As interpreted by McKean, legal experience suggests a gradual and perhaps accelerating shift toward strict liability on the part of manufacturers of products. My discussion is limited to predicting the economic effects of this movement.

It is useful to note at the outset that accidents cannot be prevented, in the sense that the probability of occurrence cannot be reduced to zero. We live in an uncertain world, whether we like it or not, and the working properties of either human or material agents cannot be completely specified. Any discussion of products liability, therefore, involves only the possible modification in the probability distribution of accidents.

Two categories of events may be distinguished: those which involve pure accidents and those which involve probably preventable accidents. A pure accident occurs stochastically in a sequence of possibilities, but the probability distribution of occurrence cannot be modified by personal behavior aimed at changing the quality or use of the product, whether this be the behavior of the manufacturer, seller, user, or non-user. A probably preventable accident occurs stochastically in a sequence of possibilities and the probability distribution of occurrence can be modified by behavior on the part of manufacturers, sellers, users, or non-users aimed at changing the quality of the product or its use. When any given accident occurs, there remains only some positive probability that it could have been prevented with precautionary behavioral adjustments.

I. THE SHIFT TOWARD STRICT PRODUCER LIABILITY UNDER PURE ACCIDENTS

It is difficult to think of good examples of pure accidents. In almost all circumstances, adjustments in the product or its use can modify the
probability distribution of accidents. Despite this, discussion will be clarified by treating the pure accident case independently. This allows examination of the economic effects of alternative liability arrangements without consideration of the possible functional influence of such arrangements on behavior. If it is known that no behavioral adjustments can modify the probability of accidents, then it follows that, regardless of who bears the liability for damages when an accident does occur, behavioral changes will not take place within the restricted product quality under consideration. As later discussion shows, however, even in this highly restricted case, alternative liability arrangements will generate differing final results, and economic analysis allows us to place some relative evaluation on these.

A. A Hypothetical Example

I shall construct a highly artificial example. Assume that there are two kinds of coal available. Each kind is produced competitively by a large number of firms under conditions of increasing costs, or at least can be so produced if demand conditions warrant. The sole distinction between these two kinds of coal is as follows: for one kind, which we shall call "low quality," it can be predicted that one lump in one thousand will violently explode, causing possibly severe damage to surrounding objects; with the other kind, which we shall call "high quality," it can be predicted that one lump in one million will similarly explode. In all other respects the two qualities are identical. In order to make the example fit perfectly within my pure accident classification, I assume that there exists no possible means of determining in advance which lump will explode. We also assume that all persons have full knowledge as to the characteristics of the two qualities of product.

The simple economics of this industry may now be examined. Initially, assume that caveat emptor prevails; buyer-users are responsible for damages that might occur and they have no claim against producing-selling firms in the event of accident and subsequent damage. (We leave third party non-users out of account at this stage.) In order to sell any low quality coal at all, sellers must offer it at a price per ton that is differentially lower than that for high quality coal. At equal prices and given full knowledge as to quality by all potential buyers, no one would demand low quality coal. If the costs of producing either quality of coal should be constant over varying quantities and both qualities could be produced at equal cost, no sellers would find it advantageous to sell low quality coal at differentially lower prices. Competition would insure that the price of high quality coal would
tend to cover costs plus normal return on investment. Any differentially lower price for low quality coal would not cover costs for producing firms. In order for this quality to be supplied at differentially lower prices necessary for sale, differentially lower costs of producing the low quality must be present.

Why should anyone demand the low quality product, even at a differentially lower price? A person will demand such a low quality product if he places a lower value on risk aversion than the demanders of the high quality product. For illustration, let us suppose that the equilibrium price for the high quality coal is $10 per ton. Let us suppose that the equilibrium price for the low quality coal is $2 per ton. Let us further assume that the cost per ton of an insurance policy which would fully bring the protection of the low quality user up to that received by the high quality user is $8 per ton. With the purchase of insurance for the low quality product, the two qualities become economically identical. Those demanders who purchase the low quality coal at $2 per ton, without insurance, are those who are willing to take the differentially higher risk that this quality embodies. These are the buyers who place a lower valuation on risk avoidance (relative to money) than their fellows. They are unwilling to pay $8 per ton in risk avoidance. For the most part, but not exclusively, demanders of the low quality product will be poor people who can ill afford to purchase a high degree of risk avoidance. Their effective alternatives may be those of buying coal at $2 per ton and buying no coal at all.

The simple description of the economic regime under *caveat emptor* is straightforward. Let us now assume that legal rulings begin to make producing-selling firms fully liable for all damages arising from the usage of either quality of the product. In order to absorb the increased costs of this new liability arrangement, the market price for both qualities of coal will increase, but the market price for the low quality coal will increase much more dramatically. The imposition of strict liability will effectively prohibit firms from marketing a quality of product that inherently involves a relatively larger buyer-user risk. In our example, the low quality product will disappear from the market in an economic sense. It will be impossible for demanders to purchase a quality of product that does not embody full insurance as a part of the price.

B. *Who Has Benefited from the Change in Liability? Who Has Suffered?*

To answer these questions, we may classify persons or firms into four groups: (1) previous buyers of the high quality product; (2) previous
buyers of the low quality product; (3) previous sellers of the high quality product; (4) previous sellers of the low quality product. It is clear that the change in liability has little, if any, effect on the buyers or the sellers of the high quality product, groups (1) and (3). By the nature of our example, the product traded is inherently "safe;" hence, relatively little effect is produced by modifying liability for accidents. For group (4), the previous sellers of the low quality product, there may be significant losses, but these are confined to the short term. To the extent that these firms have fixed investments in producing the low quality item, losses will occur. But these will disappear as fixed facilities wear out and investment is shifted into other outlets. Over the long run, and given time for such shifting, this group will not be differentially affected. The lasting effects of the change in liability will be to damage those in group (2), those persons who were the buyers of the low quality product under *caveat emptor*. Their effective range of choice has been narrowed. They can no longer bear the risk that they indicated a willingness to bear under the earlier regime. The shift in liability closes off mutually advantageous exchanges between these demanders and those firms that would arise to supply their expressed desires for the low quality product.

The effects on economic welfare are clear and unambiguous. The change in liability arrangements reduces economic welfare generally, and this reduction is concentrated on the poor. On grounds of both efficiency and equity, the shift can be condemned. In economists' language, the change in legal arrangements from *caveat emptor* to strict producer liability is non-optimal. Conceptually, it would be possible to make some persons better off, by their own accounting, and no one worse off by returning to the regime of *caveat emptor*.

II. Shift toward Strict Producer Liability under Probably Preventable Accidents

The analysis is not significantly changed when we modify our example to allow for probably preventable accidents. We may stick with our same basic illustration, modified only as necessary for the discussion. Instead of two distinct qualities of product, as determined by nature, let us now assume that only one quality is naturally determined. If no quality controls are imposed, there exists a one in one thousand chance that a lump of coal will violently explode, the equivalent of the low quality case earlier. It is now assumed, however, that a reduction in this probability of accident can be secured by specific quality control behavior. By using available technology, the producing
firm can reduce this probability, in the extreme case to the one in one million chance of explosion. Within the two extreme limits, however, the behavior of the firm can determine the quality of the product that it markets. Any given accident could, therefore, probably have been prevented with a high quality, superior, safer product. As higher qualities of product are marketed, however, costs of the supplying firms increase since quality control devices cost something, and, the more reliable devices are, the higher these costs.

Under full *caveat emptor*, we should, as before, expect buyer-users to demand varying qualities of final product, this variation being limited in our illustration to varying degrees of riskiness. Attracted by ordinary profit motives, firms would supply differing qualities of product all along the safety-riskiness spectrum, with competitively determined price differentials established among the different qualities. These differentials in price would reflect the market's evaluation of the riskiness differentials.

If legal rulings change so as to make producing firms fully liable for damages, we can predict that the relative prices of the low quality, high risk products will increase dramatically. Firms which previously may have produced coal of all qualities at differing prices will modify their behavior so as to install high intensity, high cost quality controls for all production. There will be a reduction in the number of varieties offered for sale, and a discernible bunching of production among high quality classes.

The effects are identical to those traced earlier. Over the long run, those who suffer are those demanders who are unable or unwilling to pay for the risk aversion that high level quality offers.

III. Risk Aversion, Producer Liability, and the Coase Theorem

The conclusions of this analysis may seem at variance with the Coase theorem to which McKean refers. Coase argues that in the absence of transaction costs the assignment of liability as between two parties to a potential transaction will not modify the final allocative result. In apparent contrast to this, we have shown that the shift of liability to producing firms from buyers has a predictable and detrimental effect. The purpose of this section is to reconcile this apparent contradiction.

In my view, the Coase theorem is not directly applicable to situations where varying qualities of product may be marketed. There are essentially two separate but related issues of public policy that arise here, and McKean's discussion does not seem to distinguish them care-
fully. They are: (1) what degree of riskiness are buyer-users to be allowed to bear? and (2) what is the specific assignment of liability to be? If (1) is answered, the Coase theorem may be applied, and it says that the specific assignment of liability does not matter in the absence of transaction costs. Under normal circumstances, however, question (1) is not specifically answered separately from question (2), and, therefore, a shift in the assignment of liability may indirectly determine the solution to question (1). Hence, the assignment of liability may indirectly exert significant allocative effects.

Consider once again our example of the two kinds of coal. If it is decided, in advance and independently, that buyer-users should not be allowed to have access to the low quality product, this product will then be eliminated from the market. Within the defined high quality product, it then matters not at all to the final result whether producing firms are made liable for damages for the occasional accident or whether buyer-users must bear these damages. There will be only one most efficient means of producing this specific product quality, and if we ignore transaction costs, this means will be found regardless of the legal arrangements. And, of course, buyers will bear the final incidence of the quality control in all cases so long as the industry is competitively organized.

If no such decision as to high quality restriction is made independently, however, the same results may be achieved by the specific assignment of liability. There are two separate institutions that will accomplish this. As indicated in our analysis, producing firms can be made fully liable for damages. The low quality product will disappear, with the effects noted. The same results could be achieved if buyer-users were required compulsorily to buy insurance against accidents. In this latter case, the high insurance premium on the low quality items would remove them from the market, having the same effect as the differentially increased purchase price under the alternative arrangement. In either instance, buyers in the net pay for the differentially higher quality that they are forced to receive, and those buyers who are unable or unwilling to expend funds for this higher quality are harmed by being excluded from all transactions.

Professor Armen Alchian has suggested a somewhat different means of reconciling the analysis of this comment with the Coase theorem. To be fully applicable, the Coase theorem requires the assumption that there be no prohibitions on any mutually advantageous exchanges that may be made as between potential buyers and potential sellers. The shift of strict liability to producer-sellers amounts to imposing such prohibitions. Potential buyers of the low quality product are ef-
fectively forced to purchase risk aversion; they are prevented from "buying risk." Or, in slightly different language, transaction costs become prohibitively high for such potential exchanges.

IV. IS THERE AN ECONOMIC RATIONALE FOR THE SHIFT TO STRICT PRODUCER LIABILITY?

With the standard economic models, I have shown that the shift away from *caveat emptor* can be condemned on both efficiency and equity grounds. The question now becomes one of examining these standard models to see if there are qualifying features which serve to make recent legal history less violative of criteria for economic rationality.

A. THIRD PARTY OR NON-USER EFFECTS

The standard models concentrate on contractual arrangements between buyers and sellers, and they must be amended to take into account the potential interests of third parties. If it can be argued that, as product technology has developed, products increasingly exert effects on third parties in the event of accident, a plausible case can be made for the shift away from *caveat emptor*. As we have shown, this shift removes low quality, high risk products from the market despite the expressed willingness of potential buyer-users to assume the risks of accidents that these products embody. If third parties are not affected by possible accidents that may occur with usage of these products, the shift toward stricter producer-seller liability stands condemned without qualification. But even if potential buyer-users stand willing to assume a high degree of risk, their behavior in so doing may not be desired if accidents cause harm or do damage to third party non-users.

The automobile is, of course, the familiar example here. If, in fact, technology could insure that damages to life and property were concentrated on the driver of the vehicle, there would be little or no argument for legislating safety features or for shifting legal arrangements toward stricter producer liability. For the reasons noted, poor users should be allowed to purchase unsafe automobiles under such conditions. By their own expressions of preference, they are better off with unsafe automobiles than with no automobiles at all. However, as we all recognize, the technology of both the automobile and the highway is such that no concentration of damage on drivers is possible. There is, therefore, a logic in imposing generalized standards of riskiness that should not be exceeded, even if agreed to by parties to a particular contract. Strict producer liability does indirectly accom-
plish this and is closely analogous to the direct legislation of safety requirements.

The question at issue for general liability arrangements is whether or not more and more products are coming to be like the automobile, where third party effects are admittedly important. To the extent that this is true, some plausible justification for a general shift toward strict producer liability can be made. As the discussion should make clear, however, no generally applicable argument can be established, even on these grounds. The introduction of third party effects points strongly in the direction of adjusting the legal liability arrangements to the particulars of the product technology. A discriminating approach is required, and courts should proceed on a product-by-product basis, taking into account the relevant economic criteria. Precedents applicable to one product category should clearly not be extended blindly across product lines. A sharper distinction must be made between those products which are likely to involve third party effects and those which are not.

To the extent that producing-selling firms can be made liable for damages to third parties without being made fully liable for damages to direct users, some of the advantages of *caveat emptor* might be retained. The same conclusion applies to the more direct legislation of safety requirements. There is little or no argument for compulsory safety requirements when damage is concentrated on the buyer-user. There is an argument for imposing safety requirements that reduce probabilities of damages to non-users. These have not been carefully distinguished in the recent discussions of automobile safety legislation.

B. *Complex Modern Technology and Information*

A second argument is sometimes advanced for modern safety legislation which could be equally well applied in defense of the shift toward stricter producer liability. If it could be empirically shown that the information required for buyer-users to make rational judgments as to product quality has increased over time, a case is established for some shift from strict *caveat emptor*. There seems little point in disputing the facts here; the complexities of modern technology are overwhelming, and rational purchase of even simple products requires great knowledge and discrimination on the part of buyers.

Does this justify the indirect means of securing some reduction in riskiness, or increase in safety, that the shift toward strict producer liability represents? I shall argue that it does not, although some expanded governmental role in information supply is perhaps necessary. The complex information required in discriminatory choices
among product qualities is costly to produce, and individuals, as independent buyers, may not be willing to purchase such information in optimally preferred quantities. There is, or so it seems to me, a "public good" argument for collective, governmental supply of information about product qualities. Once produced, such information may be supplied to consumers. This need not reduce the range of products on the market at all, nor should it remove high risk, unsafe products. If individuals are willing to purchase such items in the full knowledge of their dangers, they should be allowed to do so when third party effects are not deemed important. The government's role can be restricted to the supplying of information. In terms of a practical example, there was, I think, a strong case for the requirement that the "hazard to health" notice be placed on cigarette packages. There was, and is, no economic basis for making cigarette producers liable for damages due to lung cancer.

V. The Essential Trade-offs between Quality and Quantity

As an economist who studies market processes, disciplinary prejudice alone suggests to me that departures from caveat emptor should be carefully scrutinized and accepted only after specific argument accompanied by convincing evidence. As an individualist, who places a high value on freedom of exchange, any limitations on the exchange process, either directly or indirectly, arouse my initial skepticism. As I have argued in this comment, caveat emptor encourages the maximum range of products geared to meet all variations in demand. For a commodity or product category considered as a whole, that is, for a commodity group, only by allowing quality variations within a wide range can the maximum quantity be produced and exchanged. Limitations on the quality range result in some restriction on the total quantity. The essential trade-off is that between a larger quantity with lower average quality and a smaller quantity with higher average quality.

Too much uninformed discussion proceeds as if higher average quality of product can somehow be achieved without sacrifice in quantity and indeed without cost, which indirectly amounts to saying the same thing. If my analysis is correct, the shift toward stricter producer liability tends to reduce the overall quantity of products produced and exchanged. This reduction in quantity is the cost; it is offset, in part, by the higher average quality of product that is guaranteed under the modified legal arrangements. If we think of this basic trade-off in gross and very general terms, the defense of caveat emptor seems strong indeed. Not only are more efficient results generated, but equity objectives are also more effectively secured.
If we shift from very general treatment to the specifics of each product category, selective departures from *caveat emptor* may well be justified. The law, as the law, tends to be general in applicability. If it is not, it ceases to be law in a certain sense. But the economics here varies from product to product. The normative rule to be applied seems to be: "Commence with some prejudice for *caveat emptor* and be sophisticated in the application of departures from this principle."