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EQUITY AND EFFICIENCY IN MARKETS FOR IDEAS

*Richard Adelstein**

I. INTRODUCTION

I am a lawyer and an economist who knows something about intellectual property, but I have no special knowledge of either AIDS and its terrible effects around the world or the state of the pharmaceutical industry in particular. I hope instead to contribute to this symposium by illuminating some of the complex issues of legal and economic organization that arise from the attempt to make ideas into economic commodities. I begin by discussing some basic notions of efficiency and equity in markets and some of the complications introduced by the existence of monopoly. I then turn specifically to markets for ideas to illustrate the question to which state-created patent monopolies are the answer, and conclude by using this framework to pose some of the difficult and painful questions with which the symposium is concerned.

II. EXCHANGE, EFFICIENCY AND EQUITY

When we speak of efficiency in everyday life, we typically mean something like the elimination of waste, or getting the most of what we want from what we have. An efficient worker, for example, is one who produces the most work for a given expenditure of time or effort; an efficient process is one that transforms inputs into outputs with a minimal expenditure of energy. As an economist's term of art, *allocative efficiency* means much the same thing: extracting the greatest economic value possible from a fixed quantity of goods or resources. Efficiency in this sense is achieved when every good is in the possession of the person who derives the greatest economic value from it, so that the sum of these maximized values is itself as large as possible. Free exchange allocates goods in just this way. Goods are continuously moved by means of consensual transfer from lower to higher valuing owners until an efficient allocation is realized. At this point exchange ceases and the exchange system is said to be in efficient equilibrium.

Suppose, for example, that between us, you and I have a total of ten apples and ten chocolates, divided initially so that I have nine apples and one chocolate, while you have one apple and nine chocolates. Suppose further that, since I have so many apples and so few chocolates, I would gain a greater quantum of personal satisfaction or utility from acquiring one more chocolate than I would lose from the

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sacrifice of one apple. For you, this relation is reversed, because you have so many chocolates and so few apples. In such a case, we can both increase our utility if I trade one of my apples to you for one of your chocolates, so that the sum of our two utilities is necessarily larger than it was before the trade. If, after completing this exchange, it is still the case that I would gain more utility from another chocolate than I would lose by surrendering another apple, and that the reverse remains true for you, we can make a second trade on the same terms and increase our individual utilities still further. With every such mutually beneficial transaction, the sum of human satisfaction is made greater without increasing the total stock of apples and chocolates available to the two of us. Simply by reallocating the ten apples and ten chocolates with which we began, without having to produce or acquire more of either good, we can increase the total utility we experience from the fixed stock of apples and chocolates. Only when no further increases in utility on both sides can be realized through voluntary exchange will the trading stop. At this point every apple and every chocolate will reside in the hands of the person who places the highest value on it. It is this efficient quality of the resulting allocation that brings the system of exchange to equilibrium. Because every apple and every chocolate is held by the person who values it the most, neither of us have reason to offer what it would take to induce the other to voluntarily part with it. Any reshuffling of apples and chocolates away from this efficient allocation will necessarily be opposed by one of us, so that once efficiency is achieved, exchange simply ceases. The equilibrium allocation is like the outcome of a free auction in which every apple and every chocolate is ultimately directed to the person who is willing and able to pay the most for it.

The normative significance of efficient allocation is ambiguous. On the one hand, because every consensual exchange increases the utility of every participant without increasing the physical quantity of goods in the world, it is easy to prefer the ultimate result of such exchanges to the initially inefficient allocation that gives rise to them. All the better that this continuous squeezing of more human satisfaction from a fixed stock of material resources is achieved through free exchange, a process that relies on individual initiative and responsibility and insists that every person's range of choice at every moment be as broad as possible. On the other hand, as the auction analogy suggests, the economic value that is maximized by free exchange is not the same thing as simple utility or satisfaction; rather, it is utility underwritten by the ability to pay. We may well believe that a poor person who badly wants a loaf of bread would derive greater personal utility from consuming it than would a wealthy one who owns a bakery. If he cannot pay for it, or if the wealthy person is willing to outbid him for it so as to realize a smaller personal utility, the poor person will do without. In the real world of free exchange, it is not the sum of human satisfaction that is maximized, but the sum of the dollar values that are actually paid for every good that is purchased in the market. Thus, insofar as the value of any good to an individual is determined in part by her ability to pay for it, the particulars of any efficient allocation, the list of who has what when the trading is done, depend crucially on the distribution of tradable wealth that precedes the process of exchange. In terms of the human welfare or satisfaction to be wrested from the material universe, free exchange is a

tide that lifts the boats of both rich and poor, but it is resolutely blind to questions of distributional equity. Because free exchange proceeds only with the consent of all sides, unless the wealthy pursue the interests of the needy to the detriment of their own, it cannot change the general shape of the distribution of wealth by increasing the lot of the poor at the expense of the rich.

To illustrate this last point, suppose we change the terms of our example, so that there are now one thousand apples and one thousand chocolates to be divided between you and me. Initially, I have just twenty apples and twenty chocolates, and you have the rest, nine hundred and eighty of each, so that we can safely say that I am relatively poor and you are relatively rich. Suppose as well that our respective tastes for apples and chocolates are such that I would once again trade one apple for one chocolate, and you would still trade one chocolate for one apple. So we make the trade, and as before, each of us experiences an increase in utility as compared to the initial distribution. If this is the last consensual exchange of this sort that can be made, the resulting allocation, in which I have nineteen apples and twenty-one chocolates, and you have 981 apples and 979 chocolates, is an efficient one, just as before. But in this efficient equilibrium, you are still rich, and I am still poor. To change this relation appreciably, you would have to surrender some substantial quantity of apples or chocolates, or both, to me without receiving anything in return, but unless such an uncompensated transfer would bring you utility of the sort we experience when we make a voluntary contribution to a charity, it will never take place. So it is hard to argue for the moral superiority of any particular efficient allocation of resources, even one produced by consensual exchange, that is grounded in an unjust or coercive initial distribution of tradeable wealth. Like the proverbial computer, in this important normative respect, even perfectly functioning systems of exchange are subject to the maxim "garbage in, garbage out." Free exchange can do no more than transform an initial distribution of resources that is inefficient and unjust into one that is efficient and unjust. Averting their eyes from this complication, economists have increasingly turned their analytical energies in recent years to elaborating on the mathematics of efficient allocation and, like their fellow travelers in the law schools, at times been prone to overstating its ethical virtues in their efforts to prescribe "optimal" rules or outcomes in economic systems.

There is a second complication as well, one of particular relevance to the subject of this symposium. For it is only in the laboratory environment of constant preferences, unchanging technologies and fixed resource constraints that equilibrium exists and economic activity comes to a halt. Even if we could imagine life in such an artificial world, we could scarcely outlaw the change that free people would soon force on the parameters that define it. They would surely begin to invent new interests and desires, new needs and new ways to satisfy them, and before the exchange system could organize the innumerable transactions that would ultimately adjust the equilibrium to these changes, they would reinvent them, again and again. Real markets are never at rest; efficient equilibrium exists only in textbooks. The problem addressed by real markets is not just how a given quantity of resources can be efficiently allocated among men and women with differing preferences and incomes in the present, but how new knowledge and techniques

can be discovered and put to use to create new resources and additional human welfare in the future. The simple notion of static efficiency captured by the auction analogy is of little use in confronting this larger problem of growth, change and allocation over time. Any serious conception of efficient allocation must entail an effective response to novel situations and emerging opportunities as well, which in turn demands knowledge not just of what is but of what might be if things were done differently at certain times and places. We may increase the welfare of thousands of people in the here and now by devoting scarce resources to feeding the poor or healing those of their afflictions that we know how to treat. But we may increase the welfare of millions of people in the future by devoting those same resources to the discovery of new ways to increase the world's food supply or treatments for diseases that cannot now be cured.

III. COMPETITION AND MONOPOLY

The conclusion that free exchange results in efficient equilibrium rests on the set of assumptions that economists call *perfect competition*. Here, the term of art diverges significantly from everyday usage. We ordinarily think of competition as something people do, an activity governed by rules and undertaken by individuals in pursuit of conflicting objectives. But to most economists, competition is a state of affairs, the economic environment within which these individuals act and whose specifics largely determine the normative quality of the outcomes of their competitive behavior.¹ When competition in this sense is perfect, buying and selling proceeds smoothly, without error or surprise, until efficient equilibrium is achieved.

In much the same way that the simple relationships of Newtonian mechanics hold only in a vacuum, the logic that links free exchange to efficient allocation applies only in a rarefied atmosphere entirely purged of the human fallibility and kaleidoscopic change that fill the world of real men and women. Because traders must know what is theirs to trade and what is not, in perfect competition every property right to every valuable object is clearly defined and securely allocated to someone before trading begins. Because traders must know which exchanges will further their interests and which will not, every person is presumed to be able to reduce the uncertainties of the future to a distribution of known probabilities and to be fully aware of her own preferences, the constraints that bind her choices and the price at which every good is traded. Because traders must be able to move resources freely from less to more valuable uses by consensual exchange, the costs borne by each side in identifying and completing these transactions are assumed always to be smaller than the personal gains to be had from them. Because efficient allocation requires that the price of every good be equal to the costs imposed by the act of producing it, in perfect competition there are many buyers

1. F. HAYEK, *Competition as a Discovery Procedure*, in *NEW STUDIES IN PHILOSOPHY, POLITICS, ECONOMICS & THE HISTORY OF IDEAS* 179, 182 (1978).

and many sellers, so that sellers are always able to compete with other sellers, and buyers with other buyers, by adjusting the prices at which they buy or sell until this equilibrium is reached. And this in turn requires that the essential qualities of every good be independent of the identity of the specific individuals who buy or sell it, so that traders choose their trading partners solely on the basis of the prices being bid or asked. This last point is crucial. In perfect competition, the many buyers and sellers deal in identical goods, so that no one can exercise control over the price at which goods are sold. If a buyer does not like the price being charged for a certain good by one seller, she can always turn to another seller who is selling an identical good in hopes of finding a lower price. The competitive activity this implies is what drives the price of every good down to the cost of producing it and leads to equilibrium prices that ensure efficient allocation. When all these otherworldly conditions are obtained, and only then, free exchange logically results in an efficient equilibrium that persists until some externally induced change in preferences, constraints or the rules that govern the game of exchange itself make it necessary to play it again.

Monopoly exists when there is just one seller of a good who, impervious to price competition of this sort, can set the price wherever he likes. If he does so to maximize his profits, he will sell less of the good, and at a higher price, than would the many sellers who exist in perfect competition. Not surprisingly, this will often transfer more income to him alone from the class of buyers than would be transferred to the large class of sellers in the case of perfect competition.² The resultant allocation, because it differs from the competitive outcome, is inefficient. Is this a bad thing? The answer depends on how we choose to weigh the competing claims to income of the monopolist and his buyers. If our sympathies lie with the buyers or against the monopolist, it is a bad thing, at least as compared to the competitive outcome. This corresponds to the image that monopoly most often brings to our minds, a big corporation, run by greedy plutocrats dressed in the morning coats and top hats of the board game, extracting income from helpless buyers. But if our sympathies lie in the other direction, with the monopolist rather than his buyers, the normative balance may be tipped accordingly. If we lament the fate of the earliest North Americans, for example, we may see rough justice in the monopoly on casino gambling held in many states by their once-impoverished descendants.

The common law of monopoly reflected this normative ambiguity. Recognizing the ubiquity of situational monopoly in everyday life, and the considerable social value of the efforts of every seller to achieve it, it did not concern itself with the existence of monopoly, or even the exercise of monopoly power to raise prices and increase profits. Instead, the law's target was "monopolizing" behavior, unfairly excluding competitors from the game as opposed to defeating them by playing hard but within the rules. Such a policy has much to recommend it. Every seller acts competitively in an attempt to drive her

2. ANDREW SCHOTTER, MICROECONOMICS: A MODERN APPROACH 297-316 (John Greeman ed., Harper Collins Publishers 2nd ed. 1996).

competitors out of business, either by breaking free of the identity of goods characteristic of perfect competition ("product differentiation") or by finding cheaper ways to produce otherwise identical goods and thus being able to lower the price at which they can be sold. And for a variety of reasons, perspicacity in the development of new techniques of production or distribution, perhaps, or effective advertising, or the advantages of being the "first mover" in a particular market, or simple luck, many succeed. In the law's eyes, monopoly fairly achieved posed little threat, and monopoly power for as long as it could be maintained was seen by many as the just reward for superior performance in the market, as long as it was not created by unfair tactics or unreasonable contractual barriers to entry by others. A few firms might bask in local dominance built from idiosyncratic advantages of geography, competence or reputation, others might absorb existing competitors as they expanded in search of greater efficiencies, and still others might drive their competitors under by building a better mousetrap or selling old ones for less. Yet much of this seemed clearly in the interests of the consuming public and, in any case, whatever power any such monopolist had over prices and outputs was likely to be fleeting. Because there were (and are) so many successful monopolists of this kind in every economy, some big and rich, like Microsoft, some small and less rich, like the only hardware store in a rural town, our normative evaluations of monopoly vary from case to case. We find some we like, and some we don't.³

The common law placed much faith in the existence and efficacy of "potential competition" as a rein on monopoly power. Even in markets inhabited by a single large seller, the knowledge that others might still join the fray would check the monopolist's impulse to raise prices, and where it did not, the profits that resulted would spur at least some who were currently on the sidelines to enter the market if they could and fight for a piece of them. It was potential competition that made monopoly tolerable to the common law, and its ability to discipline even a monopoly of long standing should not be underestimated. A hypothetical monopoly in slide rules held in 1965, for example, would surely have been toppled by 1980 by the introduction of the hand-held electronic calculator, without any action against it other than that of other people trying to create monopolies of their own. The only monopolies impervious to potential competition are those enforced by the state itself, and for this reason, these have always been the targets of special hostility in the United States.⁴ But as I argue below, there may be no other way to ensure that certain kinds of socially desirable goods will be produced at all. Where this is the case, monopoly, far from being an impediment to efficient allocation, may be the only way to approximate it.

3. HANS B. THORELLI, *THE FEDERAL ANTITRUST POLICY: ORIGINATION OF AN AMERICAN TRADITION* 9-53 (The Johns Hopkins Press 1955); WILLIAM LETWIN, *LAW & ECONOMIC POLICY IN AMERICA: THE EVOLUTION OF THE SHERMAN ACT* 18-52 (Random House 1965); MARTIN J. SKLAR, *THE CORPORATE RECONSTRUCTION OF AMERICAN CAPITALISM 1890-1916: THE MARKET, THE LAW & POLITICS* 93-105 (Cambridge University Press 1988).

4. LETWIN, *supra* note 3, at 59-66.

IV. MARKETS FOR IDEAS

Before any entrepreneur can become a successful seller of goods, she must possess the means to overcome two related technological problems. The first is the more obvious one, opening a channel of exchange between herself and willing buyers of her good that enables transactions between them to take place. Sellers must devise ways to identify and exchange information with prospective buyers, negotiate mutually acceptable terms of trade, and arrange for the actual transfer of the good once an agreement has been reached. But this can rarely be done without some expenditure of resources by either seller or buyer, losses due to friction in the exchange mechanism that economists refer to generally as *transaction costs*. Unless these costs are somehow driven below the value of the exchange itself to the party that bears them, markets will fail and otherwise mutually beneficial transactions will not take place. At the supermarket, for example, sellers of fresh fruit typically allow customers to inspect the produce, so that buyers will know what they are getting for their money. But if inspection means squeezing the grapefruits to see if they are ripe, some will inevitably be rendered unsaleable in the process; the value of this lost produce is a transaction cost borne by the seller. If enough grapefruits are spoiled in this way to consume the profits of grapefruit sales, the seller will have to find a cheaper way to transmit information about the quality of the good to prospective buyers, or stop selling grapefruits.

At the same time, however, sellers must also effectively close this channel of exchange to *free riders*, those who would breach the channel so as to extract some or all of the value of the good being traded without purchasing it from the seller. The most obvious form of free riding is simple theft, taking physical possession of the commodity as it passes through the channel between seller and buyer, but as we shall see, this is not always necessary. If the technology needed to breach the channel becomes easily available to free riders, the incentive to steal the good rather than buy it increases accordingly, and unless the seller can somehow find the means, technological or legal, to close the channel to free riders, she will be threatened with economic extinction. She must cultivate the same transaction costs in the case of free riders that she seeks to eliminate in the case of willing buyers, and raise the barriers to free riding to such a level that potential thieves will once again find it more expensive to steal the good than to buy it from her. If she succeeds, the initiative passes back to the free rider, who must now either find a new way to breach the channel or resort to purchasing the good in order to enjoy its value.

Hence what Steven Peretz and I have elsewhere called the *competition of technologies*,⁵ in which sellers attempt simultaneously to overcome the obstacles separating themselves from willing buyers and place corresponding impediments in the path of free riders, who are constantly in search of ways to dissipate them. Where sellers hold the upper hand in this competition and have the means to

5. Adelman & Peretz, *The Competition of Technologies in Markets for Ideas: Copyright and Fair Use in Evolutionary Perspective*, 5 INT'L. REV. L & ECON. 209 (1985).

exclude free riders, goods are *private* and free exchange in markets is possible; where free riders have the advantage, goods become *public* and generally cannot be traded in markets. Sometimes, the seller's exclusionary technology is physical or organizational, as in the case of electronic detection devices that frustrate shoplifters or bookstores designed to make it difficult for potential customers to read books on the spot and extract the value of their contents without buying them. And sellers can sometimes rely on the force of moral or ethical norms to make free riding unattractive to potential thieves even where it is technologically feasible. Where either of these barriers to free riding are effectively in place, sellers have little need for formal legal protection of their channels of exchange. But if sellers have no effective exclusionary technology and informal norms fail to check the self-interest of free riders, markets can exist only if the state is able and willing to enforce property rights that succeed in deterring free riding. In markets for most physical objects, free riding requires actual possession of the good and is generally understood to be stealing, and the necessary legal scaffolding is provided by the criminal law of theft. But in markets for ideas, where breaching technology often allows the value of the good to be enjoyed without physical possession of the specific object sold by the seller, the moral quality of free riding is frequently contested and ambiguous. Theft may then be too sharp a term, and the criminal law too blunt an instrument, to address the complexities of the exchange environment.

Thomas Jefferson clearly grasped the essential elements of the problem posed by the attempt to make ideas into economic commodities. "If nature has made any one thing less susceptible than all others of exclusive property," he wrote in 1813:

it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of every one, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me.⁶

Ideas become *intellectual goods* when they are encoded in some tangible or symbolic medium such as words, images, sounds, formulas or physical objects. Intellectual goods are autonomous economic entities, unlike either private or public goods, whose specific characteristics at any moment depend crucially on the current state of breaching technology available to free riders. Where this technology is relatively primitive, intellectual goods are *impure* and can be traded in markets like ordinary private goods, but as technology becomes more advanced, intellectual goods become purer, taking on some of the attributes of public goods.

6. Thomas Jefferson to Isaac McPherson, 1813, in 13 T. JEFFERSON, THE WRITINGS OF THOMAS JEFFERSON 333 (A. Lipscomb & A. Bergh eds. 1903), available at <http://etext.virginia.edu/jefferson/quotations/jeff1550.htm>.

Markets in intellectual goods can thus be organized, and efficient allocation of resources approached through them, only so long as the governing technology renders the goods impure. Changes in breaching technology that purify intellectual goods generally make market exchange impossible, and unless these technologies can somehow be thwarted by sellers, some form of collective action will be required if incentives to produce and purchase the goods are to be maintained. Let me define these concepts more closely and discuss a few of their implications.

Imagine a hypothetical world in which people are blessed with perfect, permanent memory and the ability to read one another's minds at will. Here, intellectual goods take on their purest form, and clearly cannot be traded in markets, for three general reasons. First, the originator of the idea has no way to limit its distribution once it has been encoded, since consumers, having telepathic powers, can simply reproduce the good without cost and decode it for their own use whenever they wish. In this, as Jefferson suggests, intellectual goods are like public goods. Consumption of the good by one individual does not diminish the supply available to others, and because free riders cannot be prevented from acquiring the good, its creator has no opportunity to recoup the costs of producing it by charging others for its use.

But in two other important ways that also cause markets to fail, pure intellectual goods differ from public goods. Consumers can obtain the value of an ordinary public good only from the original producer, and can neither receive it from nor pass it on to other consumers. The lighthouse that shines for one ship shines equally for all, but ships can receive light only from the lighthouse. Unable to reproduce the light themselves, all ships would be thrown into darkness were the beacon to stop shining. But as with the light from Jefferson's taper, once an intellectual good has been produced, its consumers may become *secondary producers*, able to reproduce and transmit the good to one another independently of its original producer, even if that producer no longer exists. And again unlike ordinary public goods, which continue to increase the consumer's utility as more units of the good are acquired, perfect memory means that the utility produced by every unit of an intellectual good beyond the first is zero. The value of any pure intellectual good, that is, lies solely in its novelty or originality. When a chemist encounters the intellectual good represented by the formula for a new drug for the first time, something new has been learned and human welfare enhanced. But because he can recall the formula whenever he needs it, receiving the good a second time is of no value to him. To put the point another way, the production of the first machine of its kind requires three distinct inputs, labor, materials and the design of the machine itself. But once the prototype has been built, subsequent production of identical machines requires only new inputs of labor and materials; further inputs of the intellectual good encoded in the design become redundant.

When we leave the imaginary world of telepathic powers and perfect memory, intellectual goods become impure and markets in them become possible. Our inability to read one another's thoughts or remember them indefinitely means that intellectual goods must be embedded in some kind of carrier or *host* before they can be transmitted across space from one mind to another and preserved over time for use in the future. In some cases, the same tangible object serves both to encode

the good and store it for transportation between individuals or use in the future. This is generally true of the class of intellectual goods protected by patents, where the idea is expressed in a new combination of existing material objects which can themselves be protected and placed directly into the stream of commerce as private goods. In literature and the arts, by contrast, where intellectual goods are protected by copyrights, the good and its host are more distinct. Once the creative idea has been encoded in a specific arrangement of words, sounds or images that can be deciphered by others, the resultant intellectual good must be "packaged" within a host of some sort before consumers can receive and use it. Hosts may thus assume many forms. They can be tangible and durable, like the paint and canvas that express an artist's vision or the physical constructions that embody their builder's invention, but they may be neither. The printed page as host allows symbols or images to be transmitted across great distances, but ideas encoded as meaningful sounds can travel short distances through the air alone or much greater ones propagated by electromagnetic waves. While the creative ideas of speakers or musicians may disappear with the memories of their listeners, those of sculptors and architects may be preserved for centuries in bronze or stone.⁷

But it is always the intellectual good embedded in the host that is the actual object of commerce in markets for intellectual goods, and if it is sometimes difficult to separate them in practice, the conceptual distinction is essential. For the particular way in which the host achieves the transmission of the intellectual good largely determines the ability of sellers to render it in a permanently impure form and thus organize effective markets for it. Perhaps the least appreciated consequence of the development of written language is the power it gave sellers to embed intellectual goods in tangible hosts that could be distributed as private goods to buyers who, as secondary producers, lacked the technological means to transmit the goods to others without surrendering the original host to them as well. The seller's ability to "lock" the intellectual good in her own host in this sense means that as long as the host itself can be protected and traded as private property, the seller's channel to willing buyers can be maintained against free riding without any special collective action to protect the intellectual good as such. As in the celebrated example of the Coca-Cola recipe, if sellers can successfully embed their intellectual goods in marketable hosts so that free riders cannot extract the good from the host using the available techniques of reverse engineering, they will not need a legal patent to supplement the "natural" one created by the existing state of breaching technology.

But where the reigning technology is such that the intellectual good can be cheaply unlocked from the seller's host, the good is effectively purified and production and sale for profit, even where this would result in more efficient allocation, becomes impossible. One need no longer purchase the seller's host to enjoy the intellectual good; anyone who possesses the host and has access to the breaching technology can become a secondary producer by extracting the good and placing it in a host of his own that can be saved for personal use or distributed to

7. Adelstein & Peretz, *supra* note 5, at 217-20.

others without payment to the original seller. This form of free riding is peculiar to intellectual goods and is especially damaging to sellers, for once even a single copy of the host has left the seller's control, there is no way to prevent this mode of access to the good it carries. It is here that the competition of technologies is waged in markets for ideas. If the state of technology is such that it is cheaper to buy the seller's host than to transfer the intellectual good to a host of one's own, fixed supply of the seller's host results in fixed supply of the intellectual good, and market exchange is possible. But if free riders create or discover a new breaching technology that turns this balance in their favor, making unauthorized duplication or replacement of the seller's host a cheaper way to acquire the intellectual good, the originator of the good cannot sell it in her host at a price that will enable her to recover the costs of producing the good. Unless she counters with an effective exclusionary technology of her own, physical, organizational, or moral, the market in her intellectual good will be destroyed and production and distribution of the good will have to be reorganized or abandoned altogether.⁸

Three simple examples will illustrate. In bookstores, buyers must be able to inspect the intellectual goods in the seller's host before deciding whether or not to buy, but as noted earlier, this gives them an opportunity to extract the intellectual good during the inspection and so avoid the need to purchase the host. To prevent this free riding, bookstores generally do not permit customers to read for long periods of time, or copy from a book onto a piece of paper by hand, or use photocopying machines in the store. In this case, the store is able to use its own exclusionary technology to frustrate free riding. In theaters, concerts or museums, on the other hand, patrons must agree when purchasing their ticket not to use cameras or tape recorders to preserve the intellectual good and enable them to enjoy it without being in the seller's physical domain. Here, contractual provisions protect the seller's market where potential free riders have access to breaching technology to which the seller has no effective technological reply. Finally, magicians, who embed their intellectual goods in the physical illusions they perform on stage, have long adhered to a strict code of ethics that enjoins them from revealing the secrets of their tricks to one another or to the public. It is this "moral technology" that preserves their ability to sell their services, but in the age of slow motion and video recorders, it is in some danger of becoming irrelevant. If it does, the occupation of performing magician will disappear along with it.

V. PATENT MONOPOLIES

Where exclusionary technologies, contracts or informal codes of ethics fail, markets for intellectual goods can be protected against the possibility of lethal free riding only by the coercive power of the law. Hence, the limited monopolies conferred by the state in the form of patents and copyrights, the desirability and extent of which in the specific case of the intellectual goods contained in the various pills and fluids sold by pharmaceutical companies are the focus of this

8. *Id.* at 221-22.

symposium. Here, as the economists say, is a stylized picture of how it works. Pharmaceutical companies, in business to earn profits from the sale of drugs, invest in the research and development of whatever drugs they believe they can sell in such a way as to maximize their profits. Sometime their efforts fail to bear fruit, in which case their investment, whatever it has been, is lost. But sometimes they succeed, in which case they must bring their products to market in the face the problems I have just described. Once they have the formula for the drug, be it a cure for AIDS or a cure for impotence, they must embed the intellectual good it represents in a saleable item of commerce, a pill or a vial of liquid. But as soon as they sell the first unit, others will be able to extract the idea from the pill and become secondary producers, selling the same pill much more cheaply than the pharmaceutical company because they do not need to cover the costs of developing the formula. If the company has no technological defense to this free riding, only an enforceable patent can give it the opportunity to charge a price for the pill that will cover the costs of research and development.

What if many poor people in another country badly need the drug? If the company tries to sell them the drug at the monopoly price it charges consumers at home, or at a much lower price that the poor people can afford, or even if it gives them the drug for free, it will lose the ability to sell anywhere at the price it needs unless the poor country honors its patent monopoly and prevents local firms from producing the drug without its permission. If its patent monopoly cannot be guaranteed in this way, the company may simply refuse to export the drug to the poor country, as its patent generally allows it to do, in which case symposia like this one will be organized to discuss the problem.

Now, one might object to the patent monopoly by saying that it allows the pharmaceutical company to focus its efforts on drugs that rich people want rather than on those that poor people want. This is entirely correct and in fact, as we have seen, this is exactly what markets are supposed to do: produce the goods that people willing and able to pay the costs of production want. If rich people want drugs for baldness or obesity and are willing to pay for them, that is what the companies will produce. This is also why we know as much as we do about heart disease, which is certainly much further down the list of health problems in poor countries than in rich ones. One might reasonably ask whether the next million dollars worth of research should be spent on saving a few rich people from heart attacks or a great many poor people from tooth decay. But what drugs we have for AIDS were largely developed by profit-seeking pharmaceutical companies responding to the wants of people who could pay high prices for them. Dismantling the system of patent monopolies to allow more poor people access to AIDS drugs now might leave us with no way to mobilize resources against the next great global epidemic. One of the many dilemmas we face is how to balance the interests of patients in the here and now who cannot afford the drugs they need at the prices their developers must charge against the interests of patients in the future who may be denied the drugs they need at any price because no one had the incentive to invest in their development today.

Perhaps the patent monopolies should be preserved, then, but the companies forced to license production by others in poor countries, at prices below the going

monopoly price at home. But if so, can poor states be relied upon to police the patents of rich foreign pharmaceutical companies, or will this too simply let the cat out of the bag and quickly make it unnecessary for secondary producers anywhere to purchase the license? Perhaps the monopoly should be limited instead by a principle analogous to "fair use" in the case of copyright, one that would enable free riders to steal the intellectual goods of the drug companies where some authoritative body concludes that thefts like this serve the public interest.⁹ But as the American experience with fair use in copyright suggests, such a principle might easily be expanded over time far beyond the narrow circumstances for which it was conceived, and threaten to put sellers, not just of life-saving drugs, but of all drugs, at the mercy of secondary producers whenever cheap distribution of the drug is held to be in the public interest.¹⁰ Or perhaps the development of these drugs should be withdrawn from markets altogether and relocated in the state, which, unlike the private pharmaceutical companies, can spread the costs of development across the public at large rather than that part of the public that actually purchases the drugs. But then who will decide what drugs to develop, and on what basis, and in whose interest? In the end, we may find ourselves drawn to the most direct solution of all, utopian though it may be: recognizing and preserving the many virtues of market organization by protecting the property rights that enable markets to function, and addressing the problem of equity at its root by redistributing substantial amounts of wealth from the people of rich countries to the people of poor ones, so that the market's efficient outcomes reflect the interests of all the world's people more equally. If we give the poor some of our apples, they will be better able to pay the prices we need to develop more chocolates.

My task here has been to demonstrate that these issues are substantially more complex than one might gather from a simplistic caricature of plutocratic drug monopolists callously wringing every possible penny from desperate poor people facing imminent death. But reasonable people of good will surely differ over how best to resolve them, and it is everyone's task to confront this complexity honestly and compassionately as we try to decide where we stand on the issues ourselves and persuade one another that we are right.

9. *Williams & Wilkins Co. v. United States*, 487 F.2d 1345 (Ct. Cl. 1973), *aff'd* by an equally divided Supreme Court, 420 U.S. 376 (1975) (*per curiam*) (large-scale photocopying and distribution of copyrighted articles by federal libraries for use in medical research is fair use); *Sony Corporation of America v. Universal City Studios*, 464 U.S. 417 (1984) (home videotaping of copyrighted entertainment programs for personal convenience is fair use).

10. *Adelstein & Peretz*, *supra* note 5, at 228-33.