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SUCCESS ON THE COMMONS: A COMPARATIVE EXAMINATION OF INSTITUTIONS FOR COMMON PROPERTY RESOURCE MANAGEMENT

The reason I have decided, perhaps foolishly, to wander so far from my own specialty in contemporary Japanese politics is that my previous research within the confines of that specialty – on problems, politics, and policy concerned with the environment and natural resources – forced me to confront what political economists have variously labelled the prisoner's dilemma, free-rider problems, or most broadly the problems of collective and public goods. Many essays are devoted just to defining and describing this class of problems, let alone to solving them, and I haven't the space for an elaborate technical definition here.[1] In a nutshell, these are problems that arise when individuals must cooperate to achieve a goal that is in both their collective and their individual interest to pursue, but when the costs to individuals of cooperating may exceed at least the short-term benefit of cooperating. Whenever individuals feel that their own contribution to the collective goal is miniscule and would not be missed if withheld, that withholding their contribution would not jeopardize the outcome anyway because others will continue contributing, and that they will continue to draw benefits from the collective effort made by others, they will feel sorely tempted to refrain from contributing. Similarly, whenever individuals have no assurance that the other members of the group will make their contributions and that their lone contribution to the effort would be insufficient to produce the desired outcome, they will correctly conclude that it would be pointless for them to bother contributing. In such circumstances, the cost-benefit calculations of individuals exert pressure on them to withhold their contributions to the collective goal, in essence to defect from or to cheat against the group, even if they are fully conscious of the possibility that widespread defection or cheating would seriously damage the collective effort. The logical extension of this behavior is that defection and cheating can spread like a contagion through the group and the collective goal may be entirely undermined. Analyses of this kind can profitably be used to explain all sorts of social problems: why individuals litter even if they prefer a clean landscape, why firms pollute even if their owners would like to breathe clean air, why frightened citizens buy guns to protect themselves even if they would prefer a totally disarmed society, why herdsmen allow their herds to overgraze their pastures, why fishermen wantonly overfish the seas, why we persist in using so much water that ground subsidence and desertification occur, why individual farmers, fuelgatherers, and multinational timber companies are deforesting the planet. This analysis can also be applied to the behavior of governments: why nations cannot agree on a treaty to prevent deepsea pollution and regulate seabed mining, why individual peace-loving nations continually pour resources and human lives into arms races and wars.

What is common to all of these contemporary situations is that the solutions we want all require not just regulation but very sincere cooperation with regulation – what biologist Garrett Hardin has neatly described as "mutual coercion mutually agreed upon" – but the mix of incentives faced by the individuals involved drives them away from cooperation. This kind of analysis also makes clear that the failure of cooperation is rather easy to understand, that the need to cooperate even in the interest of survival is woefully inadequate motivation to cooperate, and that instances of successful cooperation are an admirable surprise worthy of intense study. Political economists have pursued their theoretical analyses in order to deduce how we might tamper with the incentives of individuals and increase the attractiveness of cooperation, and some empirical research on actual examples of cooperation in these circumstances has also been done. But the contemporary and historical record of useful examples has not yet been adequately mined.

The history of common rights in land and water – how these systems evolve, function, and disappear – is an excellent source of enlightenment for those like me who worry about the problems of collective goods. Among Western scholars the study of English common fields and their disappearance as enclosure progressed is very well studied – though not definitively understood – and there has also been work on such systems elsewhere (in northern Europe, Russia, the Middle East, Latin America, Indonesia, and so on). Most recently, Japan's lengthy experience with common rights in land and water, extensively studied by Japanese scholars, has attracted the notice of Western specialists on Japan. The Japanese cases are particularly valuable because the documentation and detail about village life is almost as rich as that for Europe, and in fact the evidence about actual management practices on common land may be every bit as good. Whether one's interest is in the historical evolution of communities and communal social practices, or in the utility of historical research for solving practical problems of today, we need much more work on local history to bring the richness of the Japanese example to the attention of Western scholars, and we need to make careful comparisons among systems. Although I am an amateur adventurer and interloper with regard to both Japanese history and the comparative history of common property systems, I would like to offer a primitive and premature list of observations on both topics. I will begin with a short summary of the management practices used in the 19th and 20th centuries in one very well studied expanse of Japanese common land – the north slope of Mount Fuji, about which I have written previously. I will then compare the essential features of these practices to those found in other systems of common property management in England, Switzerland, Morocco, Nepal, India, and the Andean highlands.[3] The common property I will speak of below consists of land of three types – cultivated arable land used for communal pasture during fallow periods, uncultivated meadow used either for pasture and fodder or for miscellaneous products, and forest used variously for fertilizer or fuelwood or construction timber. I will ignore the differences among these multiple uses because I will concentrate on the rules and institutions created to protect the resources and not on the resources themselves.

The term "common property" as used below deserves careful definition because it is frequently confused with the two other forms of property from

which it should be distinguished: unowned property (that is, property to which no one has recognized rights of any kind) and public property (that is, property owned by the state and ostensibly held in trust for the well-being of the general public and often accessible to the public).[4] This confusion is quite unfortunate because these three different arrangements of property rights have different consequences for management of the resources in question.[5] Unowned property is quite obviously vulnerable to degradation because no one has the right to keep anyone out or to limit use. Public property is almost as vulnerable because ownership is vested in an abstract entity whose representatives (government officials) are only managers who are often far removed from the resource itself and thus unable to police its use, and who are in any case only managers without a personal stake in the resource and thus not highly motivated to protect it.[6] Common property, on the other hand, is best thought of as jointly owned private property. As we shall see below, well-organized communities of co-owners are capable of protecting and managing their property quite well. Common property in many traditional societies carries the additional condition that co-owners may alienate their property only by bequeathing it, not by selling it. In the purest case, then, there is no market in which rights to the commons can be bought, leased, or exchanged. Rights are conferred only on a particular class of eligible persons and may not be transferred to persons outside of that class.[7] This theoretically inviolable bond between the co-owners and their rights to the commons can enhance their interest in making the best possible use of such rights (because they cannot sell their share of the commons when they lose interest in it) and in operating with the longest imaginable time horizons (because these rights automatically pass to their descendants). Thus it can create a built-in sense of responsibility to future generations, an ethical principle often considered to be at the heart of any solution to contemporary environmental problems.[8]

Management Practices on the Japanese Commons

Not all Japanese villages got through the Tokugawa period with their commons intact — there was much partitioning of commons by means of collective agreement to convert the commons into private parcels each owned by individuals who were former co-owners of the former commons. The reasons for partitioning were probably two. First, some villages simply did not develop clever rules and enforcement practices to solve their collective goods problems. Institutional design is a process of trial and error, and obviously some villages would fail to come up with rules that could protect their commons from themselves. They began to experience deterioration on the commons and opted instead for private ownership so that individuals would have the incentive to exclude others and exercise self-discipline in their own use of their own land.[9] In these circumstances, even if good communal management is more efficient than private ownership, private ownership may well be more efficient than bad communal management.[10]

Second, some villages probably operated their commons well enough but were located near cities or convenient transportation, and these began to

experience commercialization and regional specialization in the crops in which they had a comparative advantage, and it became uneconomical for them to rely on the traditional products of the commons. For example, with new technologies and changes in relative factor prices they could cultivate cash crops to sell to the cities, and the cash income not only allowed them to purchase food for themselves and fodder for their animals (produced in other regions that had a comparative advantage in those products) but also urban nightsoil with which to fertilize their fields, so that they no longer found it worthwhile to incur the labor cost involved in gathering fertilizer from the commons. Some such villages might choose to keep their commons but others would reach a collective agreement to sell or partition it.

Thus villages that did get through the Tokugawa period with their commons intact had to be those villages (a) that had successfully designed institutional rules to solve free-rider problems on the commons so that holding the land in common was workable, and (b) that had not experienced drastic changes in the local economy that suddenly made non-traditional and easily privatizable uses of the commons even more efficient than traditional uses.[11] Therefore we can be fairly safe in regarding the management techniques of the 19th and 20th centuries as the successful ones that offer the most important models and lessons.

The three villages of Yumanaka, Hirano, and Nagaike are located on the north slope of Mount Fuji.[12] They each have their own exclusive parcels of common land and they also share, along with several other villages, a large expanse of scruffy meadow that extends up toward the summit of Mount Fuji. The villages vary in important ways, with Hirano being the oldest, richest, most hierarchical, and least egalitarian; Nagaike being the youngest, smallest, and most egalitarian; and Yamanaka being the largest the poorest of the three. These villages relied on the commons as a source of game; as a source of assorted grasses that could be used as fresh fodder for farm animals, as dry fodder during the winter, as fertilizer in dry or wet paddy, and as material for thatching roofs, weaving baskets, or making other household products; and as a source of wood for fuel, charcoal-making, and construction. By the 19th century and perhaps earlier, each village had developed a sophisticated set of rules governing which products could be taken from the commons, how much of each could be taken, how much had to be left behind to allow regeneration of the plants in later seasons, who might enter the commons to harvest products, what tools could be used, and how the harvested products were to be distributed in the village. For items that the commons produced in abundance, villagers might be allowed free and open entry as long as they secured permission ahead of time and carried an entry permit, and as long as they obeyed rules designed to leave a self-sustaining population of plants or animals. For items in scarcer supply or items that had to be left undisturbed until maturity, the villagers set aside closed reserves and authorized the village headman to determine the day on which the reserves would become accessible to the villagers. The period of open access might last until winter or only a day or two to limit the size of the harvest. Villagers might be free to come and go at will during this open period, or they might enter the commons only in groups (usually kumi, the horizontally organized clusters of households into which most villagers were divided). Villagers might be free to wander anywhere in the closed reserve

during the open period, or they might be restricted to particular zones within the reserve. These zones might be rotated on an annual basis from kumi to kumi or household to household, or they might be reassigned at random (by lot) at each harvest. Finally, villagers might be allowed to take whatever they could cut from their assigned zone in the reserve – perhaps with the additional limitation that each household could send only one able-bodied adult and one pack horse to carry the harvest out – or they might have to contribute all or part of their haul to a village-wide or kumi-wide pool. These amalgamated harvests might then be divided into equal sized bundles (with some hope that each bundle would contain the same proportions of high and low quality material) and then redistributed immediately to the villagers by lot. Or, in the case of roof thatch in Nagaike, for instance, the entire harvest might be donated to the household whose turn it was to get a new roof.

In addition to the right of harvesting from the commons, villagers had the duty to contribute to its maintenance. This might consist of selective weeding on small commons, of tree cropping in community woodlots, and of cutting firebreaks and monitoring the annual spring burning of large meadows, a risky but efficient practice that combined weeding and fertilizing all at once. In many villages these duties also consisted of taking a turn at patrolling the commons to enforce the rules of use and apprehend violators, who were usually interlopers from other villages but might occasionally be from within the village. (In Yamanaka, where households were too poor to spare an able-bodied adult to serve in the detective patrol, such a patrol did not exist but villagers were empowered to use "citizen's arrest" to capture violators.) Violators were immediately deprived of their contraband, tools, and pack animals and ordered to pay a fine. Penalties escalated with the severity of the violation and the arrogance of unremorseful offenders, and on rate occasions culminated in exclusion or banishment – first from some rights to the commons, then from other village social and economic functions or all rights to the commons, and finally from the village itself. Accounts were kept to see that each kumi and each household made its proper contributions of labor and took only its proper share of the harvest from the commons, with few excuses accepted. As in other matters, the rules of collective responsibility gave villagers, groups within villages, and families powerful incentives to police the behavior of their members so that innocent persons would not have to suffer for the infractions of the guilty. Minor violations (especially illicit entry by impatient villagers into closed reserves just a bit before opening day) were routine, and were apprehended just as routinely by detectives who knew well what to expect. Major violations were quite rate. I encountered only two examples in Kitafuji during the last century. One concerned a wealthy village elder who, in a moment of indiscretion, decided that he was above the law and no longer needed to abide by the rules governing the commons. For this disruptive defiance his family suffered ostracism in its fullest form for a generation and in lesser forms for three more. The other case constituted a collective challenge by leading households to the then village headman concerning his choice of opening day, too late by everyone else's reckoning. They entered the commons before opening day in a peaceful mutiny, a collective act of civil disobedience, to face capture by the young detectives on patrol. These pillars of the community accepted the village's right to punish them and made an enormous controbution to the local school in compensation, but they also

got their message across to the headman that he should reach his decisions on the base of fuller consultation with local experts.

Successful Management of Common Property

The features of Japanese practice bear strong similarities to those found in other successful systems of common property management in agrarian societies: in the open-field systems of England and northern Europe,[13] in a little-known open-field system in Andhra Pradesh in India,[14] in the alpine meadows of Switzerland,[15] in Himalayan villages in Nepal,[16] in the Andean highlands of Bolivia and Peru,[17] and among the Berber tribes of the Atlas mountains in Morocco.[18] My eventual aim is to approach a list of necessary and sufficient conditions for successful solutions to collective goods problems in the management of common property resources, a task that will require far more data and careful analysis than I have presented here.[19] What follows is a first attempt.

Characteristics of the community of users. First, a clear understanding as to who is eligible to use the commons appears to be necessary. Precisely who is eligible varied in Japan: all residents of a village, all taxpaying residents of a village, all households that paid regular dues to the Shinto shrine, all households headed by an able-bodied adult male (households lacking such a person might be considered headless or even non-households and might lose their rights to the commons and other political rights in the village for a time), all households with cultivation rights, and so on. Generally, eligible users had to be local residents who would be available to perform their full duties to contribute to the commons; absentee landowners were not welcome. This requirement minimized enforcement costs since eligible local users and outsiders could be instantly distinguished. In Japan, a household that emigrated to the city would usually lose its rights to the commons even if it retained private holdings in the village; for this reason a household might allow extraneous members to emigrate but would leave someone behind in the village to retain and exercise full participatory rights in the village. In Japan and elsewhere, the unit of accounting was usually the household, and at least in Japan and medieval England we have evidence that the village exerted some control over the number of households — by restricting migration into the village, by denying recognition to new arrivals until they had "established themselves" through a long period of residency, and by restricting the splitting of households — in order to prevent the proliferation of households among whom the benefits had to be parcelled out. Both Japanese and medieval English villages had notions about how large they could be and how many units they could manageably contain, as if they were already familiar with the prediction of Mancur Olson and others that large groups have more trouble with free-riders than small ones.[20]

Next, these eligible users had to convene regularly in a deliberative body to make decisions about opening and closing the commons, about harvest dates, and about the rules governing the commons and also to adjudicate conflicts over the commons. In Japan this was either the full assembly of

heads of enfranchised households or an indirect body composed of representatives from each kumi. In medieval England this was the assembly of cultivators, which could be identical with the manorial court that adjudicated disputes on a lord's demesne, or where there were openfields in the absence of a manor it might be an assembly of free-holders.[21] The assembly might allow the village headman or even the lord of the manor to make some of the daily decisions, but the assembly met at least yearly and was the body that created and affirmed new rules or byelaws for using the commons.[22]

This deliberative assembly or community of co-owners had to have independent jurisdiction over the management of the commons – to be free from interference or challenges to its authority over the commons by other bodies – no matter how authoritarian the surrounding political context. Tokugawa Japan was a repressive society but the national and domainal governments left villages essentially alone with regard to the management of the commons. Similarly, manorial lords in medieval England encouraged the villagers of their demesne to manage the open field system without interference – the lord himself usually being the wealthiest beneficiary and participant in the system. The village councils of Andhra Pradesh actually levy taxes on private transactions and devise licensing arrangements from which they can skim off a portion – all to finance the guarding of the commons – in defiance of the formal powers of taxation granted to them by the Indian federal government. The secrecy of their operations is crucial to their independence and thus to their success. Similarly, contemporary fishing cooperatives in Turkey are greatly aided in their management of inshore fisheries (common property of the local fishermen) by national law acknowledging their collective existence as juridical persons with the right to sue to protect their property.[23]

The importance of independent jurisdiction over the commons is highlighted by the many examples of failed common property systems where national governments undermine the independence and authority of the local unit that has managed common property. This kind of interference is the source of environmental tragedy in Botswana, where the central government, in a self-conscious attempt to undermine the authority of traditional chiefs, has created land boards to allocate common land.[24] As already mentioned, the Indian and Nepalese governments have had unfortunate experiences with the nationalization of forests they imagined to be unowned that had in fact been carefully managed by nearby villages as common property.

These deliberative bodies almost always convened to perform other functions in addition to managing the commons. This was a very important factor in the efficiency of communal management because it reduced the transaction costs inherent in mobilizing the users of the commons to make decisions and rules.[25] If the same group of people had to meet anyway for other purposes, or if the group that regulated the commons could also perform other beneficial functions for the community, then the costs both to individuals and to the group as a whole of communal management would be much lower than the costs of private ownership. Private ownership multiplies the

number of boundaries and contractual arrangements that have to be enforced and therefore requires extensive arrangements for the adjudication of conflict.

It would also appear that even though traditional agrarian society afforded the rich and powerful many opportunities to oppress the poor and weak, these assemblies had to pay some attention to the views of all eligible users of the commons in order to win adherence to the rules adopted. Disgruntled violators, after all, could begin to free ride (to take more than their share of the commons) or to shirk (to withhold energetic contributions of labor to maintain the commons) if they felt that the maintenance of the commons was no longer in their interest because the rules were unfair. Thus these bodies had some democratic characteristics and usually made their decisions by consensus or unanimity rather than just majority rule. There is some evidence at least in Japan that over time the right to participate in the decision-making assembly was extended to all those with rights to use the commons.[26]

Distributional impact of common property systems. One issue that will require extensive additional study before it can be settled is the role of egalitarianism in rights and duties concerning the commons. The Japanese evidence is somewhat cluttered. Some Japanese scholars have argued that traditional Japanese practices were egalitarian, and that inegalitarianism emerged only after the Meiji restoration (1867).[27] There is also evidence that when the commons were partitioned or sold off, the land or the cash income from the sale was subdivided into equal portions per eligible household.[28] And we have strikingly clear evidence of scrupulously egalitarian practices in the 19th and 20th centuries in Kitafuji where villagers went to great lengths to divvy up the products of the commons into equal shares for each eligible household, both in a village where private holdings were nearly equal (Nagaike) and in a village where considerable stratification and concentration of wealth prevailed (Hirano). On the other hand, the assertion of Furushima Toshio that common access rights were usually distributed unequally in Japan, on the basis of individual holdings of animals or cultivated fields, has been confirmed repeatedly.[29] Finally, it would appear that in common property systems elsewhere – in the open fields of medieval England, in the alpine pastures of Switzerland, in the grazing reserves of the Berbers in Morocco, and in the very stratified villages of Andhra Pradesh in India, for instance – entitlement to products of the commons was almost always based on private holdings and thus reproduced the inequality in private wealth.

It seems to me that a source of difficulty here is the tendency to confuse distribution of three different kinds of rights: the right to eligibility for a share and participation in decision-making in the commons, entitlement to a certain proportion of the annual production from the commons, and finally entitlement to a certain proportion of the proceeds when the commons are sold or subdivided into private parcels.

As to the first, it appears that considerable inequality in eligibility for rights to the commons was almost universal and probably essential. That

is, rights to the commons were not automatically made available to all local residents but were given out only sparingly to certain categories of local residents. Over time the definition of eligibility probably broadened, as people who were once newcomers became established in the community and struggled to acquire participatory rights in village functions. But it seems to have been essential that communities screen individual households carefully before awarding eligibility and that may put a manageable ceiling on the total number of households that could be eligible. Moreover, it seems to have been commonplace to have a hierarchy of rights to the commons – with senior or full rights reserved for one category of villagers and partial or half-rights being awarded to the rest. Full rights might include the right to harvest any plant or the right to enter a closed reserve for a longer period of time, whereas partial rights might consist of more limited access to closed reserves, stricter limits on the number of animals one might out to pasture in the commons, or stricter rules about harvesting (taking only fallen wood for fuel rather than cutting fresh wood, say). This kind of stratification has been noted in Japan[30], where tenants might receive partial rights to the commons through their landlord, and it has also been carefully documented in Berber tribes where the fraction of the tribe that claimed descent from the saint who was believed to guard the common pasture was allowed a longer period of pasturage than the rest of the tribe.[31]

I suspect that the creation of hierarchical rights was a way of resolving the tension that arose as communities and tribes grew in size and new households began to pester the older households for a share of the commons. When the disenfranchised are sufficiently numerous, they can pose a serious threat to the commons simply by invading it, yet without assurance of a long-term share they have no motivation to be disciplined in their use of it. Thus there comes a point when it is in the interest of the senior households to award rights to the commons to junior households in order to "buy" their cooperation with the rules for using the commons – to give them the motivation to exercise restraint in their use of the commons and the desire to contribute to the maintenance of the commons, now that they are assured of a share.[32] But by awarding only the level of eligibility that gives junior households the proper incentives and no more than this, senior households can avoid debasing the currency of shares in the commons. Thus hierarchical rights are probably a useful accomodation to growth and change in communities with common property.

In conclusion, the exigencies of management – keeping the number of co-owners of the commons manageably small but buying the cooperation and allegiance of groups large enough to destroy the commons when they become sufficiently angry at being disenfranchised – seem to require inequality between co-owners of the commons and non-owners, and to encourage some additional stratification between senior co-owners and junior co-owners.

Entitlement to a particular share of the annual product of the commons is still another matter. The general practice in most common property systems seems to have been to design rules of use that would distribute products of the commons in direct proportion to private holdings of cultivated fields and animals – that is, to reproduce whatever inequalities

in private wealth there were in the community of senior and junior co-owners of the commons. In the Moroccan High Atlas, there were no rules at all about the number of animals each household could bring to the summer pasture on the commons, but since the trip uphill took several days each family was obviously limited to the number of animals that it could feed on the trip with fodder grown on the family's private holdings.[33] Thus each family had to maintain a delicate balance between the portion of its private fields devoted to raising fodder, the number of animals it maintained, and the amount of labor it could send into the mountains to accompany the animals in their summer pasture. Although these ratios among factors of production would be similar in each family, obviously families with more private fields could have more children, grow food for more people and animals alike, keep larger herds, and thus obtain a larger share of the pasturage in the commons than poorer families that had to keep smaller herds.

Similarly, in Switzerland the same sort of natural balance governed one's ability to partake of the commons. Each farmer could send into the alpine meadows each summer only the number of animals he could feed during the winter with food grown on private holdings. Thus the portion of the benefits from the common pasture obtained by each household was almost identical to the proportion of the private fields in the community owned by that household.[34]

In medieval English open field systems, freeholders and copyholders or tenants of the lord's manor had private holdings scattered throughout each of the several open fields in the village. There was considerable inequality of wealth in the distribution of the total private holding of an individual peasant.[35] As in the other systems mentioned above, the number of animals a farmer could graze on the commons was essentially the number he needed to work his private fields. The village assembly would determine the total acceptable size of the amalgamated herd for the village and allow individual farmers to own the number of animals within that herd that corresponded to their proportion of the private holdings of arable land within the village.

In Andhra Pradesh, farmers today practice an open field system much like that in medieval England, in that they convert their privately owned cultivated fields into common fields for grazing after the harvest and during fallow seasons. Because much of this land is suitable for cultivation, these farmers have more opportunities for grazing the fallows than their own plow animals require, so they allow herdsmen from outside of the village to graze the margins between cropped fields and the full expanse of the fallow fields. In some villages the herdsmen pay the village for grazing rights, and in others the fanners pay the village to arrange with herdsmen to bring in their animals in order to dung the fields. Who pays whom depends on how badly the fanners want fertilizer for their fields and how badly the herdsmen want grazing rights for their flocks. In any case, rather than leave these quite privatizable transactions to individual farmers and herdsmen, the village negotiates for the fanners collectively and uses a share of the proceeds of the transaction to hire field guards to make sure that the herds stay out of fields with crops still growing in them. The collective arrangement reduces many transactions to one and thus saves on transaction

costs, and greatly reduces the total cost to the village of policing the herds. Fanners pay for these services (and also for common irrigators who distribute irrigation water to the fields) in accordance with the size of their fields, and herdsmen pay for these services in accordance with the size of their flocks, so conducting these transactions collectively simply reproduces existing disparities among farmers and herdsmen respectively, and does not perform any redistributive function.[36]

There are both organizational and economic benefits from such a pattern of distribution. First, while it does not redistribute wealth so as to increase material equality in the village, it often signifies a balance between costs and benefits to individuals of using the commons. That is, those who benefit the most also bear more of the costs of maintenance, and as they are the wealthier members of the community they are those who can afford the greater costs. If our standard of equity is that people should receive only insofar as they have given, then equity is being achieved. More important to the survival of the commons is the incentive this pattern of distribution gives to the wealthiest co-owners to see that the commons is maintained and protected. In effect, this pattern creates a small "critical mass" (what some theorists might call a "minimum contributing set" for producing a "lumpy" collective good, one that can be produced with contributions from just a few of the beneficiaries[37]) of persons who not only care about the commons but have the wherewithal to contribute extra managerial effort. The wealthier families often dominate the assembly of users, and we often find that detective duty rotates only among those households. This obviously represents a concentration of political power, but it may be welcomed by households too poor to spare manpower for service on the village council or detective duty. For the wealthier families to bear more of the organizational burden may thus enhance everyone's impression that his own effort is appropriately rewarded and thus that the system is somehow "fair."

A feature that all of these arrangements share is that the common land was intended to provide services that farmers required in direct proportion to their private holdings, whether it was pasturage for the plow animals they used or fertilizer for their private fields. Given a particular agricultural technology the ratios between the various components of the productive system – of fodder to animals, of animals to cultivated land, of fertilizer to cultivated land – were essentially fixed. Distributing the benefits of the commons to match the distribution of private means of production obviously maximizes the production levels from private holdings. Indeed, any other distribution rule would cause farmers to engage in private transactions to reallocate the products of the commons in accordance with this principle. Thus the argument in favor of a neutral distribution rule (one that does not alter the distribution of private wealth) is economic efficiency.

This does not mean that other distributional rules are inefficient; other rules may be economically efficient if the circumstances of production are somehow different or if the uses of the products of the commons are not directly related to private agricultural output. The scrupulous egalitarianism in distribution of the products of the commons in Kitafuji requires close examination. In all three villages, every eligible household

(that is, every household with rights to the commons) was entitled to use the commons under the same conditions, regardless of disparities in their private wealth and holdings of paddy land or animals, and regardless of household size. Each household could send only one adult and one horse into the reserves to cut, and even though some people would be stronger and faster than others, there would obviously be only a limited range within which the harvest per household could vary. When this method of harvesting thatch or fodder began to threaten the supply (it did, after all, encourage competitive cutting even within the limited one or two days of allowable harvesting, and there may also have been a safety hazard involved in having people running amuck with sickles), the system of amalgamation, division into equal bundles, and redistribution of bundles by lottery was adopted to eliminate the advantage to any one household of vigorous or speedy harvesting.

I would suggest that two factors caused the Kitafuji villagers to adopt an egalitarian rule of distribution for the products of their commons. First, regardless of small variations in household size and more substantial variations in household wealth in two villages, all households had approximately similar requirements for fuel, roof thatch, and fodder for animals. Fuel was used only for cooking and very modest space heating in one room per household (a room equipped with a kotatsu or heated table). A farmhouse needed rethatching only every twenty years or so and even "wealthy" farmers did not have houses so much larger than poor ones did. Finally, animals were not particularly important in wet rice agriculture, and were

probably used as much for personal transportation as for plowing. There was probably not much difference between households in the number of animals they maintained. The product for which individual requirements would have varied greatly was compost or fertilizer. This was also the product that was least carefully regulated and most likely to come from open commons. It seems likely that the equal distribution of the three products for which individual needs were very similar (fuel, thatch, and fodder) was fairly efficient for the same reasons that disparities in distribution were efficient in our other cases, and did not depress either individual or total village production levels. When and if fertilizer was distributed equally too in spite of disparate requirements on different sized holdings of cultivated fields, there may have been other factors involved. The transaction and information costs of devising separate rules for harvesting different products from the same patch of commons would have been high, and the enforcement costs higher still. If fertilizer had to come from the same commons as the other products it would obviously compete with the other products that had to be regulated closely to make sure they reached maturity. Thus it might have been administratively much easier (and thus economically efficient) to distribute everything by essentially egalitarian rules in some circumstances. There might also be beneficial spillover effects for the community and thus for the social cohesion and loyalty to the rules for managing the commons. Egalitarian distribution of fertilizer to poor farmers who received more than they could use on their own fields gave them a surplus that they could sell to the wealthier families with larger requirements. As long as the wealthy farmers were not miffed at having to buy some of their fertilizer from poorer neighbors – and the support of the wealthy would be crucial here – all could feel that a little bit of economic redistribution was good for the community and served the interests of fair play and social justice.

Distribution that is not merely egalitarian but also random also enhances the group's internal cohesion and loyalty. Everyone, rich and poor alike, bears the same risk of getting a bad bundle of the harvest, and bad luck cannot be blamed on anyone. Random assignment also ensures that equal division is really equal, since no one knows beforehand which bundle will be theirs. Children who are dividing a cake into equal parts know this, and the most extreme example I have found is the division of property that takes place in a Hutterite commune when it becomes unmanageably large and decides to split. Since it is much easier to stay behind than to move and hew out a new community from the rough earth, the Hutterites eliminate "lobbying" to avoid being in the group that has to move by making the decision by lot. The community splits into two halves, equal in numbers of people and in property, and both halves pack their possessions and prepare to migrate. At the moment of departure lots are drawn: the unlucky half move on to the new site, and

the lucky half unpack their belongings and go home to relax.

The community might also benefit from using a principle of equal distribution (and in effect redistribution of wealth) for reasons having to do with the environmental health of the commons. If distribution of a product was to be equal, there was no incentive for a household to exert itself strenously in competitive harvesting of the product. Such effort could not begin to increase the village's total harvest enough to raise that household's equal share by any substantial amount. The rule of equal distribution thus reduced the size of the total village harvest as all relaxed their efforts harvesting. This result would be very desirable if the village's appetite for a resource was approaching the maximum sustainable yield of the commons for that resource.

Finally, we come to egalitarianism in distributing the proceeds when the commons are partitioned or sold off to private buyers. This is an issue of immense importance to historians who are trying to determine the distributional impact of enclosure movements, and I do not know enough to barge into that debate. Suffice it to say that in Japan there is some evidence that as villages partitioned off or sold their commons they usually followed egalitarian rules, awarding each co-owner household an equal parcel of former common land to hold as private property, or awarding each household an equal share of cash from the sale of common land to outsiders. But nowhere is the case closed on this matter. In any case, we must remember to distinguish among egalitarianisms in fundamental rights, in management practices, and finally in distribution at the time of partition.

Rules and Enforcement. Another cluster of characteristics of successful common property systems has to do with the rules they employ to govern use of the commons. There is in all of these cases a trend toward detailed regulations to restrict use when environmental health of the commons begins to suffer. The rules set limits on total size of grazing herds or on the period of time open to use; they regulate the products that are to be taken from the commons (which products, of what size, with what population left behind to permit regeneration of the supply); they regulate the tools that can be used to harvest products from the commons (saws and sickles must be under a certain size, carts and animals used to carry products away must be limited in size and number). These rules tend to have two important

characteristics: they are easily enforceable and cautious with respect to their exploitation of the environment. Closing a commons except for a limited period of use makes it very easy to determine whether a user is violating the rules – anyone in the commons during the closed period is a violator no matter what he is doing. Specifying products and tools or the number of animals or the approved locations makes it a simple matter for users of the commons to know whether they are in compliance and for enforcers to know whether they have come across a legitimate harvesting operation or an illicit one.

Successful systems are also respectfully cautious toward the natural environment. Villagers in Kitafuji tightened their rules whenever they became concerned about the effects of competitive cutting. In Nepal, where government officials want villagers to make "efficient" use of their forests but where villagers want to protect them, villagers prefer to ban the harvesting of a product rather than employ a harvesting rule that might be difficult to enforce. In a deciduous forest commons that could technically be used on a sustainable basis for both leaf litter (as fertilizer) and fuelwood, villagers fear that allowing the taking of dead or fallen trees and scrub for fuelwood would tempt users to cut healthy trees and reduce the supply of leaves on the forest floor, so they prefer to allow only the taking of leaf litter and to ban fuelwood harvesting altogether.[40]

Successful systems also betray an intense concern with the enforcement of these rules and provide for guards or detectives. They could be hired and paid in cash, they could be selected from amongst the wealthiest households of the village, or the duty of serving as detective might rotate throughout the entire community of households with rights to the commons. In medieval England the lord of the manor had enough holdings to make it worth his while to hire his own field guard, but the assembly of cultivators would also select or hire their own "wardens of autumn" to protect the crops from grazing animals and illicit harvesters, and would also hire a herdsman to discipline the village's collective herd. Such detectives or enforcers were obviously in a position to abuse their authority – to ignore an abuse of the commons in exchange for a bribe, or to exploit their favored position to extract more than their own share from the commons without fear of detection. As a result most detective systems contained built-in mechanisms for reducing the discretion detectives had to exercise and for eliminating corruption. Penalties and fines were usually carefully specified in village bye-laws so that detectives could not overcharge violators. Often detectives were allowed to retain the fines they charged as income, giving them an incentive to enforce the rules harshly rather than leniently. (Yet communities were probably small enough to ensure that any detective who tried to terrorize his neighbors or run a protection racket – in effect to penalize innocent users of the commons if they did not give him regular payoffs – would be removed from duty and punished.) In Kitafuji, the detectives patrolled in teams, partly to give them the physical power to deal with obstreperous violators but also to provide for mutual surveillance, so that teammates would monitor each other's behavior as well.

Just as successful common property management requires careful consideration of the problems of enforcement it also depends on accurate

bookkeeping to keep track of contributions to and harvests from the commons. Most of these systems we have examined did not permit the wealthy to buy their way out of obligations or to hire others to perform their duties for them, and households that could or would not contribute appropriately were soon deprived of part or all of their rights – at least to a share of the harvest for a season but possibly their fundamental right to the commons.

This last principle – escalating punishment culminating in exclusion from rights to the commons – is an extremely important ingredient of success, and it also accords with public choice theory about the importance of excluding non-contributors from a stream of benefits in order to ensure congruence between individual interests and collective interests in the production of these benefits.[41]41

To summarize the salient features of a successful system of common property management: the community of co-owners has to be a self-conscious and self-governing community with the political independence to manage the commons as it sees fit even within the context of an otherwise authoritarian polity. The distribution of rights and shares of the commons probably has to be a very careful balance of inegalitarian and egalitarian traits that is economically efficient. The rules must be easily enforced, highly specific, and conservative with respect to the sustainability of resource use. Enforcement must be conducted by members of the community itself rather than by an overlord or superordinate layer of government, to ensure that enforcement is both thorough and impartial.

NOTES

1. Some of the major works in this field include James M. Buchanan, THE DEMAND AND SUPPLY OF PUBLIC GOODS (Chicago: Rand McNally, 1968); Mancur Olson, THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS (Cambridge: Harvard University Press, 1965); and Russell Hardin, COLLECTIVE ACTION (Baltimore: Johns Hopkins University Press for Resources for the Future, 1982). On free-rider problems in particular, see John McMillan, "The Free-Rider Problem: A Survey," THE ECONOMIC RECORD (55:149, June 1979), 95-107; and George J. Stigler, "Free Riders and Collective Action: An Appendix to Theories of Economic Regulation," BELL JOURNAL OF ECONOMICS AND MANAGEMENT SCIENCE (5:2, Autumn 1974), 359-365.

2. Garrett Hardin, "The Tragedy of the Commons," now reprinted in many anthologies but originally in SCIENCE (162:3859, 13 December 1968), 1243-1248.

3. Some of these examples come from the National Academy of Science's project on Common Property and Environmental Management, in which I have participated for three years. The project goals were to establish communication among scholars and practitioners interested in management of common property resources and to gather detailed case studies of contemporary and historical common property systems in order to build generalizations about the factors responsible for success and failure of such systems. The Common Property Network now has over 1000 members worldwide, and on 21-26 April 1985 the first Conference on Common Property and Environmental Management convened in order to examine more than 25 detailed case studies on common property systems, from birds' nests in Borneo to irrigation in India to trees in Thailand.

4. Many writers fail to see the differences among these three forms of ownership. Michael Wallace uses the term "common property" to refer to both unowned property and public property entrusted to the state. H. Scott Gordeon and Anthony Scott call fish in the high seas — before capture, when they are owned by no one — "common property." Others see these important distinctions in form but confuse labels. W. P. Welch uses the term "common property" to refer to unowned property and "usufruct property" to refer to what I and the National Academy of Science panel on Common Property mean by the term "common property." See Michael B. Wallace, "Managing Resources that are Common Property: From Kathmandu to Capitol Hill," JOURNAL OF POLICY ANALYSIS AND MANAGEMENT (2:2, Winter 1983), 220-237; H. Scott Gordon, "The Economic Theory of a Common-Property Resource: The Fishery," JOURNAL OF POLITICAL ECONOMY (62:2, April 1954), 124-142; Anthony Scott, "The Fishery: The Objectives of Sole Ownership," JOURNAL OF POLITICAL ECONOMY (63:2, April 1955), 116-124; and W. P. Welch, "The Political Feasibility of Full Ownership Property Rights: The Cases of Pollution and Fisheries," POLICY SCIENCES (16:2, November 1983), 165-180.

5. Because of the important differences among types of property with regard to the protection and maintenance of resources, I would suggest that we keep in mind the following distinctions: (a) unowned property (sometimes called open-access resources) to which no one has rights and from which no potential user can be excluded (such as the high seas, the upper atmosphere, or unclaimed lands), (b) public property held in trust for the public by the state to which the general public has some access (national parks, national forests, public buildings, municipal parks, city streets, highways, a nation's territorial seas, and many of its waterways), (c) state property (this is essentially the private property of government bodies, to which the general public does not have access — many government office buildings, the typewriters and desks

in government offices, and lands off limits to the public); (d) jointly owned private property whose individual co-owners may well their shares at will without consulting other co-owners (some agricultural cooperatives, business partnerships, joint stock corporations); (e) common property, or jointly owned private property that all co-owners may simultaneously agree to sell by an agreed-upon voting rule but whose individual co-owners may not sell, trade, or lease their shares to others except according to very stringent rules laid down by the group (this definition applies to all of the "common property systems" describes in this paper); and, finally, (f) individually owned private property whose owners have full and complete rights except as attenuated by government regulation. A frequent tragedy in the Third World is the failure of governments and development advisors to detect common property institutions where they exist and to assume that the resource in question is in fact unowned and therefore in need of the purported wisdom of government management. That is, governments look at (e), think they see (a), and declare it to be (b) or (c) to save it. The results are rarely an improvement. In Nepal the government nationalized the Himalayan forests in 1957, villagers thus deprived of what had been their common property began ransacking the hills recklessly, terrible deforestation was evident by the early 1970s, and in 1976 the government finally revised the law to revive local common property institutions. Early evidence suggests that deforestation has now been arrested. See J,E. M. Arnold and J. Gabriel Campbell, "Collective Management of Hill Forests in Nepal: The Community Forestry Development Project," and Donald A. Messerschmidt, "People and Resources in Nepal: Customary Resource Management Systems of the Upper Kali Gandaki," both in PROCEEDINGS OF THE CONFERENCE ON COMMON PROPERTY RESOURCE MANAGEMENT: APRIL 21-26, 1984, ANNAPOLIS, MARYLAND, edited by (in alphabetical order) Daniel Bromley, David Feeny, Jere Gilles, Margaret McKean, Ronald Oakerson, Elinor Ostrom, Pauline Peters, C. Ford Runge, and James Thomson (Washington, D.C.: National Academy of Sciences, 1986, forthcoming); and Michael Wallace, "Managing Resources that are Common Property."

6. Piers Blaikie, John Harriss, and Adam Pain, "The Management and Use of Common Property Resources in Tamil Nadu, India," in PROCEEDINGS (1986).

7. In Japan this traditional definition of common property or iriai (most literally translated as "common access") is enshrinedin Articles 263 and 294 of the modern civil code.

8. See Ernest Partridge, editor, RESPONSIBILITIES TO FUTURE GENERATIONS: ENVIRONMENTAL ETHICS (Buffalo: Prometheus Books, 1980, 1981); and Robert Heilbroner, AN INQUIRY INTO THE HUMAN PROSPECT (New York: W.W. Norton, 1974, 1975), which contains an essay, "What Has Posterity Ever Done for Me?," 169-177, on intergenerational ethics.

9. On the deterioration of some commons in Tokugawa Japan, see Kären Wigen Lewis, "Common Losses: Transformations of Commonland and Peasant Livelihood in Tokugawa Japan, 1603-1868," (M.A. Thesis in Goegraphy, University of California at Berkeley, 1985), 58-95. Important Japanese sources referring to this problem are Chiba Tokuji, HAGEYAMA NO BUNKA [The Culture of Bald Mountains] (Tokyo: Gakuseisha, 1973); Harada Toshimaru; KINSEI IRIAI :SEIDO KEITAI KATEI NO KENKYU: YAMAWARI SEIDO NO HASSEI TO SONO HENSHITSU [A Study of the Process of the Dissolution of the Early Modern Common Access System: Genesis and Change in the 'mountain-division system'] (Tokyo: Hanawa shobo, 1968); and Furushima Toshio, KINSEI IRIAI SEIDO RON [On the Common Access System of the Early Modern Period] (Tokyo: Nihon hyoron shin shuppan, 1955).

10. Private ownership has many admirers among property rights economists, but it need not be the most efficient form of ownership in all situations. Similarly, collective ownership, which has a reputation for inefficiency and vulnerability to degradation among property rights economists, can sometimes be more efficient than private ownership. Indeed, when collective ownership as an institution survives for centuries, particularly alongside private, public, and state ownership as competing institutions, one must begin to suspect that it has survival value and permits greater efficiencies than the other forms for certain uses and in certain circumstances. Carl Dahlman has argued persuasively that the communal features of the English openfield system survived and that villagers resisted enclosure precisely because of the efficiency of the system in certain conditions and as long as economic change was gradual. He also points out that to insist that the collective institutions we so often find in traditional agrarian economies are inefficient is to subscribe to the "dumb peasant" theory. To explain the disappearance of collective ownership and the rise of private ownership in many societies with the argument that private ownership is more efficient is actually the same as saying that some external force striking at random in different times and places raises peasant IQs and converts dumb peasants into profit maximizers. See Carl Dahlman, THE OPEN FIELD SYSTEM AND BEYOND: A PROPERTY RIGHTS ANALYSIS OF AN ECONOMIC INSTITUTION (Cambridge: Cambridge University Press, 1980).

11. Many Japanese villages that encountered economic change at a gradual pace were able to retain communal ownership of their commons but to alter their use of the commons as changes in market prices created new temptations. Commons could become rock quarries, fruit orchards, vineyards, forested woodlots — indeed, some villages that retain their commons today are raking in collective profits from cattle ranching, condominium leasing, and tourism, all to serve the physical and psychological appetites of the harried urban middle class. Similarly, Dahlman notes that open field villages in England were not conservative or closed-minded in the face of the agricultural revolution and were perfectly capable of adopting new methods and crops within the context of the open field system to increase profits. Retaining communal ownership indicates neither stupidity, nor narrowmindedness, nor conservatism.

12. The major works on the history of common lands in Kitafuji are Hōjō Hiroshi and Fukushima Masao, MEIJI 26 NEN ZENKOKU SANRIN GEN'YA IRIAI KANKO SHIRYO SHU: YAMANASHI KEN [Collected Documents from the Meiji 26 National Survey of Customary Common Access to Virgin Mountain Forests: Yamanashi Prefecture], (Tokyo: Rin'hacho, 1964); Hōjo Hiroshi, RIN'YA IRIAI NO SHITEKI KENKYŪ (JO) [Historical Research on Common Access to Forests (volume 1)] (Tokyo: Ochanomizu shobō, March 1977), 191-433; Hōjo Hiroshi, MURA NO IRIAI NO HYAKUNEN SHI: YAMANASHI KEN SONMIN NO IRIAI TŌSŌSHI [A Hundred Years' History of a Village and its Common Access: the History of the Common Access Struggle of the Villagers of Yamanashi Prefecture], (Tokyo: Ochanomizu shobō, August 1978); Hōjō Hiroshi, KINSEI NO OKERU IRIAI NO SHOKEITAI [The Various Forms of Common Access in the Early Modern Period], (Tokyo: Ochanomizu shobo, January 1979); Kamimura Masana, SONRAKU SEIKATSU NO SHŪZOKU, KANSHŪ NO SHAKAI KŌZŌ [The Social Structure of the Folkways and Customs of Village Life], (Tokyo: Ochanomizu shobo, March 1979); Ōshima Mario, KINSEI NO OKERU MURA TO IE NO SHAKAI KŌZŌ [The Social Structure of Village and Household in Early Modern Japan], (Tokyo: Ochanomizu shobō, November 1978); Watanabe Yōzō and Hōjō Hiroshi, RIN'YA IRIAI TO SONRAKU KŌZŌ: KITAFUJI SANROKU NO JIREI KENKYŪ [Common Access to Forests and Village Structure: A Case Study from the North Fuji Slope], (Tokyo: Tokyo University Press, March 1975).

13 The major sources I used on medieval English common fields were Warren Ortman Ault, OPEN-FIELD FARMING IN MEDIEVAL ENGLAND: A STUDY OF VILLAGE BY-LAWS (London: Goerge Allen and Unwin; New York: Barnes and Noble Books, 1972); 'Trevor Rowley, editor, THE ORIGINS OF OPEN-FIELD AGRICULTURE (London: Croom Helm, 1981), particularly chapters by Bruce Campbell, "Commonfield Origins — the Regional Dimension," 112-129; Robert Dodgshon, "The Interpretation of Subdivided Fields: a Study in Private or Communal Interests?" 130-144, and H.S.A. Fox, "Approaches to the Adoption of the Midland System," 64-111; Bruce Campbell and Ricardo Godoy, "Commonfield Agriculture: The Andes and Medieval England compared," in PROCEEDINGS (1986); H.S.A. Fox, "The Chronology of Enclosure and Economic Development in Medieval Devon," THE ECONOMIC HISTORY REVIEW (Second Series, 38:2, May 1975), 181-202; William N. Parker and Eric L. Jones, editors, EUROPEAN PEASANTS AND THEIR MARKETS: ESSAYS IN AGRARIAN ECONOMIC HISTORY (Princeton: Princeton University Press, 1975), particularly chapters by Richard C. Hoffman, "Medieval Origins of the Common Fields," 23-71, Donald N. McCloskey, "The Economics of Enclosure: A Market Analysis," 123-160, and Donald N. McCloskey, "The Persistence of English Common Fields," 73-119; Donald N. McCloskey, "English Open Fields as Behavior Toward Risk," in Paul Uselding, editor, RESEARCH IN ECONOMIC HISTORY: AN ANNUAL COMPILATION OF RESEARCH (Volume 1: 1976) (Greenwich, Connecticut: JAI Press, 1976), 124-170; C.W. Orwin and C. W. Orwin, THE OPEN FIELDS (Oxford: Oxford University Press, 1938); Joan Thirsk, "the Common Fields," PAST AND PRESENT (29: December 1964), 3-25; Joan Thirsk, "The Origin of the Common Fields," PAST AND PRESENT (33: April 1966), in "Debates," 142-147; William Edward Tate, THE ENGLISH VILLAGE COMMUNITY AND THE ENCLOSURE MOVEMENTS (London: Golancz, 1967); and J.A. Yelling, COMMON FIELD AND ENCLOSURE IN ENGLAND 1450-1850 (London: MacMillan, and Hamden, Connecticut: Archon Books, 1977). Enormous detail on regional variations is available in Alan R. H. Baker and Robin A. Butlin, editors, STUDIES OF FIELD SYSTEMS IN THE BRITISH ISLES (Cambridge: Cambridge University Press, 1973).

14. Robert Wade, "Common Property Resource Management in South Indian Villages," in PROCEEDINGS (1986); and Robert Wade, PEASANTS AND PUBLIC CHOICE: GROUP ACTION IN IRRIGATED OPEN-FIELD VILLAGES OF SOUTH INDIA (Cambridge: Cambridge University Press, 1986 forthcoming).

15. Robert McC. Netting, "Of Men and Meadows: Strategies of Alpine Land Use," ANTHROPOLOGICAL QUARTERLY (45:3, 1972), 132-144; Robert McC. Netting, "What Alpine Peasants Have in Common: Observations on Communal Tenure in a Swiss Village," HUMAN ECOLOGY (4:2, April 1976), 135-146; and Robert E. Rhoades and Stephen I. Thompson, "Adaptive strategies in alpine environments; beyond ecological particularism," AMERICAN ETHNOLOGIST (2:3, August 1975), 535-551.

16. Arnold and Campbell, "Collective "Management of Hill Forests in Nepal;" Messerschmidt, "People and Resources in Nepal;" and Wallace, "Managing Resources that are Common Property."

17. Bruce Campbell and Ricardo Godoy, "Commonfield Agriculture: the Andes and Medieval England Compared," Jere Lee Gilles and Keith Jamtgaard, "Overgrazing in Pastoral Areas: The Commons Reconsidered," SOCIOLOGIA RURALIS (21:2, 1981), 129-141.

18. Jere L. Gilles, Abdellah Hammoudi, and Mohamed Mahdi, "Oukaimedene: A High Mountain Agdal," and Neal E. Artz, Brien E. Norton, and James T. O'Rourke, "Management of Common Grazing Lands: the Case of Timahdite, Morocco," both in PROCEEDINGS (1986).

19. The National Academy of Science's Panel on Common Property and Environmental Management, with funding from U.S. AID, is developing a computerized data base on common property systems to permit systematic study and study generalizations. Elinor Ostrom, who has initiated this effort, has also been collating case studies in order to improve our theoretical understanding of commons problems. See her "Institutional Arrangements for Resolving the Commons Dilemma: Some Contending Approaches," presented to the faculty at Indiana University, Bloomington, 3 April 1986. On the research agenda for the future developed at the NAS Conference on Common Property Resource Management, see David Feeny, "Where Do We Go From Here?: Observations on the Implications for the Research Agenda," in PROCEEDINGS (1986); and Elinor Ostrom, "The Rudiments of a Revised Theory of the Origins, Survival, and Performance of Institutions for Collective Action," manuscript, 2 December 1985.

20. Mancur Olson, THE LOGIC OF COLLECTIVE ACTION: Buchanan, THE DEMAND AND SUPPLY OF PUBLIC GOODS. Russell Hardin points out in COLLECTIVE ACTION that what is really important is not simply the number of members in a group, but rather the "thickness" of the interrelationships among the members. See his qualifications of Olson in COLLECTIVE ACTION, 16-49 and 228-231. See also Elinor Ostrom's close reading of Olson and Garrett Hardin in Ostrom, "The Origins of Institutions for Collective Action in Common-Pool Resource Situations," manuscript, 4 September 1985.

21. This was the case in East Riding in Yorkshire, where openfield systems operated in the absence of lords and manors. This example undermines the argument that the openfield system was a result of the seigneurial system or a method devised by lords to oppress their tenants. See Dahlman, THE OPEN FIELD SYSTEM AND BEYOND; and Thirsk, "The Common Fields."

22. On Japan, see Harumi Befu, "Village Autonomy and Articulation with the State," in John Whitney Hall and Marius B. Jansen, editors, STUDIES IN THE INSTITUTIONAL history of early modern Japan (Princeton: Princeton University Press, 1968), 301-314. The principal authority on the role of the medieval English village in open field farming is Warren Ortman Ault, who sees considerable village autuonomy and independence. See OPEN-FIELD FARMING IN MEDIEVAL ENGLAND; THE SELF-DIRECTING ACTIVITIES OF VILLAGE COMMUNITIES IN MEDIEVAL ENGLAND (Boston: Boston University Press, 1952); "Village By-Laws by Common Consent," \SPECULUM: A JOURNAL OF MEDIEVAL STUDIES (29:2:2, April 1954, special issue on Medieval Representation in Theory and Practice), 378-394; "Some Early Village By-laws," ENGLISH HISTORICAL REVIEW (45: 1930), 208-231; and "Open-field husbandry and the Village Community: a study of agrarian By-laws in Medieval England," TRANSACTIONS OF THE AMERICAN PHILOSOPHICAL SOCIETY (Philadelphia) (new series, 55:7, October 1965); and Yelling, THE ENGLISH VILLAGE COMMUNITY AND THE ENCLOSURE MOVEMENTS.

23. For his studies in Turkey, see Fikret Berkes, "Marine Inshore Fishery Management in Turkey: Some Examples, Problems, and Prospects," in PROCEEDINGS (1986); and "Local-Level Management and the Commons Problem: A Comparative Study of Turkish Coastal Fisheries," presented at the Association for Asian Studies, Chicago, March 1986.

24. On communal management in Botswana, see Louise Fortmann and Emery Roe, "Common Property Management of Water in Botswana," and Susan G. Wynne, "Information Problems involved in Partitioning the Cultivation Commons," both in PROCEEDINGS (1986); and Pauline E. Peters, CATTLEMEN, BOREHOLE SYNDICATES AND PRIVATIZATION IN THE KATHLENE DISTRICT OF BOTSWANA: AN ANTHROPOLOGICAL

HISTORY OF THE TRANSFORMATION OF A COMMONS (Boston: Ph.D. Dissertation in Anthropology, Boston University, 1983).

25. See Elinor Ostrom's comments on user-group organizations in "The Rudiments of a Revised Theory of the Origins, Survival, and Performance of Institutions for Collective Action."

26. See Kristina Kade Troost, "Common Land in Late Medieval Japan," presented at the Triangle East Asia Colloquium, Research Triangle Park, North Carolina, 13 April 1985; and Kristina Kade Troost, "The Medieval Origins of Common Land in Japan," presented at the American Historical Association, New York, 28 December 1985.

27. Karen Wigen Lewis, "Common Losses," 47.

28. Karen Wigen Lewis, "Common Losses," 48.

29. Karen Wigen Lewis, "Common Losses," 49.

30. Thomas C. Smith, AGRARIAN ORIGINS OF MODERN JAPAN (Stanford: Stanford University Press, 1959), 56-57.

31. Gilles, Hammoudi, and Mahdi, "Oukaimedene."

32. On the importance of assurance, or the right to be included among the beneficiaries of a commons, as well as the more frequently discussed right to exclude others from the benefits, see Carlisle Ford Runge, "Common Property Externalities: Isolation, Assurance, and Resource Depletion in a Traditional Grazing Context," AMERICAN JOURNAL OF AGRICULTURAL ECONOMICS (63:4, November 1981), 595-606; and Runge, "Institutions and the Free Rider: The Assurance Problem in Collective Action," JOURNAL OF POLITICS (46:1, February 1984), 154-181.

33. Gilles, Hammoudi, amd Mahdi, "Oukaimedene."

34. Netting, "Of Men and Meadows;" and Netting, "What Alpine Peasants Have in Common."

35. This fact underminds the argument that the scattering of plots throughout the open fields was intended to produce equality among the holders. See Dahlman, THE OPEN FIELD SYSTEM AND BEYOND; 33. For the argument that scattering per se provided insurance against risk, see McCloskey, "The Persistence of English Common Fields," and McCloskey, "English Open Fields as Behavior Toward Risk."

36. Robert Wade, "Common Property Resource Management in South Indian Villages," and Wade, PEASANTS AND PUBLIC CHOICE.

37. See Norman Frohlich and Joe A. Oppenheimer, "I Get By With A Little Help from Mt Friends," WORLD POLITICS (23:1, October 1970), 104-120; Richard Kimber, "Collective Action and the Fallacy of the Liberal Fallacy, WORLD POLITICS (33:2, January 1981), 178-196; and Alphons J.C. va de Kraft, John M. Orbell, and Robyn M. Dawes, "the Minimal Contributing Set as a Solution to Public Goods Problems," AMERICAN POLITICAL SCIENCE REVIEW (77:1, March 1983), 112-122.

38. In the early 20th century the Kitafuji area villagers found their local resource base well suited to the breeding of packhorses for transport over mountaineous areas not amenable to other forms of transportation. This placed immense stress on the commons for animal fodder, and the rules were tightened as a result. See Margaret A. McKean, "The Japanese Experience with Scarcity: Management of Traditional Common Lands," ENVIRONMENTAL REVIEW (6:2, Fall 1982), 63-82; and Margaret A. McKean, "Management of Traditional Common Lands (iriaichi) in Japan," in PROCEEDINGS (1986).

39. Kari Bullock and John Baden, "Communes and the Logic of the Commons," in Garrett Hardin and John Baden, editors, MANAGING THE COMMONS (San Francisco: W.H. Freeman, 1977), 182-199.

40. Arnold and Campbell, "Collective Management of Hill Forests in Nepal," 14.

41. See Olson, THE LOGIC OF COLLECTIVE ACTION; Buchanan, THE DEMAND AND SUPPLY OF PUBLIC GOODS; Russell Hardin, COLLECTIVE ACTION: and James Buchanan, THE LIMITS OF LIBERTY: BETWEEN ANRCHY AND LEVIATHAN (Chicago: University of Chicago Press, 1975).