I. INTRODUCTION

The ability of business managers to deal with change -- to avoid its destructive force -- to seize the opportunities it inevitably brings -- is a subject of perennial fascination and a lot of inevitable mysticism and hoopla. So the subject is somewhat akin to snake charming.

No doubt multiple skills are involved but the most critical and fundamental skill is simply the ability to clearly perceive change. This is no easy thing. And the reason it is not is that managers view the world through a panoply of lenses which distort their vision. These distortions are caused by both physical and psychological factors: remoteness (from the work-a-day world), vastness (of available resources), power (generated by success), arrogance. On the psychological side
are fear, disinclination to action, and a list of other human frailties that you can enumerate as well as I. We accept the verdict of the past until the need for change cries out loudly enough to force upon us a choice between the comforts of further inertia and the irksomeness of action. From the contents of even my brief list, however, you can readily deduce that the failure to perceive change should be most prevalent among managers of large successful organizations. It is.

This is no theoretical issue. Just look at the U.S. industrial scene today. The wreckage of misperceived change mounts daily as one industry after another feels the onslaught of foreign competition, as big businesses merge into ever larger conglomerates in a frantic attempt to achieve security through economies of scale, as education continues its steady slide into ineptness and inefficiency, and as the U.S.'s once strong international competitive position in technology continues to erode. Clearly there has been a major change in our world which is ill-perceived and thus ill-managed.

II. THE DIMENSIONS OF CHANGE

What has changed, of course, is the whole business environment which for a hundred years shaped the growth of American industry. A business environment which has changed from a
superabundance of available natural resources and a huge and expanding domestic market to an interdependent world economy dependent at its leading edge on technical talent.

Let's take a look at just a few of the consequences of that change.

Anachronistic Business Culture

To begin with, the basic business culture shaped by the old environment has become anachronistic. For example, the primary competition for most U.S. companies has come historically from other U.S. companies. Indeed, because great resources were available, we chose to tolerate a certain amount of waste and inefficiency for the sake of preserving each company's "individuality."

Horizons

Another consequence of the changed environment is that of inappropriate time horizons. There is a greater willingness on the part of our international competitors to finance longer term investments. In Europe, Japan and other countries, business is funded largely by banks through debt; debt-equity ratios are high; and capital costs average much less
(40 percent less in Japan) than in the U.S. Companies can settle for lower earnings because the market price of their stock is not of day-to-day concern.

In contrast, U.S. companies must maintain much higher earnings in order to sell equity which is the principal means of obtaining an adequate capital base to sustain growth. That necessity has pushed U.S. management into a quarter-to-quarter short-term thinking syndrome.

I do not mean to suggest that the solution to this basic problem is just a matter of management will. But it's also true that U.S. corporate management has not aggressively tackled the problem because they haven't adequately perceived the consequences of a changed competitive environment. Otherwise it would be easy enough to see that the amount of cash required to shoulder the risks and costs of new technologies could be markedly reduced through R&D cooperation.

But cooperation isn't normally a part of our U.S. management process. Cooperation requires managers to share decision-making -- to share power -- and is consequently the last thing most top executives wish to consider. It simply conflicts with our American penchant for autonomy. Management of cooperative programs is also more difficult because successful cooperation requires resolution of conflicting views -- and that requires more patience, effort and wisdom.
Proprietary Position

A third matter is that of concern for an exclusive proprietary position. Such concern, while of course basically valid, must be tempered by a perception of reality. If not, one is, once again, blinded to the advantages of cooperation.

There are certainly sound reasons for desiring proprietary products and marketing processes. But in most fields the time has long since passed for such concern to be a major deterrent with regard to basic research and development. Significant advances in technology usually require long time periods. R&D results are typically in the form of reports, drawings, processes and various other forms of knowledge. That which is patentable is often narrow in scope. The consequence of these factors is that new technology is difficult to protect and soon diffuses.

While there are differences among industries, they are not so great as to preclude any company in any industry from obtaining the advantages of cooperation, especially in the face of growing resource shortages and ever rising costs and risks.
Antitrust

Yet another consequence of the changed business environment is that some basic regulation has become outmoded. Antitrust laws are the best example. Cooperation in research and development is not illegal per se under our basic antitrust legislation. Rather it falls into a category of things governed by -- as it's termed -- "the rule of reason" which in effect means that any challenge to an R&D cooperation will cause it to be dragged through a whole socio-economic analysis in the courts. The entire process is so ambiguous -- and the consequences of a negative outcome so dire -- that few have the courage to tempt fate. So changes are needed, not to repeal the basic protection against greed and collusion, but rather to provide positive guidelines for acceptable technological cooperation.

III. RESPONSE

Clearly, an adequate response to this new business environment of scarce skills, ever-increasing capital intensity, and intense foreign competition requires myriad actions, but by far the greatest and most rapid progress can be achieved by increasing our efficiency in developing and applying technology. To achieve that objective requires a vast increase in technological cooperation. An example of such a cooperation
is the Microelectronics and Computer Technology Corporation (MCC) which was formed late last year. The founding stockholders were: Advanced Micro Devices, Control Data Corporation, Digital Equipment Corporation, Harris Corporation, Honeywell, Mostek, Motorola, NCR Corporation, National Semiconductor Corporation, RCA, and Sperry Corporation.

The question most frequently asked about MCC is: "Can intra-industry technological cooperation be a plausible strategic option without neutralizing competitive technological advantage?"

The answer is not only "yes" -- not only is it plausible -- it's actually mandatory to enhance competition.

MCC, to continue the example, is a cooperative effort to develop a broad base of fundamental technologies for use by members who will then individually add their own value and continue to compete with products and services of individual conception and design.

For convenience, MCC will hold title to all know-how and patents, and technology will be licensed to other companies on reasonable terms. This is an extremely important aspect, especially for small companies.
Benefits to MCC shareholders are great:

- A significantly expanded scope of research and development that will include projects individual companies could not or would not undertake alone due to the costs and risks involved.

- A reduction in needless and wasteful duplication of research and development.

- A lower ratio of invested capital to specific research and development results.

- A better definition of research and development needs and pitfalls.

- And last (but not least), a more efficient utilization of scarce scientific and technical talent.

These benefits, individually and in combination, then, can only serve to enhance the competitive position of both shareholders and licensees.

The merits of cooperation can be summed up in a few words. Only through wide-spread cooperation in every industry will this country be able to compete effectively in world markets.
And the action needed is likewise easily summarized: The business, social and legal environment for cooperation should be improved and encouraged in every way possible.

IV. CONCLUSION

Management of change, then, involves little more than clear vision and common sense. When a change is perceived in a timely and clear way, common sense dictates how we can manage it to avoid its destructive effects and seize its opportunities.

There's a wave of media activity these days on the subject of "artificial intelligence." One of the more popular definitions seems to be that artificial intelligence is the ability of machines to apply common sense reasoning. The most difficult problems, however, arise not in applying such reasoning to situations with clear-cut, pre-determined boundary conditions, but rather when the machine must perceive change and impute the consequences of such change.

And so it would seem for us as well -- but we must start with ridding ourselves of the lenses of distortion -- it's actually pretty easy from there on out.

Thank you.