

THE THIRD HARVEST OF THE FIRST MILLENNIUM

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The first harvest comprised the fruits and seeds of the classical triad, grapes, olives and cereals. The second harvest comprised the leaves, for fodder, the wood, for building, fencing and fuel, and the straw, for thatching and bedding. All of these were the obvious and undeniable possessions of the upper classes. The third harvest comprised those seeds and fruits traditionally referred to as 'famine food'.

The purpose of this paper, amidst the splendours of the millennium, the genius of the church, the glittering literati of the laity, the might of the military, is to delve into the lowest layers of the social hierarchy, the peasants, upon whom the whole economy ultimately depended.

The celebrated clerical architecture with its iconography and illustrated manuscripts regularly depicts the works and days of the society at large but fails to display any deep understanding of the actual working of the landscape. The lives of those responsible for the economy are merely portrayed carrying out their various tasks with the appropriate tools according to the seasons. These representations, while undoubtedly acknowledging the importance of agriculture and the rhythm of the seasons, serve rather as an educational device for those elements of society far removed from the mean physical toil of food production. There is a dearth of documentary evidence for the workings and workers of agriculture in the latter part of the first millennium of the present era. In fact, it is normal practice for mediaeval historians to resort to the classical period for documentary evidence citing the works of Strabo, Varro, Columella, Virgil, *et al.* While this may be acceptable up to a point, it is important to appreciate that these texts are, with respect to the Plana de Vic, not only out of time but also out of place. Nonetheless, the texts do allow critical insights into the practicality of agriculture and iconographic representations and archaeological discoveries of early mediaeval tools like ploughs, ards, sickles and pruning hooks, argue for a traditional continuity in that design, shape and form vary little over the millennium.

Similarly, it is unlikely that the traditional diet of the classical period alters dramatically. At the time of the end of the first millennium, the three staple foods were undoubtedly still cereals, grapes and olives. These staples were supplemented by meat, primarily sheep, cattle, goat and pig. However, it is most probable that these supplements were reserved for the upper echelons of society. Indeed, given the hierarchical nature of society, all the agricultural products were initially reserved for the upper classes. Any shortfall in production would least affect these consumers and, in contrast, the presumption is that it would most affect the lowest classes, the peasantry. Since 1992, an ongoing research programme has been carried out at the site of L'Esquerda investigating the potential yields of the typical cereals of the early mediaeval period (Reynolds, 1998a). The results of these trials challenge the traditionally accepted yield figures for the mediaeval period but also underline the fact that cereal growing is dependent upon weather and soil and that in bad years production levels are severely reduced (Reynolds, 1997). Given the absence of any real evidence for long term bulk storage of grain, such annual fluctuations must have had serious implications. Further, the very nature of the Plana de Vic, a bowl surrounded by mountains

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with its inverted winter climate, exacerbates this issue. Today, the weather is described by the local inhabitants as nine months of winter and three months of hell. The extremes of weeks of freezing fog to the searing heat of July and August represent an agricultural challenge of considerable scale.

In the absence of written records, real evidence for food production depends upon the discovery and analysis of paleocarpological remains recovered from excavations of early mediaeval sites. In this respect, the site of L'Esquerda is a principle source (Cubero, 1988) for the Plana de Vic. Excavation of this site has been in train for the last twenty years during which time a considerable body of paleocarpological evidence has been built up. The cereals evidenced include Emmer wheat (*Triticum dicoccum*), Einkorn wheat (*Tr. monococcum*), Club wheat (*Tr. compactum*), Bread wheat (*Tr. sp.*), barley (*Hordeum vulgare*), rye (*Secale cereale*), millet (*Panicum miliacum*) and oats (*Avena spp.*). Of these, the oat is probably an invasive weed of cultivation rather than a specific crop in its own right, but see below. In addition, bitter vetch (*Vicia ervilia*) and common vetch (*V. sativa*) as well as beans (*V. faba spp.*) were grown, probably in rotation with the cereals in either a two or three field system. Other crops include the chick pea (*Cier arietinum*) and lentil (*Lens culinaris*). The vine (*Vitis vinifera*) is represented throughout. The olive (*Olea europea*), in contrast, is remarkable by its absence. The region is far too cold with extended winter frosts to allow the olive to flourish. However, the lack of evidence for its presence at all implies that it was not even an imported component of the diet in the Plana de Vic at this time. This is somewhat surprising given that it was abundantly present on the coastal plain some fifty kilometres distant.

At this point it is important to recognise that the carbonised or desiccated seed recovered by excavation is the primary evidence upon which the above comments are based. The occurrence of this evidence during excavation is relatively rare and when it does occur it is unusual for it to be directly associated with a defined structure such as a granary. In addition, for the seed to be carbonised at all, a small percentage of which may survive for discovery centuries later, argues for peculiar circumstances which are extremely difficult to identify. In a sense, it is remarkable for any evidence of this nature to survive at all. Thus the absence of carbonised olive stones may simply be that none have yet been found rather than because none were there. Alternatively, it may be that only the oil was brought in. This type of evidence, however, is critical and its acquisition should be sought far more rigorously than is the case at present.

The inspiration for this focus upon peasant diet came about as a direct result of the agricultural research trials at L'Esquerda. The objective in any such attempt to establish a broad understanding of yields from cereals is to conduct the trials for as many seasons as possible in order to experience a wide range of weather conditions. The weather today is arguably similar to that of a thousand years ago. Indeed, over the last decade the fluctuations have been remarkable. Bad years have actually outnumbered good years in agricultural terms. Of the cereals listed above it is interesting to note that the most reliable has been Emmer wheat (*Tr. dicoccum*) which has yielded reasonably however bad the conditions. In this connection, it is equally interesting to report that in a similar research programme at Butser Ancient Farm in England, Einkorn (*Tr. monococcum*), not yet part of the trials at L'Esquerda, has always yielded well even in the most dire conditions. It is ironic that the two oldest wheats, dating back to c. 7,500 BCE, normally outperform more 'modern' species. Barley (*H. vulgare*), on the other hand, has performed relatively poorly.

A major element in the research programme has been to record the contaminant arable weeds within the cereal plots in order both to observe their effects upon the cereals and to compare their presence with the carbonised seed evidence. In all years, good and bad, the arable weeds have supplied a potential third harvest insofar as a number of them are perfectly edible either in their leaf form or as seeds. Two particular examples which occur annually in some abundance are Fat Hen (*Chenopodium album*) and Wild Oats (*Avena sterilis* and *A. fatua*). These observations led directly to a consideration of not only the field plots themselves but also field margins, waste ground, bushes and trees within the adjacent areas as components of a third harvest which could be resorted to when the cereal harvest was poor or failed and, subsequently, to the hypothesis that there was abundant food supplies outside the accepted triad of cereals, grapes and olives. The agricultural peasants who worked the fields for their masters did not necessarily depend upon that produce or their masters indulgence for their own well-being. In fact, some historians blame this system which provided no incentive for the labourers for the low agricultural productivity in the early mediaeval period (Sayas, 1983).

In order to attempt some understanding of the rural peasant diet, one needs to accept the fundamental and entirely human premise that, despite the requirements of their masters and overlords, the peasants are most unlikely to have suffered any major privations even in years of poor cereal harvests and restricted recognised food supplies. That they manipulated the landscape in terms of alternative food resources is barely recognised in the documented history of any period, although the role of the peasant in the Roman period has been addressed by Frayn (1979) who cites many classical sources on the subject of the definition of cultivated as opposed to wild plants. There is also some slight documentary evidence from the Muslim literature of peasants exploiting a range of wild grains as a source of flour (Riera, personal communication). By the same token, Charlemagne is reported to have advised his troops to collect the fruiting heads of the carline thistle (*Carlina acaulis*) as a nutritious source of food for an army on the move. Indeed, there are some authorities who attribute the plants common name to Charlemagne (Lanska, 1992). Such knowledge of plant foods outside the recognised diet of the military clearly must have been gleaned from the rural peasantry. Peasant revolts were not usually driven by physical hunger but rather hunger for the re-allotment of land and their own independence.

Prior to any attempt to assess and detail the specific potential of the landscape as a source of this hypothesised third harvest, it is not without point to examine the simple chemistry of food to recognise the basic requirements of nutrition.

The chemistry of nutrition fundamentally involves six chemical groups, proteins, carbohydrates, fats, water, vitamins and minerals. Of these, both vitamins and minerals, despite being essential, are, in fact, needed in minute amounts and are nearly always provided by their incidental association with the plant and animal derived bulk commodities of carbohydrate and protein. In consequence, they can be discounted in the context of this paper since the harvests under consideration are of bulk commodities.

Water is an obvious dietary requirement but it is also critical as the medium of all digestive reactions. Carbohydrates, proteins and fats are all processed by hydrolysis into their utilisable units.

Proteins are derived from both plants and animals. Structurally they are polymers or chains of approximately twenty variations of nitrogen-containing monomers. These

monomers are generically referred to as amino acids of which nine are essential for human nutrition and need to be directly provided from the intake of food. Requirement for protein is relatively low in comparison to carbohydrates but is critical for growth, metabolism and the replacement of tissue. Protein is primarily sourced from eating meat but it is also, and for the peasant diet, importantly, drawn from the pulses, peas, beans and lentils. A third source is from plant foodstuffs like leaves, roots, seeds and fruit but rarely does the protein content of these approach 10%. Nonetheless, it is a significant source.

Fats have a high energy content. They comprise a tiny glycerol core to which are attached three or four very large fatty acid molecules. Some fatty acids, like amino acids, have to be directly provided from the intake of food but as they are found in cell wall material there is rarely a deficiency.

Carbohydrates are the real key to nutrition, the fuel of life. In any assessment of diet, the primary focus is upon sourcing carbohydrates in that the energy they supply drives metabolic reactions. Carbohydrates are polymers, less variable than proteins, the monomers being monosaccharides, e.g. glucose, fructose, galactose. For dietary requirements, there are only two carbohydrate polymers to consider, starch and inulin. Starch is a polymer of glucose monomers, inulin a polymer of fructose monomers. Starch within the human body is acted upon by two enzymes which yield metabolisable glucose thus, in simple terms, energising the system. Inulin, on the other hand, cannot be broken down by human enzymes which renders it calorifically useless although it is an important 'functional food'. Functional foods, while they have no calorific or structural significance, have been recognised as being essential to the physical functioning of the human digestive system. Currently they represent the focus of a new discipline. However, if foods containing inulin (mostly *Compositae* species) are cooked for a long time in an acid environment, the inulin is broken down into a form that can be utilised for energy.

Thus it can be seen that the chemistry of nutrition, translated into a peasant diet, is perfectly sustainable from suitable plant sources and would only need to be enhanced by the further additions of meat (protein) from the hunt, fowl, fish and fur and, indeed, the humble snail as seen in the Lutterell Psalter (figure 160) (Backhouse, 1969).

Returning to the archaeological data. The paleocarpological evidence from L'Esquerda, by its very nature, is limited and represents only a partial view of the potential diet. The extra-ordinary and extremely important discovery of the granary at L'Esquerda which, in its third phase of use, had been burned down in the 13th century throws some light on the problem if one allows that traditional agriculture was practised with little change from the millennium (Ollich, 1988, Ollich & Cubero, 1989). In the event, while some carbonised seed was found in the debris, the quantities were surprisingly small. This suggests that the granary itself was either purposely emptied of its contents implying that the conflagration was deliberate or else that the accidental fire occurred at the end of winter/spring when most of the contents had been used and prior to its replenishment after the harvest in June. In either case, the identification of the plant remains substantiates the above list of cereals and vetches along with a range of arable weeds which were typical contaminants of a cereal crop. In addition, the very fact that evidence comes from a dedicated storage building limits its implications for a peasant diet. The granary is currently the focus of a major research experiment at L'Esquerda involving its construction and subsequent use.

The other major source of evidence is the typical vegetation of the region of the Plana de Vic. It is in this context that the large lacunae in the paleocarpological evidence from L'Esquerda are emphasised. For example, there is a total dearth of evidence for nuts or nut shells of any kind and, even more significantly, in the list of arable weeds identified there are no Chenopodiaceae with the exception of two seeds of Orache (*Atriplex* spp.) Throughout the empirical trials at L'Esquerda, Fat Hen (*Chenopodium album*) and Nettle-leaved Goosefoot (*Ch. murale*) are abundantly present as arable weeds. Indeed, they are abundantly present throughout the region as a whole. The value and appreciation of Fat Hen as a food plant has been recognised throughout western Europe, both north and south, from earliest times (Glob, 1969). Its leaves can be used as a nourishing vegetable like spinach, its seeds can be ground into flour and the whole plant can be sun-dried like hay as an animal winter feed.

However, prior to any discussion of the relative values of wild or uncultivated plants as a source of food, the major problem is to isolate a staple food to substitute for the cereals. This staple must be plentiful, capable of easy processing and, critically, storable without any major deterioration from one season until the next. At the same time, it must be, like cereals, a source of easily digestible carbohydrate. Ideally it should have some representation in the archaeological data.

For the Plana de Vic, there are two principal contenders to fill this role. The first possibility is that abundant weed Fat Hen (*Ch. album*) which flourishes both within the cultivated land and on the waste land especially dung heaps and around settlement areas. The second possibility is the nut of two trees, the sweet chestnut (*Castanea sativa*) and the oak (*Quercus* spp.) which thrive within the area.

The uses of Fat Hen have been outlined above and within the same parameters Nettle-leaved Goosefoot (*Ch. murale*) can be included. In nutritional terms, the green leaves of Fat Hen contain about 4% protein and 7% carbohydrate. With regard to minerals, it contains calcium and magnesium with traces of phosphorus and iron. Rich in Vitamin C, it contains as much as 245mg per 100g of the leaves. Traditionally, apart from being a food plant, the leaves, roots and tips are used in folk medicine to treat coughs and bronchitis. Archaeologically, carbonised seed of Fat Hen has been found throughout Europe from the earliest times (Glob, 1969; Buxo, 1997). Discoveries of quantities of Fat Hen seed without contaminants imply that it was specifically collected rather than being a by-product of harvesting practice, to be used either as a stored food supply or as selected seed for subsequent sowing. Each plant can yield up to 100,000 seeds. Ethnographic evidence records that the Indians of New Mexico and Arizona gathered the seeds of Fat Hen, dried them and ground them into flour in order to make bread (United States Department of Agriculture Report 419, 1870). The flour resembles Buckwheat (*Fagopyrum esculentum*) in colour and taste and is regarded as equally nutritious (Grieve, 1931). While it went out of fashion in the second millennium of our era and most herbalists refer only to its medicinal qualities, clearly it was a plant of considerable significance from the Bronze Age, if not before, through to the end of the first millennium AD.

The second major potential source of carbohydrate is represented by the nut from the sweet chestnut (*Castanea sativa*) and the oak (*Quercus coccifera*, *Q. robur*, *Q. ilex*, *Q. sobur*) (Mason, 1995). Sweet chestnuts are effectively packed with nutrition and energy. They contain 6-10% protein, 70-80% carbohydrate, 2-7% fats and 40mg per 10 g of pulp of Vitamin C and 15mg of Vitamin B. The nuts are harvested at the end of October and into November when they are dry. Stored within their capsules at a low temperature (c. 4°C) in a

shallow layer, they can be kept for many months. The nuts today are usually roasted in the hearth in the winter as an afternoon treat but this is clearly the survival of a much earlier tradition. The dried nuts can be ground into flour and made into a nourishing bread. The acorn is equally valuable since it contains 45% carbohydrate, 5.2% protein and most beneficially, 43% fat. Like the chestnut, the kernels can be dried and ground into flour, although leaching with water to remove the bitter tannins is necessary.

These sources of carbohydrate are abundant within the Plana de Vic and fulfil all the requirements of a harvestable food, the most critical of which is their capability of being stored over a long period and certainly from one harvest to another. There is no reason whatsoever why they should not have been the daily bread of the peasant class in the early mediaeval period.

Having established the daily bread, the third harvest is abundantly plentiful in its supply of flavourings and relishes. As Dimbleby (1967) observed “the wild flora contains many more plants which can be used for flavouring than are cultivated in the herb garden”.

However, continuing with trees and shrubs, one in particular, the hazel (*Corylus avellana*) has been a favourite with man from the earliest times to the present day. It has been found in neolithic contexts, Roman Pompeii, and Charlemagne is reputed, probably inaccurately insofar as hazel was already likely to have been widely dispersed, to have spread it throughout Europe. Perhaps like the Carline thistle, he commented rather on its use. Hazel nuts contain about 60% fats, 14-20% protein, 8-14% carbohydrate, considerable amounts of potassium, phosphorus, calcium magnesium, iron and copper along with folic acid and vitamins B, C and E. The hazel is widely distributed in the Plana de Vic with many coppices along the banks of the river Ter. Apart from its food value, the hazel wands were in considerable demand for fencing and walling in house construction as well as the production of wicker baskets. Pictorial representations of hazel rod fencing can be seen in many of the illustrated manuscripts as for example in *Les Tres Belles Heures de Duc de Barry* (Reynolds, 1988).

The list can be extended almost indefinitely to include fruit like Cornelian Cherry (*Cornus mas*), the hawthorn (*Crataegus spp.*) and the quince (*Cydonia oblongata*) which can be eaten directly or used in the preparation of compotes, jams and sauces.

Part of the research programme at L’Esquerda is an ongoing survey of the flora of the area (Reynolds, 1998c). To date (1999), over 150 different plants have been identified of which more than one third are edible. Within the constraints of this paper, it is only possible to make a very small selection. The bramble (*Rubus fruticosus*) is an obvious choice in that the fruits, the blackberries, are still collected from the wild to this very day. It is also possible to sun-dry blackberries and subsequently eat them many months, even years, later (personal experience). The Common Mallow (*Malva sylvestris*) is also abundant. Its seeds can be eaten and its leaves used as a salad or cooked as a green vegetable.

No list, however truncated, should omit the vetches. To date, five vetches have been identified (*Vicia cracca*, *V. hirsuta*, *V. lutea*, *V. sativa* and *V. sepium*) all of whose seeds can be eaten like lentils or in soups or dried and ground into a flour. One can add to these the Yellow Vetchling (*Lathyrus aphaca*) and the Spanish Vetchling (*L. clymens*) whose seeds are edible, as are their tubers. Lastly, the Common Orache (*Atriplex patula*), a member of the Chenopodiaceae, can be eaten as a vegetable like Fat Hen.

In this discussion which has focussed primarily upon food sources from plants, there has been little or no reference to the important aspect of the medicinal qualities of plants. That the food plants cited have beneficial medicinal properties is without doubt, in consequence of which the peasant is richer rather than poorer by virtue of his diet.

It is quite fascinating how many of these foods, particularly Fat Hen, sweet chestnut and acorns, are referred to in the texts of the second millennium, including those of the modern day, as foods reverted to in times of famine. Given that literature is directed at the literati and that the literati are not peasants, the implication is really that the upper classes are forced to change their standard agriculturally produced diet and adopt another one, that of the peasants who are, perforce, constrained to share their normal diet.

However, the problem of testing the hypothesis still remains. In the absence of documentary evidence, the future focus must be upon seeking the archaeological evidence. Finer and finer processing is urgently needed to extract and recover what paleocarpological evidence survives. At the same time, it is necessary to focus attention away from the obvious, the monumental, the ecclesiastical, the tombs and towards the settlement areas of the lowest socio-economic classes. Only in this way will there be any progress in our understanding of mediaeval society as a whole. The comments of Duby (1968), who draws attention to the scattered settlements of seventh century Europe with only small areas of land under cultivation, that 'the peasants only derived part of their livelihood from agriculture, the rest comes from fishing, hunting and wild fruits' is entirely unsatisfactory and misleading. Peasants undoubtedly hunted and fished but one suspects for very minor prey outwith the Lord's demesne. 'Wild fruits' is quite simply a gross understatement at best, at worst a complete misunderstanding of the agricultural peasant class of any period.

There is no doubt that gathering and hunting did not cease when farming began. In the earliest stages of the agricultural revolution, as it rolled from the Fertile Crescent westwards throughout Europe, the new technology would have dovetailed into the old practices. At the beginning this was through necessity, subsequently through choice. That gathering plants from the wild for food and medication played a significant role in the classical period is evidenced by the writings of Theophrastus, Strabo, Columella, Virgil, *et al.* In the post-Roman period, Galen (*De Alimetorum Facultibus* and *De Probis Pravisque Alimentorum Succis*) discusses wild and cultivated plants with equal fervour. The gatherer-hunter tradition survived at all levels in society but especially amongst the lowest socio-economic group, the peasantry. It is in some ways ironic that the plant diet employed by this group, by its sheer wealth and diversity in terms of energy foods and functional foods, was far healthier than the one they toiled in the cereal fields to provide for their lords and masters. There was, in fact, an abundant third harvest in the first millennium of our era in the Plana de Vic.

Even today, at the close of the second millennium, the gatherer-hunter tradition is still alive and well. The products of the wild harvest, available virtually all year round are on sale every Saturday in the market square of the city of Vic. Baskets of fungi of every shape and description, fruits and nuts both fresh and dried, aromatic bulbs and herbs, all being sold by those timeless characters who live closest to the landscape.

Omnia Vico Venalia (with apologies to Juvenal).

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Illustrations:

1. The experimental construct of the medieval granary across a field of Emmer wheat at L'Esquerda.
2. The fruiting head of *Chenopodium album*. The average yield per plant is 100,000 seeds.
3. The Third Harvest of the First Millennium still in evidence at the end of the Second Millenium at Vic market.