

RUSSELL MEIGGS

Russell Meiggs was lecturer in Ancient History at Balliol College, Oxford from 1939 to 1970, except for a period during the Second World War when he was put in charge of the timber section of the Ministry of Supply. Only in his retirement did he find time to fuse two long-standing interests to write the book from which this paper is taken, 'Trees and Timber in the Ancient Mediterranean World', Oxford at the Clarendon Press, 1982.

Before he died, earlier this year, he kindly gave permission for the preparation of this paper, summarized from Chapter 9, and was delighted to hear that it might speak to those involved in the needs of present-day Third World farmers for trees and tree-products.

FARM FORESTRY IN THE ANCIENT MEDITERRANEAN

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This network paper looks at the available evidence in Greek and Roman authors from 700 BC to 300 AD for on-farm tree-planting and tree-management. This evidence is of interest because of the glimpses it gives us of the way in which farmers planned land-use on their farms so as to incorporate trees for a variety of subsistence and cash purposes into the overall scheme.

In contrast to some of the somewhat utopian proposals for on-farm agroforestry we sometimes hear put forward for farmers today, we have here fascinating descriptions, from those who were actually farming themselves, of how land was used to provide a diversity of products as economically as possible.

The issues are startlingly close to those raised by Third World farmers today: the need for coppicing species grown on the shortest possible rotations to be economic for firewood, props and poles; the need for multipurpose boundary trees - here used especially for fodder as well as poles; land-use planning which puts marginal farm-land under trees for particular purposes; the pointlessness of growing trees over and above subsistence requirements unless there is a market for it. Even trees for dowry investment get a mention here.

Because of the intrinsic interest of this unusual documentation, and because we are here offered data on farm forestry practices existing for hundreds of years and in fact no doubt for millennia, the paper has been brought to the attention of networkers, virtually none of whom would ever have access otherwise to this material.

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GREEK SOURCES

Although the Greeks wrote more than fifty books on agriculture, the only work that has survived is the first, the *Works and Days* of the Boeotian poet **Hesiod** who, in the early archaic period (c. 700 BC), described the hard life of the farmer in poetry.

Hesiod's father had lived in Cyme on the east side of the Aegean, but poverty forced him to seek a new home with his two sons, Hesiod and Perses. He settled at Ascra under Mt. Helicon in Boeotia, where he seems to have been able to take over land that had not yet been cultivated and leave it when he died to his two sons. While Hesiod worked hard, his brother, according to Hesiod, wasted his time in fighting legal battles and relying on the corruption of the nobles who dispensed justice. Before writing was widespread, poetry was a natural medium of communication to a wider audience; Hesiod set out to vindicate his own way of life in contrast to his brother's.

Having traced the development of society through the five Ages from the Age of Gold to his own generation, when violence and injustice flourish, but honour and justice still struggle for survival, he appeals to his brother to realize that happiness comes from justice and hard work. He then proceeds to the practical advice that a farmer needs if he is to be successful. General moralizing is accompanied by specific advice, and though he is thinking primarily of grain crops and harvest, he assumes a need for timber and timber knowledge: so far as possible the farm must be self-sufficient. Hesiod knew that the best time to cut timber was when the high heat of summer has

passed and the leaves fall: 'Then is the time to cut your timber. Cut a mortar three feet wide and a pestle three cubits long, and an axle of seven feet, for so it will fit well: but if you make it eight feet long you can cut a mallet from it too. Cut a felloe three spans across for a wagon of ten palms width.¹

'Cut many curving timbers; and bring back for your plough a holm-oak when you find one, whether on mountain or field; for this is the strongest for oxen to plough with ...' The woodcutter has to watch the calendar carefully. 'On the seventh of the mid-month ... let the woodcutter cut beams for house building and timbers such as are suitable for ships. The farmer must look ahead and if he needs to build a wagon he must remember that a wagon takes "a hundred timbers": take care to have these ready in time.'

Of the many Greek treatises on agriculture written from a more intellectually developed background we have to remain ignorant and there is not much to be gleaned about Greek farms from other branches of literature or from inscriptions. But in agriculture as in so many other things the Romans appreciated the value of Greek experience and Roman writers on agriculture used more Greek than Roman sources.

ROMAN SOURCES

M. Porcius Cato (234-149 BC), the first of these Roman writers, fought hard politically to preserve what he regarded as the essential Roman virtues, which were primarily those of an agricultural community. He admits that trade can be more profitable, but there are serious risks involved; money-lending can also be lucrative, but it is dishonourable; agriculture produces the sturdiest soldiers and commands the most respect. Cato had worked hard on his family's farm

when he was growing up and had learnt the basic principles of agriculture by personal experience.

His purpose in writing a treatise was not to produce a literary work that would find its way into the libraries, but a practical guide to landowners. He was not thinking primarily of the peasant farmer with a holding of less than ten acres, nor of the very large ranches, but of medium-sized estates with substantial farm buildings and a variety of crops. There is little logical organisation in his work and shrewd practical sense is accompanied by the kind of superstitions that are found in all agricultural societies. Besides advice on crops he discusses the siting of the farm, marketing, and the treatment of the work-force. He gives inventories of equipment required to operate an olive-grove of 140 iugera and a vineyard of 100 iugera, and detailed instructions for building pressing-rooms for olives.²

As a general guide to land-use Cato lists the various crops in order of profitability: 'If the soil produces good wine and plenty of it vines bring the greatest profit; next comes the irrigated garden; third the willow-bed; fourth the olive; fifth the meadow; sixth grain; seventh coppice-wood; eighth orchard; ninth mast-wood (trees providing fodder in the form of acorns or other nuts).'

But while holding that wood brings least profit, he assumes that the farm will grow what timber it needs. 'Plant elms and poplars round the borders of the farm and along the roads to give you leaves for the sheep and cattle, and timber when you need it.'³ If a farmhouse has to be built 'the owner will furnish the timber and materials needed, and also a saw and a plumb-line, but the contractor will fell, square, and cut the timber (into beams and boards).' Cato gives details for the construction of a pressing-room for the olives and seems to assume that the timber will be provided from the farm for, in specifying a beam thirty-seven feet (11.28 m) long, two feet (0.61 m) broad, and one foot (0.31 m) thick, he adds: 'If you do not have a single solid beam use two together.' This is the longest timber needed, but the press-beam requires a length of twenty-five

feet (7.62 m). For the anchor-posts and guide-posts oak or pine are specified, for the great disc elm and hazel, because of their strength. Oak is used for dowels, cornel, one of the strongest woods, for nails, and willow for wedges. For the press-beam black hornbeam should be used.

The estate will grow its own trees: Cato discusses the raising from seed of olives, elms, figs, apples, vines, pines, and cypress. In assessing the profitability of crops he ranks the willow-grove higher than coppice-wood, and later writers on agriculture did not find this surprising, for the willow grows fast and served a number of useful purposes. The branches could provide poles and props: the combination of flexibility and strength explains its use for felloes on chariot-wheels in the Bronze Age, and its bark provided ties for vines; willows were also invaluable for basketry and for chair-making.

Silva caedua is a technical term for coppicing, which involves the encouraging of multiple stems from the base of a tree and cutting them at regular intervals. It was the commonest method of producing props and stakes, firewood, and secondary timbers. *Silva glandaria*, mast wood, would normally mean oak-wood but could also be applied to beech, whose nuts were valued highly for fattening pigs. Cato puts it last on his list, probably because he is thinking in terms of a mixed farm without much livestock. In Cisalpine Gaul, whose oak forests supplied a large part of the Roman market with pork, *Silva glandaria* was a good capital investment.

Cato is anxious that no land should be wasted: 'Where there is a river-bank or wet ground plant poplar cuttings and a reed thicket. Plant Greek willows along the borders of the reed thicket, so that you may have withes for tying up the vines.' But there is to be no planting for the sake of planting: 'The place for planting a willow-grove is on ground that is well watered and remains wet', but 'be sure before you plant that the crop is needed on the estate or that there is a market for it'.

Elms and poplars are specially commended because, in addition to providing useful timber, their

leaves make good fodder for sheep and cattle; elm leaves are best, followed by poplar, but there are others. 'If you have poplar leaves mix them with the elm to make the latter last longer; and failing elms, feed oak and fig leaves'.

Firewood is another by-product that he considers seriously. Normally an orchard has low priority in Cato's mind, but for estates near large towns orchards are highly recommended: 'You can sell logs and prunings and there will also be a supply for the owner.' If there is a surplus of suitable stone a contractor should be employed to provide a lime-kiln and supervise its operations with timber provided by the owner: 'If he has no suitable stone and no market for his surplus logs he should use them to make charcoal.'

M. Terentius Varro was born at Reate in the Sabine country and had followed a senatorial career to the praetorship. But in politics his ambitions were strictly limited and he chose to devote himself to study and writing. He was the most learned Roman of his day and the range of his interests is amazing: more than fifty of his titles survive and they involve, besides philosophy and history, geography, philology and medicine. In 37 BC, in his eightieth year, he settled down to write his own book on agriculture.

Why did Varro so late in his life and against such a discouraging political background write a book on agriculture? He hoped, he says, that it could be of practical value to his wife when he died, but a much shorter book would have served that purpose very much better. The main reason is probably that after so much writing on academic subjects he was attracted by a subject in which he could add his personal experience to his learning from the library. He had himself built up large herds of sheep and horses in Apulia and at Reate and maintained a lively interest in his estates throughout his political career. While commanding his fleet in the war against the pirates he took the opportunity to discuss breeding with some of the big cattle-ranchers of Epirus,⁴ and when he had to lead a military force through Gaul to the Rhine he noticed where the vines and olives, which were such a familiar part of the landscape in the Italy he knew, reached

their northern limit.

In form his book was very different from Cato's. Cato had simply provided a practical handbook of recommendations based on experience, set down without any serious consideration of how his material could best be organized. Varro's book was a literary work in dialogue form, designed to interest as well as instruct. The book was divided into three sections - agriculture proper, sheep and cattle, birds, and other lesser animals. His material, he tells us, was drawn partly from other authors, partly from consultation with experts, and partly from his own experience.

Varro does not follow Cato in regarding vineyards as the landowner's first choice; he prefers meadows as an investment and concentrates mainly on stock-raising. Like Cato he lays no emphasis on timber but accepts it as an essential element on any large estate. The ideal site for a villa is at the foot of a wooded hill. Trees will be needed to mark the boundary of the estate: 'Some plant pines as does my wife, others cypresses as I have done myself'. He agrees with Cato on the importance of the elm, if the soil and site suit it: it is one of the best nurse-trees for the vine, its leaves are good for cattle and sheep, and the timber is useful for fencing-rails and fuel for fire or furnace. For stakes and props he recommends oak and juniper. The estate will also need a willow-bed and a reed thicket; and different types of land will be needed for coppice. Like Cato he thought that nothing should be bought which could be economically produced on the farm. It would be ridiculous, for instance, to buy such things as baskets, threshing-sledges, fencing, and rakes.

The next of the surviving prose writers on agriculture was, unlike Varro and Cato, a professional specialist; **Lucius Junius Columella**, who lived in the first century AD, was born in Spain, held a junior command in the army, but spent most of his life in managing his estates in Italy.

His objective is to explain how the landowner can make the most efficient and profitable use of

his land. As in all general works on agriculture timber occupies little space, but he is fully aware of its importance. Columella's ideal estate, like Cato's, would be near the sea or a navigable river, in order to provide the most economical transport for the products of the estate that are to be marketed, and for the supply of what the estate needs from outside. It would include different types of land to suit different crops - level land for pasture and arable, willow-groves and reed thickets, but also hills. Some hills should be reserved for grain crops when the slope is not steep, others for olive-groves and vineyards, and the production of stakes for the vines. Hilly country was also required for timber and stone should building be needed, and for grazing.

Columella regards vines as the most profitable investment and discusses the management of the vineyard in great detail. In some parts of Italy it was customary to grow vines on trees and to plant trees specifically for the purpose. In most Latin poetry it is the elm that is most closely associated with the vine. Columella gave first place to the poplar, followed by elm and ash, whose leaves are liked by sheep and goats.⁵

But low-growing vines were more widespread and it was an obvious economy to grow the stakes that were needed on the estate itself. These were produced by coppicing and the best woods for the purpose were oak and chestnut. The chestnut grew more quickly and would renew itself after cutting in five years, whereas the oak required seven; it was therefore natural to use chestnut where it already grew or where the soil suited it: 'It likes a dark, loose soil, does not mind a gravelly soil, provided that it is moist, or crumbling tufa; it is at its best on a shady and northward-facing slope', a specification which would be generally accepted today. A detailed description of the planting of the nuts follows and then the cutting: the cut nearest the base should supply four stakes when split, and the second cut two. Every iugerum should yield 12,000 stakes.

Pliny closely follows Columella. Only large nuts should be used and they should be planted five together (as an insurance against failures). He also lists other trees that can be coppiced: ash,

laurel, peach, hazel, apple, though these grow more slowly. Elder and poplar grow from cuttings. There is a year's difference in Pliny's cycle. According to Columella chestnuts should be cut after five years, oaks two years later. In Pliny chestnut should be cut within the seventh year, oak three years later.

This confirmation of a short rotation will reassure those who from current practice in England would expect a much longer cycle of some twenty years. This much longer cycle is comparatively modern, influenced by the sharp decline of the firewood market on the introduction of cheap coal. Practice during the Middle Ages in both Italy and England was very similar to the Roman.⁶

An alternative to producing stakes and props by coppicing from the stump was to use branches from a growing tree. According to Pliny cypress trees were commonly grown for this purpose.⁷ Branches after twelve years' growth could be sold for a denarius apiece, making a cypress-grove a profitable investment; which is why they were called a daughter's dowry. Poplar branches were also often taken for stakes.

Columella's advice to landowners is to plant vines wherever the soil is suitable, for this was the most profitable investment provided that the vineyards are managed efficiently; but he has to admit that his own view is by no means generally accepted and that there are very many who would prefer to own meadows, mast-woods, or coppice. He defends his preference by quoting figures for the yield of vineyards, 'whereas if meadows, mast-woods, and coppice brought in 100 sesterces for every iugerum the owner would seem to be doing very well'. Columella has described coppice only as a means of producing stakes for vines; from his admission that it was a common form of silviculture it follows that there were other markets.

Coppice could produce fencing, poles, and firewood as well as stakes and props, and the market

was sufficiently large to encourage the peasant as well as the large-scale landowner. When **Martial** makes the contrast between rich and poor, his rich man, Torquatus, 'has his palatial home by the fourth milestone; at the fourth milestone the poor Otacilius has bought a smallholding... Torquatus has planted a grove of myrtles; Otacilius has sown a hundred chestnuts.' These surely are to be his main source of income.

The younger Pliny, consulting a friend when he is considering the purchase of an estate, says that 'the land is fertile and rich and consists of arable fields, vines, and woods producing timber which provides a return that, though modest, can be depended on'.⁸ The dependability of the income suggests coppice-wood cut at regular intervals and produced not only for the estate but for sale.

Coppicing was the easiest way of producing fuel and all substantial towns would provide a reliable market for landowners in the neighbourhood. The needs of Rome, however, must have been so large that they could not have been supplied from the immediate neighbourhood; coppicing for the Roman market was probably a common feature on the hillsides of Tuscan and Umbrian estates near the Tiber and its tributaries.

The last surviving Latin treatise on agriculture was written more than three centuries later than Columella. **Palladius** was a landowner of the late Empire. He knows the works of his predecessors and often follows Columella closely, but he makes new contributions from his own experience. For us his main importance lies in his list of building-timbers. In emphasising the usefulness of larch he is following Faventius:⁹ and together they imply that larch was more widely marketed, in the late Empire. More important, Palladius gives us our earliest evidence of the common usage of chestnut for building.

In the Greek and Roman writers on agriculture, timber is a minor concern, introduced only

because it is a sensible economy for a farm to produce its own timber to maintain the buildings and to supply stakes for the vineyards and fencing, and also firewood. But no advice is given on the economical management of woods other than coppice. We might expect discussions on the age at which the various species of trees should be felled, on the comparative advantages of selling trees standing or felled, and on the most profitable trees to plant for selling outside the estate. The impression that one gains from literature is that woods were appreciated more for pasture and leaf-fodder than for their timber.

There is ample evidence of olives being planted on a very substantial scale, especially in Africa, but I have found no evidence of the planting of trees to produce timber for the market. There must surely have been some estates in which a significant part of the income came from selling timber, but we hear nothing about them.

We also have to look elsewhere for the growing interest in trees for pleasure in the late Republic. The influences that gave rise to new attitudes to parks and gardens passed to Rome through Greek channels, but they derived ultimately from further east. Assyrian and Babylonian rulers, coming from the comparative treelessness of Mesopotamia, delighted in the great forests of the lands they conquered. Assurnasipal II collected plants and trees 'from all the countries through which he had marched and all the mountains he had crossed' and he lists forty-one species that he claims to have brought to Assyria.¹⁰ The Persians inherited this tradition and extended it. A *paradeisos*, or park, was an essential adjunct of a Persian governor's court.

The main new development, in using trees to improve towns, probably came in the Hellenistic period, when architects were particularly interested in the peristyle enclosing a garden of trees and shrubs.

In the last century BC there was a growth in the scale of private gardens in the city. Although the

centre of Rome and the riverside districts became more crowded, room was found by the western periphery, especially on and between the Pincian and Esquiline hills, for aristocratic gardens. Although we know the names and the sites of many of these gardens, no descriptions survive of their designs and we are left to guess what impact they had on public views and what use was made of trees in them.

For more detailed references to the authors mentioned in the text, readers are referred to the original Meiggs book 'Trees and Timber in the Ancient Mediterranean World'.

1. Hesiod, Works and Days, pp 427-36.
2. M. Porcius Cato, De agricultura, pp 10-11.
3. For the importance of leaves as fodder, see Columella, Res rusticae, p11.
4. M. Terentius Varro, Res rusticae, Book 2, Introduction p 6.
5. Lucius Junius Columella, De arboribus,
6. Oliver Rackham, Trees and Woodlands in the British Landscape (1976), pp 72-73. In England the seventeenth century was a transitional period, when both short and long cycles are found. (More information on this subject from John Evelyn's Silva, or a discourse on forest trees and the propagation of timber. First Edition, London 1664.)
7. Pliny The Elder, Natural History
8. Pliny The Younger, various extracts from his letters.
9. H. Plommer, Vitruvius and Later Roman Building Manuals, Cambridge, 1979.
10. D.J. Wiseman, Iraq, 1952.