. J. Moynahan and J. D. Evans

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The olive in the Mediterranean: its culture and use

By J. Boardman, F.B.A.
Merton College, University of Oxford

[Plates 3 and 4]

The physical evidence offered by the palaeobotanist can, in some ancient cultures, be supplemented by other information – literary, iconographic and archaeological – about plants and trees, the use of their products, and their importance in the life, trade and even religion of the people who cultivated them. This paper reviews some of the sources available for the study of the olive tree and its products, principally in Greek lands where the tree seems first to have been cultivated on any scale and where its importance is well attested from the Early Bronze Age throughout antiquity.

The classical archaeologist concerned with the evidence for the history and culture of Greek lands operates in an area where the material evidence does not form even the major part of what is available for the assessment of that history and culture, although in the earlier reaches it is more nearly dominant and it can correct or substantially supplement that from other sources. Scientific aids and approaches are increasingly used in Classical archaeology and there is, I believe, a sensible (by which I mean one which can be sensed) shift of overall approach as a result. This is of course healthy, especially in a study which is generally regarded as conservative, but the nature of the bulk of the evidence still dictates the nature of the bulk of the discipline. We may, then, be modest users of the skills of the palaeobotanist, but it is possible that there is something to contribute in return. There must be some merit and advantage in the study of an ancient culture where not only is the variety of the physical evidence so very rich and diverse, but other sources are available as well. Most archaeologists are, or should be, aware of this variety even if they have little occasion to handle it in, for instance, the study of Greek prehistory. To the scientist or prehistorian of other areas it may give an indication of the range of data from other sources, some archaeological, to which the new physical data may be added; and the range of evidence from later and better documented centuries might profitably suggest questions to be asked of earlier periods. In this paper I want to explore, sometimes summarily, sometimes in detail, this range of evidence.

My subject is the olive tree and its products, its culture and use in the Mediterranean world, especially Greece. This is the sort of study which leads rapidly far from the tree itself, and it is in the nature of my subject to pursue byways which often turn out to have much to contribute to the main course. And for the archaeologist-historian the interest in the olive inevitably lies in the use made of it by man, its effect on his life and works.

What I learn from the botanist I summarize briefly and, I confess, unprofessionally. It seems probable that the wild olive grew freely in the eastern Mediterranean area and countries of the near east (Renfrew 1973). The place and time of its first cultivation, if there was a single place and time, and its first use for the production of oil, is less clear. It has normally been assumed that this happened somewhere in the Syria/Palestine region, probably in the Early Bronze Age or Chalcolithic period. The botanical evidence remains incomplete on this point and

obviously much more may be hoped for. When we turn to the Greek world it seems clear that cultivation was known in Crete in the Early Bronze Age and that oil was being extracted there and in the Greek islands. At Myrtos in south Crete we have the vats for separating the oil, following the early practice of crushing the fruit, plunging them into hot water and skimming off the oil, and the same site has yielded stones from what must be judged the cultivated fruit (Warren 1972). And from the island of Naxos comes the find of a jug containing traces of olive oil and, from the same grave, two oil lamps (Renfrew 1972, p. 285). The allegation that some stones from Crete demonstrate a transitional type between wild and cultivated olive would encourage the belief that cultivation was achieved either first or independently in Crete (Helmquist 1973). Since Greek lands are peculiarly suitable for the olive this is a view which has some attractions, especially for the anti-diffusionist; not that I am one, holding that some things happen one way, some another, and that all extreme views are wrong. But I cannot judge the validity of the deductions for the botanical evidence in this case.

We may take it then that cultivation of the olive was learned or developed in Greek lands in the Early Bronze Age but it was certainly not yet of prime importance. Colin Renfrew has published a useful map showing the relation between Early Bronze Age sites in Greece and the olive-producing areas of varying productivity in relationship to grain (Renfrew 1973, fig. 18.12). Since there is apparently no significant correlation it is clear that we have to wait some years before the olive plays a major role in Greek life.

The land of Greece is particularly friendly to the olive. This, and other aspects of its behaviour and husbandry relevant to Greece, are worth a moment's consideration (Vickery 1936; Hehn 1911; Aschenbrenner 1972; Pease 1937; Richter 1968). When God made the world he put all the earth through a sieve and set down some good soil here, which was one country, and some there which was another, and threw all the stones over his shoulder, and that was Greece. The comparatively poor quality of Greek soil means that there are limited areas where wheat will be very successful, but there are many in the lower, alluvial soils, which are moderately productive and well drained, where either the olive or the vine, that other staple speciality of Greek sustenance, can flourish. The climate is right too provided you do not plant too high, because the olive can tolerate periods of drought but not long periods of cold, although the nip of winter is said to be necessary for good fruiting. Its cultivation also fits very well into the farmer's year. The time for the preparation of the ground in the orchards does coincide with that for ploughing, to be sure, but the harvest comes from late October to mid January when it does not compete with other major activities; and if you have to you can use your presses for olives at one time of year, for grapes at another, but this could only apply with comparatively primitive arrangements and by the Classical period specialist presses had been invented.

One peculiarity of its behaviour is that good crops come in alternate years, the difference being between two to four times as much as in the intervening lean years. This is not a matter for individual trees but the two-year cycle seems both world-wide and synchronized. In small scale farming this might not have been much remarked and the fact that the product could be readily stored would have mitigated hardship, but once the production of olives and oil became a major factor in the economy this was a feature of considerable importance in the planning of distribution and storage. Indeed it makes planned storage and distribution essential and may lie behind the very complicated arrangements made in the Minoan and Mycenaean palace bureaucracies. It was certainly also observed later, in days when Greece's economy was less

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

centralized, and may be the clue to an ancient anecdote about the sixth-century B.C. philosopher Thales. He predicted a good harvest for the following year and demonstrated the practical advantages of his wisdom by paying for prior use of the oil presses in Miletus and Chios out of season (Aristotle, *Politics* 1259*a*). He must have observed the cycle and put it to good use. In the fifth century it becomes part of the poet's lore, and Pindar writes – 'and in all the circling of the years fruit trees will not bear fragrant blossom equal to their yield, but in alternate years' (*Nemeans* 11, 40–1).

Another important factor is the length of time which it takes for the tree to reach fullest productivity. It is extremely long-lived but needs constant attention if it is not to revert to a wild state. Like us, for the olive tree life begins at forty and it is only over that age that full production of even as much as 50 kg per tree can be hoped for, while from a smaller young tree 10 kg would be a good yield today. So a farmer plants or grafts his olives for his old age or his children. In the war between Athens and Sparta at the end of the fifth century B.C. a feature of the annual invasions of Attica was not merely the burning of the wheat crops but the cutting down of olive trees. There would have been no olives to harvest there for another generation and for Athens this was a no less serious matter than the loss of a year's corn.

During the Greek Bronze Age there is some botanical and ample archaeological evidence for the importance of the olive and olive oil. I need hardly cite the great magazines and oil jars of the Cretan palaces. On one count 70 m^3 (16000 gal) of oil might have been stored in the West Magazine pithoi of the Palace at Knossos (Graham 1962). At Mycenae houses outside the citadel wall were found to have been devoted to the oil production which must have been an important part of the state economy (Wace 1953). This is shown by the storage facilities, and by the content of the inscribed records found there. The smaller storage jars introduce us to another important secondary source of information about the olive and its products. At Mycenae the distinctive so-called 'stirrup jar' with its narrow shoulder spout was found in some numbers, including many with their sealed clay stoppers still in position. This is a specialist container and you can see that in this and other periods the archaeologist's ability to date and identify the source of such vessels can be an invaluable indication of an olive oil industry and of trade.

To the physical evidence (Renfrew 1972; Hopf 1962; Helmquist 1973; Willerding 1973) of the stones, pollen, and oil, and of the clay containers, we may add the texts of the Linear B tablets which record the distributive system of the palaces in the fourteenth and thirteenth centuries B.C. (Ventris & Chadwick 1973; Bennett 1958). These, however laconic their texts, offer very varied information. There are rations of oil being dispensed to individuals, but also to divinities, so the olive is already playing some part in cult even if only as a valued commodity as likely to be of value to a god and his ministers as to mortals (Vermeule 1974; Ventris & Chadwick 1973; pp. 217–220, 303–308). There are references to perfumed oil, to which I shall return, and records of transactions which detail quantities and numbers of stirrup jars involved. At Knossos there is the record of orchards numbering hundreds of trees (Ventris & Chadwick 1973, pp. 133, 272–273). The organization involved in the collecting and distributing of the oil was complex and the areas within and outside the palaces devoted to storage and administration are witness enough to the role it played. There is nothing comparable from the better documented palaces of the near east.

The end of the Bronze Age in Greece sees the end of the palace bureaucracies and their elaborate accounting and rationing, their massive stores. What follows is the Dark Ages,

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

depopulation and general recession, but soon gradual regeneration to the new Greece of the Geometric period, from which stems that rapid progress to the full Classical in barely 300 years. The darkness of the Dark Ages is in some ways well expressed by the absence of lamps and, it is assumed, the absence not so much of light but of the oil to burn. The olive trees might have been destroyed or left to grow wild. The end of the Dark Ages is the period of the Homeric poems, which reflect more of contemporary life than of the heroic Bronze Age. The olive is of little account in Homer although the distinction between cultivated and wild is, it seems, drawn (*Odyssey* 5, 477). The poet Hesiod, writing in about 700 B.C., has a whole poem on the works and days of a farmer's life yet no mention of olive cultivation (Richter 1968). It is impossible to believe that the cultivation of the olive was one of the things which the Greek Geometric Renaissance had to relearn. Pollen from cores in the Osmanaga lagoon of south Greece and Lake Voulkaria in NW Greece seem to indicate peaks of olive growth in exactly this period of the Dark Ages (Wright 1972). If the dates are right this might mean no more than a proliferation of wild olive, or perhaps it was grown to be eaten rather than pressed, or perhaps Hesiod's ignorance merely reflects the local conditions of Boeotia in central Greece where he lived. Here is a problem where botany could help us better understand the living conditions and standards of the formative Dark Ages of Greece, but even here there is secondary archaeological evidence which may be relevant, as we shall find.

It is with the seventh and sixth centuries that we can see that the olive is acquiring again a position of economic and even political importance in Greek lands. These are the years of the consolidation and expansion of Greek colonial activity in the western Mediterranean. The Greeks carried their wine west, and then showed the Gauls and Italians how to cultivate the vine and make their own wine. The same, less fully documented, was true of the olive. In Italy there is the evidence for the import of oil in the containers for the liquid, for instance the so-called SOS amphorae from Athens and Euboea which are the predecessors in shape of the more elaborately decorated vases for the prize oil given at the games in Athens from the sixth century on. There are also the tiny perfumed-oil vases from Greece, evidence for an important oil use of which there is more to say. But at the end of the seventh century we find in Etruria locally made perfume vases, and this is a fair indication that the oil was being locally extracted and processed, that cultivation on some scale had been learned. Moreover, a later Roman writer says that there was no olive oil produced in Italy until the time of Tarquinius Priscus, which is about 600 B.C. So the evidence of an ancient author and the observation of pottery types, with what we know of their use from analogy with their use in Greece, leads us to information about the cultivation of the olive in Italy on what might be called a commercial scale (Vallet 1962).

The dispatch of colonies to the west, to Africa, to the Black Sea, was the result of the pressures of increasing population on Greece's limited land resources, plus the Greek instinct for exploration which must have been in part the response to this challenge. But not all states responded in the same way. Athens and her rural district of Attica had land more suitable for the vine and olive than for wheat and she deliberately turned to specialist farming for wine and oil which could be marketed and pay for whatever extra wheat was required without having to send out her citizens to new colonies to find new cornlands for themselves. So there are no Athenian colonies but her exploitation of the olive won her, and her goddess Athena, the reputation for having discovered the tree. In the early sixth century the Athenian lawgiver Solon expressly forbad the export of agricultural produce with the exception of olive oil

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

(Aristotle, *Politics* 1266b), which seems to have been positively encouraged. He passed laws against the casual cutting down of trees and about the distances from boundaries at which they should be planted, and we have reference here to them being planted in regular rows, not haphazard, which is more than we have even from the near east, where the references to orchards and fruit trees stop short of the olive being treated in this orderly fashion. Athena's sacred olive was shown on the Acropolis. When it was cut down by the Persian invaders it miraculously put out shoots again to celebrate the ultimate victory. It was not difficult by this time for the olive to acquire some degree of religious significance which went beyond sentiment and economic advantage and this is yet another facet of the study of the tree.

Not surprisingly, it is on Athenian vases that we can see the life cycle of olive production, from harvest to hard cash (Cloche 1931). There is the harvest, with men beating down the fruit with sticks (figure 1, plate 3); the oil press (figure 2, plate 3); and a special vase shape, known conventionally as a *pelike*, which seems to have been used in the retail trade in perfumed oil and on which there are scenes of the trade in progress, with dippers and funnels to convey the liquid, arguments over the filling or price, and the heartfelt legend on one 'Oh father Zeus, may I get rich' (figure 3, plate 3). These are works which can be closely dated and localized and therefore have immense value as sources for life and manners in Athens.

The oil was important also in the rituals accompanying death and burial and oil flasks were regular offerings in tombs (Kurtz & Boardman 1971). In fifth-century Athens these flasks (*lekythoi*) were often large and elaborately painted. Their capacity was large too, but perfumed oil was no doubt expensive and many of the flasks were made with economically false interiors which can be seen in fragmentary examples or X-ray photographs.

The production of oil and farming of the olive became really big business again in the Mediterranean world with the last centuries B.C., which saw the empire of Alexander the Great, the rise and fall of the Hellenistic kingdoms from Greece to India, and the rise of Rome. The oil moguls of the second century B.C. were the owners of the large estates in Italy and North Africa. So much is known of their methods of production and business that I need do no more than mention two of the diverse sources which help us. In Egypt we have on papyri the records of day-to-day business in the big estates of the Ptolemies. We learn of the planting of trees, distinction of varieties, grafting onto both vine and fig, and the importance of the import trade (Rostovtseff 1953). With customs duties sometimes at 50% smuggling was rife and the penalties for smuggling heavy. In Italy we have the works of Cato who describes in detail the management and equipment of his model farm (White 1970; Jüngst & Thielscher 1954, 1957; Frank 1932). It involves an area of about 60 ha of which 50 ha carry about 6000 trees. The whole harvest was to be cleared in 25 days. By this time there is seemingly no end to the sources of information about olive oil production so we may return to questions of its use and the archaeological and other evidence for it.

The use of the wood of the tree has not been mentioned. If you are cultivating olives there is no incentive to use them as timber but in the near east the wood seems to have been much in use from the Late Bronze Age on, to judge from excavated samples (van Zeist & Heeres 1973). In Greece the descriptions in Homer may suffice and he mentions the use of the wood for a variety of objects from axe hafts to the bed of Odysseus (Richter 1968). Herakles' club was of olive wood. It takes high polish and seems to have been respected by the carpenter.

The use of the fruit as a food may have been of less importance although it was certainly not despised (Vickery 1936; Bruns 1970; Brothwell 1969), as the discovery of the fruit and stones

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

in the company of other foodstuffs indicates (in the 'Caravanserai' at Knossos, for example). The olive has a higher fat content than any other readily cultivable fruit. The oil as a foodstuff, and more as a foodstuff than as a cooking medium, was obviously of prime importance. Rustic diet in Greece today is still often based simply on bread dipped in oil and Cato gave his men 5 *modii* of salted olives and 4 kg of oil for every 1200 *modii* of the fruit that they picked. Then there is the use of oil for lamps. Its possible absence in the Greek Dark Ages has been remarked and it is not surprising that the only mention of a lamp in Homer is to a golden lamp which belongs to Athena (*Odyssey* 19, 33). There is one other use, barely mentioned so far, which is more important than might be thought and for which the range of evidence is perhaps the most varied and impressive. This is the cosmetic. It gives a good idea of the archaeological, social, literary, linguistic and economic search which study of the product of the olive tree can promote. There are two liquids, says Pliny (*Natural History* 14, 150), that are specially agreeable to the human body, wine inside and oil outside.

We may start with the later evidence for the use and work our way back. In Classical Greece it was regular practice for athletes or others who had indulged in energetic work, even women, to rub olive oil on their bodies and then scrape off the mixed oil, dirt and sweat with a scraper called a strigil. One of the most famous statues of antiquity, Lysippus' Apoxyomenos, shows an athlete scraping himself down, and we are regularly shown in vase paintings the basic equipment of oil bottle, strigil and sponge. The strigil was usually a fine bronze implement (figure 4, plate 4), so personal a piece of equipment that it formed a regular part of the grave furniture of a man's tomb, a necessary accompaniment to his dustiest journey of all. But we have no metal strigils before the mid-sixth century and other things may have been used. Small iron sickles could have been employed since they are found in Classical tombs on Delos and at Sparta they were prizes for athletes (Boardman 1971). In Sparta too we are told that they used strigils of reed. Naturally none has survived but we may guess what they looked like from a decorated specimen which was taken from the body of King Kofi at the battle of Kumasi in 1874. Kumasi was the Ashanti capital and the British victory led to the foundation of the Gold Coast colony. The strigil is in the Charterhouse School museum, and I show it through the kindness of Mr Blake (figure 5, plate 4).

The small oil bottles are very well attested and take the use of perfumed oil, without the strigils, back to the later eighth century. The oil was scented. We know this from descriptions and references. In Pliny's time the iris of Corinth was prized for its scent (*Natural History* 13, 2, 1) and an Athenian oil flask of about 500 B.C. has *hirinon* 'of iris' written on its lip. It was a precious commodity and attracted the finest work of both potter and painter (Haspels 1936). Their success with the commodity and its containers may be judged from their wide distribution in considerable numbers throughout the Greek world and far beyond it.

An unusual illustration of the relation between oil and containers in the seventh century B.C. and back in the Mycenaean Bronze Age is afforded by a vase recently acquired by the British Museum (1970.9-10.2; illustrated here (figure 6, plate 4) by kind permission of Mr Haynes and Dr Birchall). It was made and decorated by a Corinthian potter, but the arrangement of handles and spout is a direct throwback to the Mycenaean stirrup jar, a shape which had not been made in Greece for over 400 years.

We come back now to the eighth century and the period of Homer. This is when the fine small flasks are first seen, and it is likely that we should assume that the practice was one of many results of the orientalizing movement apparent in Greek life and art from the eighth

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

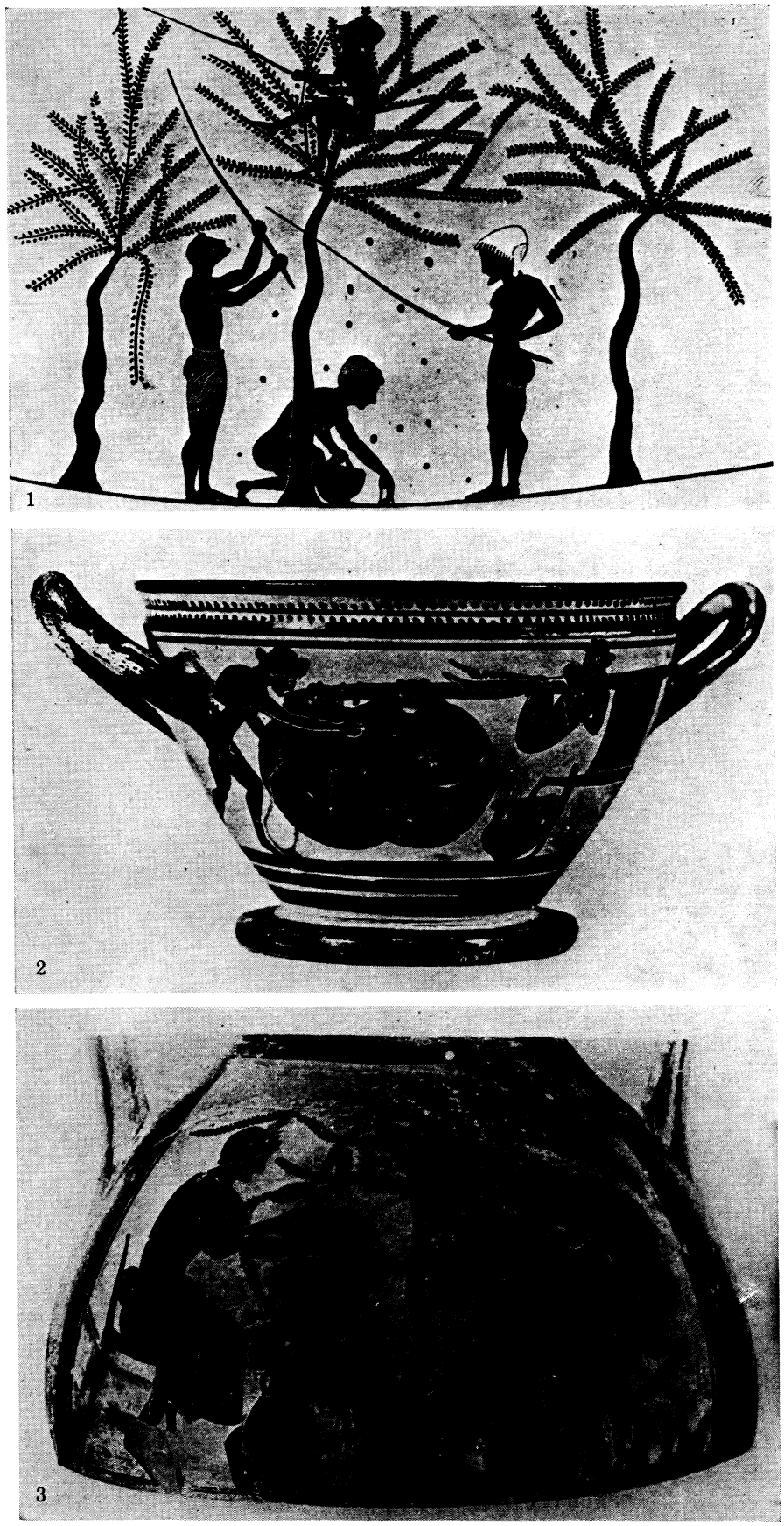

FIGURE 1. Athenian vase, about 520 B.C. British Museum B226. After Cloche 1931, pl. 10, 1.
FIGURE 2. Athenian vase, about 500 B.C. Boston Museum of Fine Arts 525. After Cloche 1931, pl. 10, 2.
FIGURE 3. Athenian vase, about 500 B.C. Vatican Museum. After Cloche 1931, pl. 33, 1.

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PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

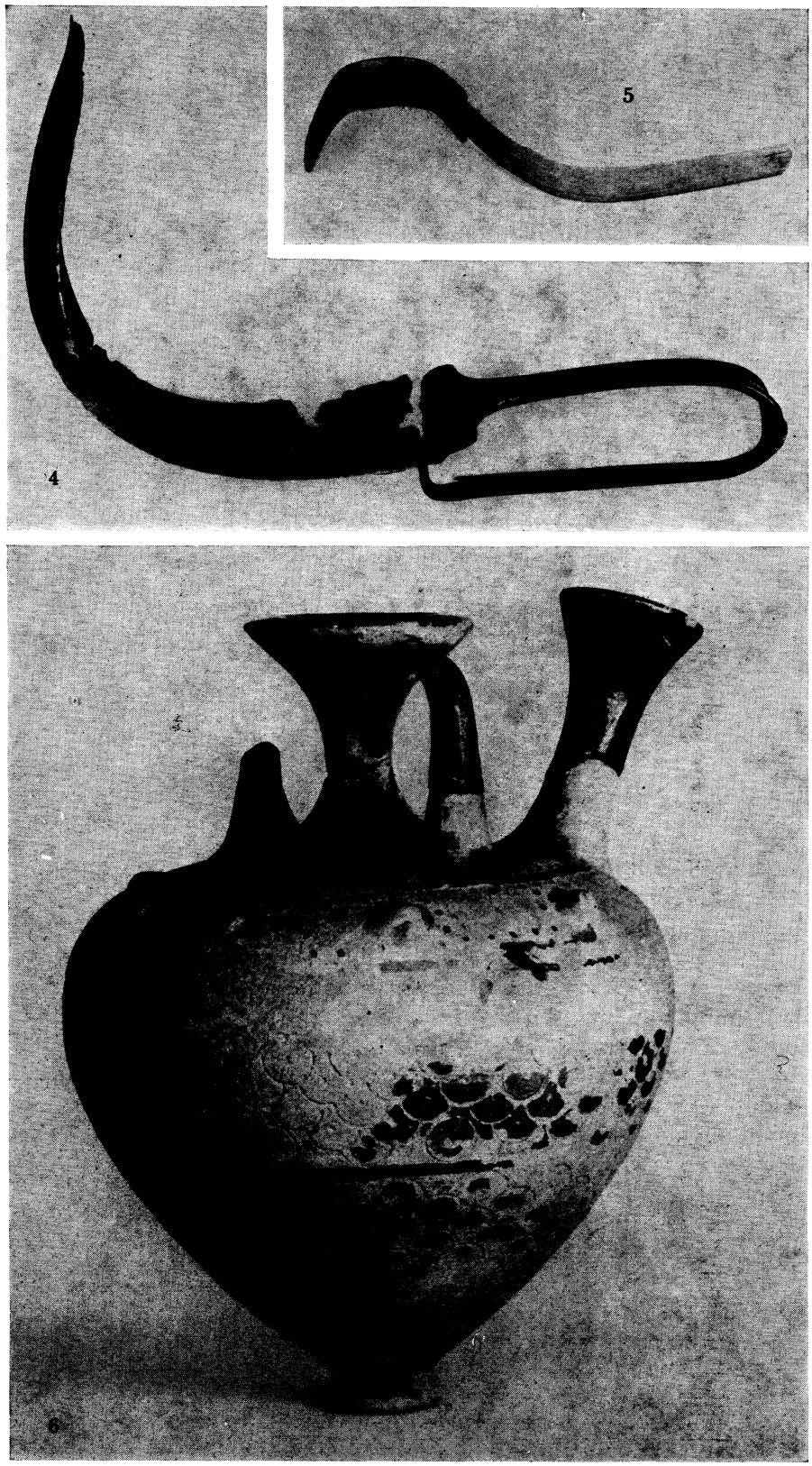

FIGURE 4. Bronze strigil. Oxford, Ashmolean Museum. Museum photo.

FIGURE 5. Reed strigil. Charterhouse School Museum. Author's photo.

FIGURE 6. Corinthian stirrup vase. About 600 B.C. British Museum 1970.9–10.2. Museum photo.

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

century on (Hampe 1969). The east had long been a source for scented oils but there was no question of learning the details of the bath ritual from the east for there are no metal strigils there. The cosmetic use might have been quite different since the practice seemed rather to involve dipping the fingers into shallow bowls, not shaking it from a narrow-necked bottle to rub all over. Homer says nothing of strigils or scraping. For his heroes and women a bath is a matter of a good wash with water followed by a rub with oil leaving the body glistening, a state obviously much admired (Richter 1968), and no less today than then to judge from current advertisements. The new perfumed oils were something of a luxury. Nausikaa keeps her bath oil in a gold flask. 'The Graces bathed (Aphrodite) with heavenly oil such as blooms upon the bodies of the eternal gods, oil divinely sweet, which she had by her, filled with fragrance (*Hymn to Aphrodite* 61–63). And the word for oil specifies olive oil. Hera, preparing to seduce her husband Zeus 'anointed herself with the delicious olive oil she uses. It was perfumed and had only to be stirred in the Palace of the Brazen Floor for its scent to spread through heaven and earth. With this she rubbed her lovely skin' (*Iliad* 14, 171–175).

The Homeric use may have differed from that of later years but the oil itself is already precious. In the Dark Ages we remain uncertain about the production and use of oil. We have no lamps, certainly, and the typical Bronze Age oil flask shape, the stirrup vase, disappears, but there are other small flasks with narrow round mouths and I wonder what, if not oil, they could have held.

Back in the Bronze Age we might expect it difficult to find evidence for cosmetic practices to match the Homeric or Classical. But the tablets and artefacts show that the great importance of oil for rations, offerings and food was matched by the cosmetic trade. On the Linear B tablets (Ventris & Chadwick 1973, pp. 476–483; Bennett 1958) the oil is sometimes described as scented, with sage, rose or cyperus; and at Pylos the functions of an unguent-boiler can be deduced from his transactions with oil and oil jars. There is mention too of oil for clothes which matches a practice mentioned by Homer and suggests something like rose water which could be sprinkled on linen. Some miniature stirrup jars too indicate a more personal container for cosmetic use. It seems most probable that the refreshing sensation of oil on skin was as familiar to Bronze Age Greeks as to Classical or to latterday users of bath products. Did they ever scrape down? There are no recognizable strigils but we might wonder about some of the various metal implements which excavators class as toilet knives or razors. Greece's special relationship with the olive and its oil may not quite take us back to the Ark and the olive twig which the dove brought Noah, but judicious use of botanical evidence, with the vast and varied range of evidence which the Classical archaeologist has also to learn to control, could reveal a relationship between man and a tree he had trained to work for him, no less significant nutritionally, socially and economically, than that between man and other products of his agricultural skills which have attracted rather more attention in the text books.

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PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

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Discussion

DAME KATHLEEN M. KENYON (*Formerly Director, British School of Archaeology in Jerusalem*)

Note on the cultivation of olives in Palestine

It is reasonably certain that olives were cultivated in Palestine at least by early in the 3rd millennium B.C., for tombs of the Early Bronze Age contain many vessels certainly used as lamps, small round-based saucers with marks of burning on the rim.† A possible 4th millennium use of olives is suggested by finds at Teleilat Ghassul, just east of the Jordan and a few kilometres north of the Dead Sea. There, in the description of the stone-lined silos, the first excavators stated‡ that in several silos were found not only grain but the stones of olives and dates. There is no morphological evidence that the olives were cultivated, for at the date of the excavations, 1929–32, such matters were not studied. The olive, however, is not indigenous in the Jordan valley, and in fact does not grow there today, though it is of course found in the hills of trans- and cis-Jordan. It seems probable that if it was worth transporting the fruit to a fairly distant settlement, it must have been improved from the small wild fruit.

† E.g. Kenyon, K. M. *Jericho I*, p. 97, Tomb D12, fig. 33. 5 and 7.
‡ Mallon, A., Koeppel, R. & Neuville, R. *Teleilat Ghassul I*, p. 40.

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

E. J. Moynahan (*Guy's Hospital, London, SE1 9RT*)

Mr Boardman has drawn attention to the use of olive oil as a cosmetic in the Greek World, but there is another and more widespread use which should not be overlooked – namely the protection of the skin against the desiccating effects of dry winds which are a feature of the climate of the East Mediterranean region at all seasons.

Exposure to such winds will produce painful chapping, scaling and fissuring as water is lost from the skin surface by evaporation. This renders the keratin of the epidermis increasingly brittle and the condition may properly be termed 'wind burn'. It is often mistaken for sunburn, but against it pigment offers no protection at all.

The nude or semi-nude Greek at the gymnasium would be at the mercy of these winds unless he anointed his skin with oil to prevent or minimize the evaporation of water from his skin; in this respect he resembles the bikini-clad girl on the Mediterranean beaches, who gets her protection, as Mr Boardman has pointed out from Ambre Solaire – perhaps *ombre venteuse* would be more apt, as these preparations offer more protection against dehydration than they do against sunburn. It seems that olive oil was also used by sea-farers in antiquity to protect against salt and wind, much as aviators are provided with protective creams to apply to exposed skin, when forced down at sea especially in the tropics.

Reference

Moynahan, E. J. 1974 Sun, wind and skin. *Br. Med. J.* p. 410.

J. D. Evans (*Institute of Archaeology, Gordon Square, London WC1H 0PY*)

The two admirably clear papers by Mr Higgs and Mrs Jarman have stressed regularities through time in the relationship of man with his environment, and the similarities between human and animal behaviour in this respect. I should, however, like to draw attention to some of the limitations of this approach.

Many years ago Professor Clark pointed out that the apparent state of equilibrium between human groups and their environment is an illusion produced by taking a short-term view of the situation (Clark 1954, p. 22). In the long-term there is a 'tendency to disequilibrium or change', so that each society's relationship to its environment at a particular time must be regarded as in some respects unique. Furthermore, while human behaviour undoubtedly has many things in common with that of other animals, there are nevertheless significant differences, which, as Professor Steensberg remarked yesterday, are often more interesting than the similarities.

It is therefore important to take into account the evidence for both the environmental and cultural history of a region as well as the aspect which it presents at the present day. Mrs Jarman's use of the distribution of Neolithic village sites on the Tavoliere of Apulia illustrates some of the problems which arise. The very large numbers of these sites (about 1000 are now known), and the fact that they frequently lie very close together (only a few hundred metres apart in some cases), has suggested that not all of them can have been occupied at the same time, though too few have yet been excavated to provide a reliable check on this. It also seems likely that there has been environmental change on the plain, but little direct evidence is available as yet. In this situation it would seem to me that conclusions based simply on the distribution of Neolithic sites and present land use in the area are premature. Strong arguments have also

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

been put forward recently that the *garrigues* of Languedoc, used in another of her examples, have probably been produced by post-Neolithic environmental change (Smith 1972, pp. 397–407).

There is also, it seems to me, another important limitation imposed by the essentially static and generalizing approach adopted in these papers. European agriculture was largely based on domesticates whose wild ancestors did not occur locally. It was essentially something introduced, rather than developed on the spot. Much of the interest of its early history in Europe lies in how this happened; in such things as the detailed study of the various combinations with pre-existing economies which arose as the various human groups developed their own individual solutions to the new situation, and of how these then changed with time.

To Mr Boardman's witty and comprehensive account of the early history of the olive I have little to add. However, I think that he has perhaps underrated the commercial importance of its products in the Aegean in the 3rd millennium B.C. Dr Rackam's study of the olive wood from Myrtos (Rackam 1972, p. 295) demonstrates intensive cultivation (evidence of regular pruning), while the evidence of the large numbers of pithoi on many sites seems to indicate that olive oil (along with wine) was being stored in large quantities at this period, and was probably already being exchanged between communities as part of the intensified commercial activity for which we have a great deal of evidence from the Aegean at about the middle of the 3rd millennium B.C.

References

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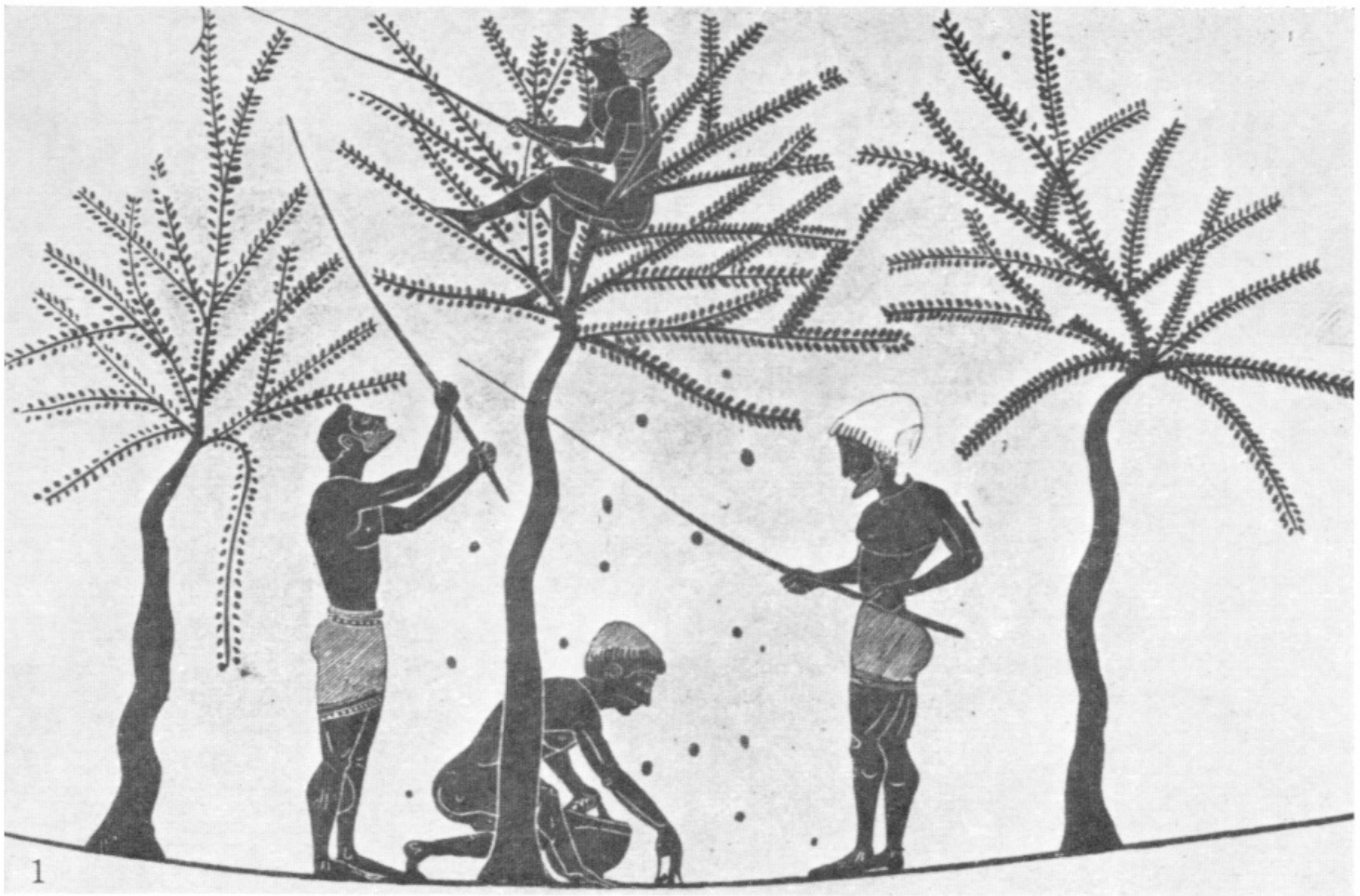
Rackam, O. 1972 The Vegetation of the Myrtos Region, in Warren, P., *Myrtos, an Early Bronze Age settlement in Crete*. The British School of Archaeology at Athens and Thames and Hudson, London.

Smith, C. A. 1972 Late neolithic settlement, land use and *garrigue* in the Montpellier region, France. *Man* **7**, 397–407.

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES



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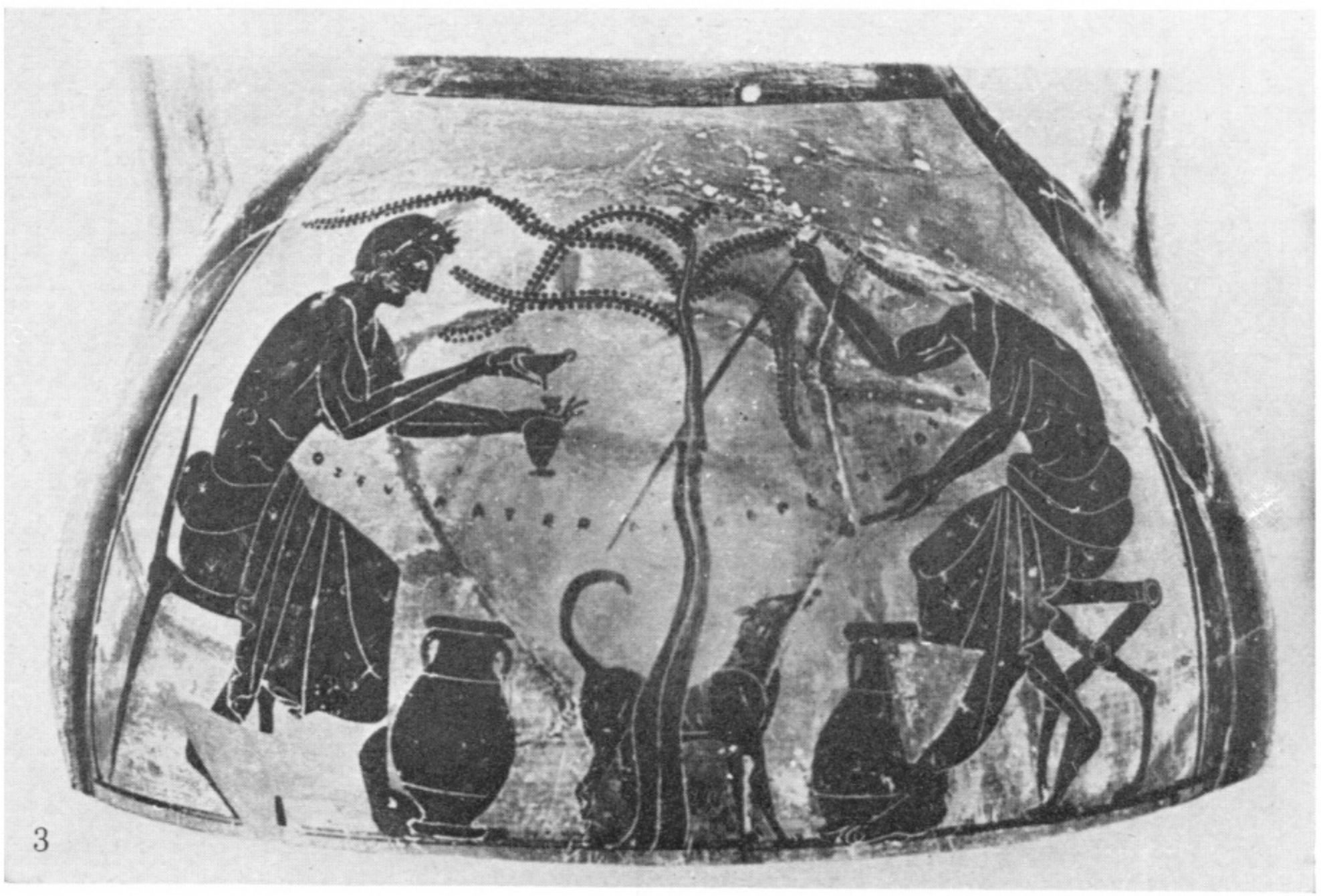

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FIGURE 1. Athenian vase, about 520 B.C. British Museum B226. After Cloche 1931, pl. 10, 1.

FIGURE 2. Athenian vase, about 500 B.C. Boston Museum of Fine Arts 525. After Cloche 1931, pl. 10, 2.

FIGURE 3. Athenian vase, about 500 B.C. Vatican Museum. After Cloche 1931, pl. 33, 1.

FIGURE 4. Bronze strigil. Oxford, Ashmolean Museum. Museum photo.

FIGURE 5. Reed strigil. Charterhouse School Museum. Author's photo.

FIGURE 6. Corinthian stirrup vase. About 600 B.C. British Museum 1970.9–10.2. Museum photo.