

## Translator's Introduction

*Cato On Farming* is the first surviving work of Latin prose, the oldest visible star in a great galaxy. It is first-hand evidence of farming, rural life and slavery in Italy 2,200 years ago, when Rome dominated the peninsula and was almost ready to rule the Mediterranean. It allows us to penetrate the mind of a remarkable and original man, one whose long-term influence on his city, its empire and its literature was profound.

## Cato's Life

Marcus Porcius Cato was born in 234 bc in Tusculum, a self-governing town of Latium (Lazio) fifteen miles south of Rome. Its citizens, including Cato's father, were Roman citizens.

But his father's living was as a farmer in the mountainous Sabine country, well to the southeast. 'I spent all my boyhood in frugality, privation and hard work, reclaiming the Sabine rocks, digging and planting those flinty fields' (Cato, *Speeches* 128).

Porcius was his *nomen*, his wider family name. The *cognomen* Cato went back in the family at least to his great-grandfather Cato, who was 'more than once rewarded for bravery, and was reimbursed from public funds, five times successively, when war-horses of his were killed in battle' (Plutarch, *Cato* 1.1).

'I first enlisted at seventeen, when Hannibal was having his run of luck, setting Italy on fire' (Cato, *Speeches* 187-8). The friendship and patronage of L. Valerius Flaccus, roughly Cato's age and the son of a consul, helped him to the rank of military tribune under Q. Fabius Maximus in 214.

After some years of fighting, Cato was elected quaestor in 204, again under Flaccus' patronage. The work before him was still military, but this was now the first rung on the ladder of Roman electoral politics. 'The Romans had a special term, *New Men*, for people who rose in politics without any family precedent. This was what they called Cato. He liked to say that in terms of office and power he was New, but in terms of his family's bravery and prowess he was extremely Old' (Plutarch, *Cato* 1.2). As quaestor he served under P. Cornelius Scipio 'Africanus', then gathering forces in Sicily for the invasion of Africa that would end the war. Scipio enjoyed the Greek culture and fine living of Syracuse. Cato did not, and thought them bad for Roman soldiers.

As a politician, Cato could now wield patronage himself. His powers as a speaker were employed on behalf of people in nearby villages and towns who wished to use him as an advocate, and he will have begun to prosper. His next elected office was as one of the two aediles, with responsibilities in Rome itself, in 199: he and his colleague found excuses to organise more Games than usual, not an unpopular move.

In 195 he and his friend Flaccus were elected consuls, the climax of many Roman political careers. Cato's task as consul was to command the Roman army in the northeastern half of the vast new territory of Spain, captured from the Carthaginians a few years before but almost continually in revolt. Within the limit of the single campaigning season, from a 'very difficult and unfavourable starting point' (*Speeches* 19) he ran an effective campaign, training, disciplining and stretching his troops, ending rebellions, even rescuing his junior colleague, the praetor P. Manlius, from threatened disaster in the southwest beyond his own province. He seemed so successful that he was voted the honour of celebrating a Triumph on his return to Rome; the booty he had won made up a bonus of a pound of

silver to every legionary; and the Senate decided to disband his army. Whereupon revolts broke out once more — but these were a problem for his successor in Spain, Scipio Africanus.

In the course of his career Cato served the expanding Roman state in Sicily and north Africa in 214, in Sardinia in 198, in Spain in 195, in Greece in 191 and 189. But his real fame came — and still comes — from what he did and said in Rome. From the outset of his political career, he was the conviction politician of the day. He knew Roman behaviour, Roman morality, the Roman way. From this standpoint he attacked, and generally discredited, for embezzlement and other illegal acts while abroad, a succession of victims: M'. Acilius Glabrio, his commander in 191, another New Man; the great Scipio Africanus, Cato's commander in Sicily and Africa, and his brother L. Cornelius Scipio; Q. Minucius Thermus, one of those who followed Cato in Spain. By 184 he had a well-deserved reputation for stubborn righteousness and fiery oratory.

Every five years Rome elected two censors. These held office for a year and their task was to review the lists of the Senate, the *Equites* 'knights' and the citizen body, expelling those unworthy of the rank or too poor to meet their obligations. The censorship was sometimes looked on as an honourable sinecure, but in 184 a climate had been created, with Cato's help, in which Romans wanted better behaviour from their aristocrats. In 184 there was fierce competition for the censorship: all other candidates, except Flaccus, directed their campaigns against Cato personally. Cato and Flaccus were elected. Their famous censorship of 184/3 aroused rivalries that 'occupied Cato for the rest of his life' (Livy 39.44.9). They demoted several senators and knights, for reasons including personal morals. Victims included M. Fulvius Nobilior, whom Cato served in 189; L. Quinctius Flamininus, brother of one of Rome's greatest generals. Cato concerned himself freely with issues of morality and private expenditure, speaking out *On Clothes and Vehicles* and *On Statues and Pictures*. The censors imposed penalties for encroachment on public land and misuse of the public water supply. They extended Rome's sewer network to serve the Aventine hill, at great cost.

Cato, it is reliably said, disapproved of humour when censorial business was in hand. L. Nasica was asked formally at registration, 'Answer to your mind. Have you a wife?' replied, 'Yes, but not to my mind!' and was immediately demoted.

Cato held no more elected offices, but his involvement in Roman politics was uninterrupted. As senator, advocate, prosecutor, he continued to target misbehaviour by generals on campaign and by governors in overseas provinces. His oratorical skills were used in long-running disputes with old adversaries and their relatives as well as in defending, or rewriting, his own past acts.

As Rome's involvement in the eastern Mediterranean grew, Cato found himself the patron or advocate of Greek delegations who had come to press a case in Rome. As a self-proclaimed traditional Roman, a self-proclaimed distruster of Greeks, he might have found this position uncomfortable, but it did not leave him at a loss for words. Asked in 150 to help get a thousand state hostages released and sent home to Greece, Cato rose in the Senate and said, 'As if we had nothing to do, we sit all day deciding whether some old Greeks should be buried by our undertakers or by Achaean ones.' The intervention was well-judged: the vote was for release. Among these 'old Greeks', who had had a seventeen years' enforced holiday in Rome, was the future historian Polybius.

Cato's last major contribution to Roman public affairs was to urge war against Carthage, the 'Third Punic War' as it is now known — a war that was eventually declared in his lifetime and ended, after his death, with the complete destruction of Rome's great rival. As Cato had so insistently repeated, *Carthago delenda est*, 'Carthage must be razed.' Its destroyer would be P. Cornelius Scipio Aemilianus, brother of Cato's daughter-in-law Tertia. '*He alone has a mind,*' said the aged Cato about Aemilianus; '*the rest are darting shadows*' (Polybius 36 fragment 8.7).

Cato had married Licinia, 'noble but not rich', about the time of his consulship. He was said to have joked 'that his wife never put her arms round him except when there was a thunderstorm: he was a happy man when Jove thundered' (Plutarch, *Cato* 17.7). He was also said to be a good husband and a thoughtful and painstaking father.

His first son, Marcus Cato later called 'Licinianus', was born around 192. Cato took personal charge of his son's education, and himself wrote out a history of Rome 'in big letters' to teach Marcus to read. Marcus fought honourably in Greece in 168 under the eminent L. Aemilius Paullus. He married Tertia, his commander's daughter, in the 160s and died just after being elected praetor in the late 150s.

Licina, too, died relatively young. At the age of about 80, still vigorous, Cato married a much younger woman, Salonia, the daughter of one of his secretaries — so probably not of Roman descent. He had a son by Salonia, also called Marcus and known to later historians as 'Cato Salonius' or 'Salonianus'. Cato died in 149.

## His Writings and Opinions

*On Farming* is the only work by Cato that survives to modern times, but later Romans were able to read numerous other writings by him. Their quotations of Cato make up a collection of fragments from which we can learn something of his lost work. The fragments are full of personal opinions forcefully stated. Classicists like their classical authors to be logical and consistent, and the fragments have been much mulled over in order to demonstrate logic and consistency in Cato.

About a hundred and fifty of Cato's speeches were known to Cicero, a century after his time. We no longer know even the titles of all of these. It seems clear that Cato began as early as 202 to write out and retain versions of the speeches that he had actually delivered 'In the Senate' or 'To the People': the first that we can date was *On the Improper Election of the Aediles*, delivered in 202. Several speeches from the year in which he was Consul, a self-justificatory retrospect *On his Consulship*, and numerous speeches as Censor, are among the ones from which fragments are known. It is not clear whether he himself allowed others to read and copy the texts (i.e. whether he 'published' them), or whether this first happened after his death.

We might conclude, from Cato's political biography and from reading what we can of his speeches, that Rome was the centre of his life and thoughts. Yet *On Farming* is written from the point of view of a landowner on the borders of Campania and Samnium, whose farm management must fit in with local practice and local market forces whether his town house happens to be in Rome, Tusculum or elsewhere. Is the book an aberration?

It is not: we can tell this from the surviving fragments of a highly original work by Cato, called in Latin *Origines*. This was a history; the first history in Latin prose. Its sole focus might have been the growth and triumph of Rome, the city which by Cato's time dominated Italy unchallenged and the city to which he had devoted his own political career. Cato saw things differently. 'In his old age he determined to write a history. There are seven books of it. Book I is the history of the early kings of Rome; books II and III the beginnings of each Italian city. This seems to be why the whole work is called *Origines*' (Nepos, *Cato* 3) and these city histories were apparently treated on an individual basis, drawing on their local traditions. The remaining four books did indeed deal with Rome's later wars and with the growth in the city's power; they 'outweighed' the rest (so Festus, *On the Meaning of Words* p. 198 M) but they did not tempt Cato to change his title.

Why did Cato set out to show that Rome was, in its origin, one city among many? We know something of the existing Roman writings on which he must have drawn. These were two long poems in Latin, the *Punic War* by Naevius and the *Annals* by Cato's own client Ennius; and two prose histories written in Greek by Romans, Q. Fabius Pictor and L. Cincius Alimentus. All four were Rome-centred from beginning to end, while the two poems wove Roman history inextricably into the adventures and plans of the Graeco-Roman gods, as Latin epics always would thereafter. It is imaginable, at least, that Cato was dissatisfied with these perspectives, as he certainly was with that of the official records of the *Pontifex Maximus*. His own experience reminded him that Rome was not everything, either to the peoples of Italy or to the gods they worshipped.

Cato's own contribution to Rome surfaced in the *Origines*: he was 'not the man to minimise his own achievements' (Livy 34.15.9). Several of his own speeches were included verbatim in the book, and although he made it a rule not to name military commanders, certain campaigns in which a certain Tusculan had participated were highlighted.

We have not yet finished listing the published writings of this remarkable author. His manual *On Soldierly* (*De Re Militari*) was probably a practical notebook, like *On Farming*, based on his own experience. His book on the law relating to priests and augurs can be seen in the same light, and might follow naturally from the religious prescriptions already included in *On Farming*. *To His Son* was a book of advice. *Carmen De Moribus* 'Poem on morals' might have drawn on some of the same material, and was apparently in prose, in spite of its title. Finally he compiled a book of *Sayings*, some of them translated from Greek, and indeed this sub-literary genre had fairly recently become popular in Greek.

Why did he write? It is easy to begin an answer. He was a man confident of his opinion, proud of his experience, and keen that others should benefit from both. And he was in the habit of keeping written records for his own use. Yet these things might not have been enough to bring about the creation of a prose literature in a new language, which is what Cato did. It seems quite possible that the decisive point was the need, in the 180s, to teach young Marcus Licinianus. Cato distrusted Greek slave professionals, and there were no other teachers. So he became his son's teacher, and taught him not in Greek but in his native Latin. The history 'in big letters' was followed by other texts addressed to Marcus, one of which later circulated as *To His Son*. So much is known. There were surely friends and clients who would say that these writings of Cato's should be copied and would be welcomed by others. From such a beginning, their author might well have found it satisfying to continue to expound, on history, agriculture, warfare and other matters, to a less limited audience.

### Cato and 'On Farming'

Let us recall Marcus Cato the Censor, who first taught Agriculture to speak Latin. Columella, *On Farming* 1.1.12.

There had been Greek writings on farming. There was a massive Carthaginian farming manual, soon to be translated into Latin at state expense. Cato probably knew none of these, and the later, more solid and systematic Latin textbooks on farming were far in the future (see below). In this, as in every one of his writings, Cato was a pioneer.

It is sometimes argued that Cato wrote *On Farming* as propaganda — because, for some political reason, he wanted more rich Romans to buy land and produce oil or wine. These arguments underestimate the book. We can begin to see from the reports of his speeches, and in any case we would know from other sources, that Cato was a master of persuasion: no one in Rome in his time could be confident of winning an argument against him. If *On Farming* is a political argument, it is surely an argument so full of irrelevances and inconsequentialities as to persuade nobody.

Cato's real motivation is perhaps simpler. He knew farming and was confident in his knowledge. Some Romans had become rich; many peasants had died or had been ruined in the years of war. With Rome's recent conquests slaves were suddenly plentiful. Land and labour were relatively cheap, and slave-run farms were likely to prove a profitable investment. Advice was needed by people who had no family experience of exploiting the land: Cato would provide it.

He put down what he knew, as it came to his mind: the choice of a farm, the staffing and equipping of it, the use of the land, the work that must be planned for through the year, the essential religious rites, the terms of trade for building work and for various tasks that were subcontracted — and a good deal more.

*On Farming* must, in his time, have been a useful, memorable, often irritating handbook. To us now it is an astonishingly rich source of information on Italy in the second century bc, and many still find it

an irritating handbook. Here some themes that emerge from study of *On Farming* will be outlined, and it may become evident why one or two of the features of *On Farming* attract irritation.

There is an unresolved conflict, throughout, between the farm as a way of life and the farm as a mere investment. The reason is obvious — it is the difference between Cato's own rural upbringing and his later prosperity as a city politician, a difference which there is no reason to suppose he had ever thought out fully. In spite of this, most of Cato's information will have been really useful to an owner, a manager or both. They could not learn to do everything necessary from this book, but, like a Baedeker, it would help to render them independent of unreliable guides.

A second point which, we may say, Cato had not thought through fully was how best to adapt his personal and local experience into general advice. Anyone who picks up the book will learn a great deal more about farming in the mountainous country where Latium, Campania and Samnium meet than about any other parts of Italy — even to a list of the market towns of choice (chapter 135). The focal point is the Venafrum country. We have to guess that this was where Cato farmed. Possibly it was the farm that he inherited from his father, in which case we must also guess that he personally turned it over largely to olives, building a press room and buying a costly crushing mill, *trapetum*, from somewhere near neighbouring Suessa after making an estimate of the comparative cost of purchase at Pompeii (chapter 22).

Cato pays great attention to cost and savings. This is a point of real interest to economic historians, but Cato's approach attracts disdain from modern economists. His advice, throughout *On Farming*, tends towards making the farm as self-sufficient as possible. Modern investors prefer to maximise income from whatever is the principal produce and to spend a proportion of this income on supplies. Economics has gained many converts in the last quarter of a millennium, but some small-scale farmers in southern Europe are still closer to Cato than to Adam Smith in their views on this point. It must be said that extremely high transport costs in republican Italy would have helped to make self-sufficiency an attractive aim.

This detail notwithstanding, Cato's focus overall is on the investment potential of a farm. His approach to the use of capital is therefore under the spotlight, and we note that he distinguishes in his Preface (see also footnote there) among land, trade and 'money-lending' as potential uses of money, regarding trade as unsafe and money-lending as utterly immoral. It is odd, then, that Cato himself was said to have lent money on maritime trade through an intermediary (so Plutarch, *Cato* 21.6). Was he so totally inconsistent? Or, by participating in something of the nature of a trading company, was he in his own eyes reducing the riskiness of 'trade' and avoiding the immorality of 'money-lending'?

*On Farming* sheds a bleak light on Roman treatment of slave labour. This is one of the topics that make the work so useful to the social historian. In exploring it, one notices on one side the cool calculations of food, clothing and sickness; on the other side, reliance on the assiduity and intelligence of the 'manager' and 'manageress', themselves almost certainly slaves. Away from the purely economic calculations of *On Farming*, Cato's treatment of his own slaves is recorded in some detail and was relatively humane (see particularly Plutarch, *Cato*). Rome's treatment of labour could also be far more brutal than is suggested in this book. In the last two centuries bc, successive slave and shepherd revolts in southern Italy and Sicily ended in the execution and crucifixion of thousands.

The level of detail in *On Farming* varies dizzyingly. Practically nothing is said of the wine harvest (presumably Cato assumes it will be subcontracted: see chapter 23). There is almost nothing on kitchen gardening (see note at 70; compare Columella books 11-12). By contrast, the assembly of the olive press and mill is among the topics that are dealt with in fearsome depth.

Two subject areas which seem tangential to most readers of *On Farming* are firmly emphasised by Cato. There is a section of recipes for bread and cakes, in a Greek tradition and perhaps drawing on a Greek cookbook. Why? Possibly so that the owner and his guests can be entertained when visiting; possibly so that profitable sales can be made at a neighbouring market. And there are several prescriptions, herbal or magical, for medicines to treat humans and oxen. In this case we are lucky enough to know exactly why Cato included the information that he did, thanks to a verbatim quotation

(perhaps from *To His Son*):

‘In due course, my son Marcus, I shall explain what I found out in Athens about these Greeks, and demonstrate what advantage there may be in looking into their writings (while not taking them too seriously). They are a worthless and unruly tribe. Take this as a prophecy: when those folk give us their writings they will corrupt everything. All the more if they send their doctors here. They have sworn to kill all barbarians with medicine — and they charge a fee for doing it, in order to be trusted and to work more easily. They call us barbarians, too, of course, and *opici*, a dirtier name than the rest. I have forbidden you to deal with doctors. Cato quoted by Pliny 29.13-14.

After giving his own summary of this passage, his biographer Plutarch observes drily (*Cato*, 24.1) that Cato’s own medicines proved better for Cato himself than for his wife and son, both of whom died young. We can at least be sure, from this tirade, that Cato aimed to make his readers as independent of Greek doctors as of any other expensive and unreliable advisers.

### Cato and his readers

I first looked at Cato *On Farming* when I wanted some real Latin for beginning students of Latin to translate. I gave them the pithy instruction at the beginning of chapter **61**: *Quid est agrum bene colere? bene arare. quid secundum? arare. tertio? stercorare*. They knew the word forms; they knew the words, except *stercorare* ‘spread dung’, which was not difficult to explain. Yet they found these six sentences very difficult to translate. They were not used to getting so much sense out of so few words.

Much of *On Farming* is like this, though not always quite as brief as this. Cato was never a man to waste words, but *On Farming* is even more concise than the passages we can still read from his political speeches. The speeches were meant to be heard only once: their published form might have been adjusted after the occasion, but their style still reflects the need to get every thought across to his hearers — even to unsympathetic hearers — at first hearing without mistake. Extreme brevity would have been incompatible with that purpose: it is a feature of natural human language that some ‘noise’, some ‘padding’ is required to assist the transmission of a message.

*On Farming* differed from Cato’s speeches in three ways. First, it would be read by individuals to themselves, or by individuals to one or two other hearers: circumstances that allow slow reading, pausing for thought or discussion, going back and reading again till all is clear. Second, its readers and hearers had either chosen to read it, or were not allowed the choice: in either case, their full attention was guaranteed. Third — the most difficult point for us to grasp now — it belonged to a linguistic culture in which speech and memory were paramount. If one read alone, one read aloud to oneself: silent reading had not been thought of. Books were few; serious literature was in Greek, and, for those few who studied literature, memorisation was the rule. Whatever the language, whatever the medium, one imbibed another’s thoughts by listening and memorising.

Language in itself was not a problem: some Romans and many Campanians must have been bilingual, like other southern Italians. But to read and study a text in Latin will have been an unfamiliar activity for most of them. Cato himself helped to change this. With his own *Origines* and other writings, alongside the plays and poetry that were meanwhile multiplying, a literature in Latin had begun to grow.

This did not change the way in which written texts were studied and used. We know this most clearly from the way that Cato *On Farming*, itself, was used by later Latin writers. When Varro, Columella and Pliny — and others — wrote on agriculture or household management, Cato came immediately to their minds. They quoted him often, from memory, with dreadful inaccuracy. *On Farming* was built into their thoughts, its pithy proverbs adjusted to a later rhythm (see note on 3, ‘Build so that the buildings will not be in want of a farm’), its unspoken assumptions filled in in words (see note on 1,

the ‘meadow’). They had read and rethought Cato: they had him by heart.

The modern reader who remembers the difference between the way texts are read now, and the way they were read in Cato’s time, will find Cato readable. He has to be surveyed: not all of the book is aimed at every reader. After that, selected pages have to be sounded and listened to and considered, as if in discussion between an owner and a manager. The ‘noise’, the ‘padding’ is not provided by the writer: it is added by his audience.

The footnotes in this translation are intended to help with this way of reading and studying *On Farming*. Many of them consist of quotations from slightly later Roman authors — the ones who had certainly read Cato themselves. These quotations may or may not be close to what was in his mind as he was writing; at any rate these are the facts and views that were filed, alongside Cato, in the minds of some of his Roman readers.

The headings and sub-headings in this translation (of which some come from the manuscript tradition, but most are newly invented) are no more than a shadow of Cato’s real train of thought, which is as coherent, and as inconsequential, as a conversation or a series of conversations. The sequence of topics is partly random (as if ‘We haven’t yet said anything about ...’), partly suggested by incidental and superficial connections of word or thought (as if ‘Mentioning *amurca* reminds me of other uses ...’), partly a matter of rethinking and recapping (as if ‘When talking about manure I ought to have added ...’ and even ‘I don’t remember whether I told you ...’).

The result is utterly different from any structure that teachers would have approved, had there as yet been any teachers of Latin. That did not matter to Cato, whose audience would get to know his opinions by reading or listening to the book and would then make any logical connections that they wished.

## This Translation

I returned to Cato *On Farming* because I wanted to understand him and his way of using language. I decided I could do this, and help others to do it, by putting his words into English. The translation by Hooper and Ash does not make him appear a coherent thinker. Brehaut’s translation is fairer (and his commentary is still important) but his style is now very old-fashioned. I am grateful to Tom Jaine, of Prospect Books, for encouraging me to make this new translation.

Study of Cato and *On Farming* can begin from the modern works listed in the Bibliography, and from the other ancient writers ‘On Farming’ also listed there. Many of these can be read in English. Beyond that, serious work cannot be done without reading Cato’s Latin text, conveniently available in Goujard’s edition with a parallel French translation and an important commentary. Brehaut’s commentary, accompanying his English translation, remains useful.

All punctuation in this translation, including the occasional ‘...’, is my responsibility as translator, added to assist the modern reader to come to terms with the ancient text. *On Farming* will have been written down originally without word division or punctuation, without paragraphing or chapter divisions, and probably (though this is not certain) without any consistent series of section headings. Gradually, in the course of manuscript copying and in the sequence of printed editions, all these things have been added. The reader of a Greek or Latin classic in translation needs to remember that this has happened; different views about punctuation and paragraphing can, in places, lead to completely different translations.

Words in square brackets [ ] are not in the Latin text. In some cases I felt them necessary to complete the sense (as I understood it) in English; in other cases they represent conjectures by various scholars which change the meaning of the Latin text of the manuscripts. The translation retains, from the printed editions of Cato’s text, its traditional chapter numbers, **1** to **162**. They are now indispensable: all scholarly references to specific passages of *On Farming* cite these chapter numbers. They are used

in the footnotes of this translation for cross-references.

### Three notes Weights and measures

	<b>Latin terms used by Cato (<i>italic</i>)</b> <b>English approximations used in this translation (roman)</b>	<b>Metric equivalent</b>	<b>Imperial equivalent</b>
<b>Linear measure</b>	1 foot ( <i>pes</i> ) = 4 palms ( <i>palmae</i> ) = 12 inches ( <i>pollices</i> ) = 16 fingers ( <i>digiti</i> )	<i>pes</i> : 24 centimetres	11.5 inches
<b>Area</b>	1 <i>iugerum</i> [= 240 x 120 <i>pedes</i> ]	<i>iugerum</i> : 0.25 hectare	0.6 acre
<b>Dry volume</b>	1 peck ( <i>modius</i> ) = 2 gallons ( <i>semodii</i> ) = 16 pints ( <i>sextarii</i> )	<i>modius</i> : 8.75 litres	2 UK gallons 2.4 US gallons
<b>Liquid volume</b>	1 <i>culleus</i> = 20 <i>amphorae</i> or <i>quadrantalia</i> = 40 <i>urnae</i> = 160 <i>congi</i> = 960 pints ( <i>sextarii</i> )	<i>culleus</i> : 525 litres (5.25 hectolitres)	115 UK gallons 139 US gallons
<b>Volume: smaller units</b>	1 pint ( <i>sextarius</i> ) = 2 <i>heminae</i> or <i>cotulae</i> = 3 <i>tertiarii</i> = 4 <i>quartarii</i> = 8 <i>acetabula</i> = 12 <i>cyathi</i>	<i>sextarius</i> : 0.55 litre	1 UK pint 1.2 US pints
<b>Weight</b>	1 <i>lb.</i> or <i>libra</i> = 12 ounces ( <i>unciae</i> )	<i>libra</i> : 0.325 kilogram	13 ounces
<b>Apothecaries' weight</b>	1 pound ( <i>mina</i> ) = 100 drams ( <i>drachmae</i> )	<i>mina</i> : 0.44 kilogram	15.4 ounces

### Money

*Nummus*, or its equivalent in Italic dialects and Greek, was the name for the standard bronze coin and the standard silver coin in much of central southern Italy in the 3rd century. Many cities of the region issued their own coins, on various weight and value standards; among the market towns mentioned by Cato (**135**) Venafrum, Cales, Suessa and Nola, as well as the much more important Capua, had — before his time — issued such coins themselves. It seems probable that in **14-15**, where Cato gives prices for building work in *nummi*, he means the bronze money that was once local to Campania and Samnium. In practice it now mostly emanated from Rome. In Rome in his day, three *nummi* (three *asses*, to use the official name; two Greek *oboloi*) could be regarded as a daily wage (Crawford,

*Coinage and money* p. 147 citing Polybius 6.39.12 and Plautus, *Mostellaria* 357).

The *victoriatus* was a silver coin struck at Rome from about 211 bc onwards. It did not form part of the standard Roman coinage system and, according to hoard evidence, it circulated not at Rome but in the Hellenised parts of Campania and southern Italy. In weight the *victoriatus* equalled \* *denarius* but, more important, it was intended to equate to the *drachma* (6 *oboloi*) of many of the Greek cities of Italy. Besides being the name of a Roman coin, *victoriatus* may, in some texts, have served as the Latin translation of *drachma*. The Roman *victoriatus* was minted in debased silver, and in the 2nd century it gradually lost credit, eventually circulating at \* *denarius*. At the same time its area of circulation shifted northwards, to the central Apennines and to Celtic regions. Cato only mentions the *victoriatus* once — as the benefit or bonus, ‘pot-money’, paid to an oil-making contractor (145).

Elsewhere in *On Farming*, prices are reckoned in *sestertii*: the abbreviation *hs* is used at 21-2, *ss* at 144-6. This is odd. *Sestertii* (\* *denarii*) had been minted at Rome in Cato’s youth, and would become the regular Roman money of account in 140 bc after his death, and would eventually be minted again from around 90 bc — but at the time when he was writing *On Farming*, *sestertii* were not an important constituent of Rome’s currency system. I quote Michael Crawford’s proposed answer to this problem: ‘There is some evidence for the circulation in the Greek areas of Italy of the sestertius as the equivalent of the diobol [2 *oboloi*] ... and I am inclined to suggest that the diobol survived as a unit of reckoning in Campania in the second century and was in due course called a sestertius, since this was in terms of silver its Roman equivalent’ (*Coinage and money* p. 346). It is worth adding that the *sestertius* = *diobolos* was the highest unit common to the Roman and the local Greek currency systems.

There is a great deal of speculation in this note. If it is all accepted, the rough equivalences in Cato’s mental arithmetic and in the markets near Venafrum are: 1 *victoriatus* = 3 *sestertii* = 9 *nummi*.

Coinage was not the only payment medium: the price for an olive crushing mill that Cato (or someone) bought in Suessa country included 50 *lb.* oil. However, he carefully adds a money value for the oil to make the estimates comparable (22). Contractors of all types were paid partly in kind; jobbers who did harvest work (136-7) could be paid entirely in kind.

## Sex

In translating from a language which has grammatical gender to one which has almost lost it, it is paradoxically difficult to deal correctly with sex-specificity in terminology.

Cato uses two terms for the owner of a farm. One is *pater familias*, ‘father of the family or household’. This is a sex-specific concept: in other words, Cato is assuming a male owner, so I translate ‘master’. More often Cato uses the term *dominus*: this often is translated ‘master’ or ‘lord’ but in this text I have preferred ‘owner’ as a translation of *dominus* because the Latin term can logically subsume either male or female, and it would be wrong to assume that the *dominus*, property-owner and slave-owner, would always be a man. As it happens, Varro’s later book *On Farming* is addressed to his wife Fundania, who had just bought a farm of her own. Several women landowners have a place in Roman history.

The only two explicitly sex-specific occupations in Cato’s book are those of the *vilicus* ‘manager’ and *vilica* ‘manageress’ (chapters 5, 142-3) — and notice the solitary mention of the ‘mistress’ at 143. One of the religious rituals that he describes is explicitly for men only (83).

It is well worth reading the frank discussion by Varro (*On Farming* 2.10) on men and women as shepherds, from which a short extract is quoted in a note at 10.



## **CATO *On Farming***

### **Preface**

Trading can sometimes bring success, but it is insecure; so can money-lending, but that is not respectable. So our forefathers thought; and so they enacted that a thief should pay any penalty twice over, a money-lender four times over, which allows us to infer how much worse a citizen they thought a money-lender was than a thief. When they wanted to say that a man was good, their highest compliments were to call him 'a good farmer and a good husbandman'. I believe that a trader may display bravery and skill in the course of trade, but, as I said above, it is insecure and liable to disaster. As to farmers, their offspring are the strongest men and bravest soldiers; their profit is truest, safest, least envied; their cast of mind is the least dishonest of any. This is sufficient preface: now to my subject.

## **Buying and Developing a Farm**

### *Selecting the Property*

**1.** When thinking of running a farm, always remember: do not buy on a whim, take the trouble to visit, do not suppose a single look will be enough. If it is a good property, then the more you go, the happier you will be. Notice the looks of the neighbours. In a good district, they ought to look well. And while you visit and inspect, leave yourself a way out.

It must have good weather; it must not be liable to storms. It must thrive from its own excellence and from its good location: if possible, it should be at the root of a mountain, south-facing, in a healthy position. There must be plenty of labour and a good water supply. There must be a sizeable town nearby, or the sea, or a river used for traffic, or a good and well-known road. It should be one of the properties that is not always changing its owners, and whose sellers regret having had to sell.

It should have good buildings: never carelessly dismiss another's expertise. It is better to buy from a good husbandman and a good builder. When you come to the farm buildings, check that there are plenty of presses and vats (remember that the lack of them means a lack of produce) but not too much farm equipment. It is to be in a good position: see that it is not wasteful, and requires the least possible equipment. A property, like a man, may bring money in, yet be so wasteful that little is left.

If you ask me what would make a farm the first choice, I will say this: varied ground, a prime position and a hundred *iugera*; then, first the vineyard (or an abundance of wine), second an irrigated kitchen garden, third a willow wood, fourth an olive field, fifth a meadow, sixth a grain-field, seventh a plantation of trees, eighth an orchard, ninth an acorn wood.

### **Directing the Business**

**2.** Each time as master you visit the farm, you must first greet the Lar of the Household. Then go round the property — that day, if you can; if not that day, the next. As soon as you are clear how the business stands, what tasks are done and still to do, next day you should send for the manager and ask him how much of the work is finished, how much remains, whether what is done was done in time and there will be time to do the rest, and how it is with the wine, the grain and everything else singly.

When you have this straight, you can get down to calculating people and days' work. If the work

seems wanting the manager will say that he has done his best, slaves were sick, the weather was bad, slaves ran away or were requisitioned for public works: when he has put these and all his other arguments, bring him back to the calculation of workers and their work! If there was rainy weather, what work could have been done while it rained? -- washing and pitching vats, cleaning farm buildings, shifting grain, shovelling dung, making a dung-heap, threshing grain, mending ropes and making new ones; the slaves could have been patching their own cloaks and hoods. On holidays they should have cleaned out blocked ditches, mended the public road, cut back hedges, dug the vegetable garden, cleared the meadow, cut sticks, pulled out brambles, husked the emmer, tidied up. While slaves were ill they ought not to have been given as much food.

When it is clear without dispute what work lies ahead, you must arrange for it to be done. You must check the figures for money and grain, check what is set aside for fodder, check the wine and oil figures -- what is already sold, and the income from this, what is still to be produced, and what it will fetch -- agree the difference and take charge of the agreed sum.

You must take stock; order to be bought whatever will be needed during the year; order to be sold whatever will be surplus; order to be contracted whatever needs contracting. You must give verbal orders on work that you want done and work that you want contracted, and also put the latter in writing. You must inspect the animals, and you must sell at auction: sell oil when it will pay; sell surplus wine and grain; sell aging oxen, runty calves, runty sheep; sell wool, hides, an old cart, old iron tools, an old slave, a sickly slave, and anything else surplus. The master has to be a selling man, not a buying man.

### **The Farm Buildings**

3. The master should get down to planting a farm while young. Building requires long thought: planting requires not thought but action. When one reaches the age of 36, that is the time to build — if you have a farm planted. Build then; and build so that the buildings will not be in want of a farm!

It is essential for the master to order well-planned workshops — an oil press room, a winery, plenty of vats so that one is free to wait for prices to rise, which will be better for income, better for self-esteem, better for reputation.

There should be good presses, so that the work can be done well. When the olive crop is in, the oil must be made at once or it will be spoilt. Think how often there are storms and the crop is knocked off the trees: if you gather quickly and the equipment is ready, the storm will have caused no loss and the oil will be greener and better, but if the crop lies too long on the earth or in the loft, it spoils, and the oil you make will be rancid. From any crop the oil will be greener, and good, if you make it in time. For 120 *iugera* under olives, given good land, close planting and good farming, there should be two sets of presses: each with a good crushing mill, and these should be of different sizes so that when the millstones are worn they can be switched over; each press with its own leather ropes, and with six levers, twelve pins, its own leather straps and Greek pulley-blocks; each worked with a pair of esparto ropes. The upper blocks should have eight sheaves, the lower six (if you have [single] blocks made, you will move more quickly): this moves quite slowly, but with relatively little effort.

4. Good housing for oxen: good sheds, barred feed-racks. The bars should be a foot apart: if you make them so, the oxen will not toss their fodder out.

Build the country house that you can afford. If it is a good property, and you plan the house well and site it well, and live comfortably when in the country, then you will visit more readily and more often, the farm will be better, less will be done wrong, and you will get more profit: 'Use your eyes!' Be a good neighbour, and do not allow your slaves to do wrong. When the neighbourhood looks favourably on you, you will sell more easily, find contractors more easily, hire labourers more easily; if you build, they will help you with labour, draught animals, materials; if there is ever need (good luck!) they will fight for you.

### **The Farm Manager**

5. The manager's instructions will be these.

To behave well; to make sure they observe holidays; not to touch others' property and carefully to look after the owner's; to prevent household quarrels; if anyone misbehaves, to give proper punishment in proportion to damage done. The household should not be in poor condition, or sick, or hungry: the work should keep them busy, and it will then be easier to prevent mischief and theft. If the manager does not allow mischief, there will be none (and if he has allowed it, the owner must not let this pass unpunished). He must reward good behaviour, so that others will want to do well.

The manager must not go about, he should be sober always and not dine out: he is to keep the household busy! He must take care that the owner's instructions are effected, and must not suppose that he knows better than the owner. He must consider the owner's friends his own, and must obey whomever he has been instructed to obey. He must not perform rites at cross-roads or hearth, except *Compitalia*, unless instructed by the owner.

He must lend to no one but ensure that the owner's loans are repaid. He must have no loans out to anyone, of seed for sowing, food, wheat, wine or oil: there should be two or three households from whom he can ask necessities and to whom he can give, but no others. He must regularly make up accounts with the owner. He must not engage the same tradesman or jobber for more than one day. He must not plan any sale unknown to the owner, or any business concealed from the owner. He must have no private friend; he must make appointments with no diviner, soothsayer, fortune-teller or magician. He must not cheat the grain-field, for that brings bad luck.

He must ensure that he knows all the work of the farm, and must do it himself often, but not so much as to tire himself out. If he does this he will know what the household are thinking: and they, too, will work more willingly. If he does this he will be less inclined to go about, will keep healthier, and will sleep better. He must be the first up and the last to bed, having first seen that the buildings are shut up, that everyone is in bed in his proper place, and that the animals have fodder.

### *Memoranda for the Manager*

Have special care taken of the oxen, and be a little indulgent to the oxherds so that they are readier to take care of the oxen.

Make sure to have good ploughs and ploughshares.

Take care not to plough carious land: drive neither cart nor herd on it. If you ignore this, where you drive you will lose three years' harvests.

Sheep and oxen are always to have straw underfoot. Attend to their hooves. Avoid sheep and ox scab, which tends to follow hunger and exposure to rain.

Get each task finished in good time. If one thing is done late you will do everything late: that is how it is with farm work.

If short of straw, cut holm-oak boughs and spread them as litter for sheep and oxen.

Be sure to have a big manure heap. Store every bit of dung. Sort it and break it down as you shift it. Cart it out in autumn. Autumn is the time to trench round your olive trees and dung them. Cut poplar, elm and oak boughs at the same time and store them, not too dry, as fodder for sheep; the late hay and the grain stalks, too, but these you must store dry. Sow rape, fodder crops and lupin after the autumn rains.

### *Notes on Where to Plant*

6. On where to sow your crops you should work to these rules. A fat and fertile ground, with no trees, can be a wheat field. One that tends to be cloudy should be sown with rape, radish, broomcorn millet, foxtail millet. In rich and hot ground grow pickling olives: choose from *radius maior*, *Sallentina*, *orcites*, *posea*, *Sergiana*, *Colminiana*, *albiceris* whichever people say does best in your district. Plant this type of olive 25 or 30 feet apart. For an olive plantation the ground must face the Favonius and be sunny: no other will suit, but the *Liciniana* olive can be planted in a rather cooler and leaner soil. If

you plant this last variety in a fat or hot ground the crop will be good for nothing, the tree will exhaust itself in cropping and will be plagued with red moss.

By field margins and roadways plant elms and some poplars, so that you have the boughs for sheep and oxen and wood to hand when you need it. Where these are river banks, or in waterlogged soil, you can plant poplar stands and reed beds. These are planted as follows: turn over with a spade, plant reed rhizomes three feet apart. Plant wild asparagus crowns there too: reeds and asparagus go together in the digging, in the burning and because one shades the other meanwhile. Plant Greek willows around the reed bed, then you will have something to tie the vines to the reeds with!

Work out where to plant vines as follows. On ground that is said to be ideal for vines and is sunny, plant *Aminnia minuscula* and *gemina*, *Eugenea*, *helvola minuscula*. In fat soil, or where it is rather cloudy, plant *Aminnia maior* or *Murgentina*, *Apicia*, *Lucana*. Other vines, especially *miscellae*, suit either ground.

7. In a property close to the City orchard planting is especially useful: timber and sticks can be marketed, and are there for the owner's use too. On such a property can be planted, as required: vines, various kinds: *Aminnia minuscula* for wine; *Aminnia maior*, *Apicia*, conserved in pots in grape marc, or just as good in grape syrup, in whole must, in *lora*. Those that you hang, *duracina*, *Aminnia maior*, can just as well be kept in the smithy for raisins;

fruit: both *strutea* and *cotonea* quinces; *Scantiana*, *Quiriniana* and other apples for conserving; *mustea* quinces; pomegranates, pig's urine or pig's dung to be put to the roots to feed the fruit; pears, *volaema*, *Aniciana sementiva*, which are good for preserving in must, *Tarentina*, *mustea*, *cucurbitiva* and others; plant or graft as many as you can fit in;

*orchites* and *posia* olives, which are best preserved, young, in brine, or crushed with mastic. *Orchites*, black and dried, can alternatively be kept in salt for five days, then, the salt discarded, placed in the sun for two days; or preserved in grape syrup without salt;

sorbs, to be preserved in must, or you can dry them, and the same goes for pears;

8. *marisca* figs to be planted on a clayey, open ground. *Africanae*, *Herculanae*, *Sacontinae*, *hibernae*, black *tellanae* with long pedicles, to be planted on a rather fat or well-manured ground. Let the grass grow long, irrigated if possible, dry if not, for your supply of hay. Close to the City be sure to grow all kinds of vegetables; all kinds of flowers for wreaths; grape-hyacinths; myrtles, *coniugulum*, white and black; Delphic, Cypriot and forest bay; walnuts, filberts, hazelnuts, almonds. A market garden, especially if it is all that one has, must be planted for maximum productivity.

9. In well-watered, damp, shady places, near streams, willows can be planted: make sure that they are productive, whether for the owner's use or for sale. By all means have an irrigated hayfield if you have water; if not, grow as much hay dry as you can.

So much for the planning of a farm in various locations.

## Equipment and Structures

### *Inventory*

10. Equipment for 240 *iugera* planted in olives.

Manager, manageress, five labourers, 3 oxherds, 1 donkey-driver, 1 swineherd, 1 shepherd: total 13 persons;

three yoke of oxen, three asses to be harnessed for carrying dung, 1 ass, 100 sheep;

oil-presses complete, 5 sets;

bronze cauldron capacity 30 *quadrantals*, lid for cauldron, 3 iron hooks, 3 water-pitchers, 2 funnels;

bronze cauldron capacity 5 *quadrantals*, 3 hooks, 1 small pan, 2 oil amphoras, 1 fifty[-*hemina*] urn, 3 ladles;

1 water-bucket, 1 basin, jug, slop-pail, tray, pisspot, watering-can, ladle, candlestick, pint measure;

3 largish carts, 6 ploughs with ploughshares, 3 yokes complete with straps, 6 ox harnesses;

1 harrow, 4 hurdles for dung, 3 hampers for dung, 3 packsaddles, 3 rugs for the asses;

iron tools: 8 forks, 8 hoes, 4 spades, 5 shovels, 2 drag-hoes with four teeth, 8 scythes, 5 sickles, 5 pruning knives, 3 axes, 3 wedges, 1 emmer-mortar, 2 tongs, 1 fire-shovel, 2 braziers;

100 oil vats, 12 tubs, 12 vats for keeping the olive pressings, 10 [tubs] for *amurca*, 10 for wine, 20 for wheat, 1 for lupins, 10 jars;

one rinsing-tub, 1 soaking-tub, 2 water-tubs, a cover for each vat and jar;

1 donkey-mill, 1 pushing mill, 1 Spanish mill;

3 hand grindstones, 1 stone table, 2 bronze tables;

2 tables, 3 long benches, 1 bench in the bedroom, 3 stools, 4 chairs, 2 armchairs, 1 bed in the bedroom, 4 beds sprung with straps and 3 beds;

1 wooden mortar, 1 fuller's mortar, 1 loom, 2 mortars;

1 bean pestle, 1 for emmer, 1 for seeds, 1 to shell nuts, 1 peck measure, 1 half-peck;

8 mattresses, 8 blankets, 16 pillows, 10 bed-covers, 3 towels, 6 patchwork cloaks for the youngsters.

## **II.** Equipment for 100 *iugera* planted in vines:

Manager, manageress, 10 labourers, 1 oxherd, 1 donkey-driver, 1 withy-cutter, 1 swineherd:  
total 16 persons;

2 oxen, 2 asses for carts, 1 ass for the mill;

3 wine-presses complete;

enough vats for five vintages, total 800 *cullei*, 20 vats for keeping the marc, 20 for wheat, a lid and cover for each vat;

6 urns with esparto casings, 4 amphoras with esparto casings, 2 funnels, 3 wicker strainers, 3 strainers to remove *flor*, 10 pitchers for must;

2 carts, 2 ploughs, cart yoke, vine yoke, 1 ass yoke;

1 bronze table, 1 grindstone;

bronze cauldron holding 1 *culleus*, lid for bronze cauldron, 3 iron hooks, bronze boiling-cauldron holding 1 *culleus*, 2 water-pitchers;

1 watering-can, 1 basin, 1 jug, 1 slop-pail, 1 water-bucket, tray, ladle, candlestick, pisspot;

4 beds, 1 bench, 2 tables, 1 stone table, 1 clothes chest, 1 cupboard, 6 long benches, 1 well-wheel, 1

iron-tipped peck measure, 1 half-peck, 1 wash-tub, 1 soaking-tub, 1 tub for lupins, 10 jars;

harnesses for oxen, harnesses for asses, 3 rugs, 3 packsaddles;

3 strainers for wine- lees, 3 donkey-mills, 1 pushing-mill;

iron tools: 5 reed knives, 6 vine-dresser's knives, 3 pruning knives, 5 axes, 4 wedges, [2] ploughshares, 10 forks, 6 spades, 4 shovels, 2 drag-hoes with four teeth, 4 hurdles for dung, 1 hamper for dung, 40 grape-harvesting sickles, 10 broom-cutting sickles, 2 braziers, 2 tongs, 1 fire-shovel;

20 Amerine carrying-baskets, 40 planting-baskets or troughs, 40 wooden trowels;

2 treading vats;

4 mattresses, 4 blankets, 6 pillows, 6 bed-covers, 3 towels, 6 patchwork cloaks for the youngsters.

**12.** Required in the press-room for 5 working presses:

5 seasoned beams, 3 spares, 5 windlasses, 1 spare, 5 leather ropes, 5 lowering ropes, 5 straps, 10 pulleys, 5 *capistra*, 5 bars for the press-beams to rest on, 3 jars, 40 levers, 40 pins, wooden clamp to compress the 'trees' if they split; also 6 wedges, 5 crushing mills, 10 axle-bars, 10 troughs, 10 wooden trowels, five iron shovels.

**13.** Wanted to hand in the press-room:

pitcher, bronze cauldron capacity 5 *quadrantals*, 3 iron hooks, bronze table, millstones, 1 sieve, 1 sifting tray, 1 axe, 1 bench, 1 wine-jar, 1 press key, bedding for two free men to sleep there as guards — the third, a slave, can sleep with the press workers — new straining bags, old straining bags, cord, a cushion, lamps, 1 hide, two wicker strainers, 1 'meat-rack', one pair of steps.

These are wanted in the oil store:

oil jars, lids, 14 oil basins, 2 large and 2 small oil cups, 3 bronze ladles, 2 oil amphoras, 1 water-pitcher, 1 fifty[-*hemina* ?] urn, 1 pint oil measure, 1 pan, 2 funnels, 2 sponges, 2 earthenware pitchers, 2 half-*amphora* pitchers, 2 wooden ladles, 2 keys with bolts for the stores, 1 scales, a hundred [*libra*] weight and other weights.

### *Building Contracts*

**14.** If you order a new farmhouse built from the ground up, the craftsman is to complete all walls as specified, mortar and rubble, corners in squared stone; all necessary woodwork, thresholds, doorposts, lintels, beams, rafters.

Specify ox-sheds winter and summer, feed-racks, stable, slave rooms; 3 'meat-racks', table, 2 bronze cauldrons; 10 pigsties; hearth; a great door and second door to the owner's plan; windows (with bars for larger windows) 10 two-foot, 6 [small] for light; 3 benches, 5 seats, 2 looms; 6 skylights; a small mortar to crush durum wheat, a fuller's mortar; exterior fittings; 2 complete presses.

The owner will supply structural timber and other timber as needed and will provide 1 saw, 1 plumb-line — thus the contractor simply fells, planes, cuts and constructs — stone, lime, sand, water, straw, earth for making clay. If the farmhouse is struck by lightning, a respectable person is to be asked to adjudicate.

The price paid for this work by a fair owner, who provides required materials fairly and pays coin fairly, is 2 *nummi* per roof tile. The roof is calculated thus: whole tiles, as they come; cut tiles lacking a quarter, two count as one; all gully tiles are taken as two; all ridge tiles are counted as four.

Farmhouse with foundations in stone and mortar to a foot above ground level, then walls in mud-brick: in this case the contractor provides lintels and exterior fittings only to order; otherwise, the rule is as for farmhouse in mortar and rubble. Price,  $1\frac{1}{2}$  *nummi* per tile.

These prices are with a fair owner on a healthy site: on a malarial site, where work cannot go on in summer, a fair owner pays a quarter more.

**15.** Yard wall in mortar, rubble, flint (the owner to provide all supplies) to be specified in this form: '5 feet high and 1 foot capping,  $1\frac{1}{2}$  feet thick, 14 feet long, and rendered'.

If house walls are ordered by the 100 square feet (which is 10 feet square), price 10 *nummi* per 5 feet horizontal and 20 feet vertical (walls  $1\frac{1}{2}$  feet thick, the owner to make the foundations and provide one peck lime per foot length, two pecks sand).

### *Notes on Materials*

**16.** When lime-burning is contracted out, it is done as follows: the lime-burner prepares, burns and removes the lime from the kiln and prepares wood for the kiln. The owner provides stone and all necessary wood for the kiln.

**17.** Oak for timber (and vine-posts) is always ripe for cutting between the summer solstice and the shortest day. Other timber that bears seed is ripe for cutting when its seed is ripe. Timber that produces no seed is ripe when it sheds its bark. Where seed is green and ripe together -- cypress and pine, whose nut you can gather at any time -- it is ready and ripe to cut at any time: they have last year's cones, now dropping their nuts, and this year's, and they can be gathered when they begin to open; the first ones ripen at sowing time, and their season continues for eight months more; this year's cones are green. The elm comes ripe for cutting a second time when its leaves fall.

### *Press-Room and Presses*

**18.** If you wish to build an olive press-room for four presses, make them face in alternate directions. Arrange them in this way:

'Trees' two feet thick, nine feet high including tenons, with sockets cut out  $3\frac{3}{4}$  feet long and 6 fingers wide beginning  $1\frac{1}{2}$  feet from the ground. 2 feet between the 'trees' and the walls; 1 foot between the two 'trees'. 16 feet at right angle from the 'trees' to the nearest of the posts.

Posts 2 feet thick, 10 feet high including tenons. Windlass 9 feet long plus tenons. Press-beam 25 feet long, including tongue  $2\frac{1}{2}$  feet.

The floor length wanted, assuming pairs of presses and two channels, is 32 feet. The pair of crushing mills, left and right, each wants 20 feet of floor. You need 22 feet space between opposite posts to allow space for levers. Given presses facing in opposite directions, from the further post [of each] to the wall behind the 'trees' [of the other] there must be 20 feet. Total width for the press-room with four assemblies, 66 feet; 52 feet long, wall to wall.

Where you are to place the 'trees', make good foundations 5 feet deep, and on these a flo first.

On top of the 'trees' and of the posts fit a horizontal beam, 2 feet wide, 1 foot thick, 37 feet long; or fit two if you have no solid one. Under these beams [and] between the channels and the far walls where the crushing mills are to stand, [build pillars. On the pillars] place a  $23\frac{1}{2}$  foot cross-beam,  $1\frac{1}{2}$  feet thick, or substitute a pair for a solid one: over these cross-beams, place the horizontal beams on top of the 'trees' and the posts.

On these structures build walls, and anchor them to the timbers of the building, to give adequate weight.

Where you are to put the press bed, make a foundation 5 feet thick, 6 feet wide. Make the bed and the channel around it  $3\frac{3}{4}$  feet wide.

Give the whole remaining floor a foundation 2 feet deep: straw first, then a half-foot layer each of broken stones and of mortar. Make the floor in this way. After levelling, make a first layer of gravel and mortar, and firm it with piles; then make a second layer in the same way. Dress this with sifted cement 2 fingers thick. On this lay a baked tile floor: when laid, ram down and smooth off to make a good floor.

Make the 'trees' and posts of oak or pine.

If you want to make your [cross-]beams shorter, route the channels outside the pillars. You will then want 22 foot beams.

Make the olive platen 4 feet across, with Punic joints, and 6 fingers thick. Joint with holm-oak dowels. When you have fitted the dowels, fix them with dogwood nails. Fit three ribs across this platen, and fix them to it with iron nails. Make the platen of elm or hazel: if you have both, alternate them.

**19.** For wine presses make the posts and 'trees' two feet taller. Above the sockets in the 'trees' (the 'trees' must be a foot apart) make a hole for a single crossbar 6 fingers square in cross-section.

Make six slots in each windlass, the first one half a foot from the tenon, the remainder spaced as equally as you can. Make a peg in the middle of the windlass. Get this middle point where you are to make the peg in line with the mid point between the 'trees', so that the press-beam will be correctly centred.

When you make the 'tongue', measure it from the middle of the press-beam, so that it fits correctly between the 'trees'. Allow it 1 thumb of play.

Longest levers 18 feet, next longest 16 feet, third longest 15 feet; stops 12 feet, next longest 10 feet, third longest 8 feet.

### *Crushing Mills*

**20.** How to assemble the crushing mill.

The iron pivot which stands on the pillar must stand at the very centre, perfectly vertical. It must be firmly fixed with wedges of willow. Pour lead over. Be sure it does not slip. If it has moved, dismount it and start again, and wedge it so that it does not.

Make axle-boxes for the millstones from *orcites* olive wood. Lead them in, and be sure they are not loose. Make them fit the axle. Make solid guards one thumb wide, with twin lips, to be fixed with staples, so that they do not fall out.

**21.** Make the axle 10 feet long, as thick as the axle-boxes require.

Its middle, fitting between the millstones, is to be pierced, wide enough to take the iron pivot, so that you can mount it on to the pivot. Insert an iron sheath to fit the pivot and the axle. Between the centre and the two ends, pierce the axle [with slots for axle-bars] at left and at right, 4 fingers wide, 3 fingers long. Under the axle fit an iron base-plate, as wide as the axle itself at its middle, and pierced to take the pivot. To left and right, where you made the slots, sheath with metal plates, folding back all four plates to the underside of the axle. To left and right, on either side of the slots, insert small thin plates under these plates, and fix them to one another so that the slots for the axle-bars do not enlarge.

On each end of the axle in the axle-boxes, four iron bushes. Make them so that they fit by themselves,

and secure their middles with pins. Beyond the bushes, on the outside, pierce the axle to take a bolt to hold the millstone, and above this slot fit an iron collar 6 fingers wide, pierced right through for the bolt. All this is done so that the axle will not get worn in the stone. Make four iron washers to fit around the millstone, so that the axle and bolt will not wear inside.

Make the axle of solid elm or beech.

The same craftsman who makes the required iron parts can fit them. It will cost 60 *sestertii*, plus 4 *sestertii* to buy the lead to seat the axle, plus 8 *sestertii* for the craftsman's labour in assembling the axle, fitting, and leading the axle-boxes (he can go on to adjust the crushing mill). Total cost 72 *sestertii* plus helpers.

22. The crushing mill is to be adjusted as follows. The *librator* is to be equidistant from the lips of the mortar; each millstone to be at least 1 finger from the surface of the mortar. Take care that the stones do not graze the mortar. There should be 1 finger between the millstone and the pillar. If there is more, and the stones are too far away, wind a rope around the pillar, looping it tight, so as to fill the unwanted space. If the millstones are too deep and graze the mortar undesirably at their base, insert pierced wooden discs around the pivot on the pillar, to adjust the height. Adjust laterally in the same way with wooden discs or iron washers until the gauge is correct.

#### *Note on Buying Crushing Mills*

A crushing mill bought in Suessa country cost HS 400 and 50 *lb.* oil; HS 60 assembly; ox transport, 6 days' work, 6 men with the oxherds, HS 72; axle with accessories, HS 72; grand total HS 729, counting HS 25 for the oil.

Bought at Pompeii, complete with accessories, HS 384; transport, HS 280; best assembled and adjusted on site, for which allow HS 60: grand total HS 724.

If getting new millstones for an old mill, 1 foot 3 fingers thick at the centre, 3½ feet high, axle slot ½ foot square. When you get them home they have to be fitted to the mill. They are sold at the walls of Rufrium at HS 180; fitting, HS 30. Same price at Pompeii.

#### *Farm work through the year Around the Vintage*

23. Have everything necessary ready for the vintage.

Have utensils washed, carrying-baskets mended, pitched, vats pitched where necessary. If it rains, have picking-baskets made or mended, emmer milled, anchovies bought, windfall olives salted. When time allows, gather *miscellae* grapes for early-harvest wine for the workers to drink.

Working cleanly, distribute each day's juice into the vats evenly.

If necessary, add grape syrup, boiled down from first-flow must, to the [regular] must. Add one fortieth part of grape syrup (or 1½ *lb.* salt) per *culleus*.

If you add marble, allow 1 *lb.* per *culleus*. Put it into an urn, mix with must, pour the mixture into the vat.

If you add resin, use 3 *lb.*, finely broken down, to 1 *culleus* must. Put it in a strainer and suspend it in the vat of must. Shake it frequently so that the resin dissolves.

Whether adding grape syrup, marble or resin, stir frequently for 20 days.

Press daily. First-press and cut-round must to be divided among the vats equally.

24. Greek Wine can be made as follows. Select very ripe *apicius* grapes. When gathered, to 1 *culleus*

of must 2 *quadrantals* old sea water or 1 peck pure salt: suspend in a strainer and allow to dissolve in the must.

If you wish to make *helviolus* wine, take half of *helviolus*, half of *apicius*, and add a thirtieth part of old grape syrup.

Whatever wine you add grape syrup to, add a thirtieth part of syrup.

**25.** When grapes are ripe and are harvested, first be sure that enough is kept by for the household and the owner's people. And be sure that they are harvested fully ripe and dry, or your wine will lose its reputation!

Spread fresh marc daily on a hemp mat, or make a sieve for the purpose. Tread it into pitched vats or a pitched wine tank. Have it well sealed, to feed to the oxen in winter. You can also strain water through it gradually and get *lorea* for the household to drink.

**26.** Once the harvest is completed, order the press equipment, carrying-baskets, straining bags, ropes, bars, pins to be put away in their proper places.

### *In Autumn*

Have the vats of wine skimmed twice a day, and have handy a brush, a separate one for each vat, to brush around the lips of the vats.

Thirty days after the vintage, once the vats are clear of marc, seal them. If you want to take the wine off the lees, this will be the best time to do so.

**27.** Sow *ocinum*, vetch, fenugreek, bean, bitter vetch, as fodder for oxen. Have a second and a third sowing of fodder. Then sow other legumes.

In a fallow field, trenches for olives, elms, vines, figs. If it is a dry spot, plant olives now during the legume sowing. Now also trim lower shoots on young trees planted earlier, and trench around trees.

**28.** When you plant out olives, elms, figs, fruit trees, vines, pines, cypresses, take them out with all their roots and as much of their earth as you can, wrapping them round to carry them. Order them to be carried in a trough or a basket. Do not dig them up or move them in wind or rain: this is particularly to be avoided. When you set them in the trench, put the top soil to the bottom, then cover the roots with earth to the top, then tread down well with the feet, then firm as well as you can with rammers and sticks: this is important here. Sturdier trees, 5 fingers thick, should be cut back before planting, the cuts sealed with dung and bound with leaves.

**29.** Allocate dung as follows. Cart half of it to the fields where you are to sow fodder, and if there are olives there trench round them and lay dung; then sow your fodder. Lay a quarter around the trenched olives, wherever it is most needed, and cover the dung with earth. Keep back the other quarter for the pasture, and, when it is most needed, cart it out when there is no moon and the Favonius blows.

**30.** Give oxen elm, poplar, oak and fig foliage as long as you have it. Provide sheep with green foliage as long as you have it. Pasture sheep where you are to sow fodder.

Foliage till the fodder is ripe. Conserve your stored dried fodder as long as you can: keep in mind how long winter is.

**31.** What is needed for the olive harvest is to be got ready. Cut ripe withy canes and willow at the right time, so that you have enough to make carrying-baskets and mend old ones. To make pins, dip dry holm-oak, elm, walnut, fig sticks in dung or water: make pins from them as needed. Have ready-made levers of holm-oak, holly, bay. The press-beam is best made from black hornbeam.

When you cut down elm, pine, walnut and all other timber, cut it when the moon is waning, in the afternoon, and not under a south wind. It is ripe for cutting when its seed is ripe. Do not shift it or chop it in dew. Timber that bears no seed is ripe for cutting when it sheds its bark.

Do not handle timber, or wine, under a south wind, unless essential.

32. Be sure to begin in good time to prune vines trained on trees and to layer vines.

### Tending Vines

Be sure to train vines upwards, as much as you can.

The trees are to be pruned thus: the branches that you leave to be well separated; cut straight; do not leave too many. Vines should have good knots on each tree-branch. Take great care not to 'precipitate' the vine and not to tie it too tight. Be sure that trees are well married, and that vines are planted in sufficient numbers: where appropriate, detach vines entirely from the tree, layer to the ground, and separate from the stock two years later.

33. Have the vines tended as follows: Vine shoots, with plenty of knots, to be trained straight and not to be crooked. Always train upwards, as much as you can. Leave fruiting wood and renewal wood. The vine to be trained as high as possible and tied straight but not too tight.

Tend in this way: trench round the heads; dig round the pruned vine; begin to plough; trace continuous furrows on each side. Layer new vines as early as possible, then hoe. Cut old vines back as little as possible. It is better to layer to the ground and separate from the stock two years later. It is time enough for the young vine to be cut back when it is strong.

If the vineyard is bald of vines, trench between and plant cuttings. Keep shade from these trenches, and dig frequently. In an old vineyard that is poor, sow *ocinum*, but not to bear seed; and put dung, or chaff, or marc, or whatever, to the heads to make them healthier.

When the vine comes into leaf, tie in. Tie young vines at close intervals, so that the shoots do not break. If they are already at the rod, tie their young tendrils lightly and train them to the right angle. When the grapes begin to colour, tie the branches to support them, strip and expose the grapes. Hoe around the heads.

Cut willow at the proper time, strip of bark and tie in bundles. Keep the bark, and, when required in the vineyard, soak some in water and use for tying. Keep the canes to make carrying-baskets.

### *Autumn Sowing; More Notes on Where to Plant*

34. I return to sowing. Sow first in the coldest, wettest field. The last sowing should be made in the hottest field. Avoid working carious land.

Red earth, grey earth, ground that is heavy, stony, sandy, and also that is not watery: lupins will do well there.

In chalk and mud and red earth and in watery ground, it is best to sow emmer.

Fields that are dry and not weedy, open and not shaded: sow durum wheat there.

35. Sow beans in fields that are strong and not prone to fail.

Sow vetch and fenugreek in your least weedy fields.

You should sow bread wheat and durum wheat in open, high fields where the sun shines longest.

Sow lentil in stony ground or red earth that is not weedy.

Sow barley in a newly cleared field or in one that can be sown every year.

You should sow three month wheat in a field that you were unable to sow early, or a field that is fat enough to be sown every year.

Sow turnip, field rape and radish in a well-manured field or a fat field.

### *Memoranda on Crops and Manuring*

#### **36. Manure for crops:**

You can spread pigeon dung on pasture, garden or arable field.

Store goat, sheep, ox and all other dung carefully.

Spread *amurca*, or water trees with it: around larger heads, dose 1 amphora; smaller, 1 *urna*; add half of water. Trench beforehand, but not deeply.

#### **37. Bad for crops:**

To dig carious ground.

Chickpea is bad, because it is pulled up, and because it is salty.

Barley, fenugreek, bitter vetch, all suck the field dry; so do all crops that are pulled up.

Do not put olive stones to the crop.

Legumes that feed cereals:

Lupin, beans, vetch.

Sources of manure:

Straw, lupin, chaff, beanstalks, pods, holm-oak and oak foliage.

### *In Winter*

Pull out danewort, hemlock, from the crop, and *herba alta* and sedge from the willow bed. Lay this stinking foliage as litter for sheep and oxen.

Sieve the debris from the olive stones, put in a tank, add water, turn over well with a shovel. Use this mixture to manure trenched olives; also use burnt olive stones.

If a vineyard is poor, chop up its shoots and plough them or dig them in at the spot.

Do this by candlelight in winter: dry-trim vine-posts and stakes, having brought them under cover a day beforehand; make torches; clear the sheds of dung, but not at new moon or half moon.

Do not touch timber at those times. Best to take is the wood that you trim or fell in the seven days closest to full moon. Take special care never to trim or fell timber, or to touch it if you can help, unless it is dry and not icy or dewy.

Hoe twice, weed and pull out oats from the wheat.

Bring back canes from pruned vines and trees. Make faggots, and pile up for the owner's use vine branches, fig wood for kindling, and chopped wood.

**38. The limekiln.** Make a limekiln 10 feet wide, 20 feet high; narrow it to 3 feet wide at the top. If

your kiln has a single door, make a large cavity inside to hold the ash, so that it does not have to be cleared, and design the kiln carefully, making sure that the hearth extends across the whole bottom of the kiln. If your kiln has two doors, there is no need for this cavity: when the ash is to be cleared it can come out of one door while the fire is at the other. Take care that the fire never goes out, neither at night nor at any other time. Load the kiln with good stones, as white and as evenly coloured as possible. In making the kiln, make the furnace as steep-sided as possible. Dig deep enough to site the kiln so that it is as deep and as sheltered from the wind as possible. If you cannot site it as deep as you would like, make the top of brick or of concrete, and seal the top part on the outside. After lighting, if fire emerges anywhere except by the chimney, stop with mud. Take care that the wind does not get in at the door: be especially wary of the south wind.

You will tell that the lime is cooked when you find that the top stones are cooked. Also the lowest stones, once cooked, will collapse, and the fire will begin to give less smoke.

If you cannot sell firewood and sticks and have no stone to make lime, make charcoal with your wood. Sticks and canes that are no use to you should be burnt in the field. Sow poppy where you had the bonfire.

**39.** When the weather is bad and no field work can be done, shift dung to the dung-heap; clean out the ox shed, the sheepfold, the hen-run, the farm buildings; mend wine vats with lead, or bind with sappy oak stems. If you mend or bind them well, fill the cracks with putty, and pitch well, any vat can become a wine vat. Make up putty for wine vats as follows: 1 *lb.* wax, 1 *lb.* resin, 1/3 oz. sulphur. Put all together in a new saucepan, add powdered gypsum till it reaches the consistency of a plaster. Use to mend vats. After mending, to make all the same colour: mix 2 parts raw clay with a third part lime. Make small bricks, cook in the oven, grind and apply.

In rain, look for work to be done indoors. Rather than do nothing, do cleaning. Remember that the establishment will cost just as much if nothing is done.

### *In Spring*

**40.** You a point. Tear off some Greek willow. Mix clay or chalk, a little sand, and cow dung; knead well together so that it becomes as sticky as possible. Take the torn-off willow, bind round the cut stock with it and do not let the bark break. At this spot, insert the sharpened twig between bark and stock to a length of 2 fingertips' breadth. Now take a scion of the kind you want to graft, and sharpen its end obliquely to 2 fingertips' breadth. Remove the dry twig that you inserted, insert the desired scion, match bark to bark. Insert to the depth of the sharpened end. Make a second, a third, a fourth graft in the same way; insert as many varieties as you wish. Bind generously with Greek willow. Seal the stock with the kneaded mixture to 3 fingers' breadth. Bandage with bugloss, so that water will not collect on the bark: tie this bugloss over the bark in such a way that it will not come off. Then cover with straw, and tie, to avoid frost damage.

**41.** Vines are grafted, firstly in spring, secondly when they are in flower: the second season is the best. Pears and apples are grafted in spring, in the fifty days of solstice, and at harvest. Olives and figs are grafted in spring.

Vines are grafted as follows. Cut the stock; split it in the centre through the quick; insert sharpened scions; match quick to quick as you insert. A second method is this: if vine is close to vine, sharpen a young shoot of each obliquely, and tie them together with bark, quick to quick. A third method is this. With a gimlet make a hole in the stock. Into this insert two vine shoots of the required kind, both cut obliquely, up to the quick; be sure to match quick to quick. Insert one from each side into the hole that you have pierced. Your shoots should be two feet long. Insert them below ground level and turn them back towards the head of the vine. Fasten the parent vines into the earth and cover with soil. Seal all with kneaded mixture, bandage and cover in the same way as for olives.

**42.** Figs and olives by another method. On any kind of fig or olive you want it to be, cut away some

bark with a scalpel. Cut a second piece of bark, with a bud, from the fig of the kind you choose, put it to the spot where you cut the bark away for your graft, and shape it to fit. The graft should be  $3\frac{1}{2}$  fingers' breadth long, 3 fingers' breadth wide. Seal and cover in the same way as the others.

**43.** In wet ground, drainage trenches should be dug 3 feet wide at the top, 4 feet deep, 1 foot 1 palm wide at the bottom. Pave with stone. If you have no stone, spread with green willow rods placed crosswise. If you have no rods, canes tied in bundles. Then dig your planting holes  $3\frac{1}{2}$  feet deep, 4 feet wide, and let the water run from these into the trench. Then plant the olives.

In vineyards, rows and plants should be not less than  $2\frac{1}{2}$  feet apart in any direction. If you want the vines and olives that you have planted to grow quickly, you can dig the rows once a month and around the olive trees every month until they are three years old. Tend other trees in the same way.

**44.** Begin to prune the olive orchard 15 days before the equinox. It is correct to prune for 45 days starting on that day.

Prune as follows. In really vigorous ground, cut out every dry branch and anything broken by the wind. In ground that is not so vigorous, prune and plough more: remove eyes carefully and smooth off the trunks.

**45.** Olive cuttings that you are to plant out should be trimmed to 3 feet. Handle them carefully: make sure the bark is not damaged when you cut or trim them.

Those that you are to plant in the nursery should be 1 foot long. Plant them thus: turn the ground with a spade, and get the soil quite soft and crumbly. When you insert the cutting, firm it down with the foot. If it will not go deep enough, knock in with a small hammer or mallet, and be careful not to split the bark as you knock it. Do not make a hole with a stake to plant the cutting in. It will take better if you plant it so that it stands upright. Once the cuttings are three years old, they are ripe to plant out when the bark turns. If you plant them in planting holes or trenches, place them in threes and spread them apart. They should not be more than 4 fingers' breadth above the ground.

Or, plant buds.

**46.** Make the nursery as follows. A ground as good, as open and as well manured as you can manage, and whose soil is as similar as possible to that where you will eventually plant the seedlings, and where the seedlings will not have to be carried too far. Turn the ground with a spade, take out stones, fence round carefully, plant in rows. Plant cuttings  $1\frac{1}{2}$  feet apart in any direction; firm down with the foot. If you cannot plant them deep enough, knock in with a hammer or mallet. Make the cuttings stand 1 finger's breadth above the ground. Seal the base of the cutting with cow dung, put a marker beside it, and hoe frequently if you want the cuttings to grow quickly. Plant other cuttings in the same way.

**47.** Sow reeds as follows: Arrange the 'eyes' 3 feet apart.

Make and plant a vine nursery in the same way. When the vine is two years old, cut it back. When it is three years old, replant it. If animals are to graze where you will plant your vineyard, cut back three times before you put them to the tree. Put them to the tree when they have five old eyes.

Every year you sow leeks, you will have leeks to pull.

**48.** Make a fruit nursery in the same way as an olive nursery. Plant each kind separately.

Where you plant cypress seed, turn the ground with a spade: plant at the beginning of spring. Make the ridges five feet wide. Add crumbled dung, hoe in and break down the sods. Make the ridges flat, slightly concave. Then sow the seed, as densely as flax, and sieve earth over densely, 1 finger's breadth thick. Flatten this earth down with a board or with the feet. Fix forked props around, stretch rods between them, place canes or fig-drying hurdles across these to keep out the cold and the sun. Make them high enough for a person to walk underneath. Weed frequently: as soon as the weeds

begin to grow, take them out, because if you pull up tough weeds you will pull up the cypresses as well.

Plant and screen pear and apple seed in the same way.

Plant pine kernels in the same way, or else plant them like garlic.

**49.** If you wish to move an old vine to a new spot, you can do so if it is no thicker than an arm. Prune first, leaving no more than two buds per branch. Dig up the roots carefully, following their full length, and take care not to damage them. Place it in the planting hole or trench, oriented as it was, cover and tread down well. Mount it, tie it and arrange its branches just as they were, and dig frequently.

**50.** Manure the pastures at the beginning of spring at new moon, or, if they are not irrigated, when the Favonius begins to blow.

While the animals are out of the pastures, clear them and root out all invasive weeds.

After pruning vines, pile up firewood and sticks.

Thin out figs. In the vineyard, prune the lower branches of figs so that the vines do not climb them.

Make a vine nursery, or restore an existing one.

All these things are to do before you begin to dig the vineyard.

When the Feast is shared and eaten, begin the spring ploughing. Plough first the grounds that are driest: those that are fattest and wettest plough last, so long as they do not begin to harden.

**51.** Layering of fruit trees, other trees.

Suckers that grow from the tree at ground level to be layered to the ground (the extremity to be raised) so that they root. Two years later, dig them up and replant them. Fig, olive, pomegranate, quince and all other apples, bay, myrtle, hazelnut, plane, can all be layered from the root, dug up and replanted in the same way.

**52.** Those that you wish to layer more carefully, you can layer in pots or planting-baskets with holes: they can eventually be planted out without removing these. The aim is that they take root while on the tree. Make a hole in a pot; take the branch that you wish to root through the hole. (Or basket.) Fill the pot or basket with earth, firm it down well, and leave it on the tree. In time, sever the branch under the basket. Make a cut in the basket from bottom to top; if a cup, break. Plant out with the basket or pot.

You can layer a vine in the same way, severing it and planting it out with the basket a year later. Layer any kind you wish in this way.

**53.** Cut hay at the right time, and take care not to cut it late. Cut it before it is ripe.

Store separately what will be your best hay, for them to eat in spring when they are ploughing, before you give them *ocinum*.

### Supplies Through the Year *A Calendar for Fodder*

**54.** Fodder for oxen can be prepared and given as follows.

When you have done the sowing, gather acorns, and prepare by soaking in water. You can give

½ peck per beast per day; but when they are not ploughing it is better to pasture them.

Or, one peck of marc stored in a vat.

Pasture by day; by night give 25 *lb.* hay per beast. If no hay, give holm-oak and ivy foliage.

Store wheat and barley chaff, bean pods and the pods of vetch, lupin and other legumes. When storing straw, keep the greenest indoors and sprinkle with salt: later on you can give this in place of hay.

When you begin to give feed in spring, give a peck of acorn or more, or a peck of soaked lupin and 15 *lb.* hay.

When *ocinum* is ready, give that for preference. Gather it by hand, so that it will grow again: what you cut with a sickle will not grow again. Give *ocinum* until it begins to dry, and that will be the proper quantity.

After that, give vetch.

After that, give foxtail millet.

After foxtail millet, give elm foliage. If you have poplar, add that to make the elm last. If you have no elm, give oak and fig.

There is nothing more profitable than to control your ox feed. They should not be pastured except in winter, when they are not ploughing. If they get green stuff to eat, they will always want it. They should have muzzles, so that they do not browse when ploughing.

#### *Note on Firewood*

55. Put firewood for the owner in the loft.

Chopped olive wood and roots in an outdoor woodpile; form them into ricks.

#### *Provisions for Household and Oxen*

56. Food for the household.

For field workers, 4 pecks wheat in winter, 4½ pecks in summer.

For the manager, manageress, supervisor, shepherd, 3 pecks.

For the chain gang, 4 *lb.* bread in winter; when they begin to dig the vineyard, 5 *lb.*, until there begin to be figs; then revert to 4 *lb.*

57. Wine for the household.

When the vintage is over they can drink *lora* for three months.

In the fourth month, half a pint a day, i.e. 2½ *congi* the month.

In the fifth, sixth, seventh, eighth months, a pint a day, i.e. 5 *congi* a month.

In the ninth, tenth, eleventh months, 1½ pints a day, i.e. 1 *amphora* [a month].

In addition, at Saturnalia and Compitalia, 1 *congius* per person.

Total of wine per person per year ...

For the chain gang, increase depending on the type of work done. It is not excessive to give them 10

*quadrantalia* each a year.

**58.** Relish for the household. Conserve as many windfall olives as possible. Then conserve those of the ripe olives that are least productive for oil. Ration them, so that they last as long as possible. When the olives are finished, give *hallec* and vinegar. Give a pint of oil each a month. A peck of salt each a year is enough.

**59.** Clothes for the household. A 3½ foot tunic and a coat every two years. When you give out a tunic or coat, take back the old, to make patchwork cloaks. You can give a good pair of boots once every two years.

**60.** Food per year for a pair of oxen. 120 pecks lupin or 240 pecks acorn, [7000] *lb.* hay, *ocinum*, 20 pecks beans, 30 pecks vetch (beside this, be sure to sow enough vetch to harvest the seed). When you sow fodder, have several sowings.

### *Memoranda on Ploughing and Planting*

**61.** How to farm a field? Plough it. And after that ...? Plough it. After that ...? Manure it.

If you turn the soil of the olive plantation very frequently and very deeply, you will plough out the smallest roots. If you do not plough well enough, the roots will come up and will thicken, and the strength of the olives will go into the roots.

When you plough the wheat field, plough well and in good weather. Never plough a cloudy furrow.

Otherwise, husbandry is: planting liberally, digging seedlings carefully, at the proper time, digging up as much of the roots as possible with the soil. And when you have covered up the roots again carefully, mulch well in, so that the water will not damage them.

When to plant olives? In a dry field, at sowing time; in a fertile field, in spring.

### *Note on Carts and Ropes*

**62.** You should have as many carts as you have teams of oxen, mules, and donkeys.

**63.** The press rope should be 55 feet end to end.

Leather cart rope, 60 feet; reins, 26 feet.

Yoke ropes for a cart, 18 feet; shaft rope, 15 feet.

Yoke ropes for a plough, 16 feet; shaft rope, 8 feet.

### *The Olive Harvest*

**64.** When olives are ripe, they should be gathered as early as possible, and stand as little as possible on the ground or in the loft. On the ground and in the loft they deteriorate. The gatherers want there to be as many windfalls as possible, so that they gather more. The press workers want them to be in the loft as long as possible, to soften, which makes their work easier. Do not accept that oil yield increases with storage. The more quickly you make it, the better the work will go, and the higher will be the quantity and quality of oil from the same amount harvested. Olives that stay on the ground or in the loft will make less and poorer oil.

If possible, draw off the oil twice a day, because oil will be poorest if it remains too long with the *amurca* and the residue.

**65.** Make green oil as follows: Collect windfall olives as quickly as possible. If dirty, wash them, clear them of leaves and manure. Make oil one day or two days after picking.

Pick olives when black. The more bitter the olives you make oil from, the better the oil will be. It is most profitable for the owner if oil is made from ripe olives.

If there are frosts when you are harvesting olives, make oil two or three days after: add salt to these olives, if you wish.

Keep the press room and store as warm as possible.

**66.** Instructions to the overseer and decanter. Guard the store and press room carefully, make sure that the press room and store are entered as little as possible, and that it is as tidy and clean as possible. The oil wants no bronze vessels, and no olive stones! In either case the oil will have a bad taste.

A lead cauldron should be placed in the tank for the oil to flow into. When the press workers are using levers, the decanter must continually dip oil with a dipper as carefully as possible, and not stop, and be careful not to take up any *amurca*. Take oil first into one tub, then into a second, and keep removing residue and *amurca* from these tubs. When you have taken the oil from the cauldron, drain off the *amurca*.

**67.** Instructions to the overseer in the press room, ii. ‘Those in the press room should use clean vessels and take care that the olives are well prepared and well dried. They should not chop wood in the press room. They should decant oil regularly. Give a pint of oil to each worker per pressing, as well as what is needed for the lamp. Remove residue daily. Take off the *amurca* till it fills the last tank in the store. Wipe the straining bags with a sponge. Decant the oil daily till it reaches the vat. Take great care that no one steals from the press room and store.’

**68.** When the harvest and the oil-making is done, raise the press-beams. Hang the press ropes, straps and hoisting ropes on the ‘meat-rack’ or on a press-beam. Put away the platens, crossbars, levers, rollers, straining bags, carrying-baskets, picking-baskets, ladders, props, everything that will be wanted again, in its proper place.

## Recipes

### *For Coating Oil Vats*

**69.** Coat new oil vats as follows. Fill with *amurca* for 7 days; top up the *amurca* each day. Then empty out the *amurca* and let dry. When dry:

Dissolve gum in water one day, dilute it the next. Heat the vat, not as hot as if you were going to pitch it: warm is enough: use kindling wood for heating. When it is moderately warm, pour in the gum and then spread it. If you mixed the gum correctly, 4 *lb.* gum is enough for a 50-*urna* vat.

### *Medicines for Oxen*

**70.** Medicine for oxen. If you expect sickness, administer while still healthy: 3 crystals salt, 3 bay leaves, 3 stems leek, 3 cloves Levant garlic, 3 cloves garlic, 3 grains incense, 3 whole plants savin, 3 leaves rue, 3 shoots white bryony, 3 white beans, 3 live coals, 3 pints wine, all to be gathered, chopped together and administered in the open air, and the person administering it should not yet have eaten. Administer this potion to each beast daily for three days, and apportion it so that, with the three doses to each beast, all is used. Ensure that the beast and the person administering are both standing up in the open air. Use a wooden dish.

**71.** If oxen become ill, administer at once one raw hen’s egg, to be eaten whole. Next day, chop a

head of Levant garlic in a *hemina* of wine, to be drunk complete. Chop in the open air; administer in a wooden dish, while the beast and the person administering are both standing up in the open air, and while neither has yet eaten.

72. So that oxen do not wear down their hooves, anoint the base of the hoof with liquid pitch before you drive them anywhere by road.

73. Each year at the time when the grapes begin to change colour give the oxen a medicine to keep them healthy. Wherever you see a snakeskin pick it up and keep it so that you will have one when you need it for this. Snakeskin, emmer, salt, mother-of-thyme: chop these all together with wine, and give to all the oxen to drink.

In summer, always take care that the oxen drink good ix all together well; make a loaf of this, with bay leaves under it, and cook slowly in a hot fire under a crock.

76. *Placenta* to be made thus: 2 *lb.* bread-wheat flour to make the base; 4 *lb.* flour and 2 *lb.* prime emmer groats to make the layers. Turn the emmer into water: when it is really soft put it in a clean mixing bowl and drain well; then knead it with your hands, and when it is well worked add the 4 *lb.* flour gradually, and make into sheets; arrange them in a basket to dry out. When they are dry rearrange them neatly. In making each sheet, when you have kneaded them, press them with a cloth soaked in oil, wipe them round and damp them. When they are made, heat up your cooking fire and your crock. Then moisten the 2 *lb.* flour and knead it; from this you make a thin base. Put in water 14 *lb.* sheep's cheese, not sour, quite fresh; let it steep, changing the water three times; take it out and squeeze it gradually dry with the hands; when properly dry put it in a mixing bowl. When all the cheese is properly dried out, in a clean mixing bowl knead it with the hands, breaking it down as much as possible. Then take a clean flour sieve and press the cheese through the sieve into the mixing bowl. Then add 4½ *lb.* good honey and mix it well with the cheese. Then put the base on a clean table which gives a foot of space, with oiled bay leaves under it, and make the *placenta*. First place a single sheet over the whole base, then, one by one, spread the sheets [with mixture] from the mortar and add them, spreading them in such a way that you eventually use all the cheese and honey, and on the top put one more sheet by itself. Then draw up [the edges of] the base, having previously stoked up the fire; then place the *placenta* to cook, cover it with the heated crock, and put hot coals around and above it. Be sure to cook it well and slowly. Open it to check on it two or three times. When it is cooked, remove it and coat in honey. This makes a one-gallon *placenta*.

77. Make *spira* as follows. Taking quantities as required, proceed as for *placenta*, but shape differently. Spread the *tracta* on the base liberally with honey. Then work as if you were drawing out a rope; place them thus over the whole base neatly. Then complete as for *placenta*, and bake.

78. Make *scriblita* as follows. For the belt, the *tracta* and the cheese, proceed in the same way as *placenta*, but without honey.

79. *Globi* to be made thus: mix cheese and emmer as above; make as many balls as you want. Put fat in a hot bronze pan: cook one or two at a time, turning them frequently with two sticks. When cooked remove them, coat in honey, roll in poppy-seeds, serve.

80. Make *encytum* in the same way as *globi*, except that you use a deep pierced dish with which you stream into the hot fat; form neatly as with *spira*, turn with two sticks and use these to present. Coat likewise. Allow to colour, but do not overheat. Serve with honey or with *mulsum*.

81. *Erneum*: like *placenta*. Make the same mixture as *placenta*; mix in a trough, pour into an earthenware *irnea* and submerge this in a bronze cauldron full of hot water. Cook over the fire. When cooked, break the *irnea*; set out.

82. Make *spaerita* as follows. Like *spira*, but form thus: make balls, fist-sized, of *tracta*, cheese and honey. Arrange on the base, densely spaced: arrange as with *spira*, and cook in the same way.

### *An Offering*

**83.** Make a dedication for the health of the oxen as follows.

To Mars and Silvanus, in the forest, in daytime, dedicate the following per head of oxen: 3 *lb.* emmer, 4½ *lb.* fat, 4½ *lb.* lean meat, 3 pints wine. You may place it all together in one jug; the wine, also, may be placed all in one jug. They may be offered by a slave or a free person. When they have been offered, they should be consumed, at once, on the spot. No woman must be present or see the rite.

You may make this dedication each year if you wish.

### *Puddings and porridges*

**84.** Make *savillum* as follows. ½ *lb.* flour, 2½ *lb.* cheese, mix together as for *libum*; □ *lb.* honey, 1 egg. Rub an earthenware baking dish with oil. When all ingredients are well mixed, place in the dish and cover the dish with a crock. Be sure to cook through in the middle, where it rises highest. When cooked, remove from the dish, spread with honey, sprinkle with poppy. Place briefly under the crock, then remove. Set out with dish and spoon.

**85.** Cook Punic *puls* as follows. Place 1 *lb.* emmer groats in water. Allow to soak well. Pour into a clean trough. Add 3 *lb.* fresh cheese, ½ *lb.* honey, 1 egg. Mix all together well and turn into a new cooking pot.

**86.** Make durum wheat *granea* as follows. You place ½ *lb.* clean durum wheat in a clean mixing bowl, wash well, thresh well and rinse well; then you place in a cooking pot with clean water and cook. When cooked you add milk gradually until the liquor thickens.

**87.** Make starch as follows. Clean bread wheat thoroughly, then place in a trough and add water twice a day. On the tenth day, drain and dry thoroughly and mix well in a clean trough and allow the product to form. Place this in a new linen cloth, and strain the liquor into a new baking-dish or a mixing bowl. Repeat the whole process and make more starch. Place the baking-dish in the sun and allow to dry. When dry, place in a new cooking pot. Cook with milk.

### *Salt*

**88.** Make white salt as follows. Fill a broken-necked amphora with clean water, place in the sun. Suspend in it a strainer of ordinary salt. Agitate and refill repeatedly: do this several times a day until salt remains two days undissolved. A test: drop in a dried anchovy or an egg. If it floats, the brine is suitable for steeping meat, cheese or fish for salting. Put out this brine in pans or baking dishes in the sun, and leave in the sun until crystallised. This gives you 'flower of salt'. When the sky is cloudy, and at night, put indoors; put in the sun daily when the sun shines.

### *Force-Feeding Poultry*

**89.** Force-feed chickens and geese as follows.

One shuts in young chickens that have just begun to lay. One makes cakes of moistened fine wheat flour or barley flour, dips them in water, and puts them in the mouth, increasing gradually day by day, judging from the gullet what is a sufficient amount. One force-feeds twice a day and gives water at midday. Water should not be allowed for more than an hour.

Feed geese in the same way, but give water first, twice daily, before food.

**90.** After catching a young wood-pigeon, first feed roasted cooked beans, puffing them from one's mouth into the bird's mouth, and give water similarly. Do this for seven days. After that, husk split beans and emmer: let the beans, a third of the whole, boil, then turn the emmer in. Do it cleanly and cook well. When removing, knead well, rubbing the hand with oil. Knead a little bit first, then more.

Sprinkle on and knead in oil till you can make cakes. Give these, dipped in water, and regulate the dose.

### Uses for *Amurca*

**91.** Make a threshing floor as follows. Dig over the site, then drench with *amurca* and allow to soak in, then break up the ground thoroughly. Then level, and pound with a rammer. Finally drench again with *amurca* and allow to dry. If you make it in this way, ants will not damage it and weeds will not grow.

**92.** So that weevils will not damage the grain and mice will not attack it: Make a mixture with *amurca*: add a little chaff, allow to soak thoroughly and turn over. Coat the whole granary thickly with this mixture. Then sprinkle *amurca* on the whole area thus covered. When it has dried, cool grain may be stored here and weevils will not damage it.

**93.** If an olive tree does not fruit. Trench round it and lay straw around. Then mix *amurca* with water in equal parts and pour around the tree. One *urna* of mixture is enough for the biggest tree: take in proportion for smaller trees. If you give the same treatment to trees that do fruit, they too will improve; but do not give them straw.

**94.** So that figs will keep their early fruit. Do the same as with olives, and also, as spring approaches, build up the earth well around the tree. If you do this, the fruit will not fall while unripe, the figs will not be scabby and the trees will be much heavier bearing.

**95.** So that vines will not have caterpillars. Store *amurca*. Make it thoroughly clean. Put 2 *congi* in a bronze vessel. Boil over a slow fire, stirring frequently with a small stick, until it reaches the consistency of honey. Then take 1/3 pint bitumen and  pint sulphur and grind each separately in a mortar. Then crumble as finely as possible into the hot *amurca*, while stirring with the stick, and boil again in the open air (because, if you boil indoors, when bitumen and sulphur are added it will catch fire). When it is as thick as birdlime, allow to cool. Coat the vine with this around the 'head' and under the 'arms', and no caterpillars will come.

**96.** So that sheep will not be scabby. Store *amurca*. Make it thoroughly clean. Mix together with equal parts of water in which lupins have boiled and of the lees of good wine. Then, after shearing, coat them all over in the mixture; leave them in sweat two or three days, and then wash in the sea, or, if you have no sea water, make up salt water and wash in this. If you do this they will not be scabby and will have more and better wool, and ticks will not attack them.

Use the same mixture for all quadrupeds if they are scabby.

**97.** Coat axles, leather straps, footwear and all leather goods with boiled-down *amurca* to improve them.

**98.** So that moths will not attack clothes. Boil *amurca* down to half, and with it coat the bottom, the outside, the legs and the edges of the chest. Clothes may be stored in it once it has dried.

If you treat all wooden furniture in this way, it will not rot. Rubbed with this, it will be shinier.

Coat all bronze items similarly, but clean them thoroughly first, then apply; and clean them when you come to use them. They will be shinier, and will not be attacked by verdigris.

**99.** If you want dried figs to keep whole, conserve them in an earthenware vessel and coat it with boiled-down *amurca*.

**100.** If you are to put oil in a new jar, rinse it first with *amurca* just as it comes, raw; shake very thoroughly so that it soaks in. If you do this, the jar will not soak up oil, the oil will be better and the

jar itself stronger.

**101.** If you wish to keep myrtle twigs with their berries, and similarly any other species, and if you want fig branches with their leaves. Tie together into bundles, and submerge in *amurca*, ensuring that they are completely covered. What you are to conserve in this way should be picked a little unripe. The vessel you use must be fully sealed.

### More Medicines for Oxen

**102.** If a snake has bitten an ox or any other quadruped, grind an *acetabulum* of love-in-a-mist (the one that physicians call *zmurnaem*) into a *hemina* of old wine. Administer through the nostrils, and apply pig dung to the actual bite. If need arises, use the same remedy for a human victim.

**103.** So that oxen will be healthy and well-kept and so that any that are refusing food will be more inclined to feed. Sprinkle the fodder you give them with *amurca*, a little at first, so that they become used to it, then more. On occasion give it to them to drink, mixed half-and-half with water: do this every fourth or fifth day. The oxen will be better-kept physically and will be free of disease.

### Wine and Wine Products

**104.** Wine for the household to drink during the winter. Put 10 *quadrantals* must in a vat and add 2 *quadrantals* sharp vinegar, 2 *quadrantals* grape syrup, 50 *quadrantals* pure water. Mix with a stick three times a day for 5 consecutive days. Add 64 pints old sea water, put the lid on the vat and seal after 10 days. This wine will last you till the solstice. If any remains unused after the solstice, it will make very sharp and very good vinegar.

**105.** At a farm that is very distant from the sea, make Greek Wine as follows. Pour 20 *quadrantals* must into a bronze or lead vessel and light a fire underneath. When the wine boils remove the fire, and when the wine is cool pour it into a forty-*urna* vat. Into another vessel pour 1 *quadrantal* pure water with 1 peck salt, and allow to form brine. When dissolved, add to the vat. Grind together in a mortar camel's-hay and sweet reed to make up 1 pint. Add this to the vat to give aroma. After 30 days, seal the vat. In spring decant into amphoras. Leave in the sun for two years, then bring indoors. This wine will be no worse than Coan.

**106.** Manufacture of sea water. Take 1 *quadrantal* sea water from deep sea where fresh water does not reach. Roast 1½ *lb.* salt, add, stir with a stick till a boiled hen's egg will float in it: then stop stirring. Pour in 2 *congi* of old wine of *aminia* or white *miscella* varieties. Stir vigorously. Then pour the whole into a pitched vessel and seal. If more sea water is wanted, make in the same proportions.

**107.** For coating the lips of vats so that they will be sweet-smelling and so that the wine does not spoil. Pour 6 *congi* of the finest grape syrup into a bronze or lead vessel. Grind as finely as possible 1 pound dried iris and 5 *lb.* melilot together with the iris, sieve, boil with the grape syrup over a light fire of canes. Keep stirring: do not allow to burn. Boil until reduced to half. When cool, pour into a sweet-smelling pitched vessel, seal, and use for the mouths of vats.

**108.** If you want to tell whether a wine will keep or not, put a generous half-*acetabulum* of pearl barley in a new cup, pour a pint of the wine you want to test on to this, and heat over charcoal. Allow to come to the boil two or three times. Then filter; discard the barley, and leave the wine in the open air. Taste on the following morning. If it tastes the same as what is still in the vat, you know that it will keep. If it is rather sour, it will not keep.

**109.** If you want to make a harsh wine mild and pleasant, do as follows. Make 4 *lb.* flour of bitter vetch and add 4 *cyathi* wine and a dash of grape syrup. Form lozenges. Leave them to harden for a night and a day, then mix with the wine in its vat. Seal after 60 days. The wine will be mild and pleasant, with good colour and good bouquet.

**110.** To remove a bad aroma from wine. Heat thoroughly in the fire a clean, thick roof tile. When hot, pitch it and tie it to a string. Lower the tile slowly to the bottom of the vat and leave two days, with the vat sealed. If the bad aroma is removed, good. If not, repeat frequently until you have removed the unwanted aroma.

**111.** If you want to know whether water has been added to wine or not, make a small cup of ivy wood. Pour into it the wine that you think contains water. If it does, the wine will soak away and the water will remain, because an ivy cup will not hold wine.

### *Coan Wine*

**112.** If you want to make Coan Wine.

Take sea water from deep sea, where fresh water does not reach, 70 days before the vintage at a time when the sea is calm and there is no wind. When you have taken it from the sea, put it in a vat; do not fill it: it must be 5 *quadrantals* short of full. Cover with a lid, but allow to breathe. After 30 days, decant cleanly and smoothly into another vat, leaving behind any deposit. After 20 days, decant again into another vat, and leave until the vintage.

Leave on the vine the grapes from which you are to make Coan Wine: allow them to ripen fully. After rain, and after they have dried off, gather, and place in the sun so long as there is no rain. If there is rain, place on drying mats indoors. Pick off any spoiled berries.

Then take the above sea water. Pour 10 *quadrantals* sea water into a 50-*urna* vat. Pick from their stems the berries of *miscella* grapes into this vat till it is full. Press the berries by hand, so that they will soak up the sea water. When you have filled the vat, cover with a lid but allow to breathe. After 3 days remove from the vat, tread in the press-room, and store the wine in fine, clean, dry vats. **113.** So that it will have a good bouquet, do as follows. Take a pitched tile, and put on it a little hot charcoal, scenting with melilot, camel's-hay and ben-nut. Put in the vat and close, so that the aroma does not escape before you put the wine in. Do this on the day before you are to fill with wine.

Take wine from the tank into the vats as promptly as possible. Leave covered 15 days before sealing: allow to breathe; then seal. After 40 days, decant into amphoras and add 1 pint grape syrup to each amphora. Do not fill the amphoras too full, just to the base of the neck. Place the amphoras in the sun, where there is no vegetation, and cover the amphoras so that water does not get in.

Do not leave them in the sun more than four years. After four years, bottle and seal with wax.

### *Purges with Hellebore*

**114.** If you want to make up a wine to do the bowels good. After harvest, when the vines are trenched, judge how many will be enough to make the following wine, trench round them, and mark them. Cut round their roots and weed them. Grind hellebore roots in a mortar: put this around the vine, and add one part old dung and old ash and two parts earth. Cover with earth. Harvest this wine separately, and, if you want to keep this wine to do the bowels good in long term storage, keep it separate from other wine. Take a *cyathus* of this wine, mix it with water and drink before dinner: it will move the bowels and have no ill effect.

**115.** Put a bundle of black hellebore into wine must in an amphora. After sufficient fermentation, take out the bundle. Use this wine to move the bowels.

To make up a wine to move the bowels. When the vines have been trenched round, mark with dye, so as not to mix with ordinary wine. Place three bunches of black hellebore around the roots and cover with earth. At vintage, keep aside what you gather from these vines. Add 1 *cyathus* to other drink: it will move the bowels, purging you thoroughly on the day after, with no ill effect.

## Conserving Lentils and Olives

**116.** How you should preserve lentils. Dissolve silphium in vinegar, soak the lentils in the silphium-vinegar, and stand them in the sun. Then rub the lentils with oil, let them dry, and they will keep quite sound.

**117.** How green olives are conserved. Before they turn black, they are to be broken and put into water. The water is to be changed frequently. When they have soaked sufficiently they are drained, put into vinegar, and oil is added.  $\frac{1}{2}$  lb. salt to 1 peck olives. Fennel and lentisk are put up separately in vinegar. When you decide to mix them in, use quickly. Pack in preserving-jars. When you wish to use, take with dry hands.

**118.** Conserve green olives that you wish to use after the vintage thus: add equal parts must and vinegar; otherwise, conserve as described.

**119.** Green, black or mixed olive relish to be made thus. Remove stones from green, black or mixed olives, then prepare as follows: chop them and add oil, vinegar, coriander, cumin, fennel, rue, mint. Put in a preserving-jar: the oil should cover them. Ready to use.

## Must and Must Cakes

**120.** If you want to have grape juice all year, put must in an amphora and seal the cork with pitch. Submerge in the fish-pond. Take out after 30 days. It will remain unfermented all year.

**121.** Must cakes to be made thus: two gallons of bread-wheat flour to be moistened with must; add to this anise, cumin, 2 lb. lard, 1 lb. cheese, and grate in the bark of a bay twig; when you have shaped them, put bay leaves under them while you cook them.

## Two Medicines, and a Note on Dogs

**122.** To make up a wine for if urine is difficult to pass. Grind *capreida* or juniper berries in a mortar. Add 1 lb. to 2 *congi* old wine. Bring to the boil in a bronze or lead vessel. When it has cooled, bottle. Take 1 *cyathus* in the morning before eating. This will work.

**123.** Make a wine for gout sufferers as follows. Break up finely juniper wood 6 fingers thick. Bring to the boil in 1 *congius* old wine. When it has cooled, bottle the whole. Afterwards take 1 *cyathus* of this wine in the morning before eating. This will work.

**124.** Dogs should be shut in during the day to make them fiercer and better guards at night.

## More Medicines

**125.** You make myrtle wine as follows. Dry black myrtle berries in the sun. When dried, keep till the vintage. Grind  $\frac{1}{2}$  peck myrtle into 1 *urna* must. When the must has stopped fermenting, remove the myrtle and seal. This serves for indigestion and for pain in the side and in the stomach.

**126.** For colic and if the bowels are loose, and in case of an attack of tapeworms or *lumbrici*. Take 30 sour pomegranates, mash, put in a pitcher with 3 *congi* dry red wine. Seal the container. After 30 days open and use. Drink 1 *hemina* before breakfast.

**127.** To cure indigestion and retention of urine. When the pomegranate is in flower, gather and put 3 pounds in an amphora. Add 1 *quadrantal* old wine and 1 pound cleaned mashed fennel root. Seal the amphora. After 30 days, open and use. When you want to digest your food properly and to pass water, you can drink as much as you like of this without ill effect.

The same wine purges tapeworms and *lumbrici* if you make it up as follows. The patient is to avoid dinner. On the following day, grind 1 dram incense, 1 dram boiled honey, 1 pint oregano wine. Administer before breakfast. For a child take ½ dram of each and 1 *hemina* wine; adjust to age. The patient to climb on to a post, to jump off, ten times, and to take a walk.

### *More Uses for Amurca*

**128.** To make a clean floor for living quarters. On to soil as alike as possible to chalk or red earth, pour *amurca* and then spread straw. Leave to soften 4 days. When quite soft, break up with a shovel. As you break up, form your floor. Spillages will not damage it, mice will not make holes, weeds will not grow and the floor will not crack.

**129.** Make a threshing floor as follows. Dig the earth thoroughly, drench well with *amurca* and allow it to soak in as much as possible. Break up the earth and level with a roller or a tamper. After levelling, ants will not attack it and, when it rains, mud will not form.

**130.** Drench chopped olive wood and other firewood with raw *amurca* and place in the sun. Let it soak in well. After this they will not be smoky and will burn well.

### Rituals and forms of contract

#### *The Feast for the Oxen*

**131.** When the pear blossoms, make the Feast for the Oxen. After that, begin the spring ploughing. First plough the fields that are gritty and sandy; thus plough last those that are heaviest and wettest.

**132.** The Feast may be performed as follows.

Present a *culigna* of wine, as much as you wish, to Festive Jove. The day is holiday for the oxen, the oxherds, and those who perform the Feast. When you are to present, you do so thus:

‘Festive Jove, my household brings a *culigna* of wine to the Feast, as is proper in your domestic worship. Therefore accept the presentation of this Feast of ours.’ Wash your hands, and take the wine. ‘Festive Jove, accept the presentation of our Feast, accept our offertory wine.’

Offer to Vesta if you wish. The Feast to Jove: a roast from herd or flock; one *urna* of wine. You should share with Jove with proper purity and with the touch of your own hand.

Then, once the Feast is performed, sow broomcorn millet, foxtail millet, garlic, lentil.

#### *Note on Layering*

**133.** Layering of fruit trees and other trees.

Tree suckers that grow from the ground should be layered to the ground and turned up at the extremity so that they can take root. Then, when the time comes, dig them up and plant them out. Fig, olive, pomegranate, *strutea* quince, *cotonea* quince and all other apples, Cyprian bay, Delphic bay, plum, *coniuolum* myrtle and white and black myrtle, filbert, hazelnut, plane: all these kinds can be layered from the root and dug up in this way.

Those that you wish to plant more carefully can be planted in pots. So that they take root on the tree, take a pierced pot or a planting basket and thread a small branch through it. Fill the basket with earth and press it down. Leave it on the tree. After two years, sever the young branch below and plant it out with its basket. You can do this with any kind of tree to ensure good rooting.

Also layer a vine in a basket, covering well with earth: sever the next year; plant with its basket.

### *Sacrifice of the Harvest Sow*

**134.** Before you harvest, you may do sacrifice of the Harvest Sow, in the following way.

A female piglet, the Harvest Sow is offered to Ceres before the following crops are put up: emmer, wheat, barley, broad bean, rapeseed. With incense and wine address Janus, Jove and Juno before you slaughter the female pig. Offer a *strues* to Janus thus:

‘Father Janus, as I offer you this *strues*, I pray with good prayers that you be ready and favourable to me and my children, to my house and household.’

Offer and present a *fertum* to Jove thus:

‘Jove, as I offer you this *fertum*, I pray with good prayers that you be ready and favourable to me and my children, to my house and household, accepting this *fertum*.’

Then give wine to Janus thus:

‘Father Janus, since in offering you a *strues* I prayed well with good prayers, therefore accept this offertory wine.’

Then to Jove thus:

‘Jove, accept this *fertum*, accept this offertory wine.’

Then slaughter the Harvest Sow. When the organs are cut out, offer and present a *strues* to Janus as you did before; offer and present a *fertum* to Jove as you did before; give Janus wine and give Jove wine as you gave it before on account of the offering of the *strues* and the slicing of the *fertum*.

Then give the organs and the wine to Ceres.

### *Where to Buy Equipment*

**135.** At Rome: tunics, togas, coats, patchwork cloaks, boots.

At Caes and Minturnae: hoods, iron tools: knives, spades, mattocks, axes, harness, *murices*, chains.

At Venafrum: spades.

At Suessa and in Lucania: carts, drags.

At Alba and Rome: vats, tubs.

Tiles from Venafrum.

Roman ploughs will be good for vigorous soil, Campanian ones for grey earth. Roman yokes will be the best. A detachable ploughshare will be the best.

Olive crushing mills at Pompeii, Nola and at the wall of Rufrium.

Locks, keys and bolts at Rome.

Buckets, oil urns, water pitchers, wine urns and other bronze vessels at Capua and Nola.

Campanian straining bags are useful ...

Hoisting ropes and all goods made of esparto at Capua.

Roman straining bags at Suessa and Casinum — but the best will be at Rome.

Who makes press ropes? L. Tunnus at Casinum; C. Mennius, son of Lucius, at Venafrum.

The press rope requires 8 good fresh local skins, well curried, with as little salt as possible. They must be curried and rubbed with fat, then dried. The rope should start out 72 feet long, and should have three knots, 9 straps to each knot 2 inches wide. Length when twisted, 49 feet. 3 feet will go in the joins: remainder, 46 feet. When stretched, 5 feet added: length 51 feet.

A press rope should be 55 feet long, stretched, for the largest equipment, 51 feet for smaller.

Normal leather cart rope, 60 feet; half-rope, 45 feet.

Reins for a cart, 36 feet, for a plough, 26 feet.

Traces, 27½ feet.

Yoke ropes for a cart, 19 feet; shaft rope, 15 feet.

Yoke ropes for a plough, 12 feet; shaft rope, 8 feet.

### Specifications for Olive Crushing Mills

Largest crushing mills, 4½ feet wide. Millstones 3½ feet high. When the millstones come from the quarryman they should be 1 foot 1 palm thick in the middle. Between the pivot and the lip, 1 foot 2 fingers. Lips 5 fingers thick.

A second olive crushing mill, 4 feet 1 palm wide. Between the pivot and the lip, 1 foot 1 finger. Lips 5 fingers thick. Millstones 3 feet 5 fingers high, 1 foot 3 fingers thick.

The axle slots in the millstones ½ foot square.

A third olive crushing mill 4 feet wide. Between pivot and lip, 1 foot. Lip 5 fingers thick. Millstones 3 feet 3 fingers high, 1 foot 2 fingers thick.

When the mill is carted in, set up and adjust at the spot where you will locate it.

### *Payment in Kind for Harvesting*

**136.** Calculation of harvesting work in Casina and Venafrum country. In good land, give an eighth by the basket; fairly good, a seventh; third-rate, a sixth; if [threshed] grain is shared, a fifth by the peck. In Venafrum country the best land gives a ninth by the basket. If there is a communal mill, then, whatever proportion is allowed to the jobber, the jobber allows the same proportion to the mill. Barley a fifth by the peck; beans a fifth by the peck. **137.** ‘To avoid damage to the vineyard; carefully to avoid damage to the farm, the orchard, the grain field. Share-harvester is to be allowed hay and fodder sufficient for actually working oxen. Other produce, equal use.’

### *Note on Ritual Holidays*

**138.** Oxen may be yoked on holidays. They can do the following: cart wood, beanpods and grain that is not for sowing.

No holidays for mules, horses or asses, except those special to the household.

### *Expiation for Clearing and Ploughing a New Field*

**139.** To open up a clearing, you must use the Roman rite, as follows. Do sacrifice of an expiation

piglet, and say it thus:

‘Whatever god, whatever goddess you may be to whom this place is sacred, since it is proper to sacrifice the expiation swine for the taking of this sacred place, therefore, may what I do or what another by my order does be rightly done. Therefore in slaughtering for you this expiation swine I pray with good prayers that you be willing and favourable to me, to my house and household and to my children; wherefore, accept the slaughter of this expiatory piglet.’

**140.** If you want to dig there, do another Expiation. Say explicitly ‘for the purpose of working the land’. Then do some of the work on each consecutive day till all is done. If you interrupt it, or public or household holidays intervene, you must do another Expiation.

**141.** You must consecrate the field as follows. Instruct Pig, Sheep and Ox to be driven all around:

‘Under the favour of the spirits and in confidence of a good outcome I entrust to you, (Manius), to consecrate by your care my farm, field and land; driving or drawing Pig, Sheep and Ox thereupon, wherever you may determine.’

First invoke Janus and Jove with wine, and say:

‘Father Mars, I ask and pray that you be ready and favourable to me, our house and household. Wherefore I have ordered Pig, Sheep and Ox to be driven all around my land and farm, so that you will prevent, ward off and avert sicknesses seen and unseen, childlessness and fruitlessness, disaster and storm; so that you will permit fruits, grains, vines and saplings to flourish and come to fruition; so that you will keep safe shepherds and flocks and give good heart and health to me, our house and household. Therefore, for the consecration and making sacred of my farm, field and land as aforesaid, accept the slaughter of this suckling Pig, Sheep and Ox.’

Repeat:

‘... therefore, Father Mars, accept the slaughter of this suckling Pig, Sheep and Ox.’

Do it with a knife. Have *strues* and *fertum* at hand. Offer immediately. As you slaughter the piglet, lamb and calf, then:

‘... therefore accept the slaughter of Pig, Sheep and Ox.’

Mars must not be named, nor must one say ‘lamb’ or ‘calf’. If all the offerings are unpromising, say it thus:

‘... Father Mars, if anything dissatisfies you in that suckling Pig, Sheep and Ox, I offer you this Pig, Sheep and Ox in expiation.’

If only one or two are doubtful, say it thus:

‘... Father Mars, since you were dissatisfied with that piglet, I offer you this piglet in expiation.’

#### *Instructions for the Manager: the Manageress*

**142.** What are the responsibilities of the manager? I advise him thus: to attend, on the owner’s authority, to everything at the farm that needs to be done, or bought, or made, and to the allocating of foodstuffs and clothing to the household; and to pay attention to the owner’s words; and, specifically, so to deal with the manageress, and so to instruct her, that, when the owner visits, all that is needed has been prepared and attended to with care:

**143.** ‘Take care that the manageress carries out her functions. If your owner gave her to you as your

wife, be satisfied with her. Make her afraid of you. She must not be too free-spending. She must not visit women neighbours, or any other women, more than absolutely necessary, or invite them to the house or to her own quarters. She must not go out to meals or be a wanderer. She must not perform rites, or cause others to perform them for her, unless at her master's or mistress's orders: it must be understood that the master performs rites for all the household. She must be clean, and keep the farmhouse sweet and clean.

'She must have the hearth ready swept all round each day before she goes to bed. On the Calends, the Ides, the Nones, and on a feast day, she must place a wreath at the hearth, and on those days she must make offering to the Lar of the Household according to her means.

'She must have cooked food ready for yourself and the household. She must have plenty of hens and eggs. She must have dried pears, sorbs, figs, raisins: sorbs in *sapa*, pears, grapes and *struthea* quinces in vats, raisins in marc and in pots buried in the ground, *scantia* apples in vats, and other varieties that are conserved, and also crab-apples — all these she must be careful to have ready, conserved, every year. She must be able to make good flour and emmer groats.'

### *Contract for Olive Harvesting*

**144.** The olive harvest is to be contracted out on these terms.

Complete the work to the satisfaction of the owner (or the person appointed as overseer, or the eventual buyer). Olives are not to be picked or knocked down without orders from the owner or overseer. If the order is contravened, that day's harvesting will not be paid for or billed. All who harvest olives are to swear to the owner or overseer that neither they, nor any others with their connivance, have stolen olives of that picking from the farm of (Lucius Manlius). If any will not swear on those terms, for all that they have harvested no one will pay or be billed. A sum is to be deposited as guarantee that the work will be performed in accordance with the decisions of (Lucius Manlius).

All ladders provided are to be returned, except any broken owing to age: if not returned, they will be deducted as determined by an impartial arbitrator. If the owner suffers loss in any way due to the work of the contractor, compensation will be deducted as determined by an impartial arbitrator.

Sufficient gatherers and pickers must be provided: if they are not, any supplied or hired by the owner will be deducted. Neither wood nor olives are to be taken off the farm. If any harvester removes olives, for any such act 2 *sestertii* will be charged or deducted. The whole harvest is to be measured, clean, in an olive *modius*.

He is to provide fifty hard workers, two-thirds of them pickers. None is to leave to go where olive harvesting and oil-making are better paid, unless naming a new crew member to take the place. If any contravenes this, the whole remaining crew must, if the owner or overseer wishes, swear not to follow; if they will not swear, no one will pay or be billed for the harvesting and oil-making of any who will not swear.

Benefits. For each 1200 pecks harvested they get 5 pecks salted olives and 9 *lb.* pure oil (5 *ss*), and, for the whole harvest, 5 *quadrantals* vinegar. If they do not get the salted olives while harvesting, they will be allowed 5 *ss* the peck.

### *Contract for Oil-Making*

**145.** Oil-making is to be contracted out on these terms.

Complete the work to the satisfaction of the owner or deputy. If six sets of equipment are needed they are to be used. Workers are to be provided to the approval of the owner or overseer or buyer of the oil. Crushing mills are to be used. If additional workers are supplied or some work has to be contracted elsewhere, this is to be compensated or will be deducted. Oil is not to be touched, whether for private

use or for removal from the farm, unless given by the owner or overseer. If any is taken, for each such act 40 *ss* will be charged or deducted. The press-workers who make the oil must all swear to the owner or representative that neither they, nor anyone by their connivance, has stolen oil or olives. If any will not swear, their whole share of the work will be deducted. No new crew member may be taken on except by the owner's or overseer's order. If the owner suffers loss in any way due to the work of the contractor, it is to be compensated as determined by an impartial arbitrator. If green oil is required, it is to be made.

The contractor gets sufficient oil and salt for daily use, and 2 *victoriati* as pot-money.

### Speculative Sale of Oil and Wine

**146.** Olives on the tree should be offered on these terms.

'Tenders for olives on the tree at the (Venafrum) farm. The buyer will add to the basic sum proposed: one hundredth of the total cash price; 50 *ss* as cost of the present announcement; oil, Roman, 1500 *lb.*, green, 200 *lb.*; windfall olives, 50 pecks, picked olives, 10 pecks, to be measured with an olive *modius*; 10 *lb.* grease; and for the owner's weights and measures the buyer will give two *cotulae iri pri primae*. Payment due: within 10 months from the Calends of November. Any hiring by the buyer for the harvesting and oil-making, and anything hired out by the buyer, to be settled on the Ides.

'The buyer is to promise to the owner or agent to carry out appropriate actions, payments and guarantees, and is to give guarantees as determined by the owner. Pending payment or such guarantees, equipment brought to the farm may be forfeit. No such equipment will be removed from the farm: any removed will become the owner's. Presses, ropes, ladders, crushing mills and anything else supplied will be returned sound, unless broken owing to age: if not returned, the buyer will pay fair compensation. If the buyer fails to pay the gatherers and press-workers who have carried out the harvest, the owner may choose to pay what is owed. In this case the buyer will owe the amount to the owner, and will give a guarantee, failing which, as above, the equipment may be forfeit.'

**147.** Wine on the vine should be offered on these terms.

'The purchaser will leave the marc, unwatered, and the lees. Storage for wine is available until the Calends of October of the next year. If not removed by that date, the owner may deal with the wine as wished.' Other conditions as for olives on the tree.

**148.** Wine in the vats should be offered on these terms.

'For each *culleus* of wine bought, 41 *urnae* will be supplied. Wine supplied will not be vinegary or musty. It will be available for tasting by an impartial arbitrator for three days, after which it will be deemed to have been tasted. If on any of these days the wine is not available to be tasted through delay caused by the owner, an equal number of added days will be accorded to the buyer. The wine may be taken from the vats at any time before the next Calends of January. If it is not so taken, the owner will measure out the wine and the buyer will pay for it as measured. On the buyer's demand the owner will swear an oath that the measuring was done fairly. Storage for wine is available until the next Calends of October. If not removed by that date, the owner may deal with the wine as wished.'

### Sale of Winter Pasture Rights

**149.** Winter pasture should be offered on these terms. State the boundaries of the pasture you sell.

'Pasture may be occupied for use from the Calends of September onwards. Dry meadow must be given up when the pear begins to blossom; irrigated meadow when neighbours, above and below, begin to irrigate. (Or fix a date agreed on both sides.) Other pasture must be vacated on the Calends of March. While the buyer is in occupation, pasture for two draught oxen and one gelding is reserved to the owner. Greens, asparagus shoots, firewood, water, rights of passage and cartage are reserved to

the owner.

‘If in any way the buyer, or the buyer’s shepherds or beasts, cause loss to the owner, the buyer will compensate as determined by an impartial arbitrator, and, pending payment or guarantee or bail, the buyer’s beasts and slaves may be forfeit.

‘If any dispute arises over these terms, judgment is to take place at Rome.’

### *Speculative Sale of Produce of Sheep*

**150.** Produce of sheep should be offered on these terms.

From each ewe, [reserve] 1½ *lb.* cheese (half of it dry), half the milk she produces on holidays and one *urna* of milk in addition. Under these terms a lamb is counted as produce if it lives a day and a night. The buyer surrenders his rights on the Calends of June’ (Calends of May if an intercalated year). Do not engage for more than 30 lambs. ‘Sheep which have not lambed [this season] count two for one.’ Recover payment from the agent 10 months from the day on which wool and lambs are sold. ‘They may nurse 1 sucking pig for every 10 lambs. The buyer will provide a shepherd for 2 months; failing guarantee or payment to the owner, the shepherd may be forfeit.’

## **Addenda**

### *Cypress Planting*

**151.** How cypress seed may be gathered, sown and cuttings made and how cypress plantations may be made. Minius Percennius Nolanus has explained the business as follows.

Tarentine cypress seed can be collected in spring; the wood, when the barley turns yellow. When gathered, place in the sun and shell the seed. Store dry so that it may be displayed dry. Sow in spring in ground where the earth is very tender, grey earth as it is called, where there is water nearby.

First manure the ground thoroughly with goat or sheep dung, then turn with a spade, mixing the earth with the manure thoroughly. Clear of weeds and grass and break down the earth thoroughly. Make beds each 4 feet wide. Make them slightly concave, so that they will retain water. Make ditches between them, into which you can clear weeds from the beds. When the beds are made, sow the seed, as densely as flax is sown. Then sieve earth over to a thickness of half an inch, and flatten well with a board or with hands or feet.

Whenever there is no rain and the ground dries out, water the beds lightly. If you have no water at hand, carry it in, and use it sparingly. Be sure to water as often as necessary. If weeds grow, be sure to clear them, as young as possible, and as often as necessary. In summer continue as described, covering with straw where seed was sown. Remove when seedlings begin to grow.

### *Three Notes on Wine*

**152.** As the Manlii have explained, in the thirty days after the vintage, more than once you should make bundles of dry elm sticks and tie them on to a small handle. With these, brush thoroughly the insides of the vats, all the way in, so that lees do not stick to the sides.

**153.** Wine from lees is made as follows. For this purpose, have at hand two Campanian olive straining bags. Fill these with lees, put under the press and squeeze out the liquid.

**154.** How to measure out wine to buyers neatly. Make a one-*culleus* tub for this purpose. It should have four handles at the top, so that it can be carried. Make a hole at the base and insert a pipe in it

which can be easily stopped. Make another hole at the one-*culleus* level. Have this tub placed on a raised spot, among the vats, so that wine can flow from it into a wineskin. Fill the latter, then stop the pipe.

### *Irrigation*

**155.** During winter water must be cleared from the fields. On hillsides, drainage ditches must be kept clear. It is in early autumn, when it is dusty, that there is most danger from water. When it begins to rain, the household can go out with forks and hoes to open up drains, divert water into channels and make sure it runs off from the crops.

In the farmhouse, when it rains, you can go round and mark with charcoal where it drips. Then, when it stops raining, the tiles can be adjusted.

In grain fields, in other crops and in ditches, wherever water stands or anything obstructs it, you should shift the obstruction, open the channel and get the water flowing.

### *Medicinal Uses of Cabbage*

**156.** On cabbage as an aid to digestion.

Cabbage surpasses all vegetables. Eat it either cooked or raw: if you eat it raw, dress it with vinegar. It aids digestion remarkably and does the bowels good, and the urine will be beneficial for all purposes.

If you want to drink a lot and eat copiously at a party, eat as much cabbage as you want, raw, dressed with vinegar, before dining. Then, when about to dine, eat about 5 leaves. You will feel as if you had eaten nothing, and you can drink as much as you want.

If you want to purge by vomiting, take 4 *lb.* of the tenderest cabbage, divide into three equal bunches and tie. Then put a pot of water on the fire, and when it begins to boil plunge one bunch into it briefly. It will stop boiling. Then, as it boils, plunge the bunch again while you count five, and take it out. Do the same with the second bunch, and then the third. Then put all together and pound. Remove into a linen bag, and express about 1 pint of juice into an earthenware mug. Add a salt crystal about the size of a bitter vetch seed, and roasted cumin seed enough to give a flavour. Then put the mug outdoors, in good weather, overnight. The person who is to take the medicine should have a hot bath, drink honey water, and go to bed without dinner, then in the morning drink the juice and walk for four hours, and do any business required. When the urge comes and nausea is felt, recline and vomit. So much bile and phlegm will be thrown up that the patient will wonder where it all came from. Later, after moving the bowels, drink half a pint or a little more. If the motions are too frequent, take two spoonfuls of fine flour, crumble into water and drink a little, and they will stop.

For those who are troubled by colic, cabbage should be steeped in water. When steeped, put it into hot water. Boil until thoroughly soft. Pour off the water. Then add salt and a little cumin; also add fine barley meal and olive oil. The boil, pour into a dish and allow to cool. This is to be included in the patient's next meal, or, preferably, to be eaten on its own. Unless there is fever, give also harsh red wine mixed with as little water as possible; if there is fever, give water. Do this daily, early in the morning. Do not give too much, or the patient will become sick of it instead of continuing to take it freely. Treat a man, a woman or a child in the same way.

Now as to patients for whom urination is painful or dribbling. Take cabbage, put in boiling water, boil briefly till half cooked. Then pour out some of the water, add plenty of oil and salt and a little cumin. Bring to the boil briefly. Then take the juice, cold, and eat the cabbage itself, digesting it as quickly as possible. Do this each day.

**158.** Move the bowels as follows. If you want a good motion, take a pot and put in it 6 pints of water and a cooked pig's trotter. If you have no trotter, substitute  $\frac{1}{2}$  *lb.* ham as lean as possible. When nearly cooked add two young cabbage heads, two heads of beet with the root, a shoot of polypody, a little

herb mercury, 2 lb. mussels, 1 *capito* fish, 1 scorpion, 6 snails and a handful of lentils. Boil all this down till it reduces to 3 pints of liquid. Do not add oil. Take 1 pint of this mixture, warm, adding 1 *cyathus* Coan Wine. Drink it, rest, then drink another pint as before, then the third. You will purge yourself thoroughly. If you wish in addition to drink Coan Wine mixed with water, you may. Of all these ingredients listed only one, whichever, has the power to move the bowels! The other ingredients are given so as to move thoroughly, and to enjoy it.

### *Two Charms*

**159.** Cure for chafing. When you go walking, hold a stem of *absinthium ponticum* under your finger-ring.

**160.** In case of dislocation this spell will cure it. Take a green reed 4 or 5 feet long, split it down the middle, and have two persons hold the split pieces to their hips. Begin to chant, motas vaeta daries dardares astataries dissunapiter (another text has motas vaeta daries dardaries asiadarides una petes), while the two pieces are brought together. Brandish iron above. When they are together and touching, take the reed in your hand and cut it at left and right. Tie it to the dislocation or fracture and it will heal. Meanwhile chant every day, huat haut haut istasis tarsis ardannabou dannaustra (another text has huat hauat huat ista pista sista dannabou dannaustra).

### *Growing Asparagus*

**161.** How to plant asparagus.

Turn over thoroughly a ground that is moist or fat. When turned over, make beds, in such a way that you can hoe and pull up weeds on either side without treading on them. In forming the beds make a ½ foot wide gap separating the beds on all sides. Then sow in a straight line, using a stake, sowing two or three seeds per hole, and fill in the hole with the same stake. Then spread manure thoroughly over the beds. Sow after the spring equinox.

When shoots appear, clear weeds frequently and be careful not to pull up the asparagus with the weeds. In that first year cover with straw in winter so that it is not scorched. At the beginning of spring open up, hoe, and pull up weeds. Three years after sowing, burn at the beginning of spring. After this, do not hoe before the shoots appear, or you may damage the roots as you hoe.

After 3 or 4 years, pick the asparagus from the root. If you break it off higher, more shoots will appear and some will die. You can go on picking until you see that it is going to seed.

The seed is ripe in autumn. At that time, after harvesting the seed, burn, and, when asparagus begins to grow, hoe and manure.

After 7 to 9 years, when it is getting old, split up, and turn over and manure the soil thoroughly where you intend to plant; then make channels in which to plant the asparagus roots. There should be a gap of no less than 1 foot between the roots. Pull up; dig round so that you can pull the roots easily without breaking them.

Give as much sheep dung as possible, as this is best for asparagus. Other dung produces weeds.

### *Salting Hams*

**162.** Hams can be salted as follows in a vat or a jar.

After buying legs of pork cut off the trotters. ½ peck ground Roman salt per ham. Spread the salt in the base of the vat or jar, then place a ham with the skin facing downwards. Cover completely with salt. Then place another above it and cover in the same way. Be careful not to let meat touch meat. Cover them all in the same way. When all are arranged, cover the top with salt so that no meat is seen, and

level it off.

After standing in salt for five days, take all hams out with the salt. Put those that were above below, and so rearrange and replace. After a total of 12 days take out the hams, clean off all the salt and hang in the fresh air 2 days. On the third day clean off with a sponge, rub all over with oil, hang in smoke for 2 days. On the third day take down, rub all over with a mixture of oil and vinegar and hang in the meat store. Neither moths nor worms will attack it.

### Supplement on Cabbage

**157.** On the Pythagorean Cabbage and its good and health-giving properties.

First you must know the different kinds of cabbage and their nature.

It blends all healthy influences and ever adapts itself with the application of heat, being at once dry and wet, at once sweet and sour and bitter. Cabbage, in its mixed nature, has all of the so-called Seven Good Things.

### Garden Cabbage and its Uses

First, then, to explain this nature. The first kind is called *levis*, delicate. It is large, broad-leaved, long-stemmed, and has a powerful nature and great force. The second is crinkled, called *apiaca*: good in nature and appearance, it is more powerful in medicine than the first. So is the third, called *mild*: thin-stemmed, it is tender and the bitterest of all, with a very active thin juice, and you must know first of all that of all the kinds of cabbage none is as effective a medicine as this.

Put it, ground fine, to all wounds and swellings. It will clean up and heal all sores painlessly. It brings boils to a head and makes them burst.

It will clean up and heal septic wounds and cancers, as medicines cannot. Before you apply it, wash with plenty of hot water, then apply ground cabbage twice a day. It will remove all decay. Black cancer gives off a smell and a foul slime; the white is purulent but fistulous and suppurates under the flesh. Grind cabbage for illnesses of this kind. It will cure them, and is the best thing for illnesses of this kind.

In case of dislocation, foment with hot water twice a day and apply ground cabbage: it will soon cure it. Apply twice a day: it will remove the pain. If there is any bruising, it will break it up; apply ground cabbage: it will cure it.

If any sore or cancer develops in the breasts, apply ground cabbage: it will cure it. If the sore cannot bear the bitterness of the cabbage, mix with barley flour and apply the mixture: it will cure all sores of this kind, while other medicines cannot cure them or clean them up. If a boy or girl has a sore of this kind, again, add barley flour.

If you want your cabbage chopped, washed, dried, sprinkled with salt or vinegar, there is nothing healthier. To enjoy it more, sprinkle with honey vinegar. Washed and dried, with chopped rue and coriander and sprinkled with salt you will enjoy it a little better. It does you good, permits no disease to remain in the body, and does the bowels good. If there was any disease present internally, cabbage will cure all, remove all sicknesses from the head and the eyes and cure them. Take it in the morning before eating.

If there is black bile, if the spleen swells, if the heart or liver or lungs or diaphragm are painful, in a word, it will cure whatever organ is painful.

Grate *silpium* over it: that is good.

When all the veins are blown up with food they cannot breathe through the body, and that gives rise

to illness. When from overeating the bowels will not move, if you take (as I advise) an appropriate amount of cabbage, you will develop no illness from overeating.

Now nothing clears illness of the joints as well as raw cabbage, whether you eat it chopped, with rue and coriander chopped in, dry, with grated *sirpicium*, or as cabbage in honey vinegar sprinkled with salt. If you take this, you will have the use of all your joints. It costs nothing, and even if it did you should try it for the sake of health. Take it in the morning before eating.

One who suffers from insomnia or senility will find the same cure effective. Give this patient, before eating, cabbage fried in fat, hot, and a little salt. The more that is eaten, the quicker will be the recovery from this illness.

Those who are troubled by colic are to be treated as follows. Soak cabbage thoroughly, then place in a cooking pot and boil thoroughly. When well cooked, pour off the water and add plenty of oil and a little salt, cumin and fine barley meal. Then boil thoroughly. When it has boiled put in a dish. Give this to the patient to eat, without bread if possible; if not, allow bread, with this dish as relish, but nothing else. If there is no fever, give red wine to drink. The cure will be rapid.

Whenever necessary this will cure anyone who is weak: take cabbage as just described.

### *Cabbage Eaters' Urine*

In addition, store the urine of anyone who habitually eats cabbage; warm it, bathe the patient in it. With this treatment you will soon restore health; it has been tested. If you wash feeble children in this urine they will be weak no longer. Those who cannot see clearly should bathe their eyes in this urine and they will see more. If the head or neck is painful, wash in this urine, heated: they will cease to be painful.

Also, if a woman foment her parts with this urine, they will never irritate. Foment as follows: boil in a basin and place under a commode; the woman is then to sit on the commode, covering the basin with her clothing.

### *Wild Cabbage and its Uses*

Wild cabbage has the greatest strength. It should be heated and ground thoroughly fine.

If you intend to purge someone, the patient should not take dinner on the preceding day. In the morning, before eating, give ground cabbage and 4 *cyathi* of water. Nothing will purge so well, not even hellebore or scammony, and safely too: you must know that it is healthy for the body. Use it on those you despair of curing. When giving this purge, administer as follows: give this for seven days as a liquid food. When there is appetite, give donkey meat. If the patient will not eat that, give boiled cabbage and bread, and a mild wine mixed with water to drink. The patient should wash only occasionally, using oil instead. One thus treated will long remain healthy and suffer no sickness unless self-induced.

If there is a suppurating or fresh sore, sprinkle this ground wild cabbage with water and apply: you will cure it.

In the case of a fistula, insert it as a pack. If the pack will not stay in, dilute the ground cabbage, put in a bladder, attach a reed, squeeze into the fistula. This will soon effect a cure.

Also apply, ground, with honey, to any wounds old or recent. This will cure them.

If there is a nasal polyp, put dried ground wild cabbage in a tuft of wool; put to the patient's nose to aspire as much as possible. Within three days the polyp will fall out. When it has done so continue the treatment for an equal number of days to heal up the roots of the polyp completely.

If you are hard of hearing grind cabbage with wine, press out the juice, drop into the ear warm. You will soon be aware of hearing more.

Apply cabbage to a suppurating scab. It will cure it without causing a sore.

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