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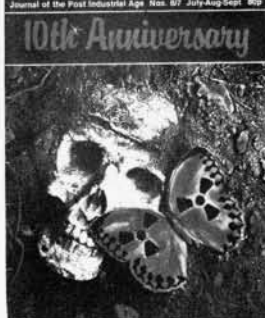
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The modern administrative boundaries of France take no account of historical, geographical or ethnic factors. People have simply been lumped together with no regard for language or culture. Regional nationalism is now growing — and to deny it is to risk triggering a political time-bomb. Only by recognising the cultural rights of the regions can we ensure a stable and fulfilling future.

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## Digest



## EXPENDIENCY RULES OK?

A few months ago, I received news from Sri Lanka of a sordid trade in young children, a trade in which a Sri Lankan madam is getting women pregnant in order to sell their babies to Western parents seeking children for adoption. Six weeks later came the news that Mexico had been brought back — at least temporarily — from the brink of bankruptcy after a crisis which has been described as the greatest threat to the stability of the world's financial institutions since 1929.

I have no wish to suggest any direct link between the two events. There is none. But I would argue that it may not be too long before we become insensitive to such scandals as baby farming: and that one reason will lie in the increasingly intractable problem of national indebtedness. I say that because, as our attempts to keep the industrial boat afloat become more desperate, so expediency is becoming the order of the day. And, as the foundations of affluence crumble, so expediency has become the enemy of ethics.

The facts of the international debt crisis are well-known: in August, Mexico announced that it was unable to meet the scheduled repayments on its massive 85 billion dollar foreign debt: by September, it had become clear that Argentina (with debts of 37 billion dollars) and Brazil (with debts of 70 billion dollars) were in the same boat: and the dread realization grew that a collective debt of some 200 billion dollars was unlikely to be serviced.

The banks were worried. And with good reason: if Mexico defaulted, American banks alone would lose 40 per cent of their total reserves at a single stroke. Inevitably, those banks would be forced to call in other loans in a desperate attempt to remain solvent. But with what chance of being paid? Nearly thirty Third World countries — whose debts have risen five-fold since the first oil price hike in 1973 — are now said to be in grave financial straits: indeed, twenty of them have asked for their debt repayments to be rescheduled because they are unable to meet them. And, to make matters worse, Western industry is clearly not in a healthy enough state to withstand pressure from the banks either: in Britain, the Midland Bank says it has 70 companies 'in intensive care': West Germany's AEG/Telefunken is broke: and Canada's Dome Petroleum, with debts of 7.3 billion dollars, is scarcely better off.

In effect, the debtors have a gun to the bankers' heads. To permit just one country to default would be to bring a cascade of bankruptcies, with countries and companies and individuals collapsing like dominoes. All proof of Keynes' canny observation, "If you owe your bank manager a thousand pounds, you are at his mercy: if you owe him a million pounds, he is at your mercy."

Indeed he is. A default on a major bank would, as one analyst put it, 'close every bank within two hours'. The result would be little less than total panic: savings would be wiped out: there would be no money to buy food, clothing or fuel: and, if the crisis continued, the ensuing social chaos would bring major ecological catastrophes. For even when (as would surely happen) a barter system arose to take over the role played by the banks, how likely is it that nuclear power stations or toxic waste dumps would be maintained in exchange for vegetables or the occasional sheep? The resulting pollution does not bear contemplating.

It is an appalling prospect. But still more appalling are the prospects of trying to avert such a crisis by doggedly maintaining the *status quo*. That course can only spur our race to ecological — and moral — Armageddon.

For the Third World, the problem is uncompromisingly simple. If it is to meet its debt repayments, it must strip its natural assets in order to raise the necessary foreign exchange. Inevitably, ecological considerations go by the board in the scramble for foreign exchange. Thus, in 1979, Brazil — desperate for cash to meet a previous debt repayment crisis — announced that it was tendering 'risk contracts' to multinational timber corporations to 'harvest' one hundred million acres of Amazonia. That announcement came just two years after Brazil signed a convention pledging itself to 'develop' the area with due environmental care.

So too, Peru — lured by the promise of easy foreign exchange earnings — repeatedly overfished its anchovy breeding grounds, despite the warnings of biologists. The consequences were all too predictable. "The catches of 1967, 1968, 1970 and 1971 all exceeded the estimated maximum sustainable yield of 9.5 million tons," reports Eric Eckholm in his recent book, *Down to Earth*. "Then in 1972 came nature's backlash. A shift in the ocean



currents that periodically reduces marine productivity in the area occurred — but this time the anchovies did not spring back as they always had before. Apparently the population of mature anchovies had been so badly diminished that, under the extra pressure of the current shift, it could not produce a large new brood. On land, fortunes were lost, hundreds of fishermen lost their jobs and the world's protein market received a nasty jolt. To the dismay of the Peruvians, the anchovies have not recovered despite years of close protection."

Indeed, it is hard to contemplate the damage that will be done or the world which will emerge from the global asset stripping that will be required to keep the Third World afloat. The predictions, however, are frightening enough: a third of the earth's ice-free land area converted to desert through deforestation and overgrazing by the end of the century (already an area equivalent to twice the size of Belgium is lost to desertification every year); the loss of half the world's undisturbed tropical rainforests within a hundred years (assuming that the rate of their destruction remains at the present staggering 25 acres a minute); the certainty of climatic change as a result of deforestation and the destruction of other vegetation cover (the latest research suggesting changes in rainfall patterns which could, in the worst possible case, mean Europe and most of Asia receiving almost no precipitation); and the destruction of millions of natural species.

To that devastation must be added the degradations caused by the First World. Already the ecological movement has become well acquainted with the shrill protests of industry that environmental controls are threatening to undermine competitiveness and cause unemployment, even bankruptcy. It is an argument which is constantly used — and which has led to numerous environmental regulations being abandoned or watered down until they become worse than useless. Thus in America, the Environmental Protection Agency (once the stalwart ally of the ecological movement) is now, under the leadership of Reagan's Anne Gorsuch, doing its best to ingratiate itself with industry. Toxic waste rules are to be relaxed — this despite the experience of Love Canal — and industry has been permitted to cut its contribution to the superfund intended to clean up old waste dumps from 4 billion dollars to 1.6 billion dollars. Meanwhile other agencies have eased the regulations controlling the testing of new drugs, opened the way for companies to exploit America's remaining wilderness, and all but scrapped new laws controlling the export of hazardous chemicals to the Third World.

Nothing, it would seem blunts our ecological conscience more effectively than the fear of bankruptcy. In the West, our solvency must be bought at the cost of poisoning ourselves; in the Third World, at the cost of asset-stripping its natural environment. There is, we are told, no alternative if we are to avoid the collapse of the world's financial institutions. It is a 'Heads I win, Tails you lose' choice — and one which, I believe will promote an irrational optimism.

Already, the environmental Panglosses are with us: the fear is that, as the destruction continues, so we shall become inured to the devastation and all too ready to convince ourselves that our predicament is not as bad as the doomsters make out. The message is clear: we mustn't rock the boat. And as it

becomes more and more difficult not to do so, so we shall become more and more prepared to overlook the moral implications of our destructiveness. In a world in which our own survival becomes increasingly clearly threatened, will we really care that a famine is killing billions somewhere else? or that a Sri Lankan madam is getting women pregnant in order to sell their children? I doubt it.

The tragedy is that there *is* an alternative. For the First World, it means deindustrialising; for the Third World, delinking from the world market system. The steps we need to take have been etched out in our own *Blueprint for Survival* — but the longer we leave it, the more difficult it will become not to delegate to disaster. And disaster is inevitable so long as we continue to accept that we have no other choice but proceed along our present course. That route can only lead to ecological and moral bankruptcy — and a world which will make the present economic crisis an enjoyable experience by comparison.

Nicholas Hildyard

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J. D. Hughes

# DEFORESTATION IN ANCIENT GREECE & ROME: A CAUSE OF COLLAPSE

**J. Donald Hughes and J.V. Thirgood\***

University of Denver and University of British Columbia

Forests, it has been said, precede civilisation — whilst deserts follow. But just how far can the decline of past civilisations be explained by their ecological insensitivity? And what lessons are there for us today?

There is a close interconnection between ruined cities and ruined land. The fact that the broken statues and scattered column drums of the centers of ancient civilization have deforested and eroded landscapes as their settings does not seem to be an accident. The general impression of synchronicity, the contemporaneous ruin of ancient societies and ancient environments, has been inescapable.

Forests provided the major material for construction and almost the only fuel source of the classical world, and depletion of this source precipitated a number of crises. As forests retreated with land clearance, wood decreased in availability and increased in price, contributing to the ruinous inflation that plagued late antiquity. Competition for forest resources ignited military conflicts, which themselves created demands for timber. Erosion weakened the economic base of the predominantly agrarian societies, contributing to a population decline that made it ever more difficult for Greco-Roman civilization to resist the incursions of barbarians from beyond the frontiers. In the more arid regions, forests that formerly moderated the climate and equalized the water supply were stripped away, permitting the desert to advance. The image of the ruined cities of North Africa, from which olive oil and timber were exported in ancient times but which later were buried beneath the desert sand, epitomizes the environmental factor in the decline of civilization, as

do the swamps along the northern Mediterranean margin from which malaria spread to debilitate the population.

Without in any way discounting the importance of other causes of the passing of classical culture and its replacement by less glorious successors, we must say that such keen observers as George Perkins Marsh, Henry David Thoreau, and Fairfield Osborn were at least partially correct in their assertions that the nations of antiquity were consuming their own future as they felled their forests and allowed their soil to wash away. While it would be incorrect to attribute to the ancients all the ills of the present-day Mediterranean landscape (for it has been subjected to pressures by successive societies over the centuries), it seems clear that the peoples of the classical world in many instances set in motion a process best described as a wearing away of the heartlands of western culture.

## Lessons for Today

Environmental problems have affected human societies from very early times, and since the past represents human experience, scholars concerned with ecology and land use today may profit by drawing

\* Funding for J. Donald Hughes' original preparation of this paper was provided by the Conservation Foundation of Washington, DC. J.V. Thirgood collaborated in the revised version that is presented here.



upon earlier examples. Classical Greece and Rome are particularly instructive, not only because such problems as deforestation and erosion beset those civilizations, but also because written sources exist to supplement the archaeological record of environmental change. The ancient philosophers and historians to some extent recognized and reflected upon the process. Their attitudes have been influential in determining the way in which subsequent civilizations have viewed and treated the natural environment.

All too often, historians, in a laudable attempt to avoid the subjective reading of the present into the past, have ignored the modern implications of earlier interactions between human beings and nature, while some ecologists in turn have disregarded earlier historical periods as remote and without contemporary applicability. A few perceptive individuals, however, recognized that ecological studies benefit from a historical perspective, just as history often benefits from an ecological viewpoint. Fairfield Osborn maintained that environmental history, and specifically that of Greece and Rome, "assumes the character of a prologue to modern times. Assuredly there is an affinity between *then* and *now*." In the decline of ancient societies, he sensed "a contemporaneous deterioration of environment and peoples," of which "the causes were man-made, not natural."<sup>1</sup> Osborn recognized the cycle of deforestation, erosion, and agricultural decline in the late classical world, reminding us that in some desolate Mediterranean areas "the forests have never reappeared . . . because the land has been denuded of its soil."<sup>2</sup> Similar observations were recorded by Henry David Thoreau:

The civilized nations—Greece, Rome, England—have been sustained by the primitive forests which anciently rotted where they stand. They survive as long as the soil is not exhausted. Alas for human culture! Little is to be expected of a nation, when the vegetable mould is exhausted, and it is compelled to make manure of the bones of its fathers.<sup>3</sup>

Although Thoreau's irony is more poignant, Osborn's comments gain importance from their immediacy, written as they were when the extent of modern human damage to the worldwide natural environment, and its consequences, were becoming apparent.

The purpose of this article is to examine in some detail the role of deforestation and erosion in the decline of ancient civilization. We shall investigate the needs, practices, and attitudes that brought about deforestation and soil erosion in ancient Greece and Rome. We shall examine the extent of those forces of environmental deterioration, and their interaction with one another in producing direct and secondary impacts on the economy (including agricultural production), health, population, and social structure. Efforts undertaken to remedy environmental problems, whether successes or failures, will be described. Finally we shall attempt a new estimate of the importance of deforestation and erosion as causes of the decline of classical civilization and of the extent to which these peoples understood and practiced forest management.

We recognize that to a degree this is an ongoing process. Much evidence exists to indicate that, apart from the thin-soiled limestone regions such as Attica, catastrophic erosion occurred *after* the decline of Roman power—as is certainly the case in Palestine and Syria and probably much of North Africa, while in southern Italy denudation and the resultant soil loss has been ascribed to the Spanish occupation during the sixteenth century.

## THE DEMAND FOR FOREST PRODUCTS

The single most important use of wood and its carbonized product, charcoal, was as fuel. As in many underdeveloped countries today, probably close to 90 per cent of all wood used was consumed for this purpose. Coal and petroleum were known to the ancients, but they were not used to a great extent in any area. Although populations were much smaller in the classical period than today, the depletion, we may assume, was considerable. Every householder might have said with Vergil (70-19 BC):

My hearth is piled with branches of pitch-pine;  
Free burns my faithful fire, and every hour  
My walls are black with smoke.<sup>4</sup>

And those who set out on foot into the night might well have remembered that "the loftier forest gives our torches," referring to the resinous heartwood of the mature pine trees.<sup>5</sup> Woodcutters were kept busy supplying fuelwood, and haulers were well paid for transporting it into cities on mules and donkeys. One of these, Phaenippus of Athens, was reported to have made twelve drachmas a day in this way.<sup>6</sup>

Much wood was reduced to charcoal before being used as fuel. Theophrastus (390-286 BC), Cato (234-149 BC), Pliny (AD 23-79), and others describe the process. Charcoal burning occupied thousands of men like the Acharnians of Aristophanes (448-388 BC). Charcoal produced a higher, more even heat with less smoke and flame, and thus found uses in industry as well as in the ubiquitous braziers that warmed chimneyless rooms. Wood and charcoal fired the kilns that hardened Greek and Roman ceramics, including pottery, bricks, and tiles; melted the metal for statues, utensils, and weapons; forced pitch out of pinewood; and reduced limestone to fertilizer. Finally, the ashes served to enrich the soil. In addition to warming meals and drinks, these fuels heated the water and the floors in the many huge Roman bathing establishments. So numerous were fires in ancient cities that air pollution was a problem on which ancient authors commented.

## Forests and Industry

Mines and smelters used prodigious amounts of fuel, primarily for reducing ores to metals, but also for supports in mineshafts and for underground fires to crack resistant rocks. Reasonable estimates hold that a single major ancient metallurgical center would have required as much as a million acres of coppice forest to supply these needs.<sup>7</sup> Osborn identified this as a major cause of deforestation, but this, of course, would not necessarily occur if the coppice was managed on a basis of sustention.<sup>8</sup> Such concentrated demands could



Map (right) of Greece about 450 BC. As a result of deforestation, erosion and siltation were extensive in Classical Greece and Rome. Thermopolae, the well-known pass between the cliffs and sea was narrow enough in 480 BC to be defended by a relatively small army. Today, accretion of river silt has widened the delta of the river at least five miles seaward from the site of the famous battle.



have led to the development of a rational, continuous forestry. Indeed, we know from our reading of the classical texts on rural economy that the principles of coppice management were practiced and well understood. These varied mining activities required a continuing supply of wood that could hardly have been met over hundreds of years in the principal centers of mining if indifference to forest destruction had been universal. Nevertheless, it is hardly coincidental that the principal mining centers of antiquity are among the most treeless today.

### Forests and Trade

In addition to fuel, forests were used for building materials. Lumber and other forest products constituted a basic article of trade in the Mediterranean basin. There is no doubt that the ancients regarded forests as a valuable commercial advantage. Wood was a material so commonly used for so many purposes that the Greek word for it, *hyle*, came to mean "substance" or "matter" in general. In Latin, both concepts are also expressed by a single word—*materia*. A city well supplied with forests, then, was rich in a necessary resource and item of commerce. Plato (427-347 BC) and Aristotle (384-322 BC) agreed that an ideal city would have its own forests near enough to ensure self-sufficiency (although Plato, who disliked the political influence of sailors, thought there ought not to be too much shipbuilding timber around).<sup>9</sup> But not all cities could expect to have an adequate domestic timber supply, and the timber trade, which generalized the exploitation of the Mediterranean forests, was the result.

### Logging Lore

Classical literature and inscriptions give much information (although little quantitative data) on the process of forest exploitation. The actual cutting of trees was a specialized task at which loggers took great

pride; Alfred Zimmern quotes one epitaph on Mount Parnes: "I never saw a better woodcutter than myself."<sup>10</sup> Men like these knew the forests well; Theophrastus (390-286 BC) often quotes the expertise of lumbermen from Mount Ida, Macedonia, and Arcadia, among the most important suppliers of the Greek timber trade.

We learn which species of trees the ancient foresters chose for various types of wood and how they judged which specimens to cut: location, exposure, age, habit of growth, and appearance of the bark were all considered. The time of felling trees was carefully prescribed; wintertime was preferred, but not when the timber was wet, frosted, covered with dew, or during a south wind. There was a strong, almost universal opinion that trees ought to be cut during the waning moon, possibly deriving from an immemorial taboo whose original purpose can only be guessed. (It is of interest that a similar belief is found still in traditional European forestry lore.) Some believed the waxing moon made timber moist and soft. Pliny says the practice made the wood last longer, but he also cites a similar admonition to cut the hair only during the waning moon as a precaution against baldness. It is perhaps fanciful to suggest that the rule about cutting trees was a silvicultural measure to prevent "baldness of the earth."<sup>11</sup> At any rate the taboo was widespread. In one case Emperor Tiberius (42 BC-AD 37) ordered that larches for his naval arena be felled between the twentieth and thirtieth days of the lunar month. One of these logs measured 120 feet—one of the longest ever seen in Rome—suggesting a concern with forest preservation that extended beyond quaint taboos, at least in the Alpine province from which it was taken.<sup>12</sup>

### Felling Practices

The trees were cut with axes, saws, and wedges; smaller ones were often uprooted by digging. Sometimes trees to be felled were first girdled, or conifers



gradually girdled by removing the bark to make the pitch flow. After the branches were lopped off, logs were pulled out by draft animals and either shipped whole or hewn into thick beams and planks first. Theophrastus gives directions for splitting pine and fir logs with the grain.<sup>13</sup>

Often logs were floated down rivers or canals to ports on the coast. Rome brought much timber down the Tiber directly to the city. The Po was a major artery for Alpine timber. A typical lumber port might be at the mouth of a river with a mountainous, forested area at its watershed, like Luna, Ravenna, or even Colchis at the farther end of the Black Sea. Those without major rivers usually had the mountains at their backs, like Genoa or Antandros.

From such ports timber was shipped to populated centers; we hear of businessmen in the import trade and are told that long sea voyages were sometimes involved. Rome's timber market was located at the Porta Trigemina on the downriver side of the city, indicating that major supplies were brought up the Tiber through Ostia on the coast.<sup>14</sup> Overland transport was sometimes necessary; Russell Meiggs reports that the great building inscription of the palace of Darius (d. 486 BC) at Susa, which today stands in the desolate border country of Iran and Iraq, records Ionian and Carian Greeks "engaged in the transport of timber and in skilled labour on the building."<sup>15</sup>

### Timber in Building

Cities required timber to build houses and public buildings such as temples, theaters, and basilicas. Even after most large buildings began to be constructed of stone or brick, beams and rafters were of timber, and scaffolding and ramps were needed. Doors and their frames and hinges were often of wood, and roofs were covered with shingles—that was the old custom of Rome, according to Pliny.<sup>16</sup> Images of the gods were anciently made of wood, as were the frameworks of colossal chryselephantine statues. Plato advised painting public notices on cypress wood.<sup>17</sup>

Cabinets and household furniture were fashioned by skilled woodworkers who knew techniques such as inlaying and veneering. All sorts of tools and utensils, including cups, jars, bowls, combs, and barrels, were made of wood—even metal objects such as daggers needed wooden handles. Willows found widespread use in basketry and were even cultivated for the purpose. Musical instruments like the lyre and aulos required wood, as did agricultural and industrial machines, including those used in irrigation and construction, and vehicles such as wagons, chariots, and carts. Shipbuilding was the most frequently mentioned use of wood in ancient literature. From keel to mast, almost everything in a ship came from trees, as did pitch used to caulk the vessel.

### The Use of Other Forest Products

Wood was not the only forest product used by the ancients. Forests also supplied cork, pitch, and tar; dyes from bark, flowers, and forest insects; cedar oil, resins for varnishes, and preservatives; spices,

medicines, and drugs from trees and shrubs—not to mention beeswax, honey, nuts, and fungi. Wine jars were waterproofed with pine resin.

### Wood and War

Ancients also depended upon the woodlands for war material. Forests supplied wood not only for ships but also for chariots, battering rams, and other huge siege engines, and stock for a host of weapons. Ramparts of fortifications often consisted of tree trunks set closely together.

Armies took their toll upon the forests. Detachments of soldiers cut wood for fortifications and fuel.<sup>18</sup> The Spartans brought wood all the way from Asine to Pylos for engines, and it is said that during sieges of North African towns, Caesar had to send to Sicily for timber to reconstruct his engines.<sup>19</sup> Deliberate destruction of forests often occurred in warfare; Xerxes burned the woods during his invasion of Greece. The Aetolians set forest fires to harry the troops of the Athenian general, Demosthenes, who later used the same weapon against the Spartans at Sphacteria.<sup>20</sup>

### Farming and Forest Clearance

A major cause of forest removal was the clearance of land for farming. Writers such as Lucretius saw forests giving way to farms:

They made the woods climb higher up the mountains

Yielding the lowlands to be tilled and tended.<sup>21</sup>

The axe and saw were part of regular farm equipment. Trees were uprooted and removed or cut down, burned in place, and the ashes plowed under as valued fertilizer.<sup>22</sup> The trees that grew naturally on a plot of land were used as indicators of what crops would do well if planted there, although Pliny recognized that good forest sites were not necessarily suited for other crops:

A soil in which lofty trees do brilliantly is not invariably favorable except for those trees: for what grows taller than a silver fir? Yet what other trees could have lived in the same place?<sup>23</sup>

### The Impact of Grazing on Forests

Even more destructive than agricultural clearing were the wide-ranging herds of grazing and browsing animals. As Varro (116-27 BC) complains, "Grazing cattle do not produce what grows on the land, but tear it off with their teeth."<sup>24</sup> Herds of goats, sheep, cattle, and swine grazed through the ancient forests. Theophrastus saw cropping by animals as a major cause of damage.<sup>25</sup> Not only were animals pastured in forests, often being herded up the mountainsides as the season advanced, but branches of trees were cut so cattle, sheep, and goats could eat the leaves when other sources of forage failed.

All the herd animals were encouraged to graze in the forests, at least during part of the year, each species having its own preference among available forest vegetation. Cattle, says Varro, "are most conveniently pastured on wooded land where there is much undergrowth and foliage."<sup>26</sup> Swine were allowed to root on the forest floor, "bringing home full paunch of acorns," and the mast of beech and chestnuts.<sup>27</sup>

### The Goat: A Prime Offender

But the goat was identified as the true destroyer of forests. Although goats will graze almost anywhere, given free choice they prefer woody plants. According to Vergil,

A goat flock will find its food  
In leafy woodlands and the highest peaks  
Of an Arcadian mountain; it will browse  
On thorny vines or hardy shrubs that spread  
On inaccessible slopes.<sup>28</sup>

But not only there; in an unprotected plantation, he says, "raiding goats come crowding in."<sup>29</sup> The preference of goats for wooded country was well known, as was their appetite for a wide variety of plants. Eupolis, in Greek Old Comedy, had his chorus of goats bleat out a list of some of their favorite foods:

We feed on all manner of shrubs, browsing on  
tender shoots  
of pine, ilex, and arbutus, and on spurge, clover,  
and fragrant  
sage, and many-leaved bindweed as well, wild  
olive and lentisk  
and ash, fir, sea oak, ivy, and heath, willow,  
thorn, mullein,  
and asphodel, cistus, oak, thyme, and savory.<sup>30</sup>

This sounds like a botanist's plant list of the typical Mediterranean scrub forest community, the *maquis*, and it should be noted that on the goat's bill of fare a number of timber trees are included. The significance of pastoralism is not that it actually destroys forests but that it makes permanent what destruction goes before. While goats are often observed to climb trees and browse on foliage and bark, a mature forest is relatively immune to their depredations. Even the shrubby *maquis* will withstand all but the most severe overgrazing, and, as may be seen today in Mediterranean countries where economic advance has brought a halt to free-range grazing, the forest communities have a remarkable capacity for recovery. But where wood-cutters or a forest fire have stripped a hillside, goats will eagerly consume the seedlings and young trees that start up, effectively preventing forest regeneration.

### Clearing by Fire

Forest clearing was practiced by the shepherds, as well as by their flocks, as Vergil indicates:

Just as, in summer, when the winds he wished  
for

Awake at last, a shepherd scatters fires  
Across the forests; suddenly the space  
Between the kindled woods takes fire, too.<sup>31</sup>

The object was to improve grazing by replacing forest and *maquis* with grass. Added to this, wildfires usually ranged unchecked unless they threatened a settlement. Fires in Mediterranean vegetation tend to be catastrophic, almost completely denuding the slopes, although the plants have adapted to fire and show remarkable powers of recovery if not prevented by grazing.

A final cause of deforestation is urbanization. As the cities and towns grew, they encompassed forest districts that were later remembered, if at all, by place names formerly attached to groves of trees. Pliny the Elder mentions quarters of Rome named after a laurel

grove, an oak forest, beeches, and willows.<sup>32</sup> Speaking of the disappearance of the famous forest of *thyon* trees from the Greek colony of Cyrene (modern Cyrenaica in Libya), Theophrastus says, "There was an abundance of those trees where now the city stands, and people can still recall that some of the roofs in ancient times were made of it."<sup>33</sup> And the Aventine Hill, one of the seven on which Rome was built, was once "covered with trees of every kind . . . but the whole place is now covered with buildings, including, among many others, the Temple of Diana," according to Dionysius of Halicarnassus (late first century BC).<sup>34</sup>

### THE EXTENT OF DEFORESTATION

How widespread was deforestation in the ancient Mediterranean basin? Classical writers leave the impression that it was extensive. Forests of various types originally covered most of the land surface. Examples of vanished forests mentioned range from Pliny's region of giant trees in Egypt to the woods of Sicily and Spain whose passing Diodorus (d. after 21 BC) chronicled.<sup>35</sup> "In those days," says Livy (59 BC-AD 17) of Italy in the fourth-century BC, "the Ciminian forest was more impassable and appalling than were lately the wooded defiles of Germany."<sup>36</sup> Readers in Livy's day would have found precious little forest where the army of Fabius had marched with such difficulty against Hannibal two centuries earlier. The lines of Homer and Vergil resound with axes and falling trees. Strabo (63 BC-AD 21) complains that the forests around Pisa were being consumed in order to construct public and private buildings in Rome and ostentatious villas in the countryside.<sup>37</sup>

Classical writers could see that deforestation was widespread and severe; we are told that it was difficult to find timber suitable for shipbuilding, that good forests were generally limited to the mountains, and that sources of valuable wood were exhausted. Mediterranean forests were retreating from population centers, up the hillsides, and into moister and more isolated seclusions. Early authors may call an area forested that later writers know as barren, while traces of vanished forests persist in place names like Elatea ("Firtown"), Pityoussa ("Pineville"), Castanea ("Chestnutburg"), or Xylopolis ("Timber City").<sup>38</sup>

Destruction or at least exploitation of forests began, as would be expected, near regions of greatest demand—urban centers and mining districts. The environs of Athens were mainly bare by Plato's time, and Euboea, whose relict forests suggest abundant original growth, produced only inferior timber once the extensive silver mining complex at Laurium had stripped the island of accessible wood. The earlier Mediterranean cities and civilizations flourished in the eastern and southern parts of the basin—Egypt, Syria, Phoenicia, Asia Minor, and Greece—and therefore forests in these regions came under pressure before other areas. Since the east and south were more deficient in rainfall (for example, Genoa in northern Italy gets 52 inches per year, Athens 16 inches, Alexandria only 8 inches), the forests there were less



abundant to start with and recovered more slowly from heavy use.<sup>39</sup> To generalize, exploitation progressed from east to west and from south to north, with the movement of civilization. Locally, more accessible forestlands were cleared before the more isolated—lowlands lost their trees while the mountains preserved theirs and forests near rivers that could float logs were exploited before those further away. Some forests were leveled by the woodcutters' axes, recovered, and were cut again. The areas most often praised as sources of good timber at the height of classical times tend to be mountainous regions with heavier than average rainfall. Macedonia on the northern Greek borderlands, the Alps of Europe, the Atlas Mountains of western North Africa, the mountains of the Black Sea coast, and the island of Corsica may serve as examples. Lebanon, Cyprus, and the Taurus Mountains of southern Turkey were the prime sources of "cedar" from which successively the Byzantines, the Crusaders, the Levantine Frankish kingdoms, the Arabs, the Turks, and the Mamelukes obtained timber.

### THE IMPACT OF DEFORESTATION

It is important to emphasize the significance of Mediterranean forest ecosystems for environmental stability. The basin as a whole is mountainous and characterized by sparse rainfall that comes mainly in a few heavy winter storms; if there are summer rains, they descend in violent thunderstorms. The result of forest removal in such an environment can be catastrophic. Unprotected by the former forest cover, the soil is exposed to powerful erosion forces. George Perkins Marsh, the nineteenth-century Vermont naturalist, understood this factor of environmental degradation well:

vast forests have disappeared from mountain spurs and ridges; the vegetable earth accumulated beneath the trees . . . the soil of alpine pastures . . . are washed away; . . . rivers famous in history and song have shrunk to humble brooklets: . . . harbors . . . are shoaled by the deposits of the rivers at whose mouths they lie.<sup>40</sup>

The common results of deforestation in the Mediterranean basin are erosion of the hillsides, flooding as the gathering waters are no longer retarded and absorbed, disruption of the water supply, and siltation of lowlands and coastlands.

#### Awareness of the Problems

Ancient writers were aware of these problems. The Roman engineer Vitruvius (late first century BC) understood the role of forests in providing and preserving the flow of water in springs, as this passage demonstrates:

Water . . . is to be most sought in mountains and northern regions, because in these parts it is found of sweeter quality, more wholesome and abundant. For such places are turned away from the sun's course, and in these especially are many forest trees; . . . nor do the sun's rays reach the earth directly and cause the moisture to evaporate. Valleys between mountains are subject to much rain, and because of the dense forests, snow stands there much longer under the shadow of the



The monastic preserve of Mount Athos in Greece. A practice that averted deforestation to some extent was the protection of sacred groves. A pious appreciation of trees was enforced by laws which were by no means negligible.

trees and the hills. Then it melts and percolates through the interstices of the earth and so reaches to the lowest spurs of the mountains, from which the product of the spring flows and bursts forth.<sup>41</sup>

The connection between forests and water supply was noted by several authors. In AD 174 Pausanias visited a place "clothed with oak woods" and remarked of it, "No town in Greece is more abundantly supplied with flowing water than Phellae."<sup>42</sup> Ancients also understood the effects of deforestation. As Pliny noted, "often indeed devastating torrents unite when from hills has been cut away the wood that used to hold the rains and absorb them."<sup>43</sup> Pliny mistakenly thought that deforestation also produced springs, but Plato observed more accurately that the water that rushed unimpeded down the mountainsides was no longer available to feed the springs. Perhaps for this reason, Plato portrays his ideal Atlantis as having "springs surrounded by plantations of appropriate trees."<sup>44</sup>

#### Erosion

Plato also tells us that soil erosion following the deforestation of Attica left the mountains wasted like rocky skeletons.<sup>45</sup> Pausanias compares the silt deposits laid down at the mouths of two rivers: the Achelous, whose watershed was uninhabited (and presumably forested), "does not wash down so much mud on the Echinadian islands as it would otherwise do," but the Maeander, whose valley had been cleared, "had turned the sea between Priene and Miletus into dry land."<sup>46</sup>

The cycle of deforestation and erosion, once begun, tends to reinforce itself. The high forest gives way to *maquis*, a dense evergreen thicket, and this in turn to *garigue*, a sparse growth of spiny and often aromatic low shrubs that can support itself on the dry, denuded slopes. Further destruction can produce landscapes as bare as any steppe, a condition seen on countless Mediterranean hillsides today.<sup>47</sup> Recovery and reforestation occur only over an extended time scale, and then only if there are surviving seed sources and

all destructive impacts—especially fire and grazing—are kept out.

Erosion and siltation were extensive in classical Greece and Rome. The amount of soil actually removed from the highlands is hard to measure. Much of it washed to sea, but some came to rest in valleys and lowlands, and these deposits can be dated from artifacts found in them or from the radiocarbon content of organic materials. The studies now being made of erosive deposits in the Mediterranean basin (some not yet published) indicate that erosion was a complicated and often highly localized process.<sup>48</sup> Serious erosion, however, occurred at least in some areas during classical times. Thermopylae, the well-known pass between the cliffs and sea near the mouth of the Sperhios River, was narrow enough in 480 BC to be defended by a relatively small army. Today, accretion of river silt has widened the delta of the river at least five miles seaward from the site of the famous battle. A study by Sheldon Judson indicates that erosion rates near Rome increased dramatically during the second century BC, a period of agricultural reform that presumably involved extensive land clearing. The erosion rate, averaged over the entire drainage basin, increased from 2-3 centimeters per 1,000 years before the second century BC, to 20-40 centimeters per 1,000 years afterwards.<sup>49</sup>

### Floods and Deforestation

Deforestation and erosion must have affected both the larger environment and the social and economic welfare of the Mediterranean people. Some of the primary physical effects have already been mentioned. Soil in the uplands was washed away so that, as Plato noted, "What now remains compared with what then existed is like the skeleton of a sick man, all the fat and soft earth having wasted away, and only the bare framework of the land being left."<sup>50</sup> Without forests to absorb and impede the rainfall, torrential floods increased. Roman records, for example, indicate increased flooding on the Tiber River from the third century BC onward. (The first flood is recorded in 241 BC.)<sup>51</sup> Streams that formerly flowed clear all year long became intermittent and muddy, existing only as dry courses during the long Mediterranean summer, while hundreds of springs dried up. Deposition began in the lowlands and along the seashore, where over the centuries vast marshlands have appeared. Those around the mouths of the Po are one example.

### Changes in Climate and Agricultural Productivity

Microclimate also changes when forests are removed. The deforested tract will be more arid and windier. How far beyond the immediate area such effects might be felt is a matter of conjecture, but it seems almost certain that the general aridification that occurred over much of the Mediterranean basin since the classical period is due to human interference with the regional environment. One thinks of the so-called Fertile Crescent of Palestine, Syria, and Iraq. Theophrastus recorded changes in local climate occurring in his own lifetime; after the trees had been cut around Philippi, he records, the waters dried up

and the weather became warmer.<sup>52</sup> Such impacts have been most serious in marginal areas such as the borderlands of the Sahara and Arabian deserts.

Agricultural productivity suffered in such cases. Siltation and salinization, the accumulation of salts in the soil due to evaporation in areas where crops are grown under irrigation, is worsened by deforestation in the headwaters because the resultant erosion clogs irrigation canals and ditches and increases the amount of dissolved salts in the irrigation water. Today, areas of extreme salinization occur in the Near East, North Africa, and even in some parts of Italy.

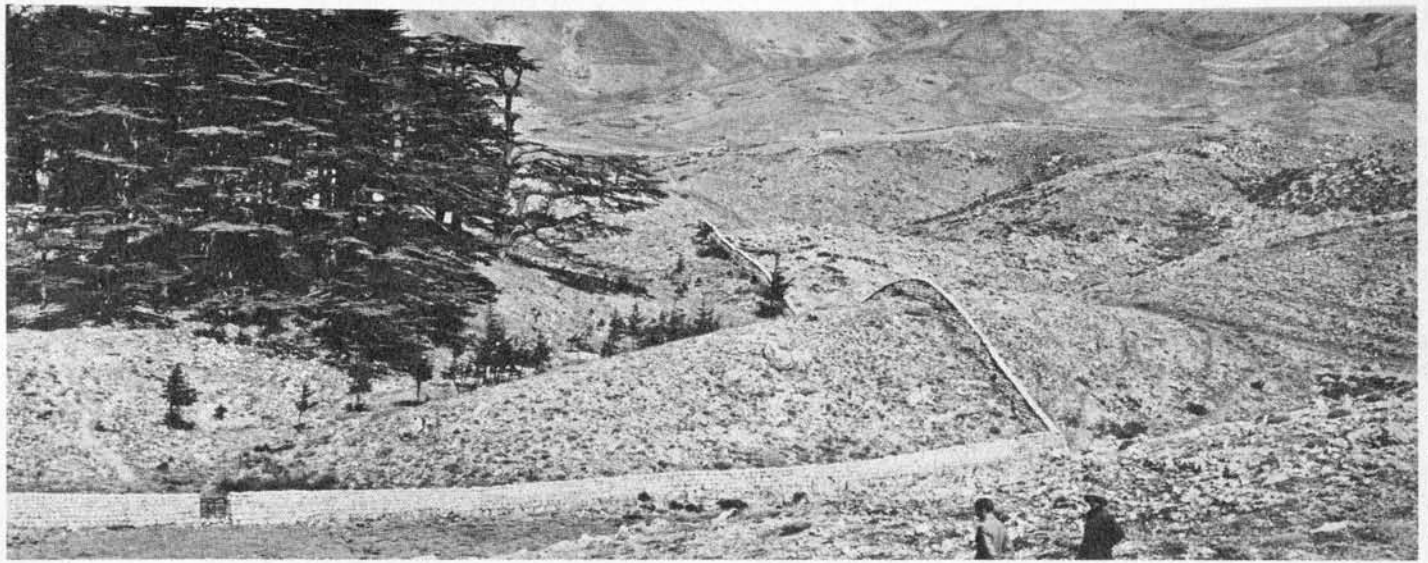
Despite its neglect by most historians in recent times, soil exhaustion has been one of the most important causes of the decline of agricultural productivity. Roman agricultural writers certainly were aware of it. Many of them noted that forested areas, when first cleared and cultivated, usually produced abundant crops—the assart effect—but in subsequent years were less and less fertile. Columella (first century AD), the Roman writer with the greatest practical insight into these matters, shrewdly observes that this is not chiefly because cleared lands are "young" and have been lying fallow but rather because the leaves and roots of woodland plants had provided nourishment to the soil, of which it was now deprived.<sup>53</sup> Soil erosion has contributed to agricultural decline throughout much of the Mediterranean basin and seems to have reached a particularly critical stage during and after the third century AD, when the classical cultures were in decline. It has been viewed as a failure of nature to support mankind, but in reality it has been a failure of mankind to support nature.

The code of Emperor Theodosius II, issued in AD 438, records a series of imperial edicts designed to shore up the sagging agricultural base of the Eastern Roman Empire.<sup>54</sup> Increasing reference is made to *agri deserti* (deserted fields), abandoned either because they were no longer sufficiently productive or because of the disastrous military campaigns that disrupted and depopulated the countryside in some sections. Chronic shortages of food resulting from agricultural decline further contributed to a downward demographic trend throughout most of the period from the second century AD to the end of the classical age. The loss of accessible productive forest and the impact of deforestation upon the potential of remaining croplands exacerbated the problem.

### Siltation, Swamps and Malaria

Malaria and other swamp-bred illnesses—a secondary result of deforestation and erosion—also contributed to population decrease. The sediments that clogged the rivers were deposited in low-lying valleys or along the Mediterranean shores where few tides exist to carry the material away. The resulting new marshlands became breeding grounds for mosquitoes and contributed to the spread of malaria, which seems to have entered the classical world during the fourth century BC. Opinions differ as to how quickly malaria actually spread in Italy after its introduction, but eventually thousands of acres of land were abandoned to it. The fact that mosquitoes were the





One of several remaining groves of the famed cedars of Lebanon: a stone fence keeps out foraging goats.

carriers was unknown to the ancients (although some of them came tantalizingly close to the truth), but they certainly knew that low, swampy places had to be avoided at the peril of one's life and health. The Pontine marshes near Rome were one famous example. The Romans drained them several times but without permanent success because the basic causative factors remained.

#### Deforestation, Trade and Inflation

The effects of deforestation and erosion on trade, while not as dramatic as those on health and population, were certainly important. As abundant sources near the centers of consumption disappeared, wood became rarer as a commodity and had to be imported over long distances. The result was a rise in price, particularly noticeable in fine woods but affecting other kinds of timber and fuel as well. Detailed price lists have survived from a few periods, and these can be interpreted to show a pattern of rising prices. People caught in areas of short supply might well have found, as did later Mediterranean travellers, that the wood for a supper fire cost as much as the meat in the pot.<sup>55</sup> Pay in kind for Athenian jurors included fuelwood, recognized as the third necessity along with bread and *opson* (fish, fruit, etc.).

The shortage and high cost of building timber due to deforestation contributed to the observable shift from wood construction to stone in both Greece and Rome, or even from the much-used brick of the Roman era to marble, since the latter required no wood fuels and firing.

Deforestation also increased transportation costs, due not only to the greater distance merchants had to go to find wood but also to the scarcity of good shipbuilding timber adjacent to principal shipbuilding centers, which drove up the price of the merchant ships themselves. Warships had priority over merchant vessels in the competition for materials. Moreover, siltation constantly clogged harbors, and herculean labors were needed to keep them usable. The repeated efforts of the Romans to keep open Ostia, Rome's major port at the mouth of the River Tiber, are described in ancient written sources, are apparent in

archaeological studies of the site, and are evident in modern aerial photographs showing the successively constructed and abandoned basins for the use of shipping.<sup>56</sup> They can be compared with the ongoing river dredging and harbor development of present-day port authorities.

#### Timber and Military Strategy

Warfare and diplomacy were other areas of human activity affected by the depletion of forests. The Greek *poleis*, the Hellenistic kingdoms, and republican and imperial Rome were all forced to develop strategies directed toward obtaining supplies of timber and other essential forest products and guarding the sea-lanes and roads over which they were transported. Historians in Greece and Rome saw the timber supply as a major factor in determining naval strategy in particular. During the Punic Wars, Rome is said to have rushed ships to completion—from tree to sea—in as little as forty to sixty days.<sup>57</sup> Most of that timber came from Rome's state forests and Etruscan vassal communities.

Domestic ships' timber, if available, was preferred. Dionysius of Syracuse (430-367 BC), for example, found all the shipbuilding material he needed in the rich forests he controlled in Magna Graecia (southern Italy), although Hiero (270-215 BC), a later tyrant of the same city, had to search far and wide for a suitable mast for a very large warship.<sup>58</sup> Athens' lack of timber was common knowledge; Plato believed that, from early times, Attica had not been "rich in timber suitable for the easy construction of a navy."<sup>59</sup>

One way to get forests was to conquer them. As Alcibiades told the Spartans, this was one of Athens' major purposes in launching the Sicilian campaign (415 BC) during the Peloponnesian War.<sup>60</sup> Areas both strategically located and rich in forests, like Cilicia and Cyprus, were often the object of conquest by those who needed to build ships. Colonies were established in forested regions to assure the founding cities' timber supplies. This, together with the presence of gold and silver, was the reason for Athens' founding of Amphipolis in Macedonia on the River Strymon, below heavily wooded mountains, and also for Augustus

Caesar's foundation of Nicopolis (31 BC), a Roman colony in forested Ambracia, in northwestern Greece.

International diplomacy often hinged on obtaining shipbuilding supplies. Pharnabazus, the Persian Satrap of Phrygia (in Asia Minor), helped to sway the course of the Peloponnesian War (431-404 BC) by giving the Spartans access to the forests of Mount Ida and counselling them "not to be discouraged over a lack of ship's timber, for there is plenty of that in the King's land."<sup>61</sup> A short-lived treaty between Athens and Perdiccas (d.321 BC) pledged the Macedonian regent to export wood suitable for oars only to Athens, and a later treaty between Amyntas, king of Macedonia, and the Chalcidians required the latter to obtain the king's permission and pay duties to export fir timber for ship's masts (while allowing them to trade less strategic lumber freely).<sup>62</sup>

The realities of warfare forced states to protect their own sources of timber against challengers and to attempt to seize the areas that supplied their enemies. The Etruscans, who were exploiting the forests of Corsica, thwarted the attempt of the Phocaeans to found a colony there. As previously indicated, much of the strategy of the Peloponnesian War revolved around timber supplies; the northern campaign of the Spartan general, Brasidas, was intended to cut off Athens' timber supply from that region and direct it to Sparta and her allies. "The Athenians", Thucydides reported, "were greatly alarmed by the capture (424 BC) of Amphipolis. The chief reason was that the city was useful to them for the importation of timber for ship-building."<sup>63</sup> The great extent to which warfare was affected by, and interacted with, the timber supply is quite clear.

## AWARENESS AND RESPONSE—FOREST MANAGEMENT

The importance of timber supply and the effects of deforestation and erosion were evident to ancient observers, since they described and often lamented them. It would seem strange, therefore, if people, both individually and collectively, had not devised means to remedy the problems and mitigate their impact. Indeed they did, and though some of these efforts may seem minor, they had important cumulative results.

We shall begin with the private efforts to conserve forest resources. Agriculture involved the preservation of some forestland and the planting of trees for timber as well as fruit. Greek and Roman farmers did not usually clear all their land. An ideal farm, they reasoned, should be partly wooded and rough; Cato included a woodlot as the seventh of nine requirements for every good farm.<sup>64</sup> Some farm estates in fact contained large forests that supplied wood for construction, manufacture, table food (nuts, wild berries, and honey) and foliage for fodder. The cultivation of forest trees was widespread for all these purposes, and in addition trees were planted to line roads, mark field and property boundaries, and support grapevines. Large-scale afforestation was not unknown in the ancient Mediterranean. Landowners propagated trees by starting seeds or cuttings in nurseries and transplanting the young trees. Pliny the Younger (AD 204

62-113) remarks that the mountain slopes around his villa were "covered with plantations of timber."<sup>65</sup> Willows and other water-loving trees were planted along streams and in swampy ground. Pollarding was a common practice, as was coppice. Cultivated trees were esteemed for the protection they offered from winds; they added so greatly to the value of a property that when Crassus (d. 53 BC) would not sell some large trees with his estate, Domitius refused to buy it, even though he had previously offered a princely sum.<sup>66</sup> It is no wonder that Columella condemned a neighbour who cut down trees near his property line.<sup>67</sup> In addition to timber-producing trees, the Mediterranean peoples planted thousands of crop trees. In the first century BC, Varro asked, "is not Italy so covered with trees that the whole land seems to be an orchard?"<sup>68</sup>

## Attempts at Conservation

As woodlands were removed to make room for cultivation and grazing, birds and animals were killed and their habitat destroyed. Lucretius exhorted, "convert the woods to open harvest fields, kill the wild beasts."<sup>69</sup> But there were also some attempts at conservation. Vergil noted that as trees were felled, the birds had no place to nest.<sup>70</sup> Columella remarked that "the task of a good huntsman, tracking his prey in a vast forest, is to catch as many wild beasts as he can, but no blame has ever been attached to anyone if he did not catch them at all."<sup>71</sup> The wealthier landowners limited the process of forest clearance by enclosing tracts of forestland as private hunting reserves and stocking them with deer, boars, and other wild animals. Quintus Hortensius (114-50 BC) had more than 50 jugera (33 acres or 13.3 hectares) enclosed within a wall.<sup>72</sup> Others maintained artificial parks, planted trees of many species together in studied disorder to make an artificial wilderness, or imported exotic trees. How far all these efforts contributed to the development of forest management is unclear, but they do indicate an appreciation for trees inconsistent with thoughtless forest destruction.

## The Protection of Sacred Groves

A practice that averted deforestation to some extent was the protection of sacred groves. This involved both individuals and government, since many such groves were first set aside by private landowners and later given legal protection by local governments. Thus a pious appreciation for trees was enforced by laws carrying penalties that were by no means negligible. The multifaceted association of gods with trees and forests was so intimate that a particularly impressive grove of trees might prompt an ancient observer to exclaim, "There's a god in there!"<sup>73</sup> At Dodona and elsewhere the god's voice was heard in the rustling of leaves. Groves were places of worship; the temple buildings that were erected in them later were at first simply protective shelters for the images of the gods, while the altars remained outdoors under the trees. Sacred groves were carefully demarcated and consecrated. The earliest were tracts of virgin forest, although later many were special plantings. To the ancient sacred groves were added new zones to honour living emperor-gods, such as those Claudius (10 BC-AD 54) permitted in Egypt.<sup>74</sup> Some were quite large; one at Daphne in Syria was ten miles in circumference. As a result of the protection given to them, the individual trees often reached remarkable size; an oak



at Corne reached fourteen feet in circumference, and the high cypresses of Psophis "overshadowed a mountain."<sup>75</sup>

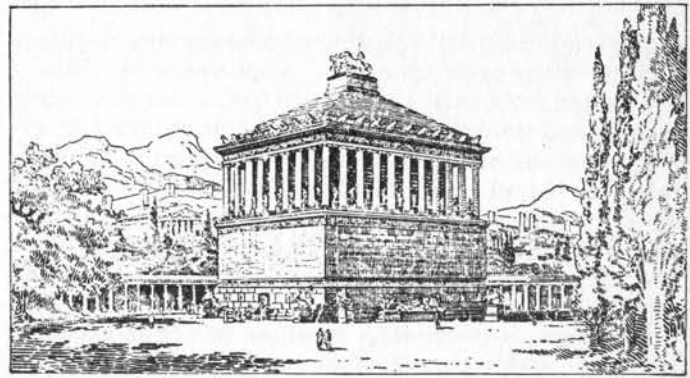
The rules to prevent injuries to sacred groves were many: almost any act producing environmental change was forbidden, although rules varied considerably from place to place. The most serious sanction prohibited felling trees, breaking or cutting branches, and setting fires. Removal of dead wood and stripping for fodder was likewise forbidden. Tilling the soil and sowing grain were prohibited, and in some groves no iron object such as an axe or saw could be introduced. Generally, no animals could be brought in, except for sacrifice.

Sacred groves were protected by local magistrates who had jurisdiction over religious matters; in Athens it was the *archon* called the *basileus* (king). The priest of the grove, or indeed any witness, was expected to report infractions to the appropriate official, and there were penalties for witnesses who failed to do so. Penalties for desecrating the groves were moderately severe; slaves or aliens might be whipped (Plato additionally recommends imprisonment), and citizens were generally fined an amount sufficient to deter any attempt to make illegal profits from the groves.<sup>76</sup> Sometimes mandatory sacrifices were assessed, amounting to not inconsiderable fines in themselves.

To these legal penalties were added ritual curses and the far more intimidating imprecations that were believed to be hurled by the outraged gods and goddesses to whom the groves were sacred. Individual trees were inhabited by nymphs and dryads. Each of these dryads was believed to live only as long as her tree and to die when it was cut down. Anyone who ignored the pleas of a dryad and felled her tree risked terrible retribution. Erysichthon was stricken with hunger that could never be satisfied—perhaps a uniquely appropriate punishment for one who wantonly destroyed trees.<sup>77</sup>

While religion threatened penalties, it also offered expiation in the form of prayers, sacrifices, and acts of restitution. The replanting of trees in a sacred grove, whether they had succumbed to decay, lightning, or the woodsman's axe, was regarded as a religious duty and was specifically required in the rules of the Arval Brethren. It was also written into leases. As a means of maintaining sacred places, such expiation is to be commended, but often it appears that prayers and sacrifices only eased the consciences of those who found it expedient to use the groves for their own purposes. Cato advises the sacrifice of a pig with an all-purpose prayer in order to obtain permission from a god or goddess to cut wood or to till the earth in a sacred grove.<sup>78</sup> Felling timber in a grove for a sufficiently religious purpose was also allowed—with the proper sacrifice. A tall cypress, taken from the precinct of Apollo on Carpathos, was sent to Athens to use in the rebuilding of the temple of Athena, and the Athenians were grateful enough to put up an inscription honouring their benefactors.<sup>79</sup>

Sacred groves near populated centres were used for many purposes other than those that might be considered religious in modern times. In addition to temples, they might contain baths, spring houses, arenas, gymnasiums, exercising grounds, schools, and the ancient equivalents of hospitals. In Greek and Roman eyes each of these had a religious purpose, although they could not have enhanced the sylvan



qualities of the groves. Other uses could hardly be called sacred. Groves were evidently rented out to private entrepreneurs. We hear complaints that in Rome sacred precincts were rented out to foreign squatters.<sup>80</sup> It seems clear that although some religious attitudes and practices tended to preserve certain designated woodlands and individual trees, others weakened this effect.

### Deforestation and the Government

There were numerous public efforts to control the use of forests, assure the water supply, and mitigate the effects of erosion. Because of the great military and economic importance of timber, forests were considered a proper area of concern for governments. Government supervision of forests and watersheds was relatively widespread, involving regulation of the forest products trade, of the timber harvested, and of land use, as well as the construction of works to provide and control water supply and drainage. Responsibility for these matters was delegated to certain government officials; in some cities, for example, the timber trade was under *agoranomoi* (overseers of commerce), while forestland in the countryside was supervised by *hyloroi* (custodians of forests) who, Aristotle (384-322 BC) says, had "guard-posts and mess-rooms for patrol duty."<sup>81</sup>

It was a recurrent policy of Greek and Roman governments to encourage private exploitation of forests by leasing the right to cut trees on public land, (probably a lucrative source of revenue), or by outright sale or grant of public forestland to private individuals or consortiums. During the Hellenic settlement of Cyprus, says Eratosthenes (275-195 BC), rulers wished to open to cultivation land that was thickly overgrown with trees, so "they permitted anyone who wished, or was able, to cut the timber and to keep the land thus cleared as his own property, and exempt from taxes."<sup>82</sup> Rome also sponsored the clearing of land and the cultivation of wasteland by granting title to it. Forestland in the city of Rome was turned into a residential subdivision for the plebeians by the tribune Icilius.<sup>83</sup> It was Roman practice to rent huge tracts of woodlands for development to syndicates of *equites*, citizens of second-highest rank who were usually businessmen. There is evidence from the late Empire that forestland belonging to the emperor was regularly sold to private owners who would clear the land, pay taxes on it, and provide other services, either as regular obligations or as liturgies—supposed "free gifts". These could include payments in kind of lumber, charcoal, burnt lime for mortar and fertilizer, and wood for weapons.

While governments in this manner encouraged deforestation, they were not unaware of the danger of a diminishing supply of wood, and they also sometimes

regulated private land so as to encourage conservation. Plato's recommendation that landowners be fined if fire spread from their property to the timber of a neighbour's land doubtless represented actual Greek law.<sup>84</sup> Published decrees of Ptolemy Euergetes (d. 221 BC), ruler of Egypt, prohibited unauthorized cutting of wood by private individuals on their own land and required the planting of trees.<sup>85</sup> Land leases elsewhere also contained restrictions on timber cutting and stipulations for replanting.

Government ownership, whether by the monarch or by the sovereign people, of all unoccupied forestland as well as the forests of conquered provinces was universally assumed. Although such lands were often granted to individuals or communities, large tracts remained in governmental hands, and measures were taken, albeit sporadically, to prevent encroachment and assure their use for the good of the state. When Scipio (185-129 BC) needed fir trees to make masts for the fleet he used against Carthage, he found them in "forests belonging to the State."<sup>86</sup> Wise administrators limited timber harvest; Theophrastus says that in Cyprus, "the kings used not to cut the trees . . . because they took great care of them and managed them."<sup>87</sup> He goes on to note that later rulers of the island reaped the benefit of their predecessors' restraint; Demetrius Poliorcetes (377-283 BC) cut timber of marvellous length there for his ships.

### Tree Plantation Schemes

Tree plantations were encouraged by some governments. Egypt, where the need for wood was particularly acute, is a case in point. Michael Rostovtzeff sifted the evidence on the Ptolemaic period found in the papyri and discovered a nationwide tree-planting project covering wasteland, private land, royal estates, and the banks of rivers and canals.<sup>88</sup> Trees were started in government nurseries. Plantations were protected by laws regulating the felling of older trees, the lopping of branches, and the removal of fallen trees. Sheep and goats were excluded from areas where young trees had been planted.

Parks with groves of trees in them, called *paradises*, were a tradition perpetuated by Persian kings and adopted by other monarchs. Theophrastus says that the *paradises* in Syria protected especially fine, large Lebanon cedars.<sup>89</sup> Exotic trees imported and planted in these arboreta were more than curiosities: Apollonius advised Zeno to plant three hundred fir trees in the *paradise* at Philadelphia, "for the tree has a striking appearance and will be of service to the king."<sup>90</sup> By service, he no doubt meant that they would eventually be felled for timber. Hadrian (AD 76-138) demarcated large areas of strictly protected state forest in Lebanon; his inscribed boundary markers listing the protected species remain today in the midst of a treeless, eroded wilderness.

The state should take measures to keep water pure and regulate its supply from the hills, advises Plato in the *Laws*, and the abundant archaeological evidence of dams, tunnels, aqueducts, tanks, terraces, and drainage canals all around the Mediterranean basin reveals the scale of the effort to make maximum use of available water, direct its supply, and protect against drought, flood, and erosion.<sup>91</sup> Roman dams and canals in North Africa and Syria stand in dry *wadis* today as witness to the fact that destruction of the vegetation and consequent dessication have changed the environ-

ment and that the extension of Roman *limes* (areas of settlement) far into water-deficient regions depended upon the efficient use of available supplies.

### Religious Sanctions against Environmental Degradation

Literary and archaeological evidence reveals that both the Greeks and Romans were pragmatic people who approached environmental problems in a rational, commonsense way. Their traditional religions taught them to stand in awe of nature and interfere as little as possible in natural processes. Although these sanctions lost their original force over time, the best insight of traditional religion was later couched in the language of Greek rationalism, as was expressed succinctly by the practical philosopher Xenophon (430-355 BC): "The earth willingly teaches righteousness to those who can learn; for the better she is served, the more good things she gives in return."<sup>92</sup> The converse thesis, that a mistreated earth will take vengeance on mankind, was also pronounced by ancient writers. Thus the *do ut des* of the archaic prayers—"I will give to you so you will give to me"—became the "cause and effect" of philosophers and agricultural writers.

### Lack of Ecological Insight

There was, however, an incomplete understanding as to how to realize such ideals. The Romans in particular came to have complete faith in their ability to maintain their environment. Their sense of mastery over, yet responsibility for, the environment is epitomized by Cicero (106-43 BC):

We are the absolute masters of what the earth produces  
We enjoy the mountains and the plains,  
The rivers are ours, we sow the seed and plant the trees.  
We fertilize the earth . . . we stop, direct, and turn the rivers,  
in short by our hands we endeavour, by our various operations on this world, to make, as it were, another nature.<sup>93</sup>

Greeks and Romans knew how to farm, fertilize, rotate crops, grow trees, and terrace hillsides to prevent erosion. But they had no concept of an ecosystem nor of the possible effects of human interference in one aspect of the natural environment upon seemingly distant and unrelated matters. This is perhaps to state the case too bleakly, for there were classical thinkers who were aware of ecological interdependencies. Some of the early naturalists proclaimed philosophical principles that could have served as the foundation of ecological science, but they were only beginnings.<sup>94</sup> Although supported by extensive observations, theories about the interconnectedness of the natural world must have been considered speculative by the vast majority of the men who made government decisions in classical times.

A Roman consul who directed the construction of an aqueduct thought only of supplying potable water to the city, ignoring the possible effect on streamside ecosystems below the point of diversion. The *aedile* who issued a license to an equestrian consortium to strip the trees from some watershed did not consider whether the water in the aqueduct would become



muddy or its flow less dependable. When the same *aedile* depleted North Africa of its lions for the arena, it never crossed his mind that, in the absence of predators, wild goats might strip the vegetative cover from hillsides on the margin of the Sahara. This is not to condemn the Romans but simply to point out their lack of some ecological insights that, due to the advance of research in modern times, we take for granted.

### Degradation and Collapse

The Romans were premier engineers and agriculturalists who were fully capable of maintaining the complex structures they had erected, but their efforts often dealt with the symptoms rather than the roots of the problem. During the last days of the Empire and the regimes that followed, the centralized administration necessary to keep the system working fell into decline, and the system collapsed. The eventual result is the North African and Near Eastern environment of the present day.

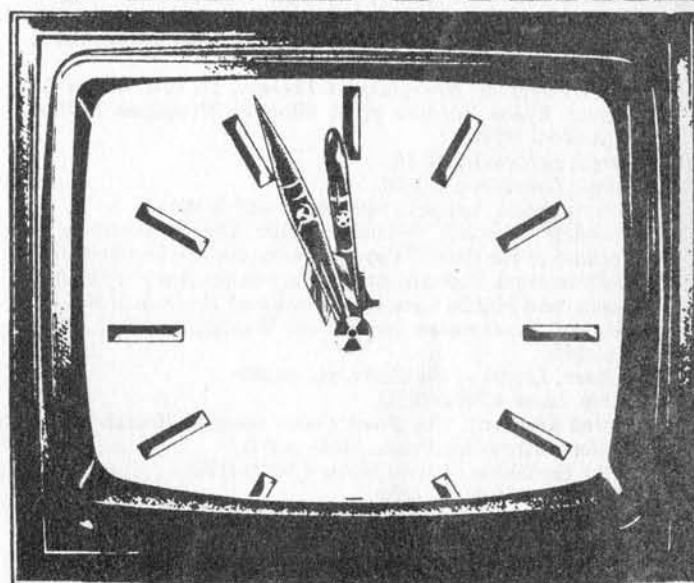
In all fairness to the Greek and Roman agricultural engineers, the constant warfare that, except for a few happy decades, afflicted the Mediterranean world also contributed to instability. The works constructed to prevent erosion and carry water—terracing in particular—were monumental, extensive, and in terms of human labour, very expensive to maintain. Yet taxation was directed toward supporting armies, not farmers. Moreover, frequent wars and military campaigns conscripted farmers, and casualties decimated the countryside. Deliberate destruction occurred over and above the fact that hostilities disrupted normal work. When maintenance was neglected, terraces collapsed and irrigation channels became clogged with silt. Erosion, in fact, can be correlated with periods of widespread war, breakdown of government, and social dislocation.<sup>95</sup>

### CONCLUSION

In retrospect, let us consider the role of deforestation and erosion in the decline of ancient civilization. Did the destruction of the Mediterranean forest and related soil erosion make it impossible for the classical cities and nations to continue? Were the forests of the Mediterranean basin devegetated and denuded by the end of the classical period? Scholars have differing views on the matter, and the present state of knowledge leaves the question open, particularly in view of the historians' limited sources and consequent inability to quantify many crucial points. Moreover, since so many interconnected factors were at work in the fall of Greece and Rome, it is difficult to isolate any single development. The ecologist, used to thinking in terms of systems and synergies, can sympathize with the historian at this point.

But we have examined sufficient evidence to document several forms of environmental deterioration and to make a preliminary judgement that the ancients who described deforestation and erosion as a serious problem were correct. Although the extent of those problems is unclear, they undoubtedly contributed, at least locally, to the problems that led to the political and economic demise of the ancient world.

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# TRADITIONAL AGRICULTURE IN SRI LANKA

**Edward Goldsmith interviews Mudiyanse Tenakoon**

Traditional agriculture in the Third World is frequently dismissed as primitive and unproductive. In fact, it offers the best hope for the future.

Tenakoon is a prophet, a prophet of traditional rural life in Sri Lanka. He is also a farmer and lives in a small village in the northern part of the island. In recent years he has become quite well known among those people who recognise the destructiveness and counter-productiveness of the modern system of intensive agriculture which the international institutions—FAO and the World Bank in particular—are imposing on Sri Lanka.

I was taken to see him by two people who fall into this category, both extremely interesting and knowledgeable men; Upalli Senanayake, a member of one of the most influential families of the land (his uncle was Dudley Senanayake the first prime minister); and Gunasekara, a civil servant who devotes his spare time to studying traditional life in Sri Lanka. I have reconstructed our conversations from my notes.

**Goldsmith:** *What is the size of the average farm in this area?*

**Tenakoon:** The average family has less than two acres of land. The richest farmers have no more than five acres. I personally have an acre of paddy plus a garden.

**Goldsmith:** *Are you self-sufficient?*

**Tenakoon:** I am afraid not. In my father's day we were very much more so. Today I must buy kerosene for our lamps as well as salt and also clothes.

**Goldsmith:** *Did you never produce these things yourself?*

**Tenakoon:** My grandmother used to make her own clothes and those of her family too. We grew cotton in the Chena—the wooded area behind the village used for slash and burn cultivation. We still do. Moreover, in

the past there was no need for kerosene as we produced our own Mee oil, extracted from the nuts of the Mee tree (Kaly).

**Goldsmith:** *Did you use Mee oil for cooking as well?*

**Tenakoon:** Yes and also for medicinal purposes. We also used coconut oil.

**Goldsmith:** *Did you have traditional bartering arrangements with local artisans as they do in India?*

**Tenakoon:** Yes, ten years ago there was both a potter and a blacksmith in the village. We provided them with food in exchange for pots and tools; now we must buy these things from a store in the town. But we don't get the clay pots any more and they were very useful.

**Goldsmith:** *What use did you put them to in particular?*

**Tenakoon:** Among other things they were used for storing water. We used to fill them with the chaff from the paddy, burn it, leave the cinders there for a few hours, and then wash them out and fill the pot with water. This kept the water cool.

**Goldsmith:** *That is remarkable; was this sort of knowledge handed down to you from father to son?*

**Tenakoon:** Of course. Every farmer is a researcher and a teacher otherwise he could not be a farmer.

**Goldsmith:** *How many varieties of rice did you use to grow here?*

**Senanayake:** At one time 280 varieties were cultivated in Sri Lanka. Only 15-20 are left. As a result of government policies the others have become extinct.\*

**Tenakoon:** I can remember 123 varieties of red rice; now only three or four remain.

**Goldsmith:** *In what way did these varieties differ from each other?*

\*According to C. Driberg, (superintendent of school gardens quoted in C. Wright, *Glimpses of Ceylon*) 1974 three to four hundred varieties of rice were once cultivated.

**Tenakoon:** First of all, we needed different varieties for the two growing seasons—the Maha season associated with the North-East monsoon and the Yala season associated with the South-West monsoon.

During the Maha season we planted what we call the “four month” varieties. As their name indicates, they take four months to grow. During the Yala season we planted “three month” varieties. Among the Maha varieties, I can remember Murungakayam, which was brown and white, Wella illangaliya, Hondarawala, Gangala and Beruwee. Among the “three month” varieties I can remember, Heenati, Dahanala, Kokkali, Kanni Murunga, Pachha perumal, Kuru wee and Suvandel. We also grew Mawee, a “six to eight” month variety.

**Goldsmith:** *What was this for?*

**Tenakoon:** It was for the priests. Buddhist priests don't eat after noon so they need very nutritious food to sustain them until the next morning. Mawee is very nutritious; it has a high protein content and that is why we grew it.

**Goldsmith:** *How about the other varieties?*

**Tenakoon:** We grew Heenati for lactating mothers as it makes them produce more milk and also better milk with a high fat and sugar content. We tried to grow it during both seasons. Kanni murunga we grew for the men going out to work in the paddy fields. It gave them energy as it contained a lot of carbohydrates. It was also used for making milk rice for traditional ceremonies. Suvandel, we grew because of its extraordinary fragrance.

Some of these varieties were specially used when there was a lot of water in the paddy fields; others when there was little water. The former we refer to as ‘Goodel’ (or ‘Goda’), the latter as ‘Madawee’ (or ‘Alwee’). Some varieties were grown when the fields were particularly muddy; some were more suitable to grow on high ground where there was less mud. Some of the varieties required very rich soil; others would do well in the poorest of soils. Some

were more resistant than others to the paddy bug and we planted them, rather than other more desirable varieties, when traditional means of controlling the bugs failed.

**Goldsmith:** *What were the traditional methods of controlling the paddy bug and other pests?*

**Tenakoon:** Pests were very much less of a problem than they are today. For one thing, the traditional varieties of paddy had long stems so they blew in the wind which made it very difficult for the insects to land

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**“Peasants are too wise to believe Western scientists who try to sell them ‘miracle’ strains of rice”.**

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on them. The Hybrid varieties of today are short-stemmed and much more rigid—which makes it much easier for bugs in general. Also the traditional, as opposed to the new, varieties of rice had big droopy leaves which shaded the soil underneath and prevented weeds from growing through. The paddy particularly needs protection from insects during one short critical period in its growth, about two weeks. During this period, the whole family would be on the alert and ready to step in and deal with any emergency; this was essential for protecting our crops. One thing that we always did during this critical period was to pour cactus milk (daluk) into the inlet to the paddy field. This was very effective in keeping away certain insects.

If the paddy plants turned yellow, we would bury bamboo leaves in the inlets until the grain began to form, at this stage the grain would be fairly liquid. To protect it from insects we would obtain the discarded robes of the Buddhist priests, and make wicks out of them by soaking them in coconut oil. They would then be lit and placed in different parts of the paddy fields; because of the bright yellow vegetable dye that the robes contain—

they burn with a bright light and at the same time emit a very strong smell which repels any insect pests. Another device that we used was to crush up leaves of a certain creeper that grows here into a juice which we then poured in the water at the inlet to the paddy field. The juice would float and settle around the plants. It had the effect of killing the godewella worms that eat the paddy during the two critical weeks.

We also used to put dried Makra leaves and stack them in the four corners of the field. We would plant the branches of the Kadura tree at the four corners of the field; they were used as supports for coconut lamps which would attract the bugs away from the paddy field. We would be very careful to plant the seeds at the most auspicious time from the astrological point of view. I am sure that this also helped to reduce pest infestations.

Another thing we did was to collect sand from the river beds and sprinkle it over the paddy fields and irrigation channels; this I am sure was also effective. We would also make long ropes which we impregnated with a very sticky substance derived from the Jak fruit; the children would drag the ropes across the fields and the bugs in the paddy would get stuck to them. Alternatively, we would tie a lot of rags on to a long bit of string and impregnate the rags with a resin called ‘dummala’. Once more these would be dragged through the paddy fields. The children would also sweep the paddy field with a special tool (the pinovia) removing any bugs that might be on the surface of the water.

**Senanayake:** All this gives an idea of the cooperation required from all the members of the family for this highly sophisticated type of agriculture to be possible. Once the family unit breaks down under the impact of development, there is no way in which it can be practised—one can only then resort to the highly destructive modern agriculture practised in the West.

**Tenakoon:** That is right.

**Goldsmith:** *Do you use biological controls as we refer to them in the West?*



**Tenakoon:** Yes, indeed. One of the most effective ways of controlling the paddy bug was to crush coconut refuse and spread it in each corner of the paddy field. This would attract a grey brown bird called the Demalichch or seven sisters. This bird would come to feed on the crushed coconut and at the same time would eat any paddy bugs that happened to be around. It would also eat the Godewella worms that feed on the paddy plant especially during the two week period.

**Goldsmith:** *Were there any traditional rituals for controlling pests?*

**Tenakoon:** There was a ritual that involved boiling milk and allowing it to overflow. It was called 'kiriturunewa' which literally means "the milk flows over the pot". It was considered very effective against the brown hopper—an important pest of the paddy plant. Another ritual consisted of planting a specially decorated stick in the middle of the paddy field which was considered very effective in repelling insect pests.

**Goldsmith:** *How about rodents? Were they a problem in the old days?*

**Tenakoon:** To control rats we would bury four pieces of root taken from the eastern side of the mee tree and burn them in the four corners of the paddy field. The rats as a result rarely entered the field.

**Goldsmith:** *How about birds?*

**Tenakoon:** These were very much under control for we would grow rice specially for them in small sections at the end of each paddy field which were called 'kurulu paluwa'.

**Goldsmith:** *But how did the birds know that this rice was theirs rather than the rice grown in the rest of the paddy fields?*

**Tenakoon:** We have been doing this for thousands of years. The birds have had ample time to learn which was their paddy and which was ours; they rarely trespassed on to our part

of the paddy fields unless of course they were invited to do so to eat the paddy bug of the godewella worm—and besides, if they did so, they would be chased away by the children.

**Senanayake:** There is no magical way of controlling pests. Our peasants are too wise to believe western scientists who try to sell them 'miracle' strains of rice and 'miracle' chemicals that are supposed to eliminate all pests. The pests of the paddy will be around long after western scientists have

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**"We grew special plots of rice for the birds . . . That way they left our paddy alone."**

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gone, long after industrial society has collapsed. The truth is that we must learn to live with them and reduce their depredations by a vast variety of different ways—each one of which by itself may make but a small contribution. This is only possible of course when the knowledge required for doing so is handed down from father to son which it cannot be when children are sent to urban schools and imbued with all your western scientific superstitions. It is also only possible when there is the full cooperation from all the members of a family—cooperation which can never be achieved when employees have to be paid for every hour of work they do.

**Goldsmith:** *How did you assure the fertility of the paddy fields?*

**Tenakoon:** Again we used a lot of different methods. One was to plant the Mee tree in the paddy fields. The Mee is a leguminous tree, which means that the bacteria on its roots fixes nitrogen, and we used to grow about eight of them to the acre. Its leaves also contain a lot of nitrogen, as must the litter that accumulates under it. Also, and this you will find particularly interesting, the fruit of the Mee tree is much appreciated by

fruit bats which used to congregate on the trees in vast numbers when the fruits were ripe; the bats' droppings (which are particularly rich in nitrogen) were thus an important source of fertilizer. We also obtained nitrogen by sowing the paddy before the first rains (Akwassa). As you know, these rains contain a lot of nitrogen.

We would also encourage the growth of many leguminous weeds on the paddy fields between harvests in particular those we refer to as Thora, Andana, Hiriya, Nidikumba and Pila. They would grow wild on the 'pillewas'—the small areas of wilderness that lie above and on either side of the paddy field. We did not cultivate these areas because it was from there that the seeds of the leguminous weeds were derived. It was also there that the buffalos used for ploughing the paddy fields would rest, and the dung that they produced would be washed off by the rains into the paddy fields beneath. This too added to their fertility. It was also behind the bushes that grew on the 'pillewas' that we would defecate and urinate. This provided yet another contribution to the fertility of the soil. Today, of course, with modern development the 'pillewas' have been ploughed up so as to increase the area under paddy—the result is bound to be a reduction in soil fertility.

Also, as I have already mentioned, traditional varieties of paddy had long stems so there is very much more straw to return to the fields than there is today with the short-stem varieties.

Equally important, behind each village there used to be considerable expanses of jungle. It is from there that was derived the water that flowed into the 'tanks'\* and which was used for flooding the fields. It was not only water that the jungle provided but also jungle soil that was highly fertile and that flowed into our fields whenever they were flooded.

It was by using all these methods that we retained the fertility of our

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\*The term tank derives from the Portuguese Tanque and is used in Sri Lanka to refer to artificial ponds and reservoirs which play a critical role in their traditional agriculture.



N. Hildyard

## Paradise Destroyed?

No two men could hold more different visions of the future than Mudiyanse Tenakoon and Sri Lanka's President Jayawardene. And nothing could illustrate the differences better than their respective attitudes to building. Thus, Tenakoon refuses to live in a modern house because concrete blocks, unlike wattle and daub, do not benefit the soil when they collapse. Jayawardene, on the other hand, has commissioned a new capital city to be built on a site named (entirely by coincidence, of course) Jayawardanepur. Clearly the President believes the city—not the traditional village house—should be the symbol of the new Sri Lanka.

Behind Jayawardene's 'vision' lies the conviction that development will only come to Sri Lanka through an export-led economy where market forces can operate unfettered by financial and bureaucratic controls. The backbone of his policy is formed by two major projects: the setting up of a Free Trade Zone (FTZ) at Katunayake, just outside Colombo; and the Mahaweli Development Programme, a massive irrigation and hydro-electric scheme covering almost 40 per cent of the island and involving four major dams. Both projects are already financial, social and ecological disasters.

Jayawardene's 'back to capitalism' philosophy is founded on an interpretation of Adam Smith that even the most fervent monetarists might find embarrassing. De-

fending his FTZ policy, for instance, he told the Sri Lankan Parliament: "I want to say quite frankly that the (FTZ zone) will be like the 'Robber Baron' areas set up in America, Japan and Britain before the industrial revolution. Let them fight each other, compete with each other, destroy each other and let the fittest survive—all for the benefit of Sri Lanka."

But Sri Lanka has not benefited. In the main, those who have taken advantage of the Government's unprecedented tax incentives to set up shop in the FTZ are clothing manufacturers. The net result is that Sri Lanka's own textile industry—and in particular the village based handloom societies—have been all but eliminated.

As for those who work in the FTZ, their lives can hardly be said to have been improved by the scheme. Recruited on a 'hire and fire' basis, they have no job security, are paid pitifully low wages, and are virtually forbidden to strike. Moreover they are subject to the most demeaning working conditions: at one factory, there were just four lavatories for a workforce of 700 people—and it was forbidden to use the lavatory except in a half hour lunch-break.

But it is Sri Lanka's 'win or lose' commitment to the Mahaweli Development Programme that has come in for the most criticism—with even the World Bank labelling the project 'overambitious' and 'a high-risk strategy'. At the root of the problem, says the Bank, lies Jayawardene's 1977 decision to abandon the previous government's step by step approach to the

Erosion is severe due to deforestation.

land. They must have worked—or we would no longer be cultivating this land.

**Goldsmith:** *Have you tried to use artificial fertilizer?*

**Tenakoon:** Yes, I have to because for the last few years I have been growing the hybrid rice that requires fertilizer.

**Goldsmith:** *What effect does it have on the rice?*

**Tenakoon:** It weakens the paddy-plants and the insects build up so we must use more and more pesticides.

**Goldsmith:** *In general did you produce more paddy than you do today?*

**Tenakoon:** I have one acre of paddy. In a very good year it produces one hundred bushels—which is a lot. My family needs seventy-five bushels a year so in a good year I have a surplus. The trouble is one needs a bigger and bigger surplus to live on because we are becoming ever less

self-sufficient. Perhaps my father produced less paddy than I did but he needed less. Also he could be sure of producing enough for his needs each year because he planted so many varieties; some always grew well whatever the problems we encountered in a particular year. Each one of these varieties was less vulnerable to severe conditions than is the hybrid variety we use today. This simply dies when there is a drought and we are getting worse droughts every year, as everybody knows, because they have cut down the jungle. Another problem is that the hybrid paddy does not keep. If you try to store it it gets mouldy in a couple of months.

**Goldsmith:** *How long did the traditional varieties keep?*

**Tenakoon:** For at least three years.

**Gunasekara:** I remember my father cursing my mother for cooking new rice in the home when there was still three year old rice in the storage house. I think that the method of storage was also important. The rice

was stored in large earthenware pots which were put on a stand so that the rats couldn't get into them. The earthenware is porous so that the rice remained aerated and cool. Also, the pot was lined with layers of lime leaves and also *kara* leaves which would serve to repel possible insect pests.

**Goldsmith:** *I am sure the reason why modern hybrids do not store well is that their water content is much higher. If you use artificial fertilizer, the weight of your produce increases but this is largely due to its water content. If you dry the produce you find that the weight is very much the same as it was without the use of fertilizer. In Europe, two studies have shown that storage problems in the third world are largely due to this increased water content. One of these studies was done at Sussex University by the Institute of Development, the other by UNEP.*

**Tenakoon:** In any case the hybrid wheat has no taste, the flour we make from it tastes like wheat flour.



scheme, which would have seen the project completed in thirty years. Instead, Jayawardene's United National Party decided to 'take time by the forelock' and opted for an 'accelerated' programme, aiming for completion within six years. That decision, says the World Bank, was 'bound to place an enormous strain on physical and financial resources'—so much so that the scheme now poses a threat 'to macro-economic stability'. Indeed, the Sri Lankan Government is even now seeking some 280 million dollars (US) to bridge the massive shortfall in foreign finance for the project.

Finances apart, there is also increasing concern over the social and ecological effects of the programme. Some 650,000 acres of forest are being cleared to make way for the project—this in an island whose forest cover, according to a recent Dutch study, has shrunk from 44 per cent in 1965 to a mere 5 per cent today. Such deforestation is likely to reduce greatly the flow of the Mahaweli River during the dry season and, thus, lead to salinisation of downstream areas due to the encroachment of seawater. During the monsoons, however, flash floods are likely to be the order of the day—bringing with them severe erosion and the almost inevitable silting-up of the dam reservoirs.

Ironically, deforestation is already causing climatic changes which could undermine the whole purpose of the programme. Rain which used to fall between Sri Lanka's two monsoons no longer does so: "Since the monsoonal pattern in the country has

been very erratic over the years, the whole basis of the project to be able first to receive the necessary water and secondly to receive it in time for the two cultivation seasons, is brought sharply into question," says Paulene Doige of *Consulting Engineer*.

Thousands of people are to be resettled but much of the land designated for resettlement is of poor quality, often covered with tough illuk grass (all that survives after the forests have been felled) and increasingly the victim of salinisation. Malnutrition in the Mahaweli area is now significantly higher than the national average (19.6 per cent as opposed to 6.6 per cent) and there are growing signs of social tension. Last year, a drought in H area—one of the first irrigation schemes—brought widespread hunger and angry speculation that the programme is designed less to benefit the rural poor than to provide electricity for the naval port at Trincomalee. Indeed, it has been pointed out that those who are reaping the most obvious rewards from the project are the foreign contractors who are building the dams—an estimated 70 per cent of Sweden's aid, for example, will return to Sweden via the Swedish construction company building the Kotmale dam. In addition, one thousand jobs have been created by the project in Sweden and over 200 Swedes are employed working on the dam.

Clearly it is time for Sri Lankans to abandon Jayawardenepur and return to the values of the traditional village house.

Nicholas Hildyard



K. James

Mee Tree: a symbol of tradition.

For all those reasons and many others I am giving up hybrid rice and intend to cultivate the old varieties again, the trouble is finding the seed but I am getting all the local farmers together so that we can help each other return to the traditional agricultural system.

There is another advantage of the old system; it is that we used to produce all sorts of foods that we cannot produce any more.

**Goldsmith:** Which ones?

**Tenakoon:** To begin with we used to go into the jungle to get many foods such as the Baulu, Weera, Jak fruit, Himbutu, Wood Apple, Wild Pear and Avocado. Now the jungle has been cut down, we no longer have access to these foods. We must try to recreate the jungle.

We also used to obtain a vast variety of fish from the streams, the tanks and the paddy fields when they were flooded. Some of these fish such as the Lula, Kawaiya, the Hadaya and Ara could live in dried up ponds. In this area at least, they have nearly all disappeared, some of them eaten by the Tillapia that have

been brought here from Africa and foisted upon us by the government. The Government insists that Tillapia only eats vegetable matter but this is not true. Others especially those that live in the paddy fields have been poisoned by pesticides. Since there are no longer any fish the larvae of the mosquitoes that transmit malaria can now survive the dry period. As a result malaria has become a lot more serious problem than it was.

The Lula that used to thrive in the tanks was also of great value to us because it favoured the formation of blood. That is why we always fed it to pregnant mothers. There were other fish that we obtained from the tank, the Lorele, the Petiya, the Hirikanaya, the Walaya, the Anda and the Ankutta. The Korale in particular was a very sweet fish. Now we only have the Tillapia; it is not bad but it does not replace all the traditional species, all of which had special uses. Also the Tillapia does not go into the paddy fields, it stays in the tanks. The change has unquestionably impoverished our diet and also our lives.

**Goldsmith:** What other food did you obtain?

**Tenakoon:** We derived a lot of vegetable food from the tanks, for instance Olu rice—the seeds of the Olu plant, a sort of lotus. We also ate the green stems of the Olu. In addition, we grew lotus yams in the tanks and we also made flour from the Kaketi roots that we obtained from the tanks. Nor must we forget the gardens or the 'gevate' that we cultivated there. We grew pawpaw, mangoes, bananas, coconut, jak fruit, pepper vines and some vegetables such as bean grams and bean sprouts. These we still cultivate up to a point but they are not what they used to be.

Nor must we forget the Chena or slash and burn cultivation as it is referred to in the West. It was carried out in the hills behind the village which were not suitable for paddy cultivation. After we had cultivated them for a few years we would abandon them and only return 10-14 years later, by which time the jungle had regrown. Each family would cultivate about half to

one acre which was not private property—cultivation there was in common with other villagers. The main crops we would grow there were millet, Kuruken and other dry grains. In recent years population growth reduced the cycle to 4-5 years which did not fully allow the jungle to recover. In any case today Chena cultivation is discouraged by the government and much of the land once used for this purpose has gone into permanent cultivation for which it is not suited.

**Goldsmith:** *It seems that practically all the traditional foodstuffs also had medicinal uses, did you have any effective traditional cures for malaria?*

**Tenakoon:** A very effective one. We use Banja or Ganja—marijuana as it is usually known. This was one of our most important medicines; it used to be called “the leaf that can win the entire world” so great were its medicinal uses. We used to reduce it to powder and boil it like tea and add jaggery (sugar from the Kittul palm) to it. It was not only effective against malaria but also against worms. We often took it with other foods for it reduced the time it took for them to be absorbed by the blood. Honey has the same effect.

**Gunasekara:** Robert Knox the Englishman who was shipwrecked in Sri Lanka in the 16th century and spent seventeen years here as a prisoner of the king referred to Banja as the cure for malaria in his *Account of Ceylon*. The plant was called “the ruler of the three worlds”.

**Goldsmith:** *Do you still use Banja for medicinal purposes?*

**Tenakoon:** No, today it is banned by the government.

**Goldsmith:** *It is said that you can increase yields by transplanting the paddy plants when they have just sprouted, have you tried to do this?*

**Tenakoon:** The government tries to force us to. They learnt this technique from the Japanese. In many areas of Japan where they grow paddy there is an annual frost which

often lasts as long as three weeks. The plants get damaged if left in the paddy fields. They get round this by broadcasting the seed inside greenhouses where they are protected from the frost. They are then transplanted into the paddy fields. But here we find that the plant after being transplanted is sick, it takes as much as two weeks for it to recover. The only way to get round this is to use artificial fertilizers to give them a fillip and pesticides to protect them in their weakened state against pests. Also the transplantation takes up a lot of time and this interferes with other activities such as Chena cultivation and tank fishing. The government is also very keen that we should have three harvests instead of two which they claim is possible with modern agricultural methods but this takes up a lot of time and interferes with most of other activities—including our social life—besides which it will provide a permanent niche for the brown hopper.

**Goldsmith:** *Have you tried to use a tractor?*

**Tenakoon:** I haven't but many farmers have done so. It is not as good as the buffalo. A pair of buffalos weigh about 2,000 pounds. Their feet are just the right shape for pressing down the soil in the paddy field, which as a result forms a gley or crust which holds the water in. They also stir up the soil above the gley and loosen it.

The buffalo also produces about 1,500 pounds of dung every year and a vast amount of urine both of which contribute very significantly to the fertility of the soil. The tractor on the other hand is much too heavy for the paddy field. Wherever it passes it breaks through the gley and water penetrates into the sub-soil. So if one uses a tractor one requires very much more water and this especially today is unlikely to be available. Also it stirs up the soil. The light organic matter comes to the surface and is lost to the flood water. So its use leads to reduced fertility. Needless to say of course the tractor neither defecates nor urinates, hence makes no contribution to soil fertility. Nor does it produce milk and hence ghee (clarified butter) nor

curd, both of which play a very important part in our diet. Nor, for that matter, does it reproduce itself, when it dies one simply has to buy another tractor.

Of course it saves labour and that is what we are always told, but my profession is agriculture which means that I must be in the fields, that is my life. I don't want to sleep all day nor to spend my time gossiping with my neighbours. In any case what is the point of saving labour in a country which has such high unemployment. In the old days, labour saving devices made still less sense, the family and the community were intact and there were always enough people for the ploughing, the sowing, the harvest and the maintenance of the tanks.

**Senanayake:** If they had not cooperated in this way the tanks would never have been maintained. The civilisations of Anuradapura and Pollonaruwa would never have existed. We would never have been able to sustain a population which was possibly as much as fifteen million people, equal to the present population.

**Goldsmith:** *Isn't the government trying to restore the old irrigation system?*

**Senanayake:** They have restored a number of tanks with World Bank aid but only the big tanks and that is not enough. The big tanks are only of use if the small village tanks are also in use and these have largely silted up. It is the job of the Department of Irrigation to maintain them but they cannot be maintained by a bureaucracy. Once the social structure of the village has collapsed they must inevitably silt up and remain that way. In fact if we wish to restore our traditional agriculture we must first restore the social life and the culture that gave rise to it and without which it cannot be conducted.

**Tenakoon:** I fully agree. It is not the tanks that must be restored but the whole system of tank cultivation—and this cannot be done by bureaucrats. We used to have five different types of tanks. First of all there was the forest tank which was dug in the



jungle above the village; it was not for irrigation but to provide drinking water for the wild animals that live in the jungle. They knew it was for them, they had thousands of years to learn this, so they do not come to the village in search of water and interfere with our agricultural activities.

The second sort of tank was the mountain tank. There were no canals running from it, its purpose was to provide water for Chena cultivation.

The third sort of tank was the erosion control tank known as the 'Pota Wetiye'. We used to have several of those and the silt would accumulate in them before it could build up in the storage tank. They were so designed as to be easily desilted.

The fourth was the storage tank. There were usually two of them. They were known as the twin-tanks. They were used in turn. One was in use while the other was being maintained. These were connected to a large number of village tanks which they fed and which fed them too with their overflow.

**Senanayake:** These tanks played an essential part in the traditional rural life. One could not imagine a village in the dry zone without a tank any more than one could imagine it without a temple or rice paddy. In fact the three basic constituents of the village were the temple (*dagoba*), the rice paddy (*cumbura*) and the tank (*wewa*). Of course there were other important constituents as Tenakoon has told you. The jungle above, the garden and the scrub where the Chena cultivation took place.

**Tenakoon:** Absolutely.

**Goldsmith:** *What did the old traditional village look like?*

**Tenakoon:** The houses were built very close together. In this way they occupied the minimum amount of precious land. This arrangement favoured the essential cooperation among the villagers. For instance, one woman could look after the children of a number of neighbours at the same time which is important when the maximum number of

people are required in the fields to harvest the crops or maintain the tanks.

**Goldsmith:** *How was the maintenance of the tanks organised?*

**Tenakoon:** It was part of the Rajakari service that was owed to the king. Everybody had to provide this service forty days of it a year. It was not for the purpose of serving his personal whims or caprices. It was work that had to be done in the interests of the whole community.

**Gunsekara:** Indeed one of our Kings tried to get the people to desilt the artificial lake in front of his palace in Kandy as part of their Rajakari work, they refused to do so saying that this was not community work. It was his personal responsibility and he had to arrange for it separately.

**Senanayake:** Of course the British misunderstood the whole principle of Rajakari, they thought it was abusive, a relic of Kandy's feudal past and they abolished it. This was

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one of the most destructive things the British ever did. It destroyed the very principle of cooperation in this country. Fortunately it did not destroy it completely, it lingered on in a somewhat rudimentary form. The villagers still worked fourteen days each year for the common good, a practice that was finally stopped in 1970 by the Irrigation Department. Bureaucrats will not tolerate any co-operative work by villagers. It reduces the demand for its services. If the Rajakari system were still functioning there would be no need for the bureaucrats of the irrigation department. Of course, now that it is their responsibility to maintain the tanks they do nothing about it.

**Tenakoon:** "What was everybody's business had become nobody's business."\*

**Goldsmith:** *I take it from all you have told me that you reject outright the whole package of western technological agriculture?*

**Tenakoon:** I do.

**Goldsmith:** *You would prefer to be a traditional farmer of the old school?*

**Tenakoon:** I would, but everything is done to make this as difficult as possible. In the eyes of officialdom I am a pauper because I am a "subsistence agriculturalist". I am uneducated because I have not been subjected to western education. All my knowledge, in particular the traditions and culture of my people counts for nought. I am even considered unemployed because I am not part of the formal economy. I make little contribution to the workings of the market. I have even been told that I am a beggar.

**Senanayake:** All this will change soon, you will be the model and our youth will flock here to learn our traditions from you. This must be so because current trends cannot be sustained. The problem has got out of hand. The jungle has been everywhere cut down to make way for plantations. As a result there has been vastly increased erosion and the tanks have silted up at an unprecedented rate. There is no longer anybody to maintain the anti-

erosion tanks, the twin tanks or the village tanks. In some villages the tanks are completely silted up. Elsewhere they are half silted up. In the meantime everybody is moving to the towns and the cities. Colombo now has vast slums which did not exist a decade ago. If current trends continue Colombo will soon look like Calcutta. People are becoming to depend more and more on the formal economy for their food and its price is going up by leaps and bounds. The government is not interested in feeding the people, if it were it would not use half our land in the wet zone to produce cash crops for export. Nor would it be building the vast complex of dams that make up the Mahaweli scheme. It would restore instead the agricultural system of the past. This of course it cannot do without abandoning its present priorities—development in particular. The attempt to transform this country into a tropical version of a western industrial nation is suicidal—it can only lead to ever greater malnutrition and indeed famine. And all this in Sri Lanka which should be, as it has been in the past, a "land of milk and honey".

\*A comment made by a British official at a Select Committee set up by the British Parliament in 1849 to consider these matters.

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# THE REAL REGIONS OF FRANCE

Yann Brekilien

(Translated by Marcelle Papworth)

The idea of a 'Europe of the Regions' is being promoted by Ecoropa — the European Group for Ecological Action — as a first step towards decentralisation. The political aspirations and the cultural reality of the regions must be recognised. But what are the regions of Europe? In this article, the first of an occasional series, we consider the case of France.

It is often said that the great charm of France lies in the striking diversity of its climates, topography and vegetation, but no less striking is the diversity of its people, and usually one is able to distinguish an Alsatian, an Auvergnat, a Breton, a Provençal, a Corsican or a Basque at first glance. One finds quite different life styles in Savoy, in Normandy, in the Bordeaux region and so on. Despite the standardizing effect of the education system, different cultures have managed to survive and, even now, nine main languages and numerous dialects and patois continue to be spoken.

That diversity, which is a great asset in itself, is due to the fact that each of the various groups who make up the French population today have their own history and culture.

From prehistoric times, the territory of what is now France was inhabited by a mosaic of peoples. The agricultural civilization of megalithic man flourished only along the river valleys, while the civilization of the hinterland was more primitive. At a later stage, groups of hunters, drinking from bell-shaped goblets, came from Spain and settled in the South of France, in the Rhône and Rhine valleys. The Bronze Age saw the arrival of various tribes from the East: first the pastoralists of the so-called 'Tomb-Tumulus' culture, then

the agriculturalists of the 'Champs d'Urnes' period and, after them, the peoples of Hallstatt. During the 'La Tène' period\*, successive waves of Celts arrived and scattered at random. The first group, the Goidels, settled in Auvergne and in the Nantes area. The second wave, the Picts, settled in Poitou and in the Doubs Valley (Jura). Then the Bretons spread out through Ile-de-France, Normandy, Berry, Orleans and Finistere. The Belgians occupied Artois Champagne, Lorraine, Mayenne, the Bordeaux region, Burgundy and Languedoc. Finally, the Boians spread through Touraine, Sologne and the area around the Bay of Arcachon. The area south of the River Garonne, however, was never settled by the Celts and was not part of Gaul.

At the time of the Roman invasion, what is now France was inhabited by about a hundred different tribes who shared three distinct cultures. North of the River Garonne were tribes of various origin but of a common Celtic civilisation, speaking the same language (Gaulish) and practising the same religion (Druidism). Between the River Garonne and the Pyrenees lived other Aquitan tribes who spoke a non Indo-European language. Finally, the Ligurians, greatly influenced by both Greek and Roman culture, lived on the Mediterranean coast.

After the fall of the Roman

Empire, the 'Great Invasions' introduced new blood and even more variety to different parts of the country. The Franks settled North of the Loire Valley, the Burgonds on both sides of the Saône river, the Alamans chose the Rhine region and the Visigoths occupied the South-West. All these tribes were of Germanic Stock. The Bretons who were Celts established themselves in Amorica (Brittany).

The results of this racial intermingling were bound to increase heterogeneity. Anthropologists differentiate six main races in France. They are: (1) the *mesocephalic*, (tall and blond, from the North, Normandy and the Paris region); (2) the *brachycephalic*, (tall and blond from the East, Burgundy and Savoy); (3) the *mesocephalic*, (short and dark from the Maine to the Bordeaux region); (4) the *brachycephalic*, short and dark from the Massif Central, Gascogne and Dauphine); (5) the *medium brachycephalic* (short statured and from the five Breton Départements); and (6) *mesodolichocephalic*, (very dark of medium-size and from the Mediterranean Coast).

## France Proper

Such dissimilar 'nations' (who had

\* Archeological and prehistoric locality situated in Neuchatel (Switzerland) which gave its name to the second Iron Age, Gaulish era prior to the Roman invasion.



'One is able to distinguish an Alsacian, an Auvergnat, a Breton, a Provençal, a Corsican or a Basque at first glance.'

neither race, language nor geography in common) would have had no reason to unite had it not been for the princes who vied with each other to secure neighbouring lands to add to their own, either through conquest, marriage or purchase. The ultimate victors of these power struggles were the descendants of the Hugues Capet, Duc de France.

What was called 'France' at the beginning of the Middle-Ages was only a small area North of Paris known as 'Ile-de-France'; this area is bordered by the rivers Seine, Oise, Aisne, Ourcq and Marne. Ultimately, the whole of the Paris region, which became the Royal domain, was referred to as the 'Ile-de-France'. It was not only a discrete geographical entity, comprising the valleys of the Oise and Middle-Seine, but also a discrete ethnic entity, the Frankish culture having been effectively imposed on the indigenous gaulish population, which consisted of Sénons and their clients, the Parisii, as well as the Suessionii and their clients, the Meldes. But above all, Ile-de-France was a political entity since it was the bastion from which the Capétian monarchs became the feudal overlords of their neighbours.

Economically and culturally, Ile-de-France is today entirely dependent on Paris which is at its centre and whose influence stretches far beyond the borders of

the province. The neighbouring provinces to the East and the South-West have become mere appendages of Ile-de-France, sharing both its lifestyle and culture. This complex is France proper: 'Francia'.

In this fairly homogenous area, one can however distinguish three parts: Ile-de-France in the centre, which owes to Paris its cosmopolitan character and its special problems; to the East, Champagne which is, geographically and historically, a quite distinct area; and to the South-West, a group of ancient provinces united by geography but with a separate history.

### Champagne

The ancient country of *Champagne* to the East of Paris is a gently undulated area which has long been the scene of successive invasions. It was incorporated into the Frankish kingdom by Clovis and became part of Western Francia in 843 at the Treaty of Verdun. Under the Capétian dynasty, the Counts of Champagne were among its most powerful feudal overlords. In the 13th century they obtained the Kingdom of Navarre but in 1284, the marriage of the heiress Jeanne 1st to Philippe Le Bel, the King of France, brought the province to the Crown. It is not a very fertile county but the wine produced on its western border has brought fame and wealth to the area.

### The Francian South-West

The Francian South-West consists of the countries of the Val de Loire (Orleans, Touraine and Anjou) and Maine. The hills of the Maine and Perche dominate the plain through which flows the River Loire, the river banks being famous for their vineyards and their 'douceur de vivre'. It is the 'Garden of France' where the kings and princes of the Renaissance came to enjoy the pleasures of life in their splendid chateaux. It is supposedly the home of the purest French.

At the time of Gaul's independence, the Orléans region, homeland of the Carnutes, was the religious and spiritual centre of Gaul. But under the Mérovingian dynasty, the Franks, who were in control of the Paris region, took it over and divided it into several minor kingdoms. In the 10th century, the Capétian kings subjugated the area and in the 14th century, it became the Duchy of Orleans, a fiefdom of the Royal House whose destiny was closely linked to the Crown. Its coat of arms bears the Royal lilies.

The only features which differentiated the Maine, the Touraine and the Anjou regions from one another were the gaulish tribes which inhabited them: the Cénomans in upper-Maine (Département of Sarthe); the Diablintes were in the low Maine (Département of Mayenne); the Turans in Touraine, and the Andecavi inhabited Anjou. All these tribes were overpowered by the Franks, but the counts appointed by the Carolingian kings rapidly secured their independence. From the end of the 9th century Anjou entered a brilliant era, thanks to a dynasty of energetic and powerful princes, such as Foulques Nerra (987-1040) whose son, the bellicose Geoffrey Martel conquered Touraine. In the following century, the marriage of Foulques, Count of Anjou, to Eremburge, Countess of Maine, achieved the union of the three countries. Later, the marriage of Geoffrey V Plantagenet to the King of England's daughter and widow of the Emperor Henry V, was the basis and the beginning of the vast Anglo-Angevin Empire. Their son, King Henry II of England married Eleanor of Aquitaine and consequently owned more land in



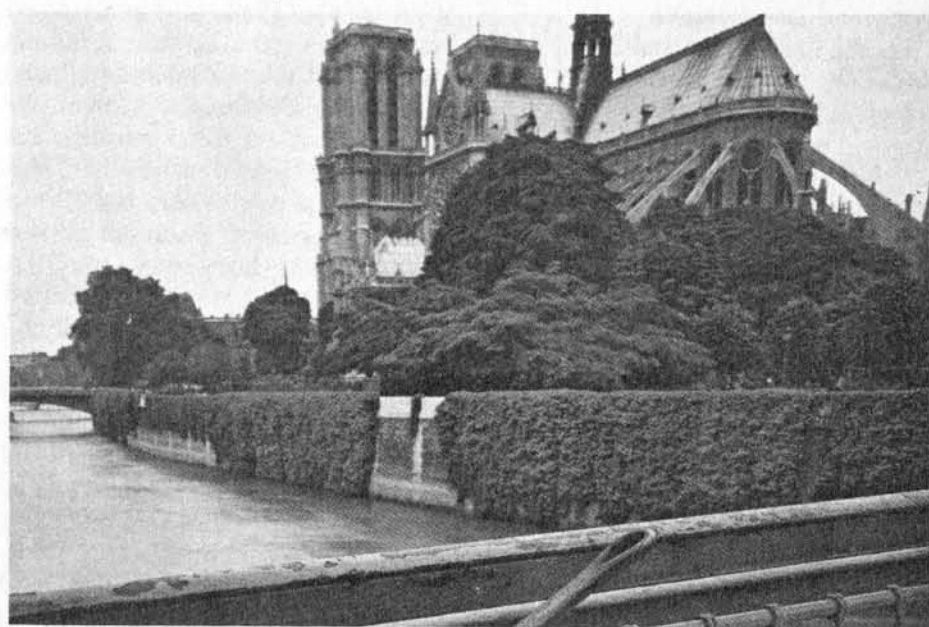
France than the French king. But the Plantagenets lost most of their French possessions after the successive defeats which King Philippe August inflicted upon John 'sans-terre' Anjou; the family seats, Touraine and Maine were annexed to the French kingdom and ceded as fiefdoms to the Royal Princes.

Anjou, however, was still destined to play a dominant role in history. In the 14th century, King John 'the Good' bestowed it as a fiefdom to his second son, Louis, an ambitious and pleasure-loving prince who led his army into the south and conquered Provence and Sicily. His successors bore the titles of: Dukes of Anjou, Kings of Sicily, Kings of Naples and Kings of Jerusalem. The last descendant to enjoy all these titles was the enlightened King René (1434-1480) a generous and cultured prince, under whose rule, prosperity increased and the arts and letters flourished with his encouragement. But René was a man of mediocre political talents who gradually lost most of his empire, and when he died, King Louis XI of France annexed Anjou, which from then on never left the French kingdom.

There is sufficient cultural affinity between the four provinces of Orleanais, Anjou, Maine and Touraine to envisage grouping them into *one* administrative region which could be called 'Maine-Val de Loire'. Today Maine and Anjou, historically allied with Paris, are attached to Nantes — although they have little in common either economically or culturally with the ancient capital of Brittany.

### French Speaking Aquitaine

The River Loire separates two quite different Frances: North France, the country of slate roofs, 'langue d'oïl'\* and government by common law; and Southern France, the country of flat tile-roofs, 'langue d'oc'\* and written law. Under the Roman Empire the whole territory between the Loire Valley and the Pyrenees was simply one administrative unit called 'Aquitaine'. This vast area was invaded by the Visigoths in the beginning of the 5th century, and a hundred years later,



What was called 'France' at the beginning of the Middle Ages was only a small area known as Ile de France. Today it is a mish-mash of regions which have little in common with each other.

the Franks, after their victory of Vouille, exerted control over the area without settling there. Charlemagne instituted a kingdom of Aquitaine which lasted almost a century. It was then divided into the Duchy of Aquitaine, the county of Poitou, the Duchy of Gasconne and the county of Toulouse. These were in turn amalgamated and separated willy-nilly, depending on the outcome of marriages and inheritances. In the 12th century, the Poitevin princess, Eleanor of Aquitaine, who owned Poitou, Aquitaine and Gasconne brought these provinces as her dowry, first to Louis VII, King of France, and then, after being rejected to the Count of Anjou, Henry II Plantagenet who became King of England. Aquitaine, except for the county of Toulouse, was to remain an English possession until the Hundred-years War. However, Poitou — fiercely disputed by the English and French monarchs — was alternatively won by the English from the French and vice-versa. It was finally annexed by King Charles V of France in 1369.

The greater part of Aquitaine was and remained occitane-speaking, but the Northern part, (Poitou, Saintonge and Berry) adopted langue d'oïl or French. In Saintonge and Poitou this switch from langue d'oc occurred in the 13th century. One therefore finds provinces which, geographically, belong to the South of the Loire; which, historically, are joined

to Aquitaine; but which culturally are part of Francia.

### Poitou—Charentes

Poitou, which is the land of the Gaulish Picton tribe, has a distinct character. Its agricultural pursuits are mainly cattle-breeding and cereal growing. The capital, Poitiers, is in Upper-Poitou and Lower-Poitou or Vendée consists of a zone of woodland, a zone of marshes and a coast line with no important port.

South of Poitou, the Western tip of the Duchy of Aquitaine is divided into three districts: Saintonge, Angoumois and Aunis, and we find several ports (la Rochelle and Rochefort) on its coast. It is a rich vineyard country where brandy is produced. The people who originated from the Santones (hence the name 'Saintonge') have been profoundly influenced by protestantism which differentiates them from the people of Poitou who are ardent Catholics. Poitou, Saintonge and Angoumois have been amalgamated into one administrative unit: Poitou-Charentes. Unfortunately Vendée has been incorporated into the 'countries of the Loire' although it has no contact with the river. The Vendéans are very dissatisfied and want their reintegration to the Poitevin grouping, since the region 'Poitou-Charentes' thus extended would make an authentic community and a viable economic entity.

\*'oïl and 'oc' were the words for 'oui' used respectively in the North and in the South.

## Berry and Bourbonnais

To the east of Poitou, Berry corresponds to the territory of the powerful Gaulish tribe, the Bituriges, whose name meant 'the kings of the world'. From the beginning of the 12th century, the kings of France gradually took Berry from Aquitaine and incorporated it into their kingdom. In the 14th century Berry was created a Duchy and granted as a fiefdom to the royal princes. Consequently, it has no particular cultural style of its own and is indistinguishable from the main body of the Francian state. The same fate was suffered by the neighbouring provinces of Bourbonnais and Nivernais, Francian speaking, and artificial creations of the feudal system that were also used as royal fiefdoms. Bourbonnais which is today attached to Auvergne could be associated with Berry to make a coherent and harmonious administrative unit.

## The Cradle of the Franks

The Francian tongue, a latin language from which originated modern French, had nothing in common with the tongue of the Franks, a Germanic people who spoke an idiom from which Flemish evolved. In the 13th century the Franks lived on the right bank of the Rhine, (Holland and Westphalia). Rome adopted them as allies and settled them on the left bank, in North Brabant from where they advanced westwards. They were warriors, who quickly conquered the whole of what is today Belgium and reached the Somme. They defeated the Gallo-Roman Governor Sygarius in 486 and invaded the country between the Somme and the Loire. Their population density differed in each area. While in Flanders they virtually replaced the indigenous population, in today's Picardy they coexisted with the local people and everywhere in Francia they seemed content merely to establish control posts. That is why the Paris region never spoke the Frankish tongue while it was still used in Picardy in the High Middle Ages, and remained the language of Flanders and Artois up to modern times.

Picardy is therefore the old Flemish speaking county, which lies

West of the Plain of Flanders, on both sides of the Somme. Flemish was quickly abandoned and replaced by a latin dialect of its own: the Picard. Since the 13th century, the name of the 'Picard nation' has been given to the area where the Picard dialect is spoken, although it was divided into numerous counties. Picardy was for a long time disputed between France and England and was finally united with France in 1482.

Flanders begins, geographically and ethnically, North of Picardy and stretches from the hills of Artois to the Zuiderzee. One section of it Artois was seized by King Philippe-Auguste in the 12th century and annexed to the crown. However, two hundred years later, when part of the Burgundian Dukedom was reunited with Flanders and later part of the Austro-Spanish empire, Cardinal Mazarin\* took advantage of the Treaty of the Pyrenees in 1659 to annex Artois. Flemish was no longer spoken but the customs, art and architecture are more Dutch than Francian.

Between 1662 and 1678, King Louis XIV progressively acquired another part of Flanders, which is today the 'Département du Nord', where Flemish is still spoken and where the people appear to be proud to have been the subjects of the Emperor Charles V. In an authentic 'European of Regions', the so-called French Flanders would be reunited with the rest of Flanders instead of being separated by an artificial border resulting from a series of historical accidents.

## Burgundy

In the Merovingian era, the Frankish kingdom and the Aquitaine of the Visigoths vied for power with the vast Kingdom of the Burgondes, stretching over the Saône Valley, the Upper and Middle Rhône Valleys together with the surrounding mountains. The Burgonds were a scandinavian people and the influence of their nordic tongue on the Gallo-Roman latin resulted in a latin language different from Francian, and called 'Franco-Provençal'.

In the 6th century the Frankish kings captured Burgundy but preserved its distinct character. At the division of the Carolingian Empire in 843, Burgundia Province, the Rhine region and Flanders came under the rule of Emperor Lothaire. However the area around Dijon was cut off and incorporated into the kingdom of Charles the Bald. Despite several attempts at reunification under Louis 'the Germanic' and Boson of Vienna, this separation was maintained, and in the Capétian era, one had the Duchy of Burgundy which was part of the French kingdom and the kingdom of Burgundy which was part of the Holy Roman Empire.

In the 10th century the kingdom of Burgundy annexed the kingdom of Provence and became the kingdom of Arles which, for a long time, remained autonomous within the Empire. After the last King Rodolphe III died in 1032, the kingdom was directly ruled by the Holy Roman Emperor. Owing to the complex feudal structure, it was later divided into a county of Burgundy (the capital being Besançon), the counties of Forez, of Viennois, Valentinois, Savoy, Provence and Dauphiné de Viennois. Actually only the counties of Burgundy and Savoy were ethnically and linguistically Burgundian. Eventually the county of Burgundy was renamed Franche-Comté.

The Duchy of Burgundy, on the other hand, was a fief of the French Crown, but the dukes increasingly asserted their independence, and King Philippe le Bel ('the Handsome') had to grant the 'Charter to the Burgundians'. In 1361 King John 'the Good' took advantage of a vacancy on the Ducal throne to annex the Duchy and cede it as a fiefdom to his son Philippe 'the Bold'. Philippe married Margaret, the Duke of Flanders' daughter who inherited Flanders, Artois and the County of Burgundy. The two Burgundies were thus reunited and the old Lotharingian idea of a single kingdom was reborn.

The Burgundian state was, by then, a dangerous rival to the Royal power. In the 15th century, the Duke of Burgundy, Charles 'the Bold' sought the blessing of the Holy Roman Emperor to reconsti-

\* Mazarin, (of Italian origin) Richelieu's successor as Prime Minister under Louis XIII and Louis XIV died 1661.



tute the vast kingdom of Lotharingia. The intrigues of King Louis XI of France resulted in the failure of this vast scheme. When Charles the Bold died, Louis XI took over the Duchy of Burgundy, but failed to take Franche-Comté which Charles' daughter, Marie of Burgundy, brought as a dowry to Maximillian of Austria. Thus East Burgundy remained part of the Holy Roman Empire whose Counts were Charles V and then the Kings of Spain. France attacked it on several occasions and the French army was notorious for the atrocities committed. Finally Louis XIV crushed the country in 1674 and annexed it in 1678 at the Treaty of Nimègue.

The old duchy has kept the name of Burgundy while the old county is called Franche-Comté. Both are mountainous regions of woodlands, but Burgundy is an extension of the Massif-Central, while Franche-Comté coincides roughly with the Jura. Their economies differ: Burgundy is a wine producing area while the wealth of Franche-Comté is based on forest and timber industries, watch-making and the manufacture of other precision instruments.

After the Peace Treaty of Nimègue, the only Burgundian land which remained outside the French borders was Savoy located at the western tip of the Northern Alps and quite distinctive geographically and ethnically. It was only incorporated into France in 1860 under Napoleon III. The Val d'Aoste, however, was attached to Italy. In both Savoy and Val d'Aoste, the Franco-Provençal language is still spoken. Today, there is much bitterness amongst the Savoyards who see themselves incorporated into an administrative unit, the 'Rhône-Alpes', which comprises other areas (Dauphiné, Lyonnais, a small section of Burgundy, and the Dombes) which have been French since the 14th century and with which they have nothing in common.

#### Lorraine

To the North of Burgundy, the area of the rivers Rhine, Moselle and Meuse, was inhabited in the 6th century by Franks and made up the kingdom of Metz whence originated the kingdom of Austrasia, home-

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land of the Carolingians. The western side of the Vosges mountains and the Plateau stretching from there to Champagne was also part of the kingdom. All the barbarian invasions came through this territory: the Suèves, the Vandals, Alains, Alamans, Burgunds, Huns and Franks.

At the Treaty of Verdun the county was allotted to Emperor Lothaire, annexed to Germania in 923 and then became the Duchy of Lotharingia. In 955 this Duchy was divided into two sections: in the North, Lower Lotharingia (Brabant) and in the South: Upper Lotharingia later called Lorraine. Lorraine was still part of Germania but predominantly French speaking and enjoyed a state of real autonomy within the empire. In 1552, the King of France Henry II took the three Lorrainian bishoprics, Metz, Toul and Verdun by force. The following century, Louis XIII plundered the whole country. By the Treaty of Vienna in 1738, the Duchy of Lorraine was given to the King of Poland, Stanislas I, to compensate for his lost throne; Stanislas was Louis XV's father-in-law and at his death Louis inherited Lorraine. The Lorrainians who had been the loyal subjects of the Holy Roman Emperor, became subjects of the King of France. A lot of them refused to accept this change and emigrated to Austria.

After the 1870 Franco-German war, the Treaty of Frankfurt returned part of Lorraine to Germany which displeased the French-speaking Lorrainians. At the end of the First World War Lorraine was returned to France; in 1940 it was under German control; and in 1945 it was returned once again to France. In fact, Lorraine is a bilingual zone of transition which has preserved its apparent vocation for the status of 'intermediary county'. Economically, it is much more closely linked with the Sarre, Luxembourg, Rhenan region and Belgium than it is with the Paris region.

#### Alsace

Of all the Germanic lands annexed by France, the most typically German is Alsace. Geographically, it lies on the East side of the Vosges

mountains; ethnically it is where the Alamans settled. It was Celtic at some point (as was Germany itself) but, in the fifth century, the Alamans invaded the entire Rhénan plain as well as the surrounding mountains. Alsace was included in Lotharingia in 843 but was integrated into Germania in 870. For several centuries it was part of the Swabien duchy, but became a prey of the imperialist policies of Louis XIV who captured several scattered parts of the territory and later, by the Treaty of Nimègue, annexed the rest of the province except for Strasbourg which remained free until 1681. Alsace was returned to Germany in 1871, was French again in 1918, German in 1940 and French in 1945.

With each change of master, Alsace was cruelly and unfairly treated. Germany persecuted its French culture and France persecuted its German culture. Its young men were forced to wear in turn the French uniform and the German uniform. After the last war, odious retaliations were inflicted on those who had been recruited, against their will, into the German army. After having been made a shuttlecock for so long, the Alsatian people are now divided amongst themselves as to their real identity. Some favour union with France, others union with Germany, and still others seek independence. Whilst those who are pro-French are vociferous in their demands, the pro-German and nationalist movements are more muted. In fact the issue is a simple one: the Rhine does not constitute a border and nothing distinguishes Alsace from the German Bade-Wurtemberg. The Alsatian dialect is nothing more than one of the German dialects.

#### Normandy

Normandy is situated on each side of the Armorican Massif and the Paris Basin and owes its character, firstly to its coast and secondly to its wet climate that makes it good cattle-breeding country. However the uniqueness of Normandy stems from the individuality of its people and the vicissitudes of its history. Up to the 9th century, nothing differentiated this area from Neustria of which it was a part. It

was inhabited by Gallo-Romans and Franks, but had to cope with the incursions of Norman pirates who infested the seas and used to sail up such rivers as the Seine. In 896 some of these brigands settled along the Seine estuary and in 911, by the Treaty of St-Clair-Sur-Epte, their chief Rollo demand the fiefdom of the territory called, since then, Normandy. It took some time before the Normans, of Scandinavian stock, culture and language, began to adopt the Franc culture and speak Norman, a latin dialect differing from Francian.

Rollo's descendants were loyal vassals of the King of France. One of them, Robert 'the Devil' died in the Holy Land in 1035, and left as sole heir a bastard, William, who conquered England in 1066. After William became King of England, Normandy had very close ties with the English Crown. In 1204 Philippe-August captured the province from the English king, but in 1315, Louis X ('the Stubborn') had to grant Normandy its autonomy when he signed the 'Charter to the Normands'. During the Hundred-year War the English and the French king fought fiercely over the province and in 1420 the English dominated it entirely. They developed its economy and encouraged intellectual life. The French gradually reconquered it between 1436 and 1450. In 1468, Louis XI annexed it to the Royal domain. The Norman sense of identity resurfaced on various occasions, particularly when the Parliament of Rouen was suspended in 1771 by Maupeou\* and immediately before the French Revolution.

The obsessive fears of successive French governments about regional nationalism lead to the division of Normandy into two administrative units: Upper-Normandy with its capital Rouen and Lower Normandy with its capital Caen. The partition was (and still is) intended to weaken the Norman feeling of identity but, in fact, it has only served to exacerbate it. If this nonsensical division is maintained, it could be dangerous.

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\* Maupeou, Chancellor of France Under Louis XVI responsible for the suspension of provincial parliaments.



## Brittany

The only region left in France (and indeed in continental Europe) where Celtic is still spoken is Brittany. Brittany is an entity which is simultaneously a geographical, historic, ethnic, linguistic and economic unit. Brittany was the territory of five Gaulish tribes (Namnètes, Vénètes, Osismii, Curiosolites and Redgones) and Celtic has been spoken for centuries without interruption. The 4th and 7th centuries were marked by massive immigrations of Celtic cousins from across the Channel, the Britons who came from Wales and Cornwall. Neither the Mérovingian kings or Charlemagne could overpower them. Only Louis 'the Benevolent' succeeded in annexing the area to the Carolingian Empire but, upon his death, Brittany reasserted its independence. Charles the Bold was determined to reconquer the province and his vast army attacked it but Governor Nominoë, at the head of a much smaller army, routed them completely at Ballon, near Redon, on June 23rd 845. Brittany was then acknowledged as an independent kingdom with Nominoë on the throne.

Between the 9th and 16th centuries, Brittany's independence was interrupted briefly in 921, when the Vikings took control. However a Breton prince, Alain Barbe-Torte, exiled in England, landed on the coast of Brittany, liberated the country (936) and ascended the throne. He chose Nantes as his capital and Brittany became a well organised state.

From the 12th century, the rulers of Brittany called themselves 'Dukes' instead of 'Kings' so as not to offend the susceptibilities of their powerful neighbours, the Kings of France and England who both coveted the Breton peninsula. For several centuries the Dukes' foreign policy consisted of establishing alliances, with either England when France was too threatening or with France when the danger came from England. As a result, real power lay at times with the Plantagenets and at times with the Capétians, both Houses attempting to impose their will on the Bretons. For example Henry II compelled Constance, the heiress to the Duchy, to marry his son Geoffrey and likewise, King



## The Old Provinces

Philippe Auguste forced the heiress Alix to marry his cousin Pierre of Dreux. Each time, however, the Prince Consort refused to rule as a puppet, took Brittany to his heart and became more Breton than the Bretons. Whilst the Dukes used to pay homage, as was the tradition, it was only on a personal basis and Brittany could not be incorporated into the Kingdoms of England or France.

The French and English attacks on Brittany were many, but were all repulsed until 1488, when the French Regent, Ann of Beaujeu, sent a colossal army to Brittany without any provocation. The Breton army, with much inferior numbers, fought gallantly, but was defeated at St. Aubin-du-Cormier. The Duke Francois II died leaving his throne to a twelve-year-old daughter Anne who, despite her youth, resumed the struggle. In 1490, she married by proxy, Maximilian, the heir to the Holy Roman Empire. However another massive assault from the French Army compelled her to capitulate, annul her marriage and marry, against her

will, the French king, Charles VIII. After the latter died, she married his successor Louis XII, but it was only a personal union and Brittany remained independent from France. Anne died in 1514, satisfied at having maintained this independence. Her son-in-law, François I self-appointed administrator of the Duchy, negotiated a Treaty of Union, signed in 1532. Brittany now became part of France, but the treaty guaranteed the Duchy's independence which was only lost after the French Revolution when the legislative Assembly decreed, unilaterally, that Brittany would no longer be autonomous and would be divided into five départements.

As a maritime country Brittany is admirably placed for international trade and was wealthy as long as it controlled its own affairs. It lost its prosperity when it was integrated into an economy run from Paris.

Although it has lost considerable ground and is spoken only in the West half of the Peninsula, the Celtic language has survived and Brittany still has a distinctive character and culture of its own.



The Real Regions of France. To suggest a return to the traditional regions is not to yearn for the past since they still belong to the present.

Indeed, since 1532, Bretons have retained a strong sense of nationalism. In the last two decades, the French government has had to make concessions to that nationalism as a result of violent local hostility to policies which have sacrificed Brittany's economic interests and attempted to suppress its language and culture. Those concessions, however, have proved insufficient to calm discontent. For example, the administrative boundaries drawn by the Vichy Government and maintained under the fifth Republic are a perpetual source of friction. The 'Loire-Atlantique' division with Nantes, the old capital of the Duchy, in its midst, is cut off from Brittany and attached to the 'Pay de la Loire'. Recently 8,000 people demonstrated in the streets of Nantes against this division.

### Occitania

Of the 95 existing French Départements 33 (south of the Loire) are of Occitan culture, and hence the region's historic name, Occitania. The influence of the Romans on the whole area was more pronounced

than in the countries North of the Loire. Moreover, whereas the North was colonised by the Franks, Occitania was occupied by the more cultured Visigoths. As a result one finds there, from the beginning of the Middle Ages, a culture greatly superior to that of the langue d'oïl speaking countries and a taste for liberty and a tradition of tolerance quite unknown in the North.

The bloody conquest of Occitania in the 12th century by the French, is one of the greatest crimes in history. Under the pretext of restoring Catholic orthodoxy to a country where Catharism was tolerated and had numerous disciples, the raffish troops of Simon de Montfort, in the name of Christian love, massacred, burned, pillaged and finally divided the country among themselves. These atrocities could never be condoned and explain the traditions of anti-clericalism, anti-centralisation and leftish radicalism which prevail in the South of France to this day.

Occitan is, like French, a latin language, but the two are quite different. Occitan is more musical and less grating and its superiority

over French was without question in the Middle Ages when there were many more literary works in langue d'oc (which was the troubadours' language) than there were in langue d'oïl. Like all languages, Occitan evolved with time and branched out into several dialects, which correspond to quite distinct geographical and historical areas.

### Auvergne

Auvergne is the land of a Celtic people, the Arvernes, one of the most powerful tribes in Gaul to which belonged Vercingetorix, the hero of the resistance to the Roman occupation. Geographically, Auvergne is part of the Massif Central. The Visigoths, with great difficulty, imposed their rule over the area but did not settle there. The Counts of Poitiers and the Counts of Toulouse ruled it alternately but it was an autonomous county between the 10th and 12th centuries. Included in the Plantagenet empire, it was gradually conquered by Philippe August and his successors. At one point, Auvergne was divided into four territories: Le Comté, La Terre, Le Comté Épiscopal and Le Dauphiné. After a period of anarchy, all four were annexed to the Crown, the last in 1606.

### Limousin

The Limousin is also the land of an ancient Celtic people, the Lemovices, to which the Visigoths added new blood. It consists of two geographic regions: Upper-Limousin (capital Limoges) and Lower-Limousin (Capital Tulle). From Limousin came the first literary works written in langue d'oc and the famous troubadour, Bernard de Ventadour. The area was divided into several 'Vicomtés' under the sovereignty of the Duke of Aquitaine. It was then, for a long time, an English fief before being conquered by Charles V and finally annexed by Henry IV in 1607.

### Languedoc

The Languedoc roughly corresponds to the Celtic land of the Volques Tectosages, invaded by the Romans in 121 B.C. who included it in their empire under the name of Narbonnaise Première. In the 4th century the Visigoths settled there and made Toulouse their capital.



Under the Carolingians, the region of Toulouse and the Mediterranean coast, west of the Rhone, were only parts of Aquitaine. They were then ruled by the Counts of Toulouse, cultured princes who favoured learning and the arts. France's fury was unleashed on them in the Crusade of the Albigenois and the territory (which was, from then on, called 'Languedoc') was annexed to the Crown by the Treaty of Meaux-Paris in 1229. At first, it kept its customs and privileges, but later the central government in Paris did all it could to stifle the national identity and suppress the language. The protestant religion had many enthusiastic converts and Languedoc was therefore the chief victim of Louis XIV's persecution in the war of the 'Camisards'.\*

### Gascogne

Gascogne which stretches from the Garonne to the Pyrenees has never been Celtic. It was not part of Gaul and in Julius Caesar's time, the language was Iberian. It was invaded in the 6th century by the Vascons, fearsome warriors from the Ebre valley. In 602 the Franks, who had defeated the Vascons, incorporated it into the Duchy, and later the Kingdom of Aquitaine. Charlemagne established a Duchy of Gascogne distinct from Aquitaine, but both Duchies were again united through a royal marriage in the 11th century. The name 'Vascons' has a curious evolution: in one form it became 'Basques' and referred to the mountain people of the Pyrenees who had kept their language, and in another, it became 'Gascons' which applies to the people living in the Plain, assimilated by the Aquitans and speaking langue d'oc. From the 11th century, the history of Gascogne merges with the history of Aquitaine. In 1453 France annexed Gascogne; although included in the vast conglomeration of 'Guyenne and Gascogne', it has preserved its language, customs as well as its Gascon identity.

### Guyenne

What is left of the ancient Aquitaine when one has removed Poitou, Auvergne, Limousin, Languedoc and Gascogne is called



Cutting artichokes in Brittany. Anger over the centralising policy of the French Government has led to an upsurge in Breton Nationalism.

Guyenne, a popular distortion of the name 'Aquitaine' pronounced 'Aguyenne'. Guyenne was formerly inhabited by Celts then invaded by Visigoths and after Vouillé, was under Frankish control. After Eleanor of Aquitaine's marriage it became an English Duchy. Actually the local people were very pleased to be subjects of the English Crown as it brought them prosperity based on the sale of their wines to England and in the Hundred-years-war, Lower-Guyenne (Bordeaux region) was very hostile to the French. From 1453 Guyenne was part of the French Kingdom and suffered a great deal from the Wars of Religion a hundred years later. In the 18th century Guyenne developed its maritime trade and viticulture and found prosperity again. Since the economy of the Guyenne-Gascogne complex has been centred on Bordeaux, it is logical to keep them combined in one administrative region of Aquitaine.

### Provence

Provence occupies a place of its own in Occitania as it was neither part of Gaul nor of Aquitaine. In effect it is part of the Mediterranean coast, situated between the Rhône

river and the Alps. Successively hellenised, romanised and badly oppressed by various barbaric invaders, it has nonetheless kept its character. Provence was included in Lotharingia and later, constituted with Southern Burgundia the prestigious Kingdom of Arles, a part of the Holy Roman Empire. After the division of the Kingdom of Arles, Provence was, for a time, an autonomous county which fell into the hands of the House of Anjou through dynastic marriages; it was finally taken by Louis XI after the death of René of Anjou. A Treaty of Union was signed in 1487 guaranteeing its autonomy, but this was not, of course, respected by the central Government. It is in Provence that the Occitan literary renaissance was launched, in 1854, through the Foundation Félibrige.

### Dauphiné

North of Provence, Dauphiné was a Celtic land colonised by the Romans in the second century B.C. and taken over by the Burgundians in the fifth century. Part of the Kingdom of Arles, it belonged to the

\* The Camisards are the protestants of the Cévennes who took arms against Louis XIV and were so called because of the shirt they wore, called a 'camiso' in the local dialect.

Holy Roman Empire until 1343 when Prince Humbert II gave it to France under the condition that it should by the heir to the throne, the 'Dauphin'.

### The Non-Occitan South

To the South West of Aquitaine begins the territory of the Ancient Vascons, the Basques, whose mysterious language, Euskara is a non Indo-European language.

The Basque country is a Pyrenees border region and the greater part is in Spain. An artificial border separates the provinces of Labourd, Lower-Navarre and Soule from the

rest of the Basque country. The intrepid and indomitable mountain-people of the 'Pyrenees — Atlantiques' know full well the 'French Pays Basque' and the 'Spanish Pays Basque' are one homeland, and if nationalist activity is less violent North of the border than it is South, it is no less obstinate. One is confronted with the same situation at the other end of the Pyrenees, where Catalonia is under Spanish rule except for a small part, the Roussillon, annexed by France in 1659 at the Treaty of the Pyrenees. Roussillon has preserved its identity, culture and language.

Catalan, related to Occitan but quite distinctive, has inspired an important literary movement and, to this day, one finds countless works published in Catalan.

### Corsica

Because it is an island, Corsica, is a special case. It still retains an independent way of life. Successively occupied by the Ligurians and Iberians, it was colonised in turn by the Phoenicians, Greeks, Etruscans and Carthaginians and the Romans. Goths and Vandals launched raids on the island; the Byzantines conquered it, then the Arabs. It was then ruled by the Popes who surrendered it to the Pisans, who in turn, surrendered it to the Genoese in the 13th century. The Corsicans repeatedly revolted against Genoese rule and, after the last uprising, under the leadership of Paoli in 1755, the by then discouraged Genoese sold the island to the King of France, Louis XV (1768). Nationalist activity is now directed against France. The mixture of stock in the Corsican gives him a special character with a culture and language of his own.

### Towards Genuine Regionalisation

The regions were not created, but they exist and everyone knows them. One merely needs to undertake some marginal regroupings to balance them. Unfortunately, nowadays, administrative boundaries take no account of historical, geographical or cultural factors. To suggest a return to the traditional regions is not to yearn for the past since they still belong to the present. One still calls oneself a Norman, Picard or Gascon; a Guerandais is not a 'Pays-de-Loirien' but a Breton; a native of Chamonix is still a Savoyard and not a 'Rhônalpian' and at Guéthary one is a Basque and not an Aquitan.

Some argue that an administrative reorganisation which respects the true regions of France would provoke a re-awakening of nationalism. But nationalism is already a fact of life: to deny it is to exacerbate the problems and to risk triggering a political time bomb. Only respect for fundamental ethnic and regional realities can ensure a stable and fulfilling future.



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## Books

### A Small War

**NUCLEAR WAR: THE AFTERMATH**, *Ambio* (Vol. XI, Nos. 2-3 1982), Royal Swedish Academy of Sciences/Pergamon Press.

This issue of *Ambio*, the prestigious journal of the Royal Swedish Academy of Sciences, considers the likely effects of a global nuclear war on the human environment. Its study of environmental consequences shows that more people will die as a result of the aftermath of the conflict than will be killed directly by bombing and radiation.

It draws two conclusions. First it predicts — somewhat unexpectedly — that while 750 million people may die in the Northern Hemisphere, between 1 and 3 billion are likely to die in the Southern Hemisphere. Secondly, it states that 'the natural environment might suffer such grave long-term changes as to threaten the survivors' 'fight for recovery'.

These conclusions are reached through the use of a model in which a global conflict implies the detonation of only half of the superpowers' arsenals (14,741 warheads and 5,742 Megatons) aimed at military targets, industrial and economic centres and cities in North America, Europe and the USSR. Civilian nuclear reactors are not included in the list of targets: but, were they to be, *Ambio* argues that the long-term radiation effects would cause even greater damage to the environment.

The first conclusion is derived from papers examining the economic, agricultural and medical consequences of a holocaust. While the Northern Hemisphere would witness the disappearance of money and investment, the collapse of the international system of exchange and trade would precipitate widespread starvation, sickness and social upheaval in the Southern Hemisphere. (Though some would argue that much of the food imported by the

South from the North never reaches the majority of the population — and that financial aid has rarely been beneficial). Even beyond those regions directly affected by local fallout, radioactivity levels in diet and human tissue would be 20 times higher than during the weapons' testing period of the 1960s, due to the omnipresence of global fallout.

And, although as many as 200 million may survive in the North, many would later die from the latent effects of radiation as well as infectious diseases like cholera, typhus and dysentery, since even low doses of radiation weaken human resistance to disease.

Furthermore, using the evidence accumulated from Hiroshima, *Ambio*, predicts that between 5.4 and 12.8 million of the initial survivors would develop fatal cancers; between 17 and 31 million would be rendered sterile; and between 6.4 and 16.3 million children would be born with defects in the subsequent 100 years. Serious mental disorders could affect some 20 per cent of the survivors to the extent that they become incapable of fending for themselves. The Pugwash Working Medical Group is quoted as stating, "Prevention of nuclear war offers the only possibility for protecting people from its medical consequences."

The second conclusion is reached from papers which examine the short-term effects on the natural environment for which relatively reliable calculations have been made. For instance, the biotic effects of ionizing radiation are discussed using evidence from an experiment, conducted over a period of 15 years at the Brookhaven National Laboratory in the United States, in which an area of forest was exposed to repeated doses of radiation. It was concluded: "Exposure of high levels of ionizing radiation will devastate the natural plant and animal communities . . . leaving impoverished residual vegetation of hardy successional plants. The circumstances likely to prevail following a nuclear war favour small-bodied, rapidly reproducing organisms that are often identified as pests." There is evidence, too, of an increase in the rate of mutations, which in the case of Man would be particularly hazardous since he is not subject to rigorous selection. This could lead to a serious loss of quality in the gene pool, and thus a decrease in the health of successive generations.

We are told that the atmosphere could be greatly disturbed by a nuclear war. For many months, fires would release large quantities of light-absorbing particles into the troposphere, thus restricting the penetration of sunlight to the earth's surface, and hence almost totally

eliminating crop yields in the North. A worldwide photochemical smog could develop with the high levels of tropospheric ozone. And the depletion of ozone in the stratosphere, leading to increased ultra-violet radiation, could jeopardize recovery.

Other papers explore the effects of a war on freshwater and ocean ecosystems, in the latter case noting that the initial loss of sunlight followed by a possible increase in ultra-violet radiation could cause large-scale reductions in marine populations at the bottom of the food chain.

In summing up, *Ambio* states that these direct environmental impacts could be overshadowed by longer-term, less predictable secondary ecological effects, but does not go on to speculate what these might be. In using cautious words like 'possible' and 'could', the contributors to this special issue of *Ambio* are very properly acknowledging that scientists are still ignorant of the long-term effects. It should be remembered that it was not until the 1970s — thirty years after Hiroshima — that scientists had any inkling that the ozone layer could be affected by a nuclear war, let alone how.

It is encouraging that the Royal Swedish Academy of Sciences should produce this humble yet authoritative special issue. However, since some military strategists are talking in terms of winning a nuclear war with a refinement in 'first-strike' weapons, *Ambio's* second conclusion would have been more persuasive if it could have been argued that the devastation of just one superpower would have the global consequences in space and time that *Ambio* has predicted using its own scenario. Would the 'winners' be able to survive?

David Lomax

### Atoms for Peace?

**KILLING OUR OWN: THE DISASTER OF AMERICA'S EXPERIENCE WITH ATOMIC RADIATION**, by Harvey Wasserman and Norman Solomon, with Robert Alvarez and Eleanor Walters. Dell, \$12.95.

*Killing Our Own*, a history of the medical impact of US nuclear programs, tells two parallel stories.

The first is a chronicle of suffering, in which innocent and uninformed individuals are exposed to radiation, and later fall victim to cancer or leukaemia, or conceive children that are born dead or deformed. Some of these are well known, others less so:

the women who painted radium onto luminous clock dials in the 1920s and licked the brushes to improve the point; the GIs sent into Hiroshima and Nagasaki within weeks of the bombs being dropped; the many more US soldiers and sailors who were sent into the near vicinity of the Nevada and Pacific bomb tests; the inhabitants of towns in Nevada, Utah, and California (and those as far away as New York state) that received fallout from the atmospheric bomb tests; the millions of people, and especially pregnant women, who have been exposed to incompetently performed, badly designed, or simply unnecessary x-ray scanning; uranium miners, many of them native Americans, who work in conditions that have been described as mediaeval, constantly breathing radioactive radon gas; workers in the nuclear industry, where standards are not always adequate and less often enforced; and all of those who live in the neighbourhood of atomic power plants and other nuclear installations, malfunctioning or not.

The second strand of the narrative concerns the nuclear establishment's consistent tendency to protect the public image of nuclear energy, at the expense of the health and civil rights of individuals: a repeated pattern of secrecy, defensiveness, and a refusal to accept responsibility.

The Veterans Administration (VA), for example, has regularly refused disability pensions to cancer-ridden GIs who were exposed to radiation in the aftermath of A and H bomb explosions, arguing that radiation levels after such an explosion quickly decline to the level of a medical x ray. This argument, as many critics have pointed out, is deceptive, because it disregards alpha and beta particles, which, when inhaled or ingested, are a potent source of cell damage. In 1979, after years of steadfast refusal to consider radiation-related claims, a VA representative breezily told the press, "These guys are getting old enough so that they're just getting sick from being on the good old earth. Someone has convinced them to blame it on radiation."

When, in 1953, sheep in Utah began to drop dead by the hundreds, the Atomic Energy Commission (AEC) put the blame on a combination of malnutrition, bad management, and unusual weather conditions (and denied compensation to the farmers). At the same time, internal AEC documents — made public decades later — stated that the sheep were found to have burns associated with beta radiation, presumably from the Nevada tests. (In 1979, after the Three Mile Island accident, Pennsylvania farmers who found themselves with dead animals on their hands were told the same

story about bad management and feeding.)

When an abnormally high incidence of cancer and leukaemia began to show up in the human population of Utah, predominantly Mormons who neither smoke nor drink, the AEC routinely denied any link to fallout. The only expression of concern came in 1980, when a news story reported that a Hollywood film crew, including four box-office stars, had been on location in Utah in 1954, and that a large number of those involved had subsequently died of cancer. "Please, God," a Pentagon official was heard to say, "don't let us have killed John Wayne!"

It's symptomatic of official attitudes in the United States that, after almost forty years of atoms for war and peace, there has been no systematic study of the effects of radiation on the environment and on human health. The most informative studies to date on the environmental impact of radiation have been performed in the USSR, at the site of the 1957 Kyshtym accident; and the best work on the human health impact has been done by researchers (Wasserman *et al.* List 51 of them) who have consequently had to face establishment wrath in the form of attacks on their reputation and threats to their funding.

After the Three Mile Island accident, which Ernest Sternglass has claimed was responsible for a significant increase in infant mortality in the Harrisburg area, at least 14 psychological surveys of local residents were made, using 375,000 dollars from the National Institute of Mental Health and 52,000 dollars from electric-power companies. "It makes you wonder," one resident commented, "how they can get so much money to study the psychological effects of this accident when they can't seem to pull it together to look at the physical effects on animal and human health."

Three Mile Island is probably the best-known nuclear accident, but Wasserman *et al.* devote a chapter to a much less publicised event, fourteen weeks later, that is thought to have been the largest single discharge of radioactive materials in the United States since the atmospheric bomb tests: a dam burst at a uranium mill in Church Rock, New Mexico, releasing 1100 tons of radioactive mill waste and 90 million gallons of liquid. The Rio Puerco river, the main water source for the native Navajo people and their animals, was seriously contaminated, and there were fears that, in time, the effects would be felt in the groundwater and in Lake Mead, which provides drinking water for Las Vegas, Los Angeles, and much of Arizona.

Investigation of the accident cast

doubts on the competence of the mill operators (and on the vigilance of the New Mexico state government), and those doubts soon extended to the cleanup operations, which succeeded in removing only one percent of the contaminants known to have spilled from the dam. Ordered to monitor some pools formed by the spill, the mill operators chose to monitor the uranium content, and found it to be safe, whereas the Nuclear Regulatory Commission (NRC) measured a radiation level 100 to 500 times above background: most of the uranium, of course, had been removed by the milling process, leaving behind equally toxic thorium and radium. "It was a subterfuge on the company's part," a local doctor commented.

Five months after the accident, the mill was back in operation, with the dam leaking up to 80,000 gallons of contaminated liquid per day. The local Navajo people now have to live with the radioactivity that remains: "We don't sleep at night," one woman told the authors. "I worry about our children and their children."

As a case study of how nuclear managers behave, the Church Rock accident is instructive, but there is also a general point to be made: the disposal of uranium tailings, the highly radioactive waste sands from the processing of uranium ore, remains an unsolved problem. Between 1959 and 1977, according to NRC figures, there were 15 accidental releases of tailings solution; in one incident, 25,000 gallons of radioactive slurry went straight into the Colorado river.

But tailings are a source of environmental contamination even when there are no accidents: they sit in huge piles (up to a hundred feet high and hundreds of acres in extent), from which the rain leaches radioactive nuclides into the soil, the wind blows solid particles away, and radon gas escapes into the air; or else they are held in ponds which are subject to leakage and evaporation. Many of the dams built to contain those ponds are, in the words of one engineer, "accidents waiting to happen."

Proposals for permanent containment of the tailings, which will be radioactive for millenia, are under consideration. Meanwhile, in the town of Durango, Colorado, dust plumes from a nearby tailings pile stretch thousands of feet into the air and coat cars and houses with radioactive dust; a rise in leukaemia and lung-cancer rates has begun. Other towns are suffering the consequences of a simple disposal procedure adopted in the 1950s: tailings were incorporated into building materials, from which many of the local houses have been built.

*Killing Our Own* is packed full of information; it is accessible and unrhettorical in style. Appendices



provide simple explanations of the physics and physiology of radiation and health, together with lists of bomb tests, planned and operational US power stations, and organisations that are active on nuclear issues. The book is written out of the authors' belief in the power of informed individuals, and its conclusion is plain: that nuclear technology has killed too many people already; that it kills more with each day that passes and that it will continue to wreak havoc with the human and non-human life on this planet until those who care can command the political muscle to stop it.

Bernard Gilbert

## Soviet Pollution

**THE DESTRUCTION OF NATURE IN THE SOVIET UNION**, Boris Komarov, White Plains, N.Y.: M.E. Sharpe, 1980, \$17.50.

One of the ways not to get published in the Soviet Union is to describe too accurately the ecological situation there. For together with graphic accounts in the Soviet media of how the capitalist world abuses the natural environment go reassurances that under "socialism" all is inevitably onward and upward, ecologically as otherwise.

Nothing could be further from the truth, declares "Boris Komarov" — the pseudonym of an ecological dissident somewhere in one of the concerned Soviet ministries. His book had circulated in samizdat before reaching the West, and is now in German and English translation.

True, the Soviet Union appears to have some of the most enlightened ecological standards and legislation in the world, and theoretically it can "plan" in this respect where capitalism cannot. It also maintains a number of ecological "Potemkin villages" or "showcases" for the edification of foreign tourists and experts. But all this, like the democratic "guarantees" of the Soviet constitution, means very little. Although industrialization in Russia started later and in some respects has not got as far as in the West the ecology is not in better but worse shape.

Much information to this effect is officially withheld and much is to be found only in fragmentary form, in obscure specialist journals. Upon the basis of what is available, and his personal information and contacts, Komarov takes us on his own tour of Soviet ecological reality.

He begins with the scandal of Lake Baikal, which emerged some two decades ago and has persisted in

muted form since. This "radiant orb of Siberia," the deepest and purest body of fresh water in the world, turned out to be too pure for its own good. That is its water was found to be the best for making the kind of cellulose needed for heavy bomber tyres. This, says Komarov, was the main factor "that sealed Baikal's fate," though other industries and logging also contributed. The assorted pollutions have been gradually depleting epishura, the tiny crustacean which has lived at the bottom of the lake's food chain for millions of years. It is an extremely potent biological filter and mainly responsible for the lake's purity, to which it is so perfectly adapted as to be unable to live anywhere else.

When the peril to the lake was first recognized some two decades ago, a shock wave travelled through the Soviet and especially the international press. In a bustle of ecological reform, millions of rubles were spent on sewage treatment plants and other measures. Yet, ten years later, a special scientific commission found that meanwhile the danger had not decreased but increased. The end of the lake's unique qualities and fauna may be protracted but seems only a matter of time.

This is in effect now one of the "state secrets" of the Soviet Union. In following chapters, Komarov furnishes details of its "Secret Air," "Secret Water," and "Secret Land." Again, allowing for its relative "underdevelopment" in some respects, and for some genuine if marginal or temporary ecological achievements, there can be no doubt that the overall condition of the Russian natural environment is deteriorating faster than elsewhere.

Air quality in many Western urban and industrial centres has somewhat improved in the past two decades, while worsening in the Soviet counterparts. A major factor is the increasing number of Russian automobiles, which Komarov says pollute the air about four times as much as do American ones, owing to more intensive use and poor engine maintenance. In general, he estimates that as compared to the West, "for each unit of goods the socialist economy produces twice as many air pollutants of all sorts . . ." He goes on to point out: "In the last decade, the incidence of lung cancer has doubled in the Soviet Union." A visible and "poetic" index of air quality is the colour of the snow. It rarely comes down white any more over Soviet urban and industrial centres, and "in 1977 something new was noticed in the capital: the snow fell to the earth already black."

As in all industrial countries, large quantities of fertilisers, pesticides,

gasoline and grease find their way into Soviet waters. "Even now the fleets of farm machines are washed mainly in rivers and streams, as horses once were bathed." While avid attention is paid to Western oil spills by the Soviet media, the domestic ones are almost never recorded. Yet mainly due to oil pollution the fish catch in the Sea of Azov, once extremely productive, is now about one-ninetieth of what it used to be. As everywhere, the discharge of heavy metals — in pure form unknown to nature — does incalculable damage. As everywhere, "Scientific institutions cannot study all the new metals and their compounds that go into the rivers and lakes." But where as over a two-year period U.S. scientists were able to identify and establish standards for some 17,000 pollutants, the Soviet scientists managed this for only 15. One factor was that the Soviets were reluctant to reveal the extent of their ecological problems. Secret military or "strategic interests" were another — for instance, it was only belatedly realized through foreign information that PCBs were now in all the waters of the Soviet Union, because the military had again neglected to inform the scientific arm that it was up to ecological no good.

Universally, the noose of industrial progress is tightening on the natural habitats, and many Russian animals, birds and plants are also in decline, if not extinct. Komarov estimates the overall rate of destruction to be more than nine times anything theoretically "saved" by ecological reforms. Most of this is inevitable if "growth" is inevitable, but some of it is due to gratuitous ignorance, mismanagement, thievery and sheer wantonness (though Soviet generals are no longer allowed to machinegun polar bears from helicopters).

Komarov's book dates from 1978 and some of these details may be outdated, but it is unlikely that the general picture has changed, or will in the foreseeable future, as long as "Industrial development remains the slogan, the ideal, the sole absolute value in the eyes of every Soviet leader."

We need ideas which transcend those of both progress and revolution (or Marxism). "Clearly," as Komarov says, it is "through the development of profound, basic ideas about human existence that such a harmony, or at least the alleviation of disharmony, must be sought." The ecological cause then may be no mere "reform" within any of the established general ideologies, but has its own world-historical potential.

Jack Jones.

ONE JOURNEY—THE STORY OF A SUFFOLK FARMER. B. A. Steward. £5.95. (Privately published by the author at Marden House, Old Felixstowe, Suffolk, England.)

The author of this autobiography was born 85 years ago in the ideal nursery for a man of character—the Norfolk countryside not too far from Norwich where his father had a small, profitless shoe factory and where his forbears had been craftsmen. He gained one of the first scholarships to the Paston Grammar School, North Walsham, where Horatio Nelson was educated. Norwich is known as the radical city and working class families, influenced by the traditions of Norwich, respect craftsmanship and are usually independently minded chapel-goers. Mr Steward's father, a good musician, brought up a family of three on £80 a year; and they were contented. Unlike many in the feudal county beyond he was subservient to no man.

When Mr Steward wrote *One Journey*—the old farm worker's term for 'doing a day's work in one shift so as to make the most of the light'—he still retained these traditional virtues of his enviable upbringing. They shaped his 'twentieth century pilgrimage' and protected him from the seductions of Fleet Street where for twenty years he wrote his 'Country Diary' and was an agricultural correspondent. Prior to that he had sacrificed a lucrative job in the City to work as a farm labourer after being demobilised from the 1914 war.

A man of Mr Steward's calibre and background is not likely to be deceived for long and he soon understood, as a humble infantry man, that this patriotic war was a shameful degradation of the human spirit maintained by the establishments of Europe to protect their interests and using the people as if they were their private armies. But being a sound countryman, he did not find the answer in ideologies, but in a return to the values of the land as a means of curing the wounded soul with a better life closer to reality.

This revelation often comes to those who have fallen for the glamour of war and they realise, as Mr Steward tells us, that the proper and just ownership of the land and a world wide increase of its productiveness—the two are related—are the essential path to world peace. Small productive family farms using tested traditional principles of husbandry—which does not rule out some modern technology—can alone create the

foundations of a stable civilisation. Unfortunately this wisdom does not spread among mankind owing to the predominance of mass industrial thinking—whether capitalist or communist; consequently we need to take very seriously those who like Mr Steward advocate 'peace through good farming' as the message they leave to us after struggling to achieve it in their own lives.

The cause for optimism that comes through Mr Steward's simple, forthright description of his experiences is that the traditional East Anglian virtues survive to a surprising degree among those whose conscience does not allow them to adapt wholeheartedly to the temptation of economic and technological success with its boring simplification both of husbandry and the landscape. After prodigious labours as a journalist to raise enough capital to buy himself a farm and then to make it profitable—it was in poor shape when he bought it—after he had succeeded, Mr Steward renounced it for a smaller one so as to give himself more leisure and time to think. He was no idler ever; at one time he was editing *The Dairy Farmer*—which he founded—writing his 'Country Diary' for *The Daily Herald*, and managing several other farming periodicals in addition to farming his own place. A man of character makes decisions that develop his inner life, not his bank account. Unfortunately today the conditions that control the ownership of land have so deteriorated that with all the experience and determination of a Mr Steward a newcomer could not afford his own farm—farming has become an hereditary occupation or the fief of finance companies.

What hope have we then of providing the environment within which men of character can develop such as our country needs to survive? I am sure that it could be done and that the people still exist—just—who could think out a comprehensive practical plan. In Britain alone there are not only countless thousands of idle acres but countless thousands of unemployed who would be glad to work on them. As Mr Steward says, to build up a network of small farms working together on a cooperative basis through a controlled marketing system "would be a more profitable national investment than the dole".

As it is, unfortunately, impossible to persuade the owner of several thousand acres that his land should support several family farms rather than just his own and a few farm workers, a reformed land policy has to be a national political decision—and there are few policies, throughout the world, that arouse such furious hostility. So we may have to forego 'grub and peace'—Mr Steward's phrase—so as not to

disturb the complacency and greed of acquisitive farmers—admirable chaps though many of them were when they began farming. It is success which reveals their weakness of character.

Robert Waller

## Two Islands

HILBRE, THE CHESHIRE ISLAND: ITS HISTORY AND NATURAL HISTORY by John D. Craggs (ed.), Liverpool University Press, £20. A WORLD LIKE OUR OWN: MAN AND NATURE IN MADAGASCAR by Alison Jolly, Yale University Press, £21.

Book-reviewers' pot-luck sometimes produces strange juxtapositions. Each of these books is a portrait of the ecology of an island, but could two islands be more totally dissimilar? One, eleven acres off the coast of Cheshire; the other, 230,000 square miles off the coast of Africa. The end-products differ almost as much as the subjects: yet each book is inspired by love and written with infectious enthusiasm.

*Hilbre, the Cheshire Island* is a compilation from the work of sixteen writers, some professional and some amateur, who have studied various aspects of the island for, in many cases, an impressive number of years. Hilbre is evidently a familiar resort for local people (being accessible on foot at low tide): it is also well-known to ornithologists as one of the chain of coastal observatories where the ringing and recording of birds is helping to build up an ever more detailed picture of migration patterns. This work is given due prominence in the book; but other chapters cover all the other major life-forms of the island, from mosses to grey seals, with detailed species-lists and references. Practical students of coastal natural history will find it invaluable for comparison and contrast. To the general reader the book's interest is that of a minutely detailed study of a small, restricted and to some extent isolated ecosystem: Hilbre at first sight offers little more than a wind-swept expanse of rough grassland, but close analysis reveals a surprising variety of habitats, some only a few square yards in extent, with their own specialized flora and fauna. The origins of these tiny isolated communities raise many questions; and the contributors to the book are well aware of the value of islands as natural laboratories for the study of the dynamics of plant and animal populations.

In this respect, Madagascar is like



Hilbre only much, much more so. Detached from the east coast of Africa about 100 million years ago, it has largely gone its own way ever since (though some terrestrial species, notably the lemurs, probably arrived rather more recently on rafts of vegetable debris from the mainland). As in the better-known case of Australia, the limited stock of original species diversified to fill all available ecological niches. Hence Madagascar today is, in the words of Alison Jolly's title, "a world like our own"—its underlying likeness actually emphasized and accentuated by its unlikeness in detail. It is an alternative world, reminiscent of those science-fiction stories in which numbers of possible futures are simultaneously realized in different continua. "The importance of Madagascar is that it shows us the ecological theatre and evolutionary play with a different cast of characters."

Predictably, of course, some of the leading roles in this play are now vacant. Madagascar, unlike most other regions, was spared the ravages of both the Ice Age and early human migrations, and got through till about A.D. 500 with its pre-Pleistocene fauna intact. Then the Malagasy began to arrive by canoe from Indonesia. They inaugurated an era of destruction which is not yet over: the island's legends speak of a Great Fire, which turned the centre of Madagascar from forest into arid prairie. The megafauna, as elsewhere, were the first to become extinct—tortoises with five foot shells, four hundred pound lemurs like giant Koalas, and the magnificent aepyornis, the heaviest bird that ever lived, ten feet tall and laying two-gallon eggs.

Alison Jolly regrets their passing as much as any zoologist would: but unlike many zoologists she still has a lot of time for the human species. When researching this book she travelled with Malagasy friends and met ordinary people. In this, too, she reveals a world like our own: "the particular villages and villagers I quote are only spokesmen for millions of others like them throughout the tropical world." The problem of, say, deforestation looks a bit different when one sees it through the eyes of Jean with his illegal clove plantation in the jungle which one day, he hopes, will make him rich enough to get married. "What would *you* do?" asks one villager. What indeed?

What seems certain is that we, the rich, are not doing enough. World help for conservation in Madagascar has been negligible, and what little there has been has patronized or ignored the local people rather than enlisting them as allies. (National poverty affects every aspect of life. The standard work on Madagascan

birds, published in Paris, is not on sale in Madagascar—foreign exchange is too precious to waste on such luxuries.) Alison Jolly's book is not merely an enthralling, affectionate and beautifully written and illustrated portrait of a uniquely interesting country; it is a moving and passionate plea to the international community to save what is unique there while there is yet time. The World Wildlife Fund, which commissioned her "to produce a book which would convey the scientific excitement of Madagascar", must have been well pleased by the total success with which she executed that commission.

Nicholas Gould

## The Humble Worm

WORKSHOP ON THE ROLE OF EARTHWORMS IN THE STABILIZATION OF ORGANIC RESIDUES. Compiled by Mary Appelhof, Co-sponsored by Western Michigan University and Kalamazoo Nature Center.

Pollution of the Ecosystem by organic residues from sources such as municipal solid wastes, municipal wastewater, sludges, and intensive animal industry wastes has reached an all time high.

Commercial vermi-composting or the breakdown of organic material by earthworms on a large scale, is an extremely viable solution to the problem and therefore the workshop hosted by Western Michigan University offered an attractive and important opportunity for workers in this field to exchange knowledge.

Participants came from several countries and included scientists and representatives from commercial earthworm farms, waste management systems and state departments.

The report is published in two volumes, the first being a publication of the proceedings and the second an extensive bibliography of relevant literature.

Papers delivered cover a wide range, and it would be impossible in this short review to mention more than a few. The opening section covers background information on the earthworm. For example, a paper written by Dr. J.E. Satchell of Merlewood Research Station, Cumbria, discusses earthworm evolution. In it, he strongly recommends that instead of relying on one or two types, as happens at present, research should be broadened so that better use may be made of the specialised characteristics of a wider range of species.

Section two looks at earthworms in relation to soil fertility and includes a paper presented by Dr. Clive A. Edwards of Rothamsted Experimental Station, Hertfordshire, on earthworms, soil fertility and plant growth. He shows how a practical programme can be put together which maximizes earthworm populations but which may conflict with modern farming practices. For instance, populations of *Lumbricus terrestris* are drastically reduced when straw is burnt on the field rather than baled or spread.

Section three studies the earthworm and its interaction with the environment. Ona Atlavinyte from Lithuanian SSR, USSR, illustrates in his paper some detrimental effects of pesticides on earthworm activity. Interestingly, survival of earthworms was higher when organic fertilizers had been added to the soil.

Section four looks at the application of earthworms in organic matter cycles on a laboratory scale and includes a paper by Roy Hartenstein involving the manure worm *Eisenia foetida*. This work shows that appropriately produced sludges and manures are valuable food sources for this species, which composts these wastes efficiently on a small scale.

Another section deals with the application of earthworms on an industrial scale. Vermi-composting of municipal solid wastes, and municipal wastewater sludges is covered, along with vermi-culture as an option for resource recovery in the intensive animal industries.

Section six treats the problems of public utilities with regard to the disposal of organic wastes, and describes research projects relating to vermi-composting which are funded by these bodies.

Volume one is rounded off with a comprehensive list of research needs.

Volume two takes the form of a thorough and extensive bibliography of relevant subjects which lists over 3,000 scientific papers.

One must conclude from this interesting and highly valuable book that "vermi-composting offers the most economical, energy efficient and ecological method of handling organic wastes", producing at the same time a potentially valuable new food source for livestock.

According to Jim McNelly of Planet Earthworm Inc., the earthworm is a prime element of the food chain and fostering its widespread cultivation is a sound investment in urban self-sufficiency and local self-reliance. In the most optimistic light, the humble earthworm may succeed in ushering in an era of soil appreciation and a closer relationship between man and his environment.



## Letters

### Population and Deforestation

Dear Sir,

I cannot allow some of the arguments of Val Plumwood and Richard Routley regarding rain forest destruction. They maintain that population increase is not an important factor, because many of the countries where rain forest is being destroyed can or do feed themselves—they devote several pages to this argument. But they admit that the forests are being destroyed to supply the export market, and there would not be the export demand if the rest of the world did not have an increasing population. They attribute the destruction to "inegalitarian society" with a big proportion of the land in large farms. Yet in Russia, which presumably has an "egalitarian society" there is much ecological destruction and many large state farms.

Denys Trussel in an article about New Zealand in the same issue (vol.12, no.1) is far closer to the mark. He points out "The classic Maori made no significant incursions into the dense forests of the North Island. The response to population pressure was more often to resort to warfare or migration". Nowadays this is seldom a feasible alternative to forest destruction.

Without population stabilisation, or hopefully reduction, the measures advocated by Plumwood and Routley can only slow down slightly the process of destruction.

Yours faithfully,  
A. de Villiers,  
Auckland,  
New Zealand.

### A Case of Suppression

Dear Sir,

You may be aware of the difficulty I had with AWRE Aldermaston over safety, which led to the interference with my duties as a councillor (and eventually a severe reprimand for some mild comments on TV that unnecessary secrecy may possibly have been detrimental to the interests of my constituents—while three AWRE shop stewards on the same programme had no action taken against them because they were "elected representatives").

Looking back it is interesting to reflect that the difficulty probably started earlier. In the 60s, as a member of the Fast Reactor Fuel Element Working Party, I recall a strong feeling of losing favour after criticising the neglect of neutron multiplication factors and plutonium reprocessing losses, both vital to the concept of a successful fast reactor philosophy.

But the crucial "error" on my part, (along with becoming a county councillor, albeit with full MOD approval, while not in the "right" political party—I'm a Liberal) was to accept the plea of the Editor of AWRE News to write a series of semi-humorous scientific articles to improve the worthy but dull image of the magazine. The first four were sketched out and the text of the first two passed by the authorities in 1973. When they first appeared, in January 1974, so much public interest was generated by its humorous but correct contention that the UKAEA would have been better occupied thatching roofs than building reactors that the next issue was scrapped on the presses so that its "How Atomic Bombs affect the Weather" never saw the light of day.

One of the MPs who has kindly taken an interest in my case is Mr. Tony Benn, for whom I worked in MinTech in 1968/9. In fact I believe the thatching joke was probably the major influence in his introduction of the Loft Insulation scheme. He also wanted to raise my case as another example of the damage done by the closed nature of the nuclear industry, but has respected my request to maintain a low profile to avoid embarrassing

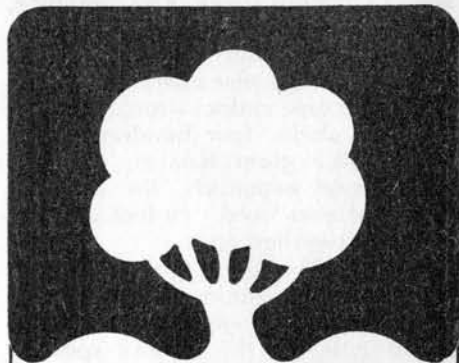
my employers, the Ministry of Defence.

I write to you now because in spite of much pressure from members of both Houses of Parliament the civil service have never agreed to have my case (which is important to the concepts of freedom of representatives to represent their constituents, freedom of speech, and avoidance of political pressure on civil servants) referred to an independent inquiry. I have just spent nine months quietly trying to persuade the Ministry's Permanent Under-Secretary, Sir Frank Cooper, to review the matter discreetly "round a table", but without success. So MPs are now about to raise the issue again, and the National Council of Civil Liberties is planning to take the case to the European Court.

Yours faithfully,  
Councillor Trevor Brown,  
2, The Glade,  
Newbury, Berks.

#### ERRATA Vol 12, No 4, July/August 1982.

In our review of Colin Sweets' book *The Cost of Nuclear Power*, the 3rd Para, 5th to 9th line should read: Thus we have been told, *ad nauseum*, that the capital cost component of nuclear power is offset by extremely low fuel costs, with the consequence that nuclear power is cheaper than electricity generated by plants operating on fossil fuels.



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# Classified

## MISCELLANEOUS

**INTERNATIONAL CENTRE FOR SOIL CONSERVATION INFORMATION.** It is planned to set up an International Centre for Soil Conservation Information as an independent, no-profit-making, educational organisation based at the National College of Agricultural Engineering, (NCAE), at Silsoe, Bedford, England. The activities of the Centre will be to collect information on soil conservation using bibliographic sources and a world network of correspondents. The information will be disseminated through a bulletin, bibliographies, and other publications. There will be an answering service for technical enquiries. The Centre will work closely with NCAE in offering training, research, and consultancy services. Anyone interested is invited to write to ICSCI, NCAE, SILCOE, BEDFORD, MK45 4DT, UK.

## PERSONAL

### VEGETARIAN MATCH-MAKERS

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## SITUATIONS VACANT

**AGRONOMIST: HONDURAS.** An agriculturalist or horticulturalist is needed to join a Parish social promotion project in rural Honduras. The agronomist will be training local agricultural promoters; developing new ways to improve agricultural production & grain storage; and supporting other work in education, animal health and co-operative development. Applicants should have HND or BSc in Agriculture or Horticulture, and

experience in grains and vegetable production. The project needs an agronomist with broad rather than high level skills, to share them with local people, working and living in their communities. The contract is for two years on a salary related to local incomes. Return air-fares, insurance, resettlement and other grants are provided; also language and other training. For further details please write to CIIR with full details of your experience, enclosing a large (A5) SAE and quoting ref EC/3: CIIR Overseas Programme, 22 Coleman Fields, London N1 7AF.

**DIRECTOR for Conservation Monitoring Centre (CMC), Cambridge UK.** International Union for Conservation of Nature and Natural Resources. The Director of the CMC reports to the IUCN Director General at Gland, Switzerland. The Director will have full executive responsibility to plan, organize and manage the Centre which consists of the Protected Areas Data Unit, the Threatened Plants Unit, the Species Conservation Monitoring Unit and the Wildlife Trade Monitoring Unit located in Kew and Cambridge, UK. A mature and experienced individual with proven management expertise is sought. No particular scientific discipline is a prerequisite but PhD, or equivalent experience is desired. Fluency in English is required; additional language ability is useful. It is likely the successful candidate will come from a scientific or R&D background. Salary scale £10,000-£15,000 negotiable (to be) commensurate with individual qualifications, experience and requirements. Letters of application, enclosing a current C/V and photograph should be sent as soon as possible to the Director General, IUCN, Avenue du Mont Blanc, 1196 Gland, Switzerland.

## PUBLICATIONS

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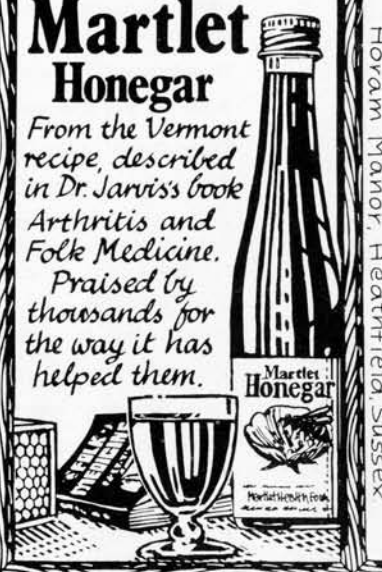
**SOIL CONSERVATION SOCIETY OF AMERICA.** 38th Annual Meeting: *Resource Information for Conservation Decisions*. July 31 - August 3, 1983. Sheraton-Hartford Hotel, Hartford, Connecticut. In keeping with the above theme, members of SCSA and others are encouraged to propose papers that speak to one or more of the following issues: 1. Information requirements for conservation decisions. 2. Resource data acquisition. 3. Information extraction. 4. Communication of resource information. Selection of submitted (volunteer) papers will be made on the basis of 500-word abstracts due December 15, 1982. Notification of paper acceptance by February 1, 1983. Please send abstracts to: Dr. Marion F Baumgardner, Program Chairman, Soil Conservation Society of America, 7515 N.E. Ankeny Road, Ankeny, Iowa 50021-9764.

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