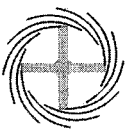
God's Clockmaker



1. Richard of Wallingford shown as abbot, in the act of dividing a circular instrument, probably meant to be his albion. Hanging in the alcove is a quadrant, while the books on the floor perhaps symbolise his many writings. British Library, MS Cotton Claud. E.iv, fol. 201r. (*British Library*)

God's Clockmaker

Richard of Wallingford and the Invention of Time

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Preface

RICHARD OF WALLINGFORD was the most original English scientist of the later middle ages. His life began with few advantages and ended prematurely and in great misery, but it was lived with a burning intensity. He studied and taught mathematics and astronomy at Oxford, England's premier university, going on to become abbot of St Albans, England's premier monastery. At Oxford, he made important contributions to mathematics, and designed new astronomical instruments. At St Albans, in an environment that was anything but tranquil, he designed an extraordinary clock. It is the very earliest mechanical clock of which we have detailed knowledge, and in several respects was without equal in the following two centuries.

How should a person of such diverse talents be remembered? That he is not well known to history has much to do with the difficulty of his scientific thought. The biographer of a man born more than seven hundred years ago—even though he was an abbot whose life merited a lengthy account in his abbey's chronicles—does not have the luxury of personal documents to leaven the account, or to expose his subject's personal feelings. Richard's recorded actions as abbot give us a passable idea of his character, which in the ordinary sense of the word his scientific writings do not, but it is his writings which justify his place in the history of ideas. While they are not to the taste of every reader, any more than they were to that of the St Albans chroniclers, a man who made outstanding mathematical and astronomical advances deserves to have them not only listed but explained. Without his scholastic background he could not have designed his clock; without his scholarly reputation he would never have become abbot; and without the wealth of his abbey he would have remained just another scholar, dreaming of a machine that could never be brought into being.

The invention of the mechanical clock was one of the great turning points of history, an important junction on the tortuous road which eventually led to European economic and technological pre-eminence. Although the invention took place some years before Richard of Wallingford's birth, since his writings shed much light on its genesis I have asked how it came about, what motives lay behind it, what precise form it took, and where the breakthrough was made.

One of the difficulties of presenting medieval history to a wider public is that of conveying a feeling for what the lapse of seven centuries entails. Isaac Newton is nearer to us in time than Richard of Wallingford was to

him. In the nineteenth century, on the rare occasions when English historians took note of pre-Copernican science, it was to dismiss it as a product either of ignorance and superstition or of hair-splitting logical vacuities. A few found signs of hope for the future of English pragmatism—for instance, in Roger Bacon's visions of marvellous inventions yet to come—but that was as far as the general level of scientific education allowed them to go. Many, on the other hand, considered themselves very close to the religious sentiment of the middle ages, notwithstanding the barrier presented by the Reformation. Today, people are likely to be more familiar with voodoo than with medieval Christianity, more familiar with Tolkien than with Dante. Historians who study the intellectual movements of the middle ages are of course in another category, but are not always free from prejudice. Some write as though there was no world outside the lecture room, paying deference wherever they detect depth and subtlety, but in an entirely bloodless way. Others, impatient of logic, natural philosophy, mathematics, and science in its more easily recognised forms, find all the social history they need—and an occasional scientific insight—in occult practices, and even in witchcraft. Richard of Wallingford does nothing to help his biographer in any of these respects. He was neither a white-coated experimenter nor a bloodless logician; he was no magician, and he did not know the secret of the Holy Grail. He was a creature of the age in which he lived, and should be judged by the manners, the religion, and the science of his own time. That is why I have thought it necessary to explain at some length what his lost world was like.

The final part of the book goes beyond the personal history of earlier chapters. It places Richard of Wallingford in the wider context of western science, which was rapidly gathering momentum in his day. While not intended as a comprehensive history of western scientific thought, this part carries a serious message about the vital importance of the exact sciences of the later middle ages to the scientific movement that followed in its wake. The thirteenth and fourteenth centuries witnessed a growing appreciation of scientific ideals which we now take for granted, in particular those relating to the mathematisation of science and the creative character of the act of formulating new concepts and theories. This part of the book still has a biographical purpose, but on a larger scale. It surveys the chief tributaries to the Oxford tradition in which Richard of Wallingford was nurtured, those originating in ancient Greece and medieval Islam; and it deals with some of the streams which issued forth from Oxford after his time. It is not intended as a history of Greek scientific genius or Islamic virtuosity, except in so far as they touch on the life of the subject of this book.

Central to the sciences discussed here are natural philosophy, cosmology, mathematics, astronomy, and astrology too—where it followed similar

norms. The high point of Richard of Wallingford's science was reached with his use of certain mathematical techniques, which passed from him to later generations. They were exploited, to be sure, by only a discriminating few. Then as now, the imagination was caught far more easily by an expensive clockwork artefact than by an esoteric mathematical theorem—but the design of his clock also rested heavily on mathematics. To do even rough justice to the technicalities of Richard's work it is necessary to include a certain amount of formal detail, but I hope I have included signposts enough for those who wish to pass it by.

One purpose of this book is to make materials I first assembled between 1964 and 1971 more easily accessible. They were published as *Richard of Wallingford* (Oxford, 1976), in three volumes, which those who require further detail will need to consult. In the preface to that edition I thanked the many friends who helped me with it at the time. I have dedicated this volume to the memory of three of them. Francis Maddison is a fourth whom I must mention, for it was he who first made me aware of the many unanswered questions surrounding the origins of mechanical timekeeping, and who led me into a medieval maze from which there was to be no escape. It was my wife Marion, however, who—having learned to live with the edition all those years ago—suggested that the time had come to introduce Richard of Wallingford to a more general readership. In doing so, it has been my good fortune to work with Martin Sheppard, a devoted editor of an almost extinct species. I thank him, and all at Hambledon and London, for their timely support.

March 2004 Oxford

By the Same Author

The Measure of the Universe

Richard of Wallingford (3 vols)

Horoscopes and History

Stars, Minds and Fate

The Universal Frame

Chaucer's Universe

Fontana History of Astronomy and Cosmology

Stonehenge

The Ambassadors' Secret

In Memoriam

Willy Hartner	1905-1981
Alistair Crombie	1915-1996
Olaf Pedersen	1920-1997

who shared the belief that medieval science did
not begin or end with the middle ages

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Part One

Foundations

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1

Eclipse

WHEN JOHN LELAND stood at the crossing of the nave in the abbey church of St Albans in 1534, and looked towards the great window in the southern transept, he saw something he thought to be a marvel without equal in the whole of Europe. What he saw was already two centuries old. It had been built for his monastery by Richard of Wallingford, abbot of St Albans, with great labour and at enormous expense. The abbot was a man whose office was a symbol of the wealth and power of the church, but what he had offered to his community was meant as a proof of his skill, his great learning, and his piety. The modern mind is so sated with ingenious contrivances that it is no longer easy to understand the awe, even veneration, shown towards a clockwork mechanism, however complex, but those sentiments were real enough.

We may call it a clock, although a word closer to Leland's Latin would be 'horologe'—an instrument for telling the hour. Neither word really explains its purpose. As Leland looked at the colossal dial of the clock, high on a gallery below the great south window, he might have seen the places of the Sun, Moon and stars as they were at that moment in the heavens. He might have seen that the Moon showed the same phase on the dial as it was showing currently in the sky, and it might have been explained to him that the Moon's eclipses in the heavens would likewise be correctly displayed at the appropriate day and hour. In looking south at this colossus he was looking in the direction in which the true Sun, the Moon, and most of the visible stars, reached their highest points in their daily motions around the sky. Some of those occurrences might have been visible through the window above the clock, but there were things shown on the dial that were not to be seen at all in the St Albans sky: the ebb and flow of the tide at London Bridge; a moving image of changing human fortune; and numerous lines and geometrical figures that in all probability Leland did not understand, but that only served to enhance his admiration.

Leland tells us something more, namely that Abbot Richard the clockmaker had composed a set of rules concerning the clock, lest it deteri-

orate through the fault of the monks, or cease to function because they were ignorant of its structure. That book, which to all intents and purposes was lost for more than four centuries, has now been found. As a result, most of the workings of the machine—it was as much a celestial theatre as a timepiece—are now known to us. We know nothing whatsoever of the detailed workings of any earlier mechanical clock. The fact that this is the earliest known mechanism of its type, and yet was in many ways more complex than any other from the two centuries following Richard's death in 1336, makes it doubly remarkable. Leland's instincts were right. He was right to describe the abbot as 'easily the first in mathematics and astronomy in his day'.[1] It is true that to justify those claims he had only the written testimony of others, and a few of the abbot's own writings that he could not readily understand, but no one knew the manuscript remains of the English monasteries better than Leland. He was far more than a royal chaplain on a sightseeing tour. As the king's librarian and antiquary, he was expressly commissioned to search for antiquities of all kinds, in all the cathedrals, religious houses, and colleges of England. The clock caught his attention twice over, partly for its own sake, and partly because it related to an important group of manuscripts.

The circumstances of John Leland's appointment are notorious. Henry VIII's wish to divorce Catherine of Aragon and marry Anne Boleyn had brought to a head many a long-running question of discontent at the idea of English subservience to the pope, and widespread corruption among the clergy. The idea that divine law was on a higher plane than human law offered comfort to those who thought they would benefit more from the former than the latter, and those who identified more closely with the state usually accepted—however grudgingly—that church and state should stand apart. The break with Rome spelt the end of monastic wealth and privilege, but also of monastic learning. The new English church, with the king at its head, almost inevitably became an arm of the state: it was too rich and powerful to be allowed an independent role. When Henry's personal, political, and diplomatic plans began to outrun his finances, he was easily persuaded that he had the right to seize the great wealth of the monasteries. Most church institutions eventually bowed to royal authority, but excuses were easily found. The open allegiance of some of the monasteries to the bishop of Rome was considered a threat to the state, and Catholic uprisings in 1536 and 1537 seemed to confirm that they offered a serious threat to the new order. Their wholesale dissolution was therefore pursued with great vigour. Within three years the English monasteries had virtually disappeared. Their wealth had been enormous: when their income was

transferred to the crown it virtually doubled all previous revenues. In time, there came another kind of dissolution, when Henry and his descendants sold off the land to pay for wars and adventures in foreign policy. Reminders of the great achievements of medieval monasticism were lost to the public consciousness, and with them the memory of Richard of Wallingford, his clock, and his learning.

For all this, Leland of course carried none of the blame. While he approved of the church's reformation, he recognised that there was much more to be rescued than gold, silver, buildings and land. He had impeccable qualifications for the commission given to him in 1533. Touring the country between 1534 and 1542, he listed the contents of thousands of monastic manuscripts. He tells us that at St Albans he was shown their 'parchment treasure' by a 'duly erudite monk'. The man in question was an Oxford scholar, Thomas Kyngesburye, and the irony of the situation is that it was he who was later called upon to sign the parchment transferring the monastery to the crown.

The break with Rome marks not only a break in history but one in historical knowledge, and we owe much to Leland for making this break less serious. In 1546 he printed what amounted to an advance notice of a projected bibliography of British writers, as a gift for the king. It was the prototype of a succession of similar works. Through them we can begin to build up a picture, not only of the intellectual and monastic life of England in the middle ages, but also of the medieval universities, and of such scholars as Richard of Wallingford who belonged to both worlds. Leland's work was re-edited by John Bale in 1549. Within a year, Leland was certified insane; and by 1552 he was dead, with the great bulk of his papers unedited and left to others to put into print. What he had provided on his 'laborious journey'—Bale's very apt description—was a window into a past that most of his fellow-countrymen seemed at the time to be happy to forget.

Among the manuscripts preserved from the monastery of St Albans there was one that mattered more to the history of the place than any other, and Leland made much use of it for his own researches. It was the *Deeds of the Abbots of the St Albans Monastery*—in Latin, the *Gesta abbatum monasterii Sancti Albani*—and it is now in the British Library as manuscript Cotton Claudius E.iv. Compiled at various times over a long period, it includes an account, now known to be faulty in several details, of the abbots of this rich and important monastery. It opens with the reputed refoundation of the monastery by Offa, the powerful king of Mercia, who died in the year 796. The chief compiler of the *Gesta abbatum* was the St Albans monk Thomas Walsingham, writing in or around 1440. For information before 1308,

Walsingham simply took over the writings of Matthew Paris, the renowned thirteenth-century artist and historian of England, and William Rishanger. Both of them were monks of the abbey. Matthew Paris had inherited much of his material from another, his predecessor Roger of Wendover, who died in 1236. (Roger's writings are an important source of early English history, but they are often quite fanciful, as when he tells of how the whereabouts of St Alban's remains were revealed by an angel to Offa during a visit to Bath; and of how the king then journeyed to Rome to get the papal blessing for his grand project.) For the period from 1308, Walsingham relied on notes and remarks made by other monks, and on his own experience. We owe our first debt to him, as we try to piece together the life of Richard of Wallingford. There are perhaps three significant sources of information to be detected in his account, apart from something more extensive and infinitely more valuable: Richard's own writings. For the most part, these were simply beyond the understanding of Thomas Walsingham and most of the monks of St Albans.

2

The Black Monks

THE ABBEY OF ST ALBANS was in one respect unexceptional. It was a monastery under the jurisdiction of an abbot, in which monks and lay brothers followed the rule of life of St Benedict, who had lived more than eight centuries before Richard of Wallingford's time. It stood in a tradition with a long and rich history which had begun in Benedict's Italy, but had eventually spread to Gaul and the rest of Europe. The order was not strongly centralised. In principle, each Benedictine monastery had a large measure of autonomy, cohesion being provided simply by adherence to a shared rule. This left plenty of scope for individualism. Like all Christians, those who followed the Benedictine rule were taught to shun pride—the first of the seven deadly sins, and considered to be the fountain of all others—and yet the monks of the St Albans cloister knew that their abbey was in many respects out of the ordinary. Their abbey was well endowed. It had greater privileges, and greater revenues, than almost any other in England, and with the exception of Canterbury, for most of its history it supported more monks than any rival house.

The abbots of St Albans claimed precedence over all other English abbots, in view of the fact that their monastery was founded to honour Alban, Britain's first Christian martyr. The story of that martyrdom, which very probably took place in the middle of the third century, contributed much to the *esprit de corps* of the foundation. Alban had been a high-born native of Verulamium—the Roman name of the town that would eventually be named after him. He held Roman citizenship and probably military rank. Tradition has it that, although he was a pagan, he sheltered a persecuted British Christian priest, whose piety made such an impression on him that he was himself converted to the Christian faith. When the Roman authorities tracked down the priest, Alban gave him his own cloak, so allowing him to escape. Arrested, Alban refused to make a pagan sacrifice and was condemned to death. The story had it that he converted one executioner, but was beheaded by a second—whose eyes were said to have dropped out as a well-deserved punishment. In time, the story

of the disguise led to the name Amphibalus—from the Greek word for cloak—being assigned to the priest whose life Alban saved.[2]

Whatever the date, a church was eventually built to commemorate the event, with a shrine to which the sick were taken to be cured. There was some sort of monastic settlement by the fourth century, and in the year 429 Germanus, bishop of Auxerre, visited the place and spoke highly of the community. According to tradition, the church was eventually allowed to decay and was forgotten, only to be newly discovered by divine revelation in the time of Offa, king of Mercia. He was credited with founding a monastery on the site in the year 793. It was said to have been for a hundred monks under the Benedictine rule—and a hundred was still more or less the number of monks when Richard of Wallingford was elected abbot in 1327. The old story was challenged at an early date, and there was a long dispute with the monks of Ely as to who held the true relics of Alban—relics, of course, produced revenue from pilgrims. The case for the St Albans monastery was reinforced by the supposed rediscovery of their patron saint's original grave in 1257—not the last archaeological counterfeit in the neighbourhood, if that is what it was. In 1439, at the request of the abbot of the day, the legend of the saint was put into verse by the English poet John Lydgate. Alban's cult had spread to France at a very early date and Lydgate was able to draw heavily on a French poem. The last of the abbots of St Albans had Lydgate's account printed at a press in the town, shortly before John Leland's visit, unwittingly marking the end of a chapter of history covering at least twelve centuries.

The Order

Pride in the monastery was coupled with pride in the Benedictine order itself, which had a thousand years of history behind it by the time the English monasteries were eventually dissolved by Henry VIII. Strictly speaking, Benedict had never been a priest, but by the time he was driven out of his native Umbria around the year 525 he had already founded a group of twelve religious houses, with ten monks in each. He finally settled in Monte Cassino, halfway between Rome and Naples, and there established not only a monastery but a monastic rule which would in time provide the guiding principles for almost all monastic life in Europe, not only that of the Benedictines.

The phenomenal success of the rule owed much to the fact that several talented Benedictine monks found favour at the courts of the Holy Roman Empire and with other influential potentates. One of the great strengths of the rule was its flexibility, but at its inflexible core was its insistence on

prayer, the reading of the scriptures, and manual work. As a young man, Benedict had been so appalled at the behaviour of his fellow students that he had gone into retreat, away from all learning—'knowingly unknowing, and wisely untaught', to use the words of his biographer Pope Gregory. In short, Benedict's did not begin as an intellectual movement, and yet the combination of prayer, biblical study and labour fitted his order for a role that he had not foreseen: to educate, first the monks, and later, others, who were destined to live and work in the world.

Through their missionary work among people of all ranks in society, the black monks—so called because of their dress—spread rapidly across Europe. Their rule was introduced into England by St Augustine of Canterbury, as early as 597. The monks became a civilising influence, partly by their teaching but also by their example—in agriculture, arts and crafts, and even in the ways of organising daily life efficiently. These men were far from being entirely otherworldly, but in any case the earliest monasteries consisted largely of laymen, with a relatively small number of priests among them. That strong lay element never disappeared, and it provided the order with much of its strength.

Benedictine writers constantly remind us that their communities were primarily meant to study virtue, rather than learning for its own sake; but then they proceed to point out how so many of the great members of the order in the past, and the libraries of the houses in which they lived, testify to the honour in which learning was held. Benedictine historians often observe with pride that their rule has been issued in nearly a thousand editions in the course of the fifteen centuries of its history; but rule books are a better index of obedience than of erudition. More convincing early witnesses were two Englishmen who seem to typify the ideal of the scholar-monk. The first was Bede, whose writings on grammar and the calendar of the church, chronology and history, music and poetry, scripture and the lives of the saints, all tell us much about the extraordinary flowering of Northumbrian culture before its suppression at the hands of Viking invaders. Bede's works were fortunately copied in England and on the continent before this happened, and they had earned for him the title of 'Venerable' at least as early as Alcuin, the second of our great English Benedictine scholars. Born about 735, the year of Bede's death, Alcuin was the most able of those whom the emperor Charlemagne gathered around him. 'The schoolmaster of Europe' had been trained in the school of York, of which he had become head by the time he met Charlemagne on a journey to Rome in 781. By his writing and teaching, Alcuin inspired and guided a new intellectual movement, not only in theology and biblical

studies, but in the philosophy and secular learning of antiquity which was then being rediscovered.

Learning apart, there were many regional variations in the ways the Benedictines conducted themselves. In Burgundy, the order became highly centralised under the autocratic leadership of the abbey of Cluny. A movement for spiritual reform, reaching a climax in the eleventh century, spread from there to other parts of Europe, including England. There is no doubt that St Benedict intended his monks to do their own manual work, but as time passed, they did less and less. The Cluniac understanding of the rule placed much greater emphasis on the time to be given to prayer, which eventually came to occupy a large part of the typical monk's day. In due course—in the eleventh and twelfth centuries especially—new orders of monks were established with new identities, accepting Benedict's rule but supplementing it in ways that led to greater austerity and a channelling of worldly into spiritual energy.

This change brought a number of problems in its wake. In England, the Cistercian order was the most successful of those new orders. The Cistercians were at first of a more pragmatic cast than most, and in the twelfth century they attempted to revive the ideal of self-sufficiency in manual labour. Even there, the attempt was short-lived. In the course of the following century, leaders of monastic communities of all persuasions were growing increasingly concerned with the need to fill the time on the hands of their monks. Prayer had its limits. By order of a general chapter of black monks in 1277-79, abbots were to find administrative duties for more of their monks, while others were to be put to copying, illuminating, and correcting manuscripts. (Such pursuits were all easily justified by a number of instructions laid down by Benedict himself.) There were monasteries in plenty where the monks were either too few or without the necessary level of literacy for this to be an effective solution to the fundamental problem, but the monastery of St Albans was certainly not one of them. It had long been a hive of intellectual labour, and was well equipped to adopt the changes ordained—to the benefit of Benedictine scholarship more generally.

Federation

The English Benedictine monasteries were to be numbered in hundreds, great and small. For many centuries they remained true to their ancient tradition of independence. There was a slight tendency for clusters of houses to form, following the lead of Cluny, but it was not until the year 1215 that confederation was raised to the status of a general principle,

throughout the church as a whole. In that year the fourth and greatest of the five Lateran councils—so named because they were held in the Lateran Palace in Rome—met to consider church reform. Among many other weighty matters, it was decided that the monasteries within each province of the church should be federated for the sake of strength and discipline. (The English provinces were Canterbury and York.)[3] It was decided that the heads of the monasteries, their abbots, should meet every three years, in their so-called 'provincial chapters', to decide on important matters. Not only should they make laws that were binding on their communities, they should appoint visitors who would report back to the chapters on the state of affairs, spiritual and material, in their abbeys.

The loose federation allowed for competition, but within tolerable bounds, and this helped to stimulate resourcefulness in economic, social, and political affairs. These had not been Benedict's own priorities, but times had changed, and the church with them. The new formula for federal government often failed miserably in Benedictine houses on the Continent, but in England it worked reasonably well, despite an abundance of jealousy and personal animosity between abbots. Then as now, there was one easy way of avoiding a clash of human wills in the upper echelons of administration: members of committees simply stayed away from meetings, so weakening the federal ideal. Interference by visitors from outside the order was something they found harder to bear than enmities within it. There were to be Benedictine visitors, but augmented by bishops appointed from outside, bishops who of course did not belong to the monastic system. The abbeys became accustomed to visitation by bishops, although they both resented and feared the experience. There is one story of a monk who broke out and enlisted in another monastic order altogether at the thought of an impending visitation by the tireless scholar-bishop Robert Grosseteste. (It is true that Grosseteste had an unusually fearsome reputation, for in his first wave of visitations, held during the first six months of his episcopate, he deposed no fewer than seven abbots and four priors.) The bishops, on the other hand, resented sharing their powers of visitation with insiders to the system; and then again, some abbots greatly resented the thought that rival abbots would sit in judgement on them, and preferred to subject themselves to episcopal visitations.

The two English provinces, with their federal organisation, were on the whole well regulated, and the larger houses especially flourished. By the end of the thirteenth century, the organisation controlled about three hundred Benedictine houses, many of women, but more of men. These included some of the country's greatest religious institutions. Especially

noteworthy for their wealth, privileges, and numbers were the abbeys at St Albans, Canterbury, Westminster, Bury St Edmonds, Peterborough, York, and Durham. To be a black monk implied renunciation of the world, but to be a member of such an organisation as theirs in the thirteenth and fourteenth centuries was to be conscious of being member of an elite. To be an abbot within such an organisation meant something more. St Benedict had planned that all within the cloister should be equal, and that those holding high office should be elected by their fellows. By the later middle ages the forms were still observed, but the powers of the elected abbot had grown so great that humility was all too often stretched to breaking point.

The Monastery

Apart from pride in his order, and pride in the fact that his abbey was first in order of foundation in England, the St Albans monk would have taken pride in its architecture. The abbey church—now the cathedral—was set high on one slope of the green valley of the River Ver, across from the site of the Roman town of Verulamium. During the middle ages that city was the first of any importance north of London, about twenty-five miles distant. A Roman road, called Watling Street by the Saxons, ran from Dover through London to Wroxeter near the Welsh borders. It had originally gone through the middle of the town of St Albans, but at the end of the eighth century or thereabouts it was diverted—surely Britain's oldest town by-pass. By the tenth century, the abbots were beginning to dismantle the ruins of Roman buildings for materials. Roman Verulamium had covered about 200 acres, and the store the abbots assembled was so massive that most of it remained unused for centuries. What the Saxons built was modest, even so, and was treated with some disdain after the Norman Conquest, when Paul of Caen was made abbot in 1077.

Paul was well connected—some even said that he was the natural son of Lanfranc, whom William the Conqueror made archbishop of Canterbury. True or not, it was Lanfranc who appointed Paul to St Albans. Both had previously been at the Benedictine abbey of St Stephen (St Etienne) at Caen, Lanfranc as abbot. When they began to build their English churches they modelled them on that church at Caen, but with one great difference: whereas at Canterbury the church was a copy of the church of St Etienne in plan and measurements alike, the building at St Albans was more elaborate than either, and on a more ambitious scale. Abbot Paul—or rather his great architect Robert the Mason—was there able to make use of a massive supply of well-seasoned timber that his predecessors had laid by. Whatever

they thought of the elegance of the other materials there assembled, they were not above making use of them. Among other properties of the main church, this explains the broad Roman tiles that are still to be seen in large numbers in its walls. Paul of Caen considered his Saxon predecessors coarse and uneducated (*rudes et idiotas*), and he is even said to have destroyed their tombs. The chronicler Matthew Paris found many of Paul's actions hard to forgive, and the arrogance towards native English traditions which gave rise to them. It is a historian's foible to protest at the loss of the past, added to which it was not Paul's own past he was destroying. Memories are short, however, and the monumental scale of his new buildings at St Albans was something of which the monks could be proud.

The massive crossing tower, originally capped by a pyramidal roof, was itself an architectural masterpiece. No other great church of the eleventh century still has its crossing tower still standing: those at Winchester, Lincoln, Wells, York, and Chichester all suffered disasters of one sort or another, the first two shortly after completion. The ambitious outline of the Norman church at St Albans was not very different from that which survives today, although the structure was often altered in its details. When the church was eventually extended at the eastern end, the form of the apse of Abbot Paul's church was lost. Even some of the extensive twelfth-century work that was added to the Norman original has been lost. At the very end of that century, John de Cella (abbot from 1195 to 1214) pulled down the west front and parts of the aisles, and began to replace them with something more to the taste of his own time. In 1250 there was an earthquake, and by 1257 the opening of cracks in the fabric made it necessary to demolish and rebuild much of the eastern end of the Norman church. For the rest of the century the resources of the abbey were spent on rich embellishments—a fine painted timber vault over the rebuilt presbytery, a Lady chapel, a sanctuary and an ante-chapel, for example.

When Richard of Wallingford first set foot in the abbey as a young monk, at the beginning of the fourteenth century, its church would have been a source of great admiration, even to someone who is likely to have visited the great London churches. Under Abbot Hugh of Eversdone, the new Lady chapel at the eastern end of the church had just been roofed and glazed, after long delays. The interior of the church had grown to about 515 feet long (157 m). Where church builders in Normandy vied with one another for the height of their vaults, in England they seem to have valued length. For those who measured architectural glory with a rod, the St Albans church was only marginally shorter than the cathedral at Winchester—although both were admittedly shorter than St Paul's in London. A

contest based on the length of the nave alone, however, gave the palm to St Albans. At about 300 feet long (91.4 m), it had the longest nave in Christendom.[4]

The tower too was larger than most, the tallest surviving Norman tower in England. Apart from its broached spire, it still stands as it stood when built. Despite the presence of Early English and Decorated styles of architecture in the church, the Norman presence is still felt. The only Saxon remains are some substantial lathe-turned baluster shafts in the arcading of the transepts, where they had been reused by the Normans. Some say that they came from Offa's church, but they are more probably from the tenth century.[5] In overall form, the church Richard of Wallingford would have seen was much the same as that we see today. One striking difference would have been in the use of colour, which the English Reformation swept away. A fine series of paintings on the piers—scenes from the life of the Virgin, crucifixion scenes, and others, all in tempera—was uncovered in the course of restorations in 1862. They are a reminder of changed attitudes to what a church should be. Much of the painted ceiling fell victim to the Victorian renovators. That at the eastern end of the church is from the fifteenth century, overlaying thirteenth-century painting that Richard of Wallingford would have known.[6] Perhaps the most striking of all the early painted murals, detected with great difficulty in modern times, would have been one showing 'Christ in Majesty'. With his right hand raised in blessing and his left holding a chalice, Christ looked down on the altar. He was seated on a double rainbow within a great lobed mandorla, against a ground with diaper pattern. Flanking the whole stood the apostles Peter and Paul, each in a pinnacled tabernacle, Peter with a key and Paul with a sword.

Then as now, a person entering at the western end of the church would have been unable to appreciate all of its complexities at first sight, since its great length is broken up into spaces appropriate to different uses. First is the main part of the nave, in which the general congregation gathered. It ends in an altar to the Virgin, and a fine carved stone screen from 1350, replacing the wooden screen that Richard of Wallingford would have known. Beyond, and hidden by it, is the choir, where the monks worshipped at appropriate hours throughout the day. Beyond that is the presbytery, but first there is an interruption at the crossing, with the interior of the great tower and its fine lantern above us, and transepts to left and right. Today in the south transept there is a lonely thirteenth-century angel with outspread wings, retaining some of its early paint. In the north transept

there are still a few medieval tiles, and examples of mid-fourteenth-century glass.

Eastwards from the crossing is the presbytery, which had a thirteenth-century timber vault and floral bosses above it, again much more colourful then than now. The eyes were and are drawn in the first place, however, to the high altar at the far end. The present richly carved stone screen behind it is one of the finest of its kind in England, but it dates only from the late fifteenth century. In Richard's day it would have been of wood and much simpler. Here in the presbytery and its aisles there are tombstones in the floor, many of them of past abbots. Richard of Wallingford's is now among them. Like most of the others it has lost its brasses, although we do at least know in his case what the inscription was. In Norman French, it promised indulgence to the passer-by who said a prayer for his soul.[7]

Beyond the great screen, and hidden by it, is the chapel of Saint Alban, with the shrine to which medieval pilgrims flocked in large numbers—an attraction carefully restored around 1300. It is richly carved with scenes of the saint's history; and again we can still make out traces of paint on the stone. A magnificent grille of Sussex wrought iron, blacksmith's work, dating from around 1275, protected the shrine from the press of pilgrims (Fig. 43 below). In the fifteenth century it was thought necessary to build a 'watching chamber' to keep guard over the shrine and the gifts left by pilgrims. Its frieze of oak shows scenes of contemporary life and the martyrdom of St Alban. Finally, beyond the shrine of St Amphibalus, the priest in the Alban story, the church ends at the Lady chapel.

Such a church as this was a wonder, scarcely to be matched in all of England, but it was only one element in a greater complex of monastery buildings. Most of the others are no longer standing, but we can still get an idea of their great scale from the traces of their foundations in the fields and lawns surrounding the abbey church. There is still an imposing gatehouse, built as the main entrance to the abbey court, although it is one which replaced the gatehouse known to Richard of Wallingford, destroyed in a hurricane nearly thirty years after his death.[8] There are a few remains that give us an impression of other buildings—of the vanished cloister quadrangle, of a smaller cloister, kitchens, chapter house (now replaced), dormitories, and guest houses. The church has kept much of the old character provided by its massive proportions and the texture of its brick, flint, and stone. The fabric of the vanished buildings would not have been very different. To envisage its appearance in Richard of Wallingford's day it is necessary to screen out the nineteenth-century additions, which speak

loudly for what Lord Grimthorpe and his fellow restorers thought the middle ages should have been.[9] The west front is all Grimthorpe's work, but the tower and main transept walls, have been little altered since Paul of Caen's time. The transept windows are Grimthorpe's, but those he replaced were not as old as the fourteenth century.

Buildings on such a grand scale were not immune from occasional misfortune. When Richard of Wallingford first entered the abbey church as a young novice it was much as we have described it. When he became abbot, in 1327, it was in a less happy state. Two great columns on the southern side of the main church had collapsed on 10 October 1323, during the celebration of mass. Within an hour, the wooden roof they supported, and the aisle on the south side of the church, followed suit. 'Only two monks and a boy were killed.' The catastrophe—due to poor foundations—was followed by another, when temporary supporting timbers fell with more masonry and much of the cloister. Those events led to an eventual rebuilding of the Norman cloisters and five bays of the southern side of the church. (It is easy to distinguish the Decorated style of architecture on the south side from the rest.) The glories of medieval building which most of us now admire are those which have stood the test of time. Very many did not. The architectural miseries continued later in the same year, when the greater part of a stone wall behind the dormitory also collapsed. Elsewhere in the church a wooden beam fell on the shrine of St Amphibalus and broke the thigh of a mason working there. The beam demolished the marble shafts supporting the shrine, but miraculously left the wooden shrine itself intact.

The saint was duly thanked for his intervention on this point, but speaking more generally, the calamities of 1323 put a great strain on the monastery's resources. To Richard of Wallingford, when he became abbot, this was a serious obstacle standing in the way of a project much nearer to his heart than the repair of stonework. He needed large sums of money to build a great clock for his abbey, the like of which no other institution could rival. Throughout the nine years of life left to him, he struggled with the problem of abbey finance. This struggle helped to dictate his behaviour in other respects, but his character was moulded by more powerful forces of a very different kind.

3

Wallingford

RICHARD OF WALLINGFORD was not born into privilege, nor in the ordinary way of things would his circumstances have led him into a scholarly or religious life. He was the son of a certain Isabella and her husband William, a blacksmith of the town of Wallingford in Berkshire. The couple, as the St Albans chronicler reports, were 'prosperous with respect to the poor, and moderately so in the eyes of the rich', but 'they lived frugally and without complaining'. This sounds like a literary conceit, but no doubt harks back to Richard's own reminiscences. The year of his birth was most probably 1292. Edward I was on the throne of England, although he was then rather less concerned with home affairs than with events in Scotland and the risks of awarding its crown to John Balliol. Continuing Anglo-Scottish hostility was something to which the abbots of St Albans could not be indifferent: not only were they expected to provide troops and support for the war, but by virtue of their location they were often expected to house the king's army on its journeys from London northwards.

The Borough

Wallingford is on the River Thames, fifty miles or so to the west of London and twelve short of Oxford. It owed its early importance, indeed its existence, to the fact that the Thames was easily forded there, although by the thirteenth century the ford was supplemented by an impressively long bridge. Wallingford was no mere backwater of history. It had been an important Saxon stronghold that had grown to become the largest defended town in the kingdom of Wessex. In the year 1006 it was almost obliterated by a Danish raid under Swein Forkbeard, the father of King Canute, and the memory of that event no doubt explains why its inhabitants knew better than to oppose the army of William the Conqueror, sixty years later. In the Domesday survey, Wallingford was still by far the largest borough in Berkshire.[10]

A royal castle in Wallingford gave the town another small niche in English history, when the besieged Empress Matilda fled there following her

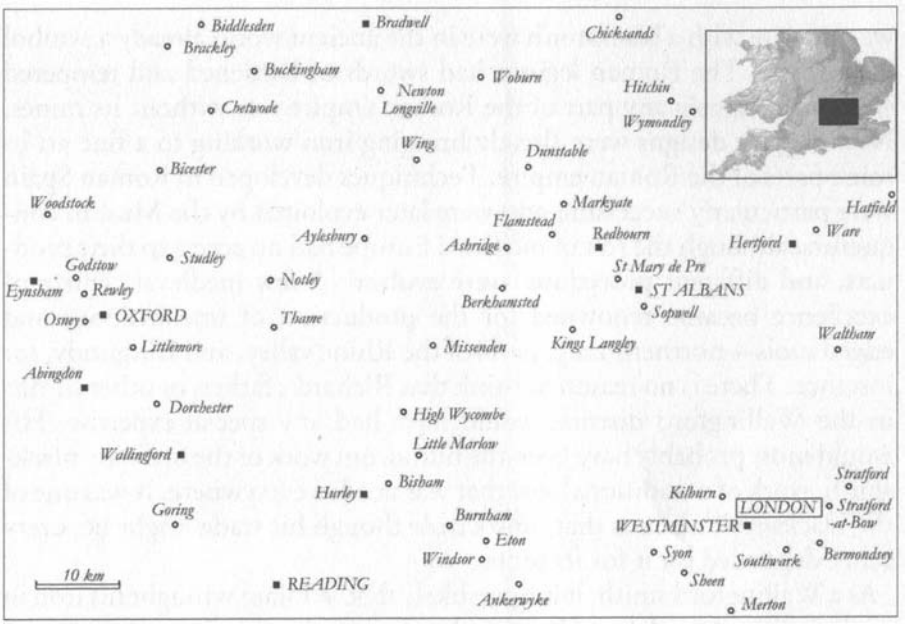
famous escape from Oxford Castle over the ice in 1142. It was at Wallingford in 1153 that a compromise was struck between her and King Stephen: he was to reign until his death, after which the crown should pass to Matilda's son, the future Henry II. Henry held his first parliament in Wallingford Castle, and it was he who presented the town with its most important charter, although the borough was then already entering a period of decline. By the time Richard was born, well over a century later, it could be said that the town was like his parents—prosperous in the eyes of poorer places but less so in the eyes of richer. It was a town from which an ambitious boy would gladly escape.

Son of the Smithy

When Richard was barely ten years old, his father died. A boy of ten is not able to take over the heavy work of a blacksmith, but at that age the son of a smith is old enough to have learned much about the trade. He would not have known that more than two thousand years of hard experience lay behind the craft, but he would have known the workings of the smithy and the various stages in the production of iron implements, on which the whole of society was heavily dependent.

Finding iron ore in reasonable quantity had never been especially difficult, but smelting it was not easy, and was often left to specialised smiths. There were many good English ores, but by this time traders from Spain, France, Sweden, and Germany were bringing into England raw iron rods and ingots of high quality for sale. Henry of Eastry, for instance, bought large quantities of Spanish iron for work at Canterbury Cathedral in 1308-9, and similar purchases from sources in Normandy are recorded at Westminster, beginning in 1294. A Wallingford smith is more likely to have bought his iron from a bloomery nearer at hand, for instance from one of several in the north of Oxfordshire, where the ore was good enough for steel.

In the bloomery, the ore was first crushed and washed and roasted, using green timber, then quenched with water to get rid of sulphur and other impurities. This preliminary work was often done by women. Charcoal—this often costing much more than the ore itself—was then mixed with the ore, and the mixture fired in a smelting furnace, the 'bloomery fire'. Bellows were the commonest device for enhancing a natural draught, without which high temperatures were impossible—and without high temperatures nothing more than a useless cindery mass of slag with embedded iron globules was obtained. The ore having been smelted in this way, a spongy mass of iron remained, namely the 'bloom'. Its quality de-



2. The region with which Richard of Wallingford was most closely associated, including the Thames valley (Oxford, Abingdon, Wallingford, and on to London) and the St Albans area. The small black squares mark places which at some period in the middle ages had religious houses of Black Monks. Circles mark small towns and villages which almost without exception had religious houses of other sorts. Woodstock (north of Oxford) was a royal seat. London was already too large for its monasteries to be mapped at this scale.

pended heavily on the efficiency of the bloomery. The slag remaining in it after the first smelting was beaten out by heating and hammering the bloom repeatedly, leaving a decent mass of wrought iron as the end product. This is what the Wallingford smith would have bought, but it is quite possible that the boy and his mother helped to improve the bloom further in the same way, according to the quality needed. It was not unusual for women to help their husbands in the smithy. In a characteristically medieval piece of misogyny—in a northern Passion play—it was said that a woman smith made the nails for Christ's crucifixion after her husband, feigning a sprained hand, had refused.

Turning wrought iron bars into implements of hardened steel, by repeated hammering and heating in contact with charcoal, was the next stage in the smith's labours. Even that technique had been mastered in various parts of the world in antiquity, so that the hammer and anvil and tongs that

we associate with a blacksmith were in the ancient world already a symbol of his craft. The Roman legions had swords of hardened and tempered steel, and scarcely any part of the Roman empire was without its mines. New furnace designs were already bringing iron working to a fine art in some parts of the Roman empire. Techniques developed in Roman Spain were particularly successful, and were later exploited by the Muslim conquerors, although the rest of medieval Europe had no access to their products, and different procedures were evolved. A few medieval centres of excellence became renowned for the production of fine weapons and edged tools—northern Italy, parts of the Rhine valley, and Burgundy, for instance. There is no reason to think that Richard's father, or other smiths in the Wallingford district, would have had any special expertise. His would most probably have been the humdrum work of the ordinary blacksmith, work of a traditional sort that was needed everywhere. It was one of the blacksmith's boasts that, unsociable though his trade might be, every other depended on it for its tools.

As a Wallingford smith, it is more likely that William wrought his iron in a furnace blown with hand bellows than in one blown by water power; and more likely that in his forge he used charcoal bought from the charcoal burners in the local forests than coal brought from a distance. Again, in both respects, the young Richard no doubt often lent a hand—the wages of paid blowers could be a costly item for the ordinary smith. Water-mills to provide powered help with the endless hammering were as yet uncommon. It is unlikely, but not impossible, that the smith had a mill-wheel, even on the slow-moving Thames. There was a revolution in iron production then beginning in England to which he might just possibly have been party. Higher furnace temperatures, together with iron of a higher carbon content, were at last making it possible for cast iron to be produced in sizeable pieces. The new process made it easier to manufacture cannons, for example, but it was in its infancy, and the military revolution to which it gave rise was still some decades in the future at William's death.

While he is likely to have known little of such innovations, William would very probably have been done work for the soldiery of the royal castle. He could not have competed with distant specialists, skilled armourers in London and the larger towns, with their strong guild organisation, but he would have made horseshoes and arrow heads for the garrison. He is more likely to have repaired than to have made their best swords, chain mail or plate armour. Much of his time would have been spent making and repairing implements for other artisans: hammers and nails, tongs and pincers, saws and files, sickles and scythes, bill-hooks and axes, adzes and chis-

els, braces and drill-bits. He would have made hinges and scroll-work for the doors of the richer townsmen and church buildings, and also glazing bars for their windows. It is just conceivable that he had been called upon to forge the wrought iron bars that were needed for the frame of a clock, or to forge and cut its shafts and wheels, but if so his experience would have been rare indeed. His son, however, would one day be in an informed position to organise his servants to do such things.

3. A smithy, as illustrated in Georgius Agricola, *De re metallica* (Basel, 1556). The scene would have been little different in Richard of Wallingford's day, although the bellows here (*B*) are rather grand, and like the trip hammer (*D*) water-powered, something unlikely in the Wallingford smithy. The forge (*A*), the tongs and anvil (*C*) and the quenching water (*E*) would have been familiar, as would the boys, with their leather aprons.

The smoke and noise from smithies, especially at night, were a common source of complaint by townsmen, and a cause for legislation, throughout the middle ages. However mixed Richard's own feelings, he would have understood those of a poet of a later date whose thoughts are famously recorded in a manuscript now in the British Library. The poet's words bring the medieval smithy to life in a way that ours cannot. While the following modern rendering of them does not catch the wonderful alliteration of the original—'Swarte smekyd smethes smateryd with smoke', and so forth—it will at least be easily understood:[11]

> Black smutted smiths, besmirched with smoke,
> Drive me to death with the din of their strokes;
> You never did hear such noises at night,
> How the lads shout, what a clatter their knocks!
> Those crooked dwarfs, they shout Coal! Coal!
> And blow their bellows till all their brains burst.
> Huf! Puf! says one, Haf! Paf! says the other.
> They spit and they sprawl and spin many a tale,
> They grate and they grind and they grumble together,
> Kept all hot with their hard hammering,
> Their leather aprons are hides of the bull,
> Their legs are wrapped against fiery sparks.
> Heavy hammers they have, and hold them tight,
> Strong strokes they strike on an anvil of steel,
> Lus! bus! las! das! they snort in turn—
> Let the devil get rid of so doleful a tune!
> The master lengthens a little, lashes on a less,
> Twists both together and tacks on a third.
> Tik! tak! hic! hac! tiket! taket! tyk! tyk!
> Lus! bus! lus! das! This is the life
> Of these clot-heads all. Christ make them suffer!
> Can a man have no sleep for the hiss of the quenching?

Richard knew how hard and unglamorous was the life of a smith. When his father died, he was perhaps relieved to think that he was not yet strong enough to take over the work of the smithy himself.

The Priory

The boy was ten and without a father, but within a year or two he found himself adopted as a son by the Benedictine prior of Wallingford, William of Kirkeby. This was Richard's salvation. Had it not been for the presence of a foundation of black monks in the town, his destiny might have fol-

lowed a very different course. In a roundabout way, his fate was another outcome of the Norman Conquest. In the redistribution of wealth that had followed the change of dynasty, the Wallingford church of the Holy Trinity had been handed over to Paul of Caen, the abbot of St Albans whose building plans transformed the great abbey. Paul soon afterwards built a house for a convent of black monks next to the Wallingford church, making it a cell of St Albans—a dependent monastery under a prior. The foundation was modest. It is not easy to say precisely how large it was, for the simple reason that, long afterwards, Cardinal Wolsey foreshadowed the great monastic dissolution to come with a lesser version of his own: in 1528 he appropriated the revenues of Wallingford Priory and a few other places to help him found a new college at Oxford. There are now no priory buildings remaining.

In Richard's lifetime, Wallingford Priory was one of eight cells subservient to St Albans, none of them large. The dependent priories at Hatfield Peverel, Hertford, Redbourn, and Wymondham were all closer to the parent abbey, while others at Belvoir (Lincolnshire) and Tynemouth (Northumberland) were much more remote. There was also a dependent hermitage at Markyate. Each cell supported between five and a dozen monks, and each would have had a similar number of servants, and perhaps a few lay brethren.

The Wallingford priory had been first colonised by the monks sent by Abbot Paul of Caen, at the end of the eleventh century. It was never a large institution, but it launched Richard on his Benedictine career. He would certainly not have been expected to take the vows of a monk immediately: we are told that he was simply adopted as a son by Prior William on account of his 'loneliness and aptitude and great promise'. That such a judgement was possible might indicate that the priory had already given tuition to Richard, and perhaps to other boys in the borough. His father had very probably done smithing work for the priory. It is of course conceivable that William and his wife Isabella had at some stage promised the boy to the church. In the early years of the Benedictine order it had been customary for parents to offer their sons to monasteries at seven or eight years of age, but by the end of the thirteenth century this habit of 'oblation' had officially disappeared, and monks had to be at least eighteen or nineteen, and know their own minds, before committing themselves. (The St Albans chronicler Matthew Paris, however, at one point puts the age at fifteen.)

How might Richard have lived as the 'adopted son' of the prior, a man whom he later described as 'gentle and much loved'? Monasteries and their subsidiary houses were communities of four main types of person in addi-

tion to the monks. (The analogy with nunneries is straightforward and complete.)

The *novices* were those who lived in the monastery, awaiting the day when they would take their vows and commit themselves totally to the monastic life. They were few in number. The novices were not to be admitted before giving evidence that they had a true calling, but this they were normally expected to do within a matter of months of joining the community.

After the novices there were the *lay brothers.* They did manual work of many sorts, and inhabited what was almost a monastery within a monastery, having their own rooms and their own part of the church during worship. They were of the highest importance to the economic well-being of the monastery proper, and almost always outnumbered the monks by two or three to one.

These very qualities often made them seem threatening to the ordinary monks. As a result, with the passage of time, the lay brethren tended to be replaced by *paid servants,* who were more easily controlled—porters, bakers, brewers, cooks, tailors, and so forth. In some cases the servants in men's convents were women, a fact that could give rise to scandal, or at least innuendo.

The fourth class was one of people who simply *lodged* in the monastery. They were often retired abbots or priors who had been allocated a pension, wealthy laymen who had purchased the privilege, or even complete families. The provision for maintenance was called a 'corrody'. The sale of corrodies could be a useful source of monastic income, while granting them liberally as gifts could be a burden to an abbey, as Richard would one day discover from the behaviour of his predecessor as abbot. Corrodies were sometimes traded for a flat sum of money, and there were many instances where the monastery began to regret a recipient's longevity. There is a known case of the sale of a corrody to a Jew, and another (at Dunstable) of a corrody sold on behalf of two boys, one of them at school. The king reserved the right to a permanent corrody at St Albans, to which he could nominate anyone he chose.

Residents in all four categories might be found in dependent cells, just as in the larger abbeys, although of course the numbers in the cells were much smaller. It is quite possible that Richard was resident in the priory in the fourth category, without formal payment, schooled by the prior or another of the monks. Whatever evidence William of Kirkeby might have had for the boy's promise when he adopted him, the prior had enough confidence to send Richard off in due course to study at Oxford. This he did at his

own—which is to say the priory's—expense. Nothing is known of the prior's own scholarship. He is not recorded as a member of Oxford University, but St Albans had its own school, and he might have been educated there. Monks as a whole, and priors and heads of houses in particular, were expected to be reasonably well educated. Only occasionally did it happen that senior monks would appoint an ill-educated or otherwise weak man, in the hope that they would find him easy to manipulate.

Richard remained under the prior's eye between the ages of about twelve and sixteen—that is, between 1304 and 1308, or thereabouts. His later achievements suggest that he made good use of this time to prepare for his future entrance to the university. The Oxford courses began at an elementary enough level, with the 'trivium' of grammar, rhetoric, and logic. By the beginning of the fourteenth century, however, the universities were beginning to leave large parts of these 'trivial' subjects, especially the first two, to the lesser schools that were beginning to spring up, especially in the university towns of Paris, Oxford, and Cambridge. The rate at which students fell by the wayside in Oxford was high, and a poor grasp of Latin had much to answer for. The main purpose of the universities was to produce an elite, capable of serving the church and the state, and yet it was a constant complaint of bishops that some their clergy did not even understand the Latin they spoke, which they had learned only by rote. The problem was no less serious in the monasteries: from 1290 onwards, the Benedictine provincial chapters made frequent reference to breaches of the rule enjoining conversation in Latin. Records of visitations give ample evidence that questions put to the monks in Latin were often answered in French—the language of upper-class daily life—or English. That Richard of Wallingford had risen above the ranks of the illiterate was something he surely owed to William of Kirkeby as much as to his native intelligence. He doubtless owed his mechanical bent to his father, and experience of the smithy, but it was in Wallingford Priory that the foundations of his learning and his spiritual vocation were laid.

4. The church of St Mary the Virgin, seen from the north, the very heart of the university in Richard of Wallingford's time. The tower (*c.* 1280), spire (1310-20), north chapel (to the west of the tower, 1320s), and the university's first Congregation House (to the east of the tower, 1320-27), were all known to him. The first university library, above the Congregation House, was begun in his day, but not completed until 1411. The style of the windows was changed somewhat in the sixteenth century.

4

Oxford

OXFORD WAS ONLY about twelve miles from Wallingford, an easy morning's walk. Most of the inhabitants of the Berkshire market town would have been aware of Oxford's many imposing buildings, of the life on its streets, and even of its fame beyond the Thames valley. Oxford, a county town and borough, was by modern reckoning a small place. It had numbered rather more than a thousand houses at Domesday, when it was the sixth largest town in the kingdom after London, York, Norwich, Lincoln, and Winchester, but soon after that it began to decline in wealth and importance. Its fortunes were turned with the advent of the university. England's premier university was in Richard's time well over a century old, vigorous, filled with optimism, and already of repute throughout the Christian world.

Throughout the kingdom, those who were recognised as scholars were 'clerks' (clerics, clergy), and were in religious orders of one sort or another. The church made a distinction between those in holy orders proper (subdeacon, deacon, priest, and bishop) and those in minor orders, that is, persons not ordained (porter, lector, exorcist, and acolyte). Since few outside the church, however, were capable of notarial or secretarial work, the word 'clerk' came to be used of scholars in general; and with the rise of the universities it was inevitably applied to all students there, whatever their place in the church hierarchy. There was another important division, however, cutting across the first. The 'religious' clergy were those who were members of the monastic and religious orders. (They are also called 'regulars', because they followed a rule, *regula.*) The 'seculars' were those who worked in the world, whether for a parish, for a diocese, for a king, or other wealthy lay patron. Even when offering their scholarly expertise to lay patrons, they too were subject to a measure of clerical discipline. No matter what his precise circumstances in his native town, as a student in Oxford Richard of Wallingford was a clerk, with a style of dress that marked him out as such, dress that in its detail might have given the onlooker some further clue as to the Oxford institution to which he was affiliated. We are not told which