REFERENCES

The Enclosure of Open Fields: Preface to a Study of Its Impact on the Efficiency of English Agriculture in the Eighteenth Century

IN 1700 much of the land of England was farmed under the ancient system of open fields. With its three great fields planted in a communally regulated rotation of crops, its common meadows and wastes, and its mixture of holdings in hundreds of strips less than acre each, this apparently inefficient system had characterized the agriculture of northern and eastern Europe for centuries.[1] In England it had never been universal and had from an early date been subject to erosion at the edges, giving way by agreement among tenants and by compulsion from landlords to compact enclosure. Yet in 1700 a broad swath of England from the North Sea across the Midlands to the Channel exhibited the system in a more or less complete form. A century and a half later, 5,000-odd acts of Parliament and at least an equal number of voluntary agreements had swept it away, transforming numerous and vague rights of use to open fields, commons, and waste into unambiguous rights of ownership to enclosed plots, free of village direction. The enclosure movement, particularly its climax in the sixty years of intense parliamentary activity after 1760, has long been among the dozen or so central concerns of British economic and social historians, a concern warranted by the importance of the event: through the statistical haze one can discern that something on the order of

[1] One of the chief tasks of scholarship on the open fields has been to document the variety and flexibility of the system. Nothing in the argument that follows, however, depends on the oversimple characterization used here.

half the agricultural land of England was enclosed during the eighteenth and nineteenth centuries.[2]

It is on the social effects of this transformation that historians have fixed their gaze. The emphasis has been put on equity, not efficiency: as the Hammonds put it, "We are not concerned to corroborate or to question the contention that enclosure made England more productive. . . . Our business is with the changes that the enclosures caused in the social structure of England."[3] The fixation on the issue of equity is curious, for the enclosures altered the conditions of production in a large sector of the economy: the event is ideal material for an inquiry into the sources of economic growth. The source of growth here is not, of course, capital accumulation or technological change of the usual sort, but a mere rearrangement of legal rights to land. If the word "precondition" as it is used in the literature of economic growth includes anything it must include the formation of the legal institutions of private property, of which enclosures are a case in point. And economists and economic historians, in their separate ways, have not been notably successful in explaining growth with alternative categories, such as investment in machinery or the introduction of great inventions, suggesting that its legal preconditions would repay close study.

I

The less efficient were the open fields, clearly, the more would their enclosure increase the efficiency of English agriculture. One might suppose, therefore, that it would be possible to answer directly the question of how enclosure affected efficiency by analyzing the economics of the open fields. There is a fundamental obstacle to this program, but the analysis does suggest an alternative and less direct one which has more likelihood of success.

[2] The estimate excludes Wales. An estimate of English agricultural land of roughly 24 million acres can be inferred from the contemporary estimates (including arable, meadow, pasture, and woods) quoted in Lord Ernle (R. E. Prothero), *English Farming Past and Present,* 6th ed., a reprint of the 5th edition with additional introductions by G. E. Fussell and O. R. McGregor (Chicago: Quadrangle Books, 1961), p. 503. The area enclosed by parliamentary act, 6 million acres, is the estimate of F. Clifford, *A History of Private Bill Legislation,* I (London, 1885), 495. The area enclosed by private agreement, 8 million acres, is an estimate or, more candidly, a guess by Gilbert Slater in a review of the Hammonds' *The Village Labourer* in *The Sociological Review,* V (Jan., 1912), 63 ff.

[3] J. L. and Barbara Hammond, *The Village Labourer,* reprint of the 4th ed. (1927) (London: British Publishers Guild, 1948), I, p. 19.

Historical opinion has for the most part accepted the judgment of contemporaries, sixteenth-century opponents of enclosure as well as eighteenth-century enthusiasts, that the open field system was wretchedly inefficient. The scattering of each man's holdings in dozens of small strips had direct costs in waste of time moving from one strip to another and in the disincentive to enterprise created by the spill-over of one man's sloth or malice onto his neighbors' strips. Furthermore, scattered strips implied common grazing on the fallow, with consequent over-use of the land and the spread of animal disease. In turn, common grazing implied the subjugation of each man to communal decisions on when grazing should give way to crops and what crops should be planted, regardless of his land's comparative advantage. So plain has the inefficiency seemed that the question has been not why enclosure occured when it did, but why it did not occur earlier.

It is hazardous, however, to attribute inefficiency to a social arrangement as persistent as the open fields, for the following reason. The allocation of resources in open field agriculture would have been efficient if it had yielded the highest value of output attainable with the inputs available to the village. The open fields are supposed not to have achieved this result. But when conscious village intervention or unconscious social custom have defined property rights in crops, labor, capital, and use of land, and have assigned these rights to someone, to do what he wishes with them, including selling them, the rights can move by self-interested exchange into the hands of those who value them most. When all such mutually advantageous exchanges have taken place, the allocation of property rights to various tasks is by definition efficient: resources have been put to their highest-valued use. In other words, to the extent that property rights were well-defined and exchangeable (as in many cases they were from an early date) and to the extent that peasants pursued their self-interest (as there is little doubt they did), the economy of the village would arrive at an efficient allocation of resources without formal enclosure.[4]

This argument considerably complicates the task of explaining the persistence of the open fields and casts doubt even on the pre-

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[4] Readers of R. H. Coase's important article, "The Problem of Social Cost," *Journal of Law and Economics*, III (1960), 1-44, will recognize this as an application of his argument.

sumption that they were inefficient. Of course, the costs of exchanging property rights were not always low. The argument serves only to direct attention to these costs, as a necessary condition for the survival of inefficiencies, and to the possibility that the system was more efficient than has been supposed. In other words, it disciplines thinking on the reasons for the persistence of the system, pushing deeper the discussion of its rationale.

The argument applies to all features of the open fields, but with special force to their central feature, the scattering of strips. In the usual explanations, one or another *deus ex machina*—common plowing, partible inheritance, the clearing of waste, egalitarian instincts —is lowered into the action to scatter the strips, but when it has been lifted back into the rafters of the stage the question arises why its effects persist. The egalitarian explanation will serve to illustrate the nature of the difficulty. Its long historiographic career began with Paul Vinogradoff: "The only adequate explanation of the open-field intermixture . . . [is that] it has its roots in the wish to equalize the holdings [of men allotted land] as to the quantity and quality of land assigned to them in spite of all differences in the shape, the position, and the value of the soil."[5] Maitland, with many later historians, concurred: "Who laid out these fields? The obvious answer is that they were laid out by men who would sacrifice economy and efficiency at the shrine of equality."[6]

In common with the other traditional explanations of scattering, such as common plowing, partible inheritance, or the joint clearing of waste, however, the egalitarian explanation has the difficulty that intermixture is an inefficient way of establishing equality, just as it is an inefficient way of avoiding the inconvenience of early or late plowing of one's land, of distributing land among numerous heirs, or of allotting parcels after clearing new fields in the waste lands. A community bent on establishing equality—although the argument is flawed at the outset in view of the great inequalities in the size of holdings in the typical open field village—may well choose to simplify its task of equalizing the value of holdings by

5 P. Vinogradoff, *Villainage in England* (Oxford, 1892), p. 254.
6 F. W. Maitland, *Domesday Book and Beyond* (Cambridge, 1897), p. 337. Compare Ernle, *English Farming Past and Pre ent*, p. 25; E. Lipson, *The Economic History of England*, I (London: Black, 1915), p. 65 ff; and George C. Homans, *English Villagers of the Thirteenth Century* (Cambridge, Mass.: Harvard University Press, 1941), p. 91.

merely distributing a bundle of strips from all parts of the village to each family, rather than by adjusting the sizes of consolidated holdings to their quality.[7] Once this random distribution of strips had assured a rough equality among holdings with respect to their qualities of location, drainage, and fertility, however, each member of the village would benefit from exchanges of strips to achieve consolidation. Equality would not be disturbed, for the exchanges would have to be mutually beneficial for the villagers to engage in them, but efficiency would be increased. In other words, even if egalitarian sentiment influenced the initial distribution of property rights in land, it does not follow that it influenced their subsequent allocation. A market in land—the prior development of a money economy is not necessary, although it would have reduced the costs of reallocating land—with different prices for different qualities would have permitted the attainment of consolidated and efficient holdings, if not immediately, then surely by the sixteenth or seventeenth centuries. One must either deny that exchanges of land were possible, in the face of evidence that they in fact occurred from an early date, or abandon the egalitarian theory of the persistence, if not the origin, of scattered holdings.

The one explanation of scattering (and with it many of the other features of the open fields) that withstands this simple criticism is that strips were scattered to reduce risk. It withstands it because villagers did not have cheap access to markets in risk, that is, insurance, as they did in land, labor, and output. One might suppose, therefore, that they were driven to hold land in scattered strips to hedge against disasters befalling only one type of soil (such as excessive rainfall on low-lying clays) and to diversify their crops, holding land in each of the open fields of the village, to hedge against disasters raising the price of only one part of their food.

This is nothing more than an attractive supposition now, attractive because it has many testable implications. It gives some promise that the analysis of the open field system might be put on a surer footing, in which case it could be used to infer directly what gains in efficiency were to be had from an enclosure. The criticism of the

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[7] Vinogradoff, *Villainage in England,* p. 235 ff, argues that this administrative convenience was important. He briefly recognizes the difficulty that subsequent exchanges would transform the system, but dismisses it by appeal to the continuing strength of "the communal principle with its equalizing tendency."

traditional explanations suggests that the direct measurement of inefficiency will be difficult: inefficiencies are always prey to market erosion, even while maintaining their outward form; and if the hypothesis of risk aversion proves to be correct they may not in fact have existed. It does, however, suggest an alternative approach.

II

The alternative reverses the direction of the preceeding argument. The open fields persisted for many centuries; the enclosure of the Midlands, on the other hand, was accomplished in sixty years. To explain the persistence of the open fields it is natural to emphasize the power of markets to erode inefficient arrangements: each separate use of the market, as for example an exchange of strips, reduces the inefficiencies, and the summation over centuries of these steps, however small, can be expected to eliminate them entirely. To explain as comparatively brief an episode as the enclosure movement, however, it is natural, in contrast, to emphasize the limits on the market's power to erode inefficiencies, limits imposed by the costs of transacting in markets: there is no passage of centuries in this case to reduce transactions costs to insignificance, only sixty years of intense effort in leaping over them. The open fields, at one time desirable but by the eighteenth century not, could be propped up for many years if the market exchanges entailed in their dissolution were expensive. Exchanges of land were not free, as the great expenses incurred in parliamentary acts for circumventing voluntary exchange of lands in enclosure testifies. The costs of changing from one system of agriculture to another must figure prominently in an account of the enclosure movement.

The costs of change need to be considered for more than mere descriptive completeness, however, for their existence makes it possible to measure the increase in efficiency as a village moves from open fields to enclosures. If there had been in fact no costs of change one could not observe a jump in efficiency on enclosure: enclosure would occur at the instant it became to any small degree more efficient than open fields, leaving no trace in increased output, rents, or employment. But there were costs of change, and therefore there was at the time of each enclosure some increase in efficiency to be observed. Assuming that it is profitable, each enclosure project must recover in increased output at least the coat incurred in under-

taking it. The costs recovered can be divided into two parts: those that represent the withdrawal of resources from alternative employment elsewhere in the economy (such as fencing costs); and those that do not, being mere transfers of income from one group to another (such as bribes to opponents of enclosure in the village and the bulk of parliamentary fees). On the one hand the output of the economy is increased through higher agricultural output by an amount equal to at least the sum of both costs; on the other hand it is decreased by the costs that represent the withdrawal of resources from elsewhere. The minimum net increase in national output at the time of an enclosure, then, is the total cost (equal to or smaller than the gain in agricultural output) minus the opportunity cost of the resources withdrawn; that is to say, it is the portion of costs that represent income transfers alone.

The increase in national output at the time of each enclosure, however, in only a lower bound on the true increase attributable to enclosures at some terminal date. It is plainly not possible to know directly what national output would have been had enclosures not occured. Events did not perform the relevant experiments. No one set aside in 1760 a group of typical villages to be exempted from enclosure and to act as a control in an experiment to determine its ultimate effects; nor did anyone in 1820 put the enclosed fields back for a time into an open state to satisfy the curiosity of later historians. Assessing the "impact" of enclosure necessarily involves the experiment of removing its influence from the scene at some date and observing the fall in national income that results. The actual costs and benefits at the time of each enclosure are not directly relevant because they are not results of the relevant experiment.

The relevant mental experiments can be performed only if one knows what determined the variations in the costs and benefits of enclosure from one village to another and from one time to another. The experiments can be narrow or broad, depending on whether one wishes to be cautious or bold in making historical inferences. A cautious program, for example, would be to ask what the effect was on English national output of some small modification of the costs of enclosure, such as the passage of the General Enclosure Act in 1801 or the variation in fencing costs from region to region. To answer these questions one must isolate the effects of the

fall in legal costs or the variation in fencing costs on the rate of enclosure and the net output resulting from it. The isolation can be achieved by explaining statistically the observed variations in costs across time and across regions, and then relating the costs to the rate of enclosure and the rate of enclosure to the increase in output resulting from it. In a similar fashion, on the benefit side one might ask and answer the questions what effects changes in the price of wheat or regional variations in the quality of soil had on enclosure, and through enclosure on national output. The bold program would be to ask what the effect would have been of prohibiting enclosure altogether. This broader question is implied by asking what impact enclosure had on national output. To answer it, as to answer the more narrow questions, one has to know what the costs and benefits of enclosure were under the actual circumstances by comparison with what they would have been under alternative circumstances. That is to say, one has to construct and to fit to the observed facts a model of the rate of enclosure, a model that specifies the influence of fencing costs, the price of wheat, changes in the law, and so forth on its costs and benefits. Although the fitting of the model is not accomplished here, its construction is, and to that task we now turn.

III

The costs of enclosing an open field were tightly bound to the state of development of the law. If one reflects that enclosure was a mere reassignment of property rights in land, it becomes plain that there is no technological reason that an enclosure should have been costly: if imposed by some external authority with no regard for equity, it could have been achieved overnight by the simple expedient of assigning all legal rights to land to one person in the village, chosen in any way the authority fancied. A conquerer can achieve by the threat of his sword and a stroke of his pen a result of eliminating inefficiencies of an earlier social arrangement on which a society of laws must spend many years and much expense. Legal constraints on enclosure preserved equity at the cost of making it more expensive than it need have been. The agreements fashioned under these constraints varied in complexity and solemnity from temporary exchanges of land among a few peasants to full parliamentary enclosure, and each had its own special array of

costs, increased gratuitously by the notoriously clotted state of the law of land and contract before the reforms of the nineteenth century. In consequence, even as parliamentary procedures cheapened and became prevalent, the older procedures continued to be used in many enclosures.

Under the common law one procedure was enclosure by piecemeal exchanges of land, each landowner slowly building up a more and more consolidated holding until enclosure was accomplished. An alternative was to agree to one simultaneous exchange of land. Simultaneous exchange had the advantage over piecemeal exchange that it achieved more rapidly whatever gains were to be had from enclosure, but the disadvantage that it required one large agreement rather than many small ones: a landowner entering such an agreement was taking the risk that his new and unfamiliar holding would be substantially worse than his old one, a risk he did not face if he built up a new holding gradually, testing each piece of land as he bought it.

The common law put up many obstacles to either method of enclosure. For the larger freeholders, the ingenuity of common law lawyers in protecting a family's estate from the depredations of profligate heirs had by the eighteenth century reversed earlier tendencies towards the freer alienation of land. For the copyholders, the ambiguity of their title to the land had long prevented them from engaging in frequent exchanges, the more so as they shared with the freeholders, large and small, the burdensome expenses imposed on transactions in land by the common law and its lawyers.

Some enclosures would not be worthwhile if they could not be achieved rapidly, and under the common law a rapid simultaneous agreement to enclose was difficult to achieve. All those who owned rights in the open field, however small, had to be brought into an agreement for it to be legally binding, for the common law quite reasonably required that a man's consent be obtained before the community could meddle with his property. What was perhaps less reasonable was that at the same time another part of it made it impossible for some parties to the agreement—minors, for instance, or those with life interests in entailed estates—to give their consent. In the seventeenth and early eighteenth centuries men eager to enclose sometimes called on the other law of England, equity, to help them out of this difficulty. The route to enclosure by way of

the law of equity, however, was in most counties only infrequently travelled and was eventually abandoned, superceded in the middle of the eighteenth century by parliamentary procedures even more completely than were the common law procedures of voluntary agreement.

The parliamentary procedures—that is, statute law—had two related advantages over those available under either equity or the common law. They had, first, the advantage of special solemnity and permanence, and the constitutional power to override much of the other law. This was necessary in order to prevent one man from imposing on his fellow villagers a revival of the open fields whenever it suited his immediate convenience, by reasserting his ancient rights of common after the enclosure. Without the force of a parliamentary statute to restrain him, each villager had often the power to dissolve the agreement. The second advantage of parliamentary procedures is that they eliminated another power vested in each villager under the common law, namely, the power to veto the enclosure by virtue of the requirement that the consent of every owner of common rights be obtained. Parliament required only that owners of land agree, and only a majority of them (in the middle of the eighteenth century usually four-fifths). The amount a man could extract from the sponsors of an enclosure, once limited only by the entire social gain, was now limited by the substitutability of others' votes for his in achieving a majority. The bribes required for an agreement and the negotiating costs of fashioning it when all the many parties involved had the power to block it were sharply reduced at a stroke.

The effect of the fall in costs would vary with the character of the village, in particular with its size. The rule of unanimity of the common law is crippling to a project of enclosing a large village because it is more likely to contain at least one recalcitrant than a small village. The introduction of a rule of majority sharply reduces the importance of the difference in size, at least as it relates to the likelihood of failure in a vote on an enclosure. Indeed, if the likelihood of recalcitrance is low, whether from altruism or from fear of reprisals, the likelihood of failure is higher for a small village than for a large one.[8]

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[8] The reasoning here is somewhat naive, leaving to one side as it does the question of how the shift from unanimity to majority will affect the strategic behavior

The likelihood of failure in a vote was only one of the obstacles to enclosure whose importance varied with the size of the villages. Their effective size was reduced in parliamentary procedures by the limitation of the franchise to freeholders, but it remained true, as it had been before, that large villages were on balance more costly to enclose. The costs of locating and buying out or coercing recalcitrants were higher, as were the costs of surveying the holdings and arbitrating the welter of claims involved in an enclosure. The special significance here of the size of villages is that it is easy to measure, at least by comparison with some of the other characteristics of villages that affected the cost of enclosure, and is therefore a good candidate for inclusion in a statistical analysis of its variation.

A number of other determinants of cost varied from one place to another. The cost of physically altering the face of the village, particularly fencing costs, had measurable variation, as did the extent of old enclosure, an important factor in the complexity of the undertaking. The specialists in the services required in an enclosure, such as lawyers, surveyors, and commissioners, were no doubt mobile over wide areas, but to the extent that they were not, their costs could vary as well. All these factors—village size, fencing costs, and the rest—can be brought to bear on a statistical analysis of regional variations in the costs, and therefore the rate, of enclosure.

The costs of enclosure, then, varied across regions, and varied in different ways for voluntary and for parliamentary enclosures. They also varied across time, providing another dimension in which to view the effect of differing circumstances on the cost and rate of enclosure. To treat first the variables common to both voluntary and parliamentary enclosure, it is clear that the costs of fencing, surveying, and so forth varied with time. Further, any enclosure involves present costs in expectation of future returns. The rate of interest, which is the price of future income in terms of present income, is therefore relevant to an explanation of variations in the

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of the villagers in casting their votes, but it is nonetheless suggestive. It depends on a binomial model of the probability of ayes and nays. If the fraction of recalcitrants is as low as 15 percent among the population of voters, under the rule of unanimity villages of ten voters will on average vote to enclose 27 percent of the time they are presented with the choice, but villages of twenty voters only 7 percent of the time. On the other hand, under the rule of a four-fifths majority the ten-voter villages will achieve enclosure 82 percent of the time, and the twenty-voter villages 93 percent of the time.

rate of enclosure. T. S. Ashton put great emphasis on the rate of interest in this connection, observing that for the late eighteenth century there is a good correlation between the yield on consols and the rate of enclosure.[9] Later discussions, however, have generally raised Ashton's point only to reject it, for two reasons.

The first is that landlords sponsoring an enclosure did not always have to borrow money or, what is equivalent, to sell assets to finance them. The possibility of financing an enclosure out of current income, however, is irrelevant to the issue of the importance of the interest rate. If the sponsors chose to spend current income on an enclosure rather than to borrow they would not, it is true, face future outlays of cash for interest payments; but they would face, although not in the form of a piece of paper with a demand for cash written on it, the stream of future income foregone by choosing not to invest in alternative projects with yields which could be expected to run parallel with the yield on consols. Self-financing, in other words, has an opportunity cost, and this cost is related to the current rate of interest.

The second reason for denying the rate interest a central place in a discussion of the rate of enclosure also rests on a misapprehension of what is germane to the decision to invest. The objection is that the correlation between the yield on consols and the rate of enclosure breaks down during the Napoleonic Wars, a great many enclosures being undertaken then despite a high interest rate. Ashton pointed out that the sharp rise in the relative price of agricultural products could well have offset the rise in interest rates by increasing the benefits of enclosure relative to its costs. A more direct response is available, however, namely, that it is not money rate of interest which measures the real opportunity cost of an investment, but the rate of interest corrected for the expected rate of inflation in the general level of prices. A commitment to pay £5 per year in the future for the right to use £100 now is a very satisfactory arrangement for a borrower if the rate of inflation is 5 percent per year, for the real rate of interest is in this case zero: since his £100 of borrowed capital will be worth £105 next year from the

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[9] T. S. Ashton, *An Economic History of England: The Eighteenth Century* (London: Methuen, 1955), p. 41 ff, gives his argument. Chambers and Mingay are among those who disagree with Ashton. See J. D. Chambers and G. E. Mingay, *The Agricultural Revolution 1750-1880* (London: Batsford, 1966), p. 82 ff.

effect of inflation alone, he can meet the interest payment by selling off £5 of it and can keep for himself whatever real fruits the capital bears as a clear gain. From their experience in the 1790's Englishmen had very likely come to expect a rate of inflation by 1800 of 2 or 3 percent per year, and in fact these expectations were confirmed by the experience of the next decade. Under these circumstances the money rate of interest of around 5 percent corresponded by 1800 to a real rate of interest of around 2 or 3 percent, which compares favorably with the rates prevailing during the earlier burst of enclosures in the late 1760's and 1770's. In short, the interest rate does on the face of it contribute to the explanation of the rate of enclosure.

Any enclosure, whether achieved by agreement under the common law or by act of Parliament, entailed costs of fencing, surveying, and interest foregone. For common law enclosures little is known—or, given the paucity of records, directly knowable— about how the other costs of enclosure, such as legal fees, organizational effort, and transfer payments to recalcitrants, varied from year to year. The only clue is based on their substitutability for parliamentary enclosures; one would expect the total cost of common law enclosures to move in step with that of parliamentary enclosures, because the availability and threat of one procedure would limit the costs of the other.

The legal and customary requirements of disclosure to public view of each step in parliamentary procedures, in contrast, generated voluminous records of their cost. The records suggest that the parliamentary procedures were progressively simplified and cheapened. The expenses of commissioners, in whose hands the details of the enclosure were placed, were a substantial part of the total cost, and it is therefore significant that the number of them specified in each act fell during the second half of the eighteenth century from a dozen or so to three or four. A general act of 1773 (13 Geo. III. c. 81) reduced and standardized the majority required to set in motion the parliamentary procedures from four-fifths to three-fourths of the number and value of the acreage in a village, voted by its owners. The individual acts came to specify the date by which an award of new holdings was to be promulgated, to meet the frequent complaint that commissioners, taking on the responsibility for too many enclosures at once, dallied at their work on each

and prolonged the interval of uncertainty between the act and the award. The commissioners gradually became a professional class and could be expected to have become more proficient as their experience broadened: the name of any given commissioner recurs many times in different acts. The experience of Parliament itself, particularly in the first period of substantial parliamentary enclosure in the late 1760's, no doubt had a similar cumulative impact on the ease with which a petition was made a law. True, not until 1836 (6 & 7 Wm. IV. c. 115), well after the period of massive enclosure, was a truly general act for enclosure passed, under which the special appeal for exemption of each enclosure from the law of property was eliminated. The passage of the so-called General Enclosure Act of 1801 (41 Geo. III. c. 109) was a victory for the improving spirits on the Board of Agriculture such as Arthur Young, but only a partial one: the requirement that each enclosure receive the specific approval of Parliament was retained. Among other simplifications, however, the framers of bills for enclosure could now draw on forty standard clauses, much to the distress of the legal profession, and affidavits were now accepted in lieu of the physical presence of the signatories to a petition. Each of these improvements in the procedures provides a test of the sensitivity of the rate of enclosure to changes in its costs and can be inserted together with the other influences on costs into a statistical analysis of their progressive reduction.

It will seem odd to argue in this fashion that the costs of parliamentary enclosure were reduced in view of the plain evidence in the literature on enclosure that the costs rose dramatically after the middle of the 1780's. In Warwickshire, whose experience was not unusual, for example, J. M. Martin found that the public costs— that is, the costs of securing the act, paying the commissioners and surveyors, and fencing the allotments of the owners of tithes—rose sixfold from the earliest to the latest enclosures, especially after 1790.[10] An adequate allowance for the general inflation of the Napoleonic Wars would reduce the sharpness and extent of the rise somewhat, but it would still be substantial.

As useful as this evidence is for providing a quantitative variable to be explained in a statistical examination of the determinants

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[10] J. M. Martin, "The Cost of Parliamentary Enclosure in Warwickshire," *University of Birmingham Historical Journal*, IX (1964), reprinted in E. L. Jones (ed.), *Agriculture and Economic Growth in England 1650-1815* (London: Methuen, 1967).

of costs, is does not reveal directly how the costs of a given enclosure moved. As Martin and others have pointed out, the recorded costs rose not because an enclosure of given complexity had become more expensive, but because progressively more complex enclosures were undertaken as they became more profitable. There is direct evidence of this increasing complexity in the widening interval between the date of the act and of the actual award: in W. E. Tate's list of parliamentary enclosures in Nottinghamshire, for example, the interval is around two years in the 1760's and 1770's, but rises to six years by the 1790's and 1800's.[11] Each year's delay increased the real costs of enclosure by reducing the incentive to conserve one's soil, which on the morrow might become someone else's.[12] What is to the point here, however, is that a long interval is indicative of a complex and therefore costly enclosure, an enclosure, for instance, of a large village with many owners of land or other rights and with many parcels severely scattered and intermingled. A typical enlosure in 1810 was different from one in 1770. The observed increase in costs is a reflection of the increased benefits, not increased costs, for an enclosure of given specifications.

IV

The discussion so far has considered only the size of the costs of enclosure. There remains the size of the benefits. Many students of the enclosure movement have emphasized not the size of the costs and benefits, but their distribution. A remark of E. P. Thompson could serve as a motto for the tradition of Marx and the Hammonds on this matter: "Enclosure (when all the sophistications are allowed for) was a plain enough case of class robbery."[13] This judgment on the equity of enclosure would require no comment in an inquiry

[11] W. E. Tate, *Nottinghamshire Parliamentary Enclosure*, Vol. V of the Record Series of the Thoroton Society (Nottingham: Thoroton Society, 1935). Compare Martin, "The Cost of Parliamentary Enclosure," in Jones, *Agriculture*, p. 135: an interval of one year during the early enclosures in Warwickshire widened to four or five by the end of the century.

[12] This and other costs of delay are neglected in studies of the costs of enclosure. The incentive to overwork land soon to become another's could be quite expensive. With yields of, say, 2½ quarters of wheat an acre and a price of £2 a quarter, a loss from this source of as little as, say, one-fifth of the normal yield for one year after the enclosure would add £1 an acre to the other costs (which Martin, "The Cost of Parliamentary Enclosure," reckons at something over £2 an acre before the inflation of the Napoleonic Wars).

[13] E. P. Thompson, *The Making of the English Working Class* (New York: Random House, 1963), p. 218.

into its efficiency were it not that the incentive to enclose could have been affected, at least theoretically, by the distribution as well as the size of the costs and benefits. The method of distributing them may have varied from year to year and from village to village in such a way that an equal social benefit in two villages would produce an enclosure in one and a continuation of the open fields in the other. An explanation of the timing of enclosure is necessary for measuring its impact on efficiency and the timing could have been affected by a mere shift in the incidence of the costs and benefits.

As much as enclosure may have hurt the poor, however, it is doubtful that the hurt was large enough, relative to the net gain to be achieved by the larger owners of the land, that it influenced their decision to enclose. This is because the poor were very poor: the value of their land and other rights was small. In consequence, an equitable procedure, which compensated them fully for their ancient rights, would have changed the net benefits accruing to those who had the power to set an enclosure in motion very little. As a first approximation, then, the issue of equity may be set to one side.

Another traditional perspective on enclosure may be set aside as well. Its growing popularity in the eighteenth century is sometimes attributed to an increase in rationality, a new spirit of commercialism in farming, and the like, that is to say, to a realization that there were indeed benefits to be had from enclosure. At some point, perhaps in a residual role to account for phenomena that less speculative factors cannot explain, this hypothesis may have some use. But in its present form it is consistent with nearly any pattern of enclosure, and being consistent with any it is capable of being rejected by none. A hypothesis that cannot be put in jeopardy by facts is not an attractive one with which to begin.

The approach taken here is to suppose that the benefits, like the costs, varied from year to year and from village to village. When the benefits exceeded the costs a village was enclosed. In any one year after enclosure the social benefit to be set against the social costs was the value of the increased output achieved, that is to say, the product of the price of agricultural output and the increase in that output attributable to enclosure. What motivated men to enclose, of course, was not the net benefit for one year alone, but the expectation of a stream of benefits, and both the

costs and benefits, therefore, must be discounted back to the year in which the enclosure was set in motion. The prices relevant to the decision to set an enclosure in motion, although not those relevant to its social benefit considered after the event, are the prices expected to obtain in the future, not those that actually obtained in the future—the two would be the same only if men's expectations were perfectly fulfilled, which they seldom are. In brief, then, it is supposed that the rate of enclosure was governed by the present discounted value of the net benefits expected to be achieved and the capital value of the social gain is to be calculated from the present discounted value of the net benefits actually achieved.

These are familiar notions. It is a commonplace, for example, that the decision to enclose depended on expectations. Expectations on the course of future prices can be given a concrete representation by making them depend on statistics of present and past prices, on the reasonable assumption that this is the information farmers in fact used to assess their prospects. Past runs of wet or dry weather could be included as well, in the test of their influence, as that of prices, being how much they contribute to the statistical explanation of the timing of enclosure. It is a commonplace, too, that the prices of agricultural output are relevant to explaining the timing and that, in particular, their sharp rise during the Napoleonic Wars had much to do with the accompanying spurt in enclosure. It is, however, perhaps less of a commonplace to emphasize that what matters is the rise in prices relative to the costs of enclosure. The benefits of enclosure and therefore the amount that men are willing to pay to accomplish it may rise, but may nonetheless be offset by a rise in its cost, from a general inflation of prices or from an inelasticity in the supply of commissioners, surveyors, and other inputs that found much of their employment in enclosures. The rise in the price of wheat during the Napoleonic Wars, which is sometimes considered sufficient by itself to explain the spurt of enclosures, is less impressive when compared with the rise in the other prices.[14] To

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[14] "Other prices" are meant here to stand as a rough proxy for the costs of enclosure. The model of investment used here is a knife-edge one, because it supposes that any excess of benefits over costs, however small, will prompt an enclosure. A more realistic model would admit that large excesses are more potent than small ones. If this emendation proves its worth in the statistical work it will imply another: since £1000 of benefit net of cost is the same amount in real terms as £2000 of

use a fruitful analogy, the rate of enclosure depended on both demand and supply, not on demand alone.

Prices are one component in the demand for enclosure, the increase in physical output another. If it were not so difficult to measure the loss of efficiency in the open field system, it would be possible to specify the source and magnitude of the expected increase in output and to relate it to the varying conditions of technology, soil, weather, major crops, and tenurial arrangements. Unfortunately, what is known directly about the loss of efficiency and the gain to be expected from eliminating it is only qualitative: for example, it is known that, other factors held constant, enclosure for pasture was more beneficial than enclosure for tillage. The vagueness of this information would be no obstacle to quantitative analysis if there were statistics on the agricultural output of villages before and after enclosure, but in general there is not. Although yields per acre do not appear to have increased during the eighteenth century, it is difficult to decide how much and still more difficult to allocate the increase to specific regions and times.

The increased output of a recently enclosed village, however, had to accrue in the first instance as income to its occupants, and this fact provides a way around the lack of information on output. An enclosure increased the value of all factors of production by increasing the output to be shared among them. Since labor and capital were mobile, the increase in their productivity would reveal itself in an increase in their employment, not an increase in their prices: if they were paid more, more would flow into the village, and continue to flow until the previous wages of labor and returns to capital were reestablished. It is difficult, although not impossible, to find evidence on the increase in the amount and value of employment of capital and labor after enclosure. For land, however, the situation is very different, both theoretically and evidentially. The value of land was increased by the direct increase in its productivity arising from enclosure and by the indirect increase arising from the larger amounts of complementary labor and capital employed. Land cannot flow from one village to another in response to higher returns, clearly, and in consequence whatever portion of the increased output from enclosure accrued to the factor

benefit net of cost if the general price level has doubled between the two, the benefit itself will have to be deflated by the general price level.

land would reveal itself entirely in an increase in rent. The magnitude of the rise in rents after the enclosure of a village is relatively easy to observe. A rough average from the great variety of sources that give statistics on rents is a doubling of rents per acre after enclosure. The increase in rent, then, is known in a general way, can often be known in detail for particular villages, and can be used as an estimate (although biased downwards by not including the value of the increased employment of the other, mobile factors of production) of the increase in the value of output resulting from enclosure.

The evidence of the increase in rents requires careful handling, for it is not perfectly free of extraneous elements. Any fortuitous influence of variations in the price of agricultural products at the time of an enclosure must be removed from the rent figures, although this is not difficult to do. When treating a large group of enclosures together the influence of the enclosures themselves on prices must be removed as well. For individual enclosures, of course, this is not a problem, each village's output being a trivial portion of the relevant market for agricultural products as a whole. It is more difficult to correct for the influence on rents of agricultural improvements made at the time of an enclosure but neither related to it causally nor included in its costs. The simple solution of examining only those enclosures that were not accompanied by such improvements is available, but wastes evidence. A more economical solution would be to remove the influence of the improvements directly, although of necessity crudely.

Still another difficulty is that rents before an enclosure might not measure the true value of the land because long leases had been arranged during an earlier period of low agricultural prices. Since leases were annulled by enclosure the increase in rent might measure to some extent a mere adjustment of the rent to appropriate levels rather than a real increase in the productivity of the land (if agricultural prices have been falling, of course, the effect is reversed). In other words, the enclosure would present the landlords with an opportunity to repudiate the bad wagers they had made in earlier years that prices would not rise. The significance of this effect depends on the length of leases in a village to be enclosed and the course of prices in the preceding years. When long leases are common some allowances must be made for them in

the explanation of the rate of enclosure. The enclosures of the Napoleonic Wars, for example, probably had some element of renegotiation of leases in them. But as long as the prevalence of long leases can be estimated the adjustment in the reasoning is not difficult to make.

With these reservations, then, the observed increases in rent can serve as an estimate of the increase in output produced by an enclosure. It is strictly speaking a lower bound estimate, but can be expected to move in proportion to the increase in output as a whole. It can therefore play the same role in the analysis of the demand side of enclosure as costs play in the analysis of the supply side. Its variation can be related statistically to yearly variation in prices and interest rates and to regional variation in soil type, dominant crop, and so on, just as the variation in the cost of enclosure can be related to the progress of parliamentary procedures and to differences in the sizes of villages. The complete model brings the two together and permits the relevant historical experiments to be performed.

V

Some of the information given above can be used in a brief and crude experiment that may illustrate the promise of the complete model. If rents doubled on the 14 million or so acres enclosed after 1700, assuming as a low estimate that they earned typically a rent of 10 shillings an acre before enclosure (this before the inflation of the Napoleonic Wars), the increase in rent yields a lower bound on the increase in the value of agricultural output of around £7 million each year. Only opportunity costs need to be subtracted from this total (transfers of income, although they affect the rate of enclosure, do not detract from its social benefit), which may be put at around £2 an acre for each enclosure. If they were put higher it would matter little for the results, because to convert this capital sum into a stream of income comparable to the yearly increase in output it must be multiplied by the interest rate. Conceding that the rate of interest on consols, typically well under 5 percent, is a riskless rate and therefore too low, one might still doubt that the relevant rate was much above 10 percent. The 14 million acres enclosed, then, resulted in a stream of income foregone of (£2) (14 million) (.10), or £2.8 million each year. Therefore, the net gain

to national income, if one had the temerity to ignore the many qualifications necessary in view of the argument of this essay, could be put at around £4.2 million a year. Considering that the figure is meant to be very much a lower bound it is a respectable order of magnitude for a mere shift in the distribution of property rights: it is 3 or 4 percent of national income in 1970, for example; or roughly a 7 percent increase in the productivity of agriculture. To put the matter another way, the return to enclosure was high: an expenditure of £2 an acre (ignoring here transfer costs) yielded an increased rent accruing to the landlord of 10 shillings in each year following, for a rate of return of 25 percent per year.[15]

Whether or not the results of this crude experiment will be confirmed by the more refined ones proposed earlier remains to be seen. The refinements require more information, particularly a usable sample of the history of enclosure in a good number of villages, complete with the villages' topography and soil types, their size, their tenurial arrangements, and estimates of the costs and benefits of their enclosures. The constraints on the drawing of such a sample are many, for the records are often incomplete even when they have survived. And there is, of course, a large gap between constructing a model of enclosure and showing that a particular form of it is true. What can be claimed at this point, to use an appropriate metaphor, is that the ground has been cleared, if not plowed and harrowed, and with sufficient seed the harvest of historical insight can be ample.

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[15] In this form the calculation has a long history. See Arthur Young, *Agricultural Survey of Lincolnshire* (1799), pp. 77, 83; Gilbert Slater, *The English Peasantry and the Enclosure of Common Fields* (London: Constable, 1907), p. 262 ff; W. E. Tate, "The Cost of Parliamentary Enclosure in England (With Special Reference to the Country of Oxford)," *Economic History Review*, 2d ser., V (1953), 265; and, most recently, G. E. Mingay, *English Landed Society in the Eighteenth Century* (London: Routledge & Kegan Paul, 1963), p. 183.