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The Prudent Peasant: New Findings on Open Fields

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The usual picture of the medieval peasantry is based on nineteenth-century scholarship, which has proven difficult to dislodge from educated minds. This article continues the revision of an important detail in the picture, the scattering of plots in open fields. Some recent work on the subject by Robert Allen and Gregory Clark is mildly disputed, and new evidence is presented that risk avoidance is the key to understanding peasant behavior. The reason for the scattering was not sentiment or socialism. Peasants were not perhaps rational in every detail; but they were prudent.

Somewhere between his mother's knee and a graduate program in history the average educated person learns about medieval peasants in England. The lesson learned is surprisingly full, extending down to details of land tenure. Medieval people, it says, were bound to the land and immobile. In exchange for servitude, every family held land, and took some of its yield for itself. A peasant family would hold land equal to other families' land, scattered in strips to assure the equality. Cultivation was communal, by contrast with the selfish spirit of modern life. In the words of one recent college textbook on European history: "All peasants cooperated in the cultivation of the land, working it as a group. This meant that all shared in any disaster as well as any large harvest."[1]

The picture of the Middle Ages came from the pens of the first few generations of professional historians.[2] It would be surprising if the first attempts to see the Middle Ages scientifically were wholly persuasive. The historians of the nineteenth century, after all, did not have the shoulders of giants to stand on. They depended overmuch, if necessarily, on pamphlets and legal sources, taken at face value. If John in 1300 was Henry's man, according to the forms of feudalism, then that was that; when John in the sixteenth or seventeenth century appears as a

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[1] John P. McKay, Bennett D. Hill, and John Buckler, *A History of Western Society* (3rd edn., Boston, 1989), p. 283.

[2] Or from political economists with a historical method, such as K. Bücher and W. Sombart, and not without opposition from other historians. Friedrich Keutgen, a distinguished student of medieval towns, writing for the *Encyclopaedia Britannica* in 1910 on the subject of "Commune, Medieval," opined that "Sombart's notion of an entire absence of a spirit of capitalistic enterprise before the middle of the fifteenth century in Europe north of the Alps . . . is absolutely fantastic."

freeborn Englishman, evidently a revolution had occurred. If Sir Thomas More complained in 1516 about sheep eating men, the sheep must have been numerous indeed.

During the twentieth century, with more shoulders to stand on, medievalists have seen further. As long ago as 1971 the late David Herlihy declared in this JOURNAL that "[r]esearch has all but wiped from the ledgers the supposed gulf, once considered fundamental, between a medieval manorial economy and the capitalism of the modern epoch."[3] Yet the alternative view is difficult to get before the eyes of people accustomed to sweet visions of Magna Carta and many tower'd Camelot.

For a long time I have been ruminating on a peculiar feature of medieval agriculture in England and environs, the scattering of plots. A moderately prosperous peasant would hold his 20 acres in 20 plots scattered over the face of a village the size of Central Park. I promise not to repeat what I have said elsewhere.[4] I have said that the origin of open fields is less important than their reasons for persisting over many centuries; that the economics of property rights is the key to their costs and their demise; that their benefits were those of insurance; that high costs of alternative insurance, such as storage, fell in the fifteenth and sixteenth centuries; that transactions costs prevented instant enclosure; and that enclosure was not motivated by class robbery. Here are some additional ruminations and some additional doubts that the medievalists of the nineteenth century got the peasantry quite right.

USING THE RISE IN RENT TO ESTIMATE THE LOSS FROM SCATTERING

The holdings of a peasant were scattered. So what? Farmers paint Mail Pouch advertisements on their barns and indulge in other harmless ceremonies. Was scattering inefficient?

The question cannot be answered by consulting a census of agriculture because we do not have one for the fourteenth century. But I have argued elsewhere that the abundant evidence of rents can be used to fashion an answer. The "theory" is simply that tenants will not pay more than what land can earn them, and landlords will not charge less. The argument does not require fantastic neoclassical calculating machines, merely reasonable people who are reasonably greedy.

The rise of rent on an enclosure in the seventeenth and eighteenth centuries was something a little under a doubling. A doubling of rent does not constitute a doubling of productivity, of course, because rent

[3] David Herlihy, "The Economy of Traditional Europe," this JOURNAL, 31 (Mar. 1971), pp. 153–64; the quote is on p. 155.

[4] The last news from the front was Donald McCloskey, "The Open Fields of England: Rent, Risk, and the Rate of Interest, 1300–1815," in David W. Galenson, ed., *Markets in History: Economic Studies of the Past* (Cambridge, 1989), pp. 5–51, which does summarize the earlier work.

was only a share of output. But in the first ins ance all the gains went to the inelastically supplied factor of production, land.

Robert Allen has recently argued the contrary, that the rise in rent does not measure a rise in productivity. He reckoned from a sample of 231 farms reported by Arthur Young in the 1760s that economic rent did *not* increase when a farm was enclosed.[5] Some years ago I did a similar exercise with the mouthwatering statistics in Parkinson's *Rutland* of 1808.[6] In my Rutland calculations the rents accruing to landlords in nine open villages were 14.9 shillings per acre as against 22.2 shillings in 44 enclosed villages, a difference not far from the time series. As Allen and I have stressed, however, the "rent" relevant for productivity calculations must be the full economic rent, especially when comparing rents on farms in different villages, and must therefore include taxes that fall on land, such as the poor rates and the tithe. Including rates and tithes makes the figures for Rutland 21.9 shillings as against 26.0, a difference in rent between open and enclosed villages of only 19 percent. This is to be contrasted, remember, with a doubling of rents over time when a formerly open village encloses. (Attempts to control for land quality have little effect on the figures.)

The low differential is a puzzle. Yet the cross-sections have methodological difficulties. The chief one is familiar from econometric studies of production functions, namely, that a "sample" of firms participating in the same market will be biased toward finding no differences of efficiency. The market pushes out the unusually inefficient, with the result that the open fields that survived must have been suited to openness. To put it another way, the sample is self-selected: places do not become enclosed by accident. It is suggestive, for instance, that all nine open fields surviving in the tiny county of Rutland (18 miles across at its broadest) were in the southeastern side of the county, in Wrandyke hundred.[7]

But walk a little further with Allen. Why then did the rent paid increase over time in single villages, if at the one time no difference can be found? "Rents rose when villages were enclosed either because the efficiency of agriculture increased and hence the value of the land rose [the optimistic explanation Allen is rejecting] *or because open field rents*

[5] Robert C. Allen, "The Efficiency and Distributional Consequences of Eighteenth Century Enclosures," *Economic Journal*, 92 (1982), pp. 937–53; and Robert C. Allen, "Enclosure, Capitalist Agriculture, and the Growth of Corn Yields in Early Modern England" (University of British Columbia, Department of Economics, Discussion Paper 1986-39). Allen is writing a book on the subject.

[6] Donald McCloskey, "Theses on Enclosure," *Agricultural History: Papers Presented to the Economic History Society Conference, Canterbury, April 1983* (Canterbury, 1983), esp. pp. 69–71.

[7] Thomas Weiss has pointed out to me that incompetent landlords would also be incompetent at seizing (even large) gains from enclosure. They would be bad at farming and also bad at enclosuring. So a cross-section on this account would exaggerate the experimentally controlled difference in efficiency. Wrandyke hundred would be the region of stupid landlords.

were less than the value of the land and rents were raised at enclosure to eliminate the disequilibrium."[8] Allen is arguing that open fields rented below equilibrium.

It has long been recognized in the literature that parliamentary enclosure in the eighteenth century truncated all leases in a village, and that in a period of accelerating inflation such as the late eighteenth century it is not strange to suppose that a Parliament of landlords would enact a renegotiation of leases.[9] It would be a simple matter to calculate the gain from unexpired leases, since the county-by-county Reports to the Board of Agriculture in the 1790s and 1800s record the prevailing length of lease. If Allen is right the counties with the longest leases should be the ones experiencing the highest percentage declines of land in open fields. Unfortunately, no one has done the calculation.

Yet Allen's argument and therefore his sample and method face the problem that the differential favoring enclosure seems to have been of long standing, not confined to the various French wars of the eighteenth century and their accompanying inflations (shockingly high rates of price rise, upwards of 1 percent or even 2 percent per year). However plausible would be a temporary disequilibrium in the 1760s, say, it would be odd for landlords to surrender land at rents below equilibrium for centuries. A landlord doing so would be spurning a doubling of his income, in view of the doubling of annual rents to be had by being a little bit greedy. Such a man is not at any rate the grasping landlord of Ricardian theory or of Restoration comedy or of medieval poetry and preaching.

Now of course there is plenty of evidence for Good Landlords. In *The Agrarian History of England and Wales*, Christopher Clay noted for instance the third earl of Clare, who declared in his will of 1689 that he was "not willing [that his tenants] should be harassed for what they are unable to pay."[10] Clay and his co-author for Wales, David Howell, spent some pages giving examples of harsh and lenient landlords. The nuance and shading is certainly useful: it is useful to be reminded that a "good" landlord can ignore the dictates of the market as long as his money lasts. One is reminded of the farming joke in bad times: "I'm going to keep this farm as long as my money holds out." But such a method, giving examples of good landlords and bad, cannot resolve the issue, as Clay and Howell understood. We need to know how much, overall, the good landlords subsidized the bad. More particularly, we

[8] Allen, "Efficiency and Distributional Consequences," p. 939. Emphasis is added.

[9] Compare with Donald McCloskey, "The Enclosure of Open Fields: Preface to a Study of Its Impact on the Efficiency of English Agriculture in the Eighteenth Century," this JOURNAL, 32 (Mar. 1972), pp. 15–35, esp. p. 33.

[10] Christopher Clay, "Landlords and Estate Management in England," in Joan Thirsk, ed., *The Agrarian History of England and Wales* (Cambridge, 1985), vol. 5, part 2, pp. 119–251, esp. p. 242. Clay called his section "Different Landlords, Different Approachs," pp. 241–45.

need to know if there was a change in the attitude of landlords, occurring happily at the same time as enclosure. It would be strange. The puzzle for future research is to bring the strangeness of the Young sample into agreement with the more ample evidence, from many centuries, that landlords got higher rents from enclosures mainly on account of the higher productivity.

Such figures could be doubted in another way, as irrelevant to open fields in their heyday. If the purpose is to explain the persistence of scattering through the centuries from the thirteenth to the eighteenth, a selection bias of another sort is introduced by focusing on the differential at the end. Since open fields at the end disappeared, one would expect if anything that late differentials would be greater than early differentials. Open fields in the fourteenth century would be more productive relative to enclosed farms than in the eighteenth century. Enclosure was very expensive. The late game would be more worth the candle. If the total factor productivity difference implied by the doubling of rent in the eighteenth century is about 15 percent, then one might expect the difference between enclosed and open fields to be less than 15 percent in the fourteenth century.

Gregory Clark has recently shed light on the problem, using probate records for the farms of manorial lords during the fourteenth century. In 11 cases (mainly in Wiltshire) the rents on acreage outside the open fields of a village were 128 percent on average above those inside.[11] The true figure is probably somewhat lower: Clark noted that open field acreage carried with it a right to graze on the stubble after the harvest, apparently not valued in the probate records, and the enclosed acreage would probably have been better cared for. It is comforting, though, to see that the voluminous evidence in the twilight of the system for a doubling of rents is not contradicted by the scraps of evidence available at its noon.

But the same objection can be raised about the Clark/McCloskey experiment (measuring rents on two types of land in the same village in olden times) as about the Allen/McCloskey calculations (measuring productivities on two types of land in different villages in modern times). Namely, we must always remember that this is an economy we are interpreting. Neither of the observations comes from controlled experiments.[12] In particular, the rent that the lord could get depended on what the tenant favored. If the tenant in the long run favored meadow lands,

[11] Taken from Gregory Clark, "The Cost of Capital and Medieval Agricultural Technique," *Explorations in Economic History*, 25 (July 1988), pp. 265–94, esp. table 5, p. 281. I use the geometric average of the ratios.

[12] See James Heckman's recent paper on the rhetoric of experimentation, "Randomization and Social Policy Evaluation" (Unpublished Manuscript, Department of Economics, Yale University, Mar. 1990), in which he remarks that "Plots of ground do not respond to anticipated treatments of fertilizer nor can they excuse themselves from being treated with fertilizer" (pp. 2–3). To put it another way, he thinks that the analogy of agronomical treatment has been run into the ground.

those would rent higher; if he favored lands close to the village, they also would rent higher.

What is less obvious but most important: if the tenant favored scattered holdings, then scattered holdings too would rent higher. A measure based on rent in a time when scattering was the usual thing would be observing the wrong experiment. History, to repeat, does not perform controlled experiments. Even if scattering led to lower yields of grain, if it also in medieval conditions offered some compensating advantage (which is virtually the meaning of an "explanation" of persistent scattering), then a scattered holding would get a compensatingly higher rent than a consolidated holding. A professor of economics makes less than she could in business. But if she has in fact no desire to move into business, she must be satisfied with the package as a whole. It would be wrong to measure her happiness as a professor by examining her salary alone.

Therefore, paradoxically, it is *not* entirely appropriate to use medieval evidence for the medieval inefficiency. The evidence (on rents at least: the evidence on yields is another matter entirely) is biased against finding any difference—in the same way and for the same reasons that the Allen/McCloskey calculations of productivity differentials are. We are forced to anachronism, taking the doubling of rents in the seventeenth and eighteenth centuries as testimony for the inefficiency of open fields in the thirteenth and fourteenth centuries.

WHY WERE THE OPEN FIELDS INEFFICIENT? SPOILS, TRESPASSES, AND DESTRUCTIONS

The open fields, then, were inefficient. Why? People think of transport costs when they think of scattering. The less obvious but probably more important sources of inefficiency in the system of small and scattered, and therefore intermingled, plots are neighborhood effects. "Little Boy Blue, come blow your horn: The sheep's in the meadow, the cow's in the corn." In the words of a precis of an agreement to enclose Great Linford, Bucks in 1658, "many spoils, trespasses and destructions occur daily by reason of the escape of cattle into the corn and grass, causing disputes, actions, quarrels and troubles between neighbour and neighbour."[13] A little later an enclosure was recommended because it "secures corn from high roads being made into it by idle persons and cattle; which, if it lay in common, or open, could not be avoided, since those that know not the toil and cost the husbandman is at to bring his crop to a harvest, little regard what havoc they make through laziness, for wanton disportment, or the nearest way; which, if there were a barrier of good fence, they could not: and then for cattle,

[13] Michael Reed, "Enclosure in North Buckinghamshire, 1500–1750," *Agricultural History Review*, 32 (2, 1984), pp. 133–44, esp. p. 138.

it saves the trouble of [im]pounding, and many frivolous suits, that frequently arise on trespasses of these kinds; and therefore is advantageous both to the owner of the one and the other."[14] Shades of Ronald Coase.

Such complaints—of which there are a great volume from the sixteenth century on—suggest turning to the actual records of the frivolous suits and actions for trespass. The fines imposed by manorial courts hold some promise as a way of estimating the costs of scattered and intermingled holdings. The change in rent is one measure of the costs; the fines are another measure.

The logic can be worked through, in anticipation of detailed study. But be warned: the preliminary results suggest that the fines are too small to shed much light on the costs of spillovers. The trouble is that the fines are only a lower bound on the social cost. In the case of the manor of Wakefield in 1331–1333, consisting of numerous villages scattered across 20 miles of West Yorkshire, they turn out to be a uselessly tiny lower bound.

To do the accounting, the social cost should leave a mark on the measures that the village took to forestall it. That is one reason why the fines would reflect the costs. The village, or whoever was setting the fines, would connect them with the money value of the costs. A great nuisance would warrant a great fine. The other reason the fines would reflect the cost is the behavior of the criminals. A criminal earns a benefit B from his crime, facing a fine F if caught, which with probability p he will be. Under the simplest assumptions the fine will be set high enough that B just equals pF. The criminal is discouraged from his felonious little plans because as an average proposition the crime under such circumstances does not pay. Think of fines on overparking: at a high enough fine combined with a high enough probability of detection (a year's income, say, with traffic wardens on every corner) no one would overpark in Central London. The trouble is that at such a level of fines no revenue is collected, because all criminal activity ceases. Clearly the model has to allow for criminal activity inside the margin, on the part of those who get higher benefits B from committing the crime, and are willing to pay the likely fine. So the average benefits B are probably going to be larger than the probability-weighted fines, pF actually observed.

The manorial court does not appear to have set fines so high that a rational person would never contemplate committing the forbidden act. The village rules on baking bread or brewing ale, for example, were routinely violated, and fines for them amounted to licence fees. Such crimes "must have been regarded very often as matters in which the

[14] Leonard Meager, *The Mystery of Husbandry* (1697), excerpted in Joan Thirsk and J. P. Cooper, eds., *Seventeenth-Century Economic Documents* (Cambridge, 1972), p. 186.

offender calculated in advance the degree to which the probable scale of the amercement [fine] could be offset by the material advantage of committing the offense."[15]

So much for fines F. The item we seek, the costs C, are always going to be larger than the benefits B. True, for theft of sheaves of grain the cost to the owner is exactly offset by the benefit to the thief (though the story would stop there only in an economy that did not need to encourage production by granting secure ownership to producers). But for making a way through standing grain the loss to the owner evidently exceeds the small benefit to the trespasser.[16] Similarly, using a neighbor's barley crop as a drainage ditch costs more, socially speaking, than keeping the real drainage ditch clean. The deadweight loss from such carelessness is what most irritates people about it. So the costs C are strictly larger than the benefit to the criminal. And so $C \gg B \gg pF$. A fraction p of the fines paid are a lower bound on the cost.

But unless they are large they are not much of a bound and not much help. Every recorded instance of fines for agricultural spillovers in the court rolls of Wakefield has been examined in the two years after October 1331.[17] The total "escape of beasts" ("beasts" were the large animals: the cow's in the corn) and theft of sheaves are straightforward instances of spillovers. "Trespass" is more difficult. About 10 percent of the trespass category in the Wakefield court rolls may not have been trespass on fields: "Sandal:—John Lorimer plaintiff and Thomas [son] of Robert son of Thomas son of Roger compromise in a plea of trespass; Robert amerced 6d."[18] The total fines assessed, not including compensation or restitution, were about 2,700 pence. But this is for an enormous manor, containing about 20 villages. With a bushel of wheat selling for about 10 pence the fines were only 270 bushels, the ordinary yield of only 27 acres out of the many thousands in the manor. To put it another way, at the time a carpenter earned roughly 3 pence a day: the fines over the two years could have been paid by the labor of 900 days of carpenters, a few years of work out of thousands.

The method will have to be tried in other manors before it is entirely abandoned, but a lower bound of some tiny fraction of 1 percent of output is not much help.

[15] J. B. Post, "Manorial Amercements and Peasant Poverty," *Economic History Review*, 2nd series, 28 (May 1975), pp. 304–11, esp. p. 305.

[16] Another Weiss point: suppose the benefit to the trespasser were very high, such as trespassing in order to save his life? In actual fact most of the trespasses were recognized as low value relative to the havoc created, but the point is conceptually correct. One would have to argue that high-value trespasses would play out in the long run as purchases of rights, such as rights of way.

[17] Sue Sheridan Walker, ed., *The Court Rolls of the Manor of Wakefield from October 1331 to September 1333*, Wakefield Court Roll Series, Richard Vaughan, ed. (Leeds, 1983), vol. 3. I thank David R. Myers for his work on the project.

[18] Ibid., vol. 3, p. 112.

BEHAVIOR TOWARD RISK

The question is why peasants would tolerate the inconvenience of a scattered holding. Riskiness can explain it, as various forms of evidence show, from the timing of enclosure to the simulation of the peasant's choice.[19]

All right, was the land variable enough in its disasters to make scattering a good form of insurance? The townsman's doubt that the countryside has more than dull uniformity can be confronted with all manner of microclimatological evidence. The standard weather station is placed a couple of yards above the ground precisely because climate has been found to be much more variable close to the ground where the plants grow. In macro studies of climate the micro variability is merely an irritating source of error. But here it is the point.

In his classic *Climate Near the Ground* Rudolf Geiger referred to work of his own on frost at Eberswalde in Germany during 1939. "[A]lthough the ground appeared to be level, and surveying disclosed only a gentle slope" the lowest nighttime temperatures observed on frosty nights at five places within 100 meters of each other varied as much as 4.4 degrees Celsius (C) (9.9 degrees Fahrenheit), on one night in July (from which one can see why pines in this stand were having trouble growing) varying from 1.9° C above freezing to 2.5° C below (frost damage begins at about −2° C).[20] He reported an earlier study of his on why part of a fir plantation near Munich could not grow trees. Again "to the eye it appears a level surface," but in one tiny area of stunted trees the vagaries of nighttime air flows produced "a local climate that is known otherwise only from Scandinavia to Finland." The forest away from the frost hollow was itself cold, with four nights of frost in June (in other areas outside Munich there were none in June), but the worst spot in the hollow (which was in fact only a meter below the unaffected areas) had fully 15 nights of frost, with temperatures as low as −8.8° C.

Even the slopes of minor hollows have a separate and notable effect on temperature, relevant for the ribbed landscape of open-field England. Shallow trenches will keep more warmth if their sides are steeper, because the ground gives back its daytime heat into the hollow instead of into the heavens.[21]

Macro climates changed, and shifted the ground of the micro climates. Jan De Vries has pointed out that "the consequences of climate changes do not follow only, probably not even primarily, from differ-

[19] Donald McCloskey, "English Open Fields as Behavior Towards Risk," *Research in Economic History*, 1 (Fall 1976), pp. 124–70.

[20] Rudolf Geiger, *Climate Near the Ground* (Cambridge, MA, 1950), p. 393; the next quotation is from p. 394.

[21] Ibid., pp. 397–98.

ences in *level*; they also flow from differences in *variance*."[22] As he noted, "if these variances were to change over time. McCloskey's calculation of optimal scattering would require periodic revision." He reckoned that during the period from 1634 to 1970 in northwestern Europe a harsh continental climate alternated with a mild maritime climate two and one-half times, the maritime periods being the first half of the eighteenth century (well known in English agricultural history as a period of unusually high yields) and the century after 1840. His point is that the continental climate was not merely colder on average but more variable, driving societies to insurance, and that regardless of the regime it is the surprise rather than the average that causes the insurance to fail. It is well known that the Icelandic settlements in the New World, and Iceland itself, were damaged by a turn toward coldness around 1200, and that the whole of Europe was colder in the "Little Ice Age" of 1550 to 1920 than before.[23] But as De Vries argued, it is the second moment not the first that is crucial.

ALTERNATIVE INSURANCE: LAND HOLDINGS AND GRAIN STORINGS

The explanation from risk depends like all the explanations on a missing market (since only missing markets can account for inefficiencies), the market in this case for insurance. Any asset could provide some insurance.

Therefore the existence of a land market, which tends to erode many of the alternative explanations of scattering, also tends to erode the argument from risk aversion. If land could be sold easily, then it could provide the margin against disaster. On the other hand, the loss of the land was itself viewed as a disaster. It depends on how liquid the market was, that is, and the quantities involved. Clearly, as P. D. A. Harvey pointed out, commutation of labor rents after the Black Death could be expected to increase the breadth of the land market.[24] In fact the development of any asset markets, including the labor market, increases the liquidity of peasants and therefore their security. Off-farm employment was important in the Southeast in the fifteenth and sixteenth centuries, for instance.

The asset examined closely in another paper is the holding of stored grain. The rise of grain prices during a harvest year reveals how much it cost to store the grain. The main finding was a sharp fall, apparently a fall of interest costs, between the fourteenth century and the sixteenth

[22] In Robert I. Rotberg and Theodore K. Rabb, eds., *Climate and History: Studies in Interdisciplinary History* (Princeton, 1981), from the *Journal of Interdisciplinary History*, 10 (1980), pp. 599–630. The quotation is from p. 46 of *Climate and History*, emphasis added.

[23] Table 3 in Reid A. Bryson and Christine Padoch, "On the Climates of History," in Robert I. Rotberg and Theodore K. Rabb, eds., *Climate and History: Studies in Interdisciplinary History* (Princeton, 1981), pp. 3–17, from the *Journal of Interdisciplinary History*, 10 (1980), pp. 583–97.

[24] P. D. A. Harvey, ed., *The Peasant Land Market in Medieval England* (Oxford, 1984), p. 341.

century. The fall continued: at Oxford and Cambridge in the seventeenth century the annual rate of rise of wheat prices fell from around 18 percent early in the century to around 12 percent by its end.[25]

Gregory Clark has calculated from numerous instances of rental/price ratios on land that the interest rate was about 10 percent in the twelfth and fourteenth centuries, falling to around 5.5 percent in the sixteenth century.[26] The calculations by John Nash and me in 1983 on the basis of animal and especially grain prices resulted in much higher figures, albeit following the same downward trend that we and Clark both think was so important. Subtracting out a 5 percent annual allowance for the barn costs from both figures, the interest rates earned on wheat (and on sheep) fell from around 25 percent in the thirteenth and fourteenth century to 13 percent in the sixteenth.

Clark's figures, as based on an asset with much less risk of annual changes in its value than inventories of grain or livestock, are probably the correct absolute levels for *the* interest rate. Someone who held a quarter of wheat in carryover from harvest to harvest would on average earn the interest rate—or else the investment would never occur—but would also face the possibility that next harvest's price would be much lower.

Setting the McCloskey/Nash and the Clark results side by side suggests an illuminating calculation. The riskiness from grain prices is known. The asset price of land did not vary much. From these it should be possible to calculate the aversion to risk exhibited by medieval people: the premium for holding the highly risky asset, grain, compensates someone who could otherwise be holding land. Furthermore, the premium per unit of variance in the grain price can be calculated for eight centuries. Were medieval people especially risk averse?

A preliminary answer is yes. We have essentially two pairs of observations of returns: from Clark, the medieval and early modern returns on a secure asset (land); and from McCloskey/Nash, the medieval and modern returns on a risky asset (grain stored until the next harvest). The downside risk of holding grain is the possibility that the price will be lower in the next harvest year when one comes to sell it. The pairs can be plotted on a diagram of average return and the variability of the return as soon as the variability is known. The slope is the attitude toward risk, that is to say, how much in a higher average

[25] Calculations by V. N. Van Vleck in J. E. Thorold Rogers, *A History of Agriculture and Prices and Wages in England* (Oxford, 1886–1900), vol. 4 (prices in Oxford market and in St. Johns College, Cambridge) and in W. F. Lloyd, *Prices of Corn in Oxford* (Oxford, 1830). The decades were the harvest years 1593 to 1602 and 1623 to 1632 for "early" and 1653 to 1662 and 1683 to 1692 for "late." There were 379 pairs of prices early and 364 late. The smaller subsamples (such as Oxford from Rogers, with 70 pairs early and 44 pairs late) can yield anomalies: negative interest rates. But "the" interest rate in the two college towns could be expected to be a single number, which emerges from the mist as the sample gets larger.

[26] Clark, "The Cost of Capital," pp. 270–76.

return the medieval and the early modern folk required per unit of variability. Was there a fall in the variability of returns on holding wheat as an asset across harvest years large enough to explain the collapse of the risky return (25 to 13 percent) relative to the safe return (10 to 5.5 percent)? The risk premium fell from 15 percent (which is 25 percent minus 10 percent) to 7.5 percent (13 percent minus 5.5 percent). Was it because the price risk of holding wheat until the next harvest year became much smaller?

One has first to decide how to define variability. The peasant could be viewed as facing a distribution of next October's price, forming his expectation perhaps on the basis of a 20-year average (the length of average is at choice) and being more unhappy the further below the average he can expect to end up in a bad year.

On average, by one meaning, half the years will be "bad" (prices falling and therefore wiping out the grain-storer's investment). The issue is how bad. The economics is not straightforward. For instance, years with low prices would be years with good harvests and therefore extra large investments in stored grain. The actual investments that people will make will not be equal in all years.

But one gets a feeling for the relevant change in proportional variability from a series of price ratios, P_{t-1}/P_t (the mild inflations before paper money are trivial with such large annual changes, and in any case an inflated price for grain had to pay for inflated prices of other things purchased). In 35 years of mid-range prices (the biases from the mid-range procedure need attention) on two of the Bishop of Winchester's manors from 1245 to 1291 (12 years are uncalculable because of missing data) the average of the fall in prices in falling years is about 25 percent.[27] In 35 years for which William Beveridge reported prices of wheat for Exeter from 1320 to 1357 (1337–1339 are missing), it is only 13 percent (the ratio is 18 percent if 1320–1350 are used and is nearly identical with the comparable statistic calculated for the Winchester data over these years).[28] But in 35 years from 1520 to 1560 (1528–1531 and 1557–1558 missing) the fall in falling years at Exeter is 33 percent, higher than any of the variabilities for the thirteenth or fourteenth century. In the 12 years with data from 1561 to 1600 in which prices fell, the following year the average fall is 27 percent.

The result is startling. The price risks of holding grain certainly did not fall (the coefficient of variation barely falls even when the comparison is with nineteenth-century American wheat). If anything the risks rose from medieval to early modern times. But a rise in risk was accompanied by a fall in the risk premium. In other words, it would

[27] J. Z. Titow, *English Rural Society, 1200–1350* (London, 1969), pp. 97ff. Titow used prices from other places when those from Mardon and Ecchinswell are missing.

[28] William Beveridge's prices are from B. R. Mitchell and Phyllis Deane, *An Abstract of British Historical Statistics* (Cambridge, 1962), pp. 484–85.

appear from this partial evidence that the early modern economy was more willing to assume risk.

Why? Another puzzle for future research: John Nye has suggested to me that the risks of expropriation may have been higher in the Middle Ages than they became in the sixteenth century. Whatever the explanation, the early moderns may have been willing to assume more risk in grain storage for the same reason they were willing to assume more risk by abandoning the open fields. Perhaps they were more secure.

The new arguments run in the same direction. These medieval folk were not saints or socialists. They were moderately greedy landlords and reasonably rational peasants. The word is "prudent." When the world was filled with danger they prudently insured at every step. When it became less so they took a chance, and prudently gave up their open fields.