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DAVID P. GARDNER

# Education and the American Economy

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*More than ever,  
the vitality of the  
American economy will  
depend on a renewed  
commitment to  
higher education.*

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As the curtain fell on World War II, most of Europe and the Soviet Union were in ruins. Japan, physically devastated, was an occupied nation. China was divided by civil war. The economies of the East and the West had been crippled by a war of unprecedented destruction. By contrast, the United States emerged from the war physically unscathed and confident of its preeminent economic, political, and military power. American policy influenced every facet of world affairs and, in particular, the world's economy. American goods and American resourcefulness set the standards for world trade, and, as a result, the United States accounted for approximately 40 percent of world Gross National Product (GNP) at the end of World War II.<sup>1</sup> That economic hegemony lasted for roughly three decades.

What was it that gave the United States its scientific, managerial, military, and economic edge? Certainly, the uneven playing field after World War II was an important factor. But other forces were

also operating: a government that fostered creativity and freedom of expression and action, while interfering in individuals' lives less than most; an economic system that rewarded risk and encouraged productivity; and a society that cared more about what one could do than about who one was, and that made geographic, social, and economic mobility a

way of life for most Americans.

And beyond all of that, there was the G.I. Bill, which was surely one of the most inspired and, in retrospect, one of the shrewdest investments this country ever made. The G.I. Bill dramatically increased college enrollments beyond anything the country had previously experienced and, in the process, stimulated a revolution in the expectations of American young people: education became more attainable, financially and psychologically, than ever before. For hundreds of thousands of returning G.I.s, it was the ticket to the future; in a very real sense it was also the ticket to the nation's future. A high proportion of the persons serving in senior positions in government, universities, boardrooms, laboratories, and the Congress since the 1950s came of age during World War II, used the G.I. Bill to finance their university or college

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David P. Gardner is the President of the University of California. In 1983 he chaired the National Commission on Excellence in Education.

education, and subsequently provided the country with the scientific, technological, business, educational, and political leadership that has made such a difference to the nation's affairs, right up to the present day. Education was not just the means for giving them social and economic mobility; it was also the means by which this country assured for itself a reservoir of educated, trained, and skilled intelligence to consolidate its position after the war.

### **America in Transformation**

The United States is no longer the unquestioned economic and political arbiter of world affairs that it was in 1945. Today we are in the midst of a seemingly irreversible transformation. Over the course of the past several decades, two forces have increasingly operated to fundamentally change America's role in global affairs. First, our relative position has declined. The leadership that the United States has exerted over the past 50 years, assuring some stability to the world economy and a real if uneasy peace, will be shared by other nations to a greater extent than would have been thought possible even 20 years ago. The United States will find itself one nation among many: still the world's most productive nation, at least for the near future, but by a narrower margin. Since 1945, American share of world GNP has fallen from 40 to 22 percent.<sup>2</sup> Seventy percent of U.S. goods and services are now in direct competition with those of other countries. Our balance of trade problems, as well as the huge size of our business, consumer, and federal budgetary debts, make clear that we have little reason for complacency about our ability to compete effectively in the international marketplace.

The second driving force relates not to the changing power relationships of nations, but to a new international trend towards global interdependence. This new trend has taken many forms, manifesting itself most powerfully in economic relations. While the world's nations do maintain strong political boundaries, economic boundaries are hard to define and protect. Business and financial decisions made in Tokyo or London reverberate in New York, Paris, Hong Kong, and Moscow. The discrete national markets with which we have

long been familiar are becoming less relevant as the production of goods is characterized by increasing diversity. For example, production of a car can involve workers in four or five countries before the final product rolls off the assembly line.

The rise of a global economy, although of great importance, represents only one aspect of the new international interdependence. Another critical element has been the surge in the flow of knowledge on a global level. Revolutionary advances in communications and travel have brought the world closer together. Harlan Cleveland points out that "a quarter of a century ago, computers and telecommunications began to converge to produce a combined complexity, one interlocked industry that is transforming our personal lives, our national politics, and our international relations"<sup>3</sup>—and our universities as well. Students and faculty travel with unprecedented ease and communicate across international boundaries with a speed and regularity that are as astonishing as they are routine.

What we are seeing, in short, is a world that is concurrently more interdependent and more reliant upon information, knowledge, and technical sophistication, a world trying to come to terms with what the Arab philosopher Hichem Djait calls the forces of modernity (i.e., the technological revolution, modern science, and the industrialization of labor).<sup>4</sup> Consequently, we live in a world in which education takes on a significance and a meaning without historical parallel. For the United States, which must adjust not only to greater interdependence but also to the relative decline of its economic strength, the role of education is paramount. The quality of our education will shape our ability to remain prosperous in what is becoming a fiercely competitive global community. Given that inevitability, we would be well-advised to examine carefully how we, as a nation, are doing in education.

### **The State of Education Today**

The nation's elementary and secondary schools have been declining for over a quarter of a century, and it is only recently that we have come to hold out some hope for reversing that trend. In 1988, *Fortune* magazine observed:

As a major contributor of tax dollars to public education, corporate America is getting a lousy return on its investment. Not only are schools today not preparing kids for jobs, they aren't even teaching them to read and write. In the U. S. 30% of all high school students—one million teenagers each year—drop out before graduating. Most are virtually unemployable. Of those who do graduate, many do not have the problem-solving skills to function in an increasingly complex information society.<sup>5</sup>

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Furthermore, not long ago, the *Wall Street Journal* published the results of an exam given by the New York Telephone Company to its entry-level applicants. Administered in early 1987, the 50-minute test measured basic reading and reasoning skills of the 21,000 applicants. Only 16 percent passed.<sup>6</sup>

That is not an isolated example. According to one estimate by the American Society for Training and Development, "productivity losses caused by poorly educated workers, together with the price of remedial training, cost business about \$25 billion a year."<sup>7</sup> Moreover, the Department of Labor has warned of a growing disparity between the skills of young people entering the workplace and the jobs of the future. Many of those jobs will demand a greater ability to read, write, and reason analytically than ever before.<sup>8</sup>

Eight years ago I was appointed to chair the National Commission on Excellence in Education, whose 1983 report, *A Nation at Risk*, highlighted the alarming decline in the performance of our schools and our students. The report warned of a rising tide of mediocrity in our schools and a tolerance for shoddiness in many walks of American life that put at risk our once unchallenged preeminence in commerce and industry and our hopes for the education and economic well-being of the next generation. We concluded, "If an unfriendly foreign power had attempted to impose

on America the mediocre educational performance that exists today, we might well have viewed it as an act of war."

During the six years following the publication of *A Nation at Risk*, we have made some significant beginnings and taken some important steps towards restoring the education provided by our schools. Most states have raised high school graduation requirements and lengthened the school day and year. Many have enacted comprehensive reforms to address teacher status and compensation; the content, scope, and sequence of curricula; the quality of text-

books; and the special needs of gifted and disadvantaged students. Per capita state spending for elementary and secondary education increased nationally by more than 40 percent between 1981 and 1986.<sup>10</sup> Nonetheless, we need to do much more.

America's new circumstances present unique challenges to higher education. Recent national reports have raised questions about the quality of instruction in our undergraduate colleges and universities, especially at the lower division level. The new, and cyclical, interest in undergraduate education provides an opportunity to examine the content of our college curricula, the philosophy behind our curricular plans, and possible improvements of higher education. My own institution, the University of California, has embarked on a vigorous effort to improve undergraduate education, particularly in the crucial first two years of study. Other institutions have taken similar steps.

Certainly we need to better educate our students in science and technology. Comparisons regularly show that American students study less and indeed know less about science and technology than their counterparts in other developed countries, such as Japan and West Germany. One telling indication is that foreign citizens who take the Graduate Record Examination in mathematics average 100 points higher than American stu-

dents.<sup>11</sup>

Equally important, though, is the need to better prepare our students for the interdependent world in which they will be living and working. A more adequate knowledge of other countries, other cultures, and other languages is an essential part of the basic intellectual equipment young people will need in the marketplace and in the voting booth.

Our students will need to understand a variety of cultures, not only because the world is becoming a smaller place for Americans, but also because of the dramatic changes in our own society, which is becoming increasingly diverse, ethnically and racially. We will need to learn more not just about the diversity of our economic trading partners and their societies but also about the changing demographics in our own country. Education has a critical role to play in this task, one it is not yet fully performing.

In addition to educating our students, universities have another important contribution to make. Increasingly, the world economy is driven by new knowledge, and the ability to generate new ideas and knowledge has become a form of capital. It has been estimated that, since the Depression, technological change has accounted for between two-thirds and four-fifths of our growth in productivity.<sup>12</sup> Research universities are especially rich sources of that capital. Revolutions in information technology and systems, agriculture, systems design, medicine, and biotechnology, for example, are changing our world. These breakthroughs have been possible mainly because of fundamental research performed in our nation's universities and then taken into the marketplace.

But we are not investing sufficiently either in our ability to generate new knowledge or in the education and training of those who must make these discoveries. Erich Bloch, Director of the National Science Foundation, points out that although we still spend more per capita on research and development than our major competitors, they have made significant increases and are catching up with us. He also emphasizes that our numerical advantage in scientific personnel is disappearing: "In 1970, we had twice as many scientists and engi-

neers in proportion to our labor force as Japan or Germany. Today, the numbers are roughly the same."<sup>13</sup>

The national need for graduate-level scientists and engineers, in fact, greatly exceeds the supply. The shortage will become a major problem as a significant percentage of such people, now productively engaged in these fields, retire in the 1990s. For example, 40 percent of the faculty of my university will retire by the end of the century. One government estimate projects a potential shortage of up to 700,000 American scientists and engineers by the year 2010.<sup>14</sup> That estimate is, in my view, overly optimistic; the shortfall will most likely be even greater. Our dependence on foreign-born scientists and engineers to make up the deficit is clear; already, an estimated two-fifths of all engineering graduate students and about one-third of the faculty in American engineering schools are foreign-born.<sup>15</sup>

Moreover, university research facilities and instrumentation have deteriorated alarmingly in recent decades, to the point that they are almost always inferior to those available in industry. As concerned university presidents have pointed out, it is impossible to perform the science of the future with the instruments of the past.

### Effective Initiatives

Should we fail to address these problems, the only future we can look forward to is one of greater economic struggle and deeper social and political divisions, sapping the nation's capacity to remain a vibrant, cohesive society and a vital force in world affairs. Fortunately, efforts are underway to bring our educational resources to bear on the nation's competitiveness problems. I would like to discuss two: one at the state level and another at the national level.

In California, the question of economic competitiveness and its link to education has risen on the public agenda over the past few years. More than most states, California's economic vitality depends on knowledge-based industries, such as computers, and on such traditional, but increasingly knowledge-based industries, as agriculture. Recognizing the importance of science and tech-

nology to California's economy, five universities—Stanford University, the California Institute of Technology, the University of Southern California, the California State University, and the University of California—have recently agreed to work together to help bolster the state's economic competitiveness.

Called the California Council on Science and Technology, this association was created at the request of the state legislature and will devote itself to exploring ways in which California can best use its human and technological resources to enhance the state's economic competitiveness. A unique characteristic of the Council is its ability to bring together scholars, scientists, and engineers from universities and industry to provide the state with independent, objective advice on urgent issues related to technological competitiveness. Specifically, the Council has three principal aims: to identify the long-range research needed to sustain the state's economic development and competitiveness and provide appropriate direction for new scientific and technological activities; to assess private sector-university relations and technology transfer, with special attention to California's capacity to retain vital industries and scientific talent; and to analyze public policy issues that involve science and technology. The formation of the Council is one example of the efforts we need to mobilize university contributions to our economic health in an increasingly competitive world marketplace.

There is much to be done at the national level, too. The Business-Higher Education Forum, for example, seeks to promote closer cooperation between industry and education. The Forum was founded over 10 years ago by corporate and academic leaders who recognized the need to bridge the gap between the corporate and higher education communities for the benefit of society. Draw-

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ing on the talents of 40 chief executive officers of major American corporations and 40 presidents of colleges and universities, the council seeks to identify, review, and act on selected issues of mutual concern, to publicize these issues, and to encourage cooperation between the corporate and university communities.

In the past, the Forum has addressed such questions as education and training, the role of business schools, the exploration of space, and international economic competitiveness. In fact, a 1983 Forum report, *America's Competitive Challenge*, was among the first to bring that issue to national attention. More recently, the Forum issued a report, *American Potential: The Human Dimension*, prepared by a task force co-chaired by Don Petersen of Ford Motor Company

and Frank Rhodes of Cornell University. In that report, the Forum calls attention to many of the issues discussed here: the need to bolster the performance of our students and our schools, to invest in our research capacity, and to find other ways to make the most of our human resources.

The nation does not lack ideas about how to bolster American competitiveness, we concluded, or convincing evidence about the critical role education should play in that endeavor. What we have lacked is a consensus on how to accomplish our goals. Accordingly, the Forum committed itself to seeking consensus through a five-year effort to catalyze further change and to build on the gains already made. The Forum urges that the nation undertake a thorough examination of the structure and policies governing education. For example, given the success of preschool programs like Head Start, should public preschool education be available for all, beginning at age four? Should more flexible approaches to learning and advancement through the grades be introduced in recognition of the growing diversity of our students and

the lock-step system that they now confront? Can we make further gains in improving the preparation and compensation of America's 2.5 million teachers? How can we provide young people more options to prepare themselves for life and work?

Because learning continues after completion of formal education, the Forum's report also underscores the need to foster lifelong learning and to develop a more comprehensive training and retraining policy for the work force. The report urges every governor, for instance, to promote partnerships between state and local governments and the private sector that improve existing training programs and institute new programs where they are needed. The Forum also believes that local community colleges and technical institutes could be more effectively tapped as resources for designing and providing new training and retraining opportunities.

Because of the urgency of the task, the Forum has already called upon President Bush to address these issues forcefully, through regional hearings, Cabinet-level task forces, or a White House conference on human resources. The most important task is to make the development of our nation's human resources a top national priority, just as the G.I. Bill of over 40 years ago reflected a national decision to invest in the potential and in the education and training of our World War II and, later, our Korean and Vietnam veterans. Today, in the spirit of the G.I. Bill, we need a strong national consensus and a comparable national commitment to developing the nation's rich human potential in all of its dimensions.

In the world economy of the future—complex, interdependent, less amenable to American influence—we will have no guarantee that the reservoir of talent and skill we need will be available to us. No guarantee, that is, except our own willingness to do something about it.

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