O-11 / Technological Change

FOREIGN AFFAIRS

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AMERICA AND THE WORLD 1987/88

Coping With the Lippmann Gap *Samuel P. Huntington* 453
A European Perspective on the Reagan Years *Michael Howard* 478
The Superpowers: Dance of the Dinosaurs *Marshall D. Shulman* 494
The Economics of Illusion and the Illusion of Economics *Robert B. Reich* 516
The World Economy and Technological Change *W. Michael Blumenthal* 529
Soviet and Chinese Economic Reform *Marshall I. Goldman* and *Merle Goldman* 551
Israel at 40: Looking Back, Looking Ahead *Yitzhak Shamir* 574
Peace in Central America? . . . . . *Linda Robinson* 591
The 1988 Election: U.S. Foreign Policy at a Watershed *George McGovern* 614
Comment and Correspondence 630
Source Material 632
Chronology 1987 638

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THE WORLD ECONOMY AND TECHNOLOGICAL CHANGE

The years since the mid-1970s have been an unusual and disquieting period. Even before the events of last October 19 there was a growing sense that something was not quite right in America's economic life. The system appears no longer to be working as it should.

On economic matters, we seem to be governing ourselves less adequately than at any time since World War II; sometimes we seem to be confronted by factors and forces that we cannot quite understand, let alone predict or correct. We find ourselves more and more in an environment of unaccustomed economic uncertainty and instability, both at home and abroad, and with no real consensus on what is happening, what is causing it, or what should be done next.

In the postwar period we often confronted severe economic challenges at home and abroad, and we met them—not always perfectly, but certainly quite adequately and, in fact, rather well. Our domestic economic policies enjoyed a broad degree of support and met our needs. We created new international institutions and, on balance, they did the job. The depth of our problems was not an impediment to effective economic management and positive progress.

Can there be any doubt that we are not presently tackling the problems of the 1980s with equal understanding, imagination and success? Look first at our domestic scene:

—We are burdened with a federal budget deficit of unprecedented proportions, year in and year out, even in times of relatively satisfactory employment and growth. There is broad agreement that the risks are great, but not on much else. The nation with the world's largest and most sophisticated economy has so far been incapable of finding a way out.

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—We are running huge deficits in trade and current accounts which stubbornly fail to dissolve, even two years after our currency has been devalued relative to the world's other principal currencies by more than 40 percent. Most predictions as to the timing of any real improvement have so far been wrong—much to the consternation of the experts, who can no longer adequately explain exactly what is going on, let alone predict when and by how much the numbers will change.

—We are the richest nation on earth, yet we are now also the world's largest debtor. At the current rate we will soon owe more than all of the rest of the world's debtors combined. There has long been agreement that this state of affairs cannot last, yet it has—and no one can be sure exactly what will happen next.

—We have an unstable currency and cannot quite decide whether to support it or not. When we have tried, the effort has generally failed or at best only brought temporary respite. We have worried, and rightly so, about the possibility of a dollar "free-fall" and its longer-run political as well as economic implications.

—We have experienced two serious energy crises, providing clear evidence of our unhealthy dependence on inherently unreliable external sources of energy and of the importance to economize and increase the efficiency of energy use. Yet today we have largely abandoned even the pretense of a national energy policy. In spite of recent historical experience, we cannot even agree whether one is needed at all.

—We have the lowest savings rate of any developed country in the world and do not understand why, though we recognize the urgent need to save more and to reinvest to improve our global competitiveness. But since we fail to understand why we do not save more, we are unable to agree on how to change our domestic policies to promote our critical investment needs from within.

—In the midst of general prosperity and growth, amid a national binge of borrowing and consumption, we tolerate year after year grave pockets of poverty, distress and decay in this land. The consequences of these structural imbalances are egregious for our young, for our educational system, for the fabric of our social life. We know all this,

but we cannot devise effective programs to combat these national scourges, and the problem steadily worsens.

—Lastly, of course, we are now caught up in unprecedented securities market uncertainties, with excessive, sometimes violent, up and down swings which threaten the stability of the system. And again, no one quite knows what needs to be done.

I do not believe that *all* has gone awry, that *no* positive economic decisions have been made. That clearly is not the case. But the list of serious problems is long, we understand them less well than we should, and seem less able to come to grips with them than in earlier times. The result has been a growing sense of concern and frustration at large amid a stagnation of official thinking and positive action, and much empty rhetoric, wishful thinking and general drift.

We are not alone. Japan, for example, is also faced with new factors and forces which policymakers have yet to master. The past mix of domestic demand management and export promotion no longer makes sense. The yen is rising to historical highs and competition from newly industrialized countries is displacing Japanese jobs and "hollowing out" the industrial base. Meanwhile, Japanese structural surpluses on trade and current accounts have remained largely impervious to efforts to create better balance. In some European countries unemployment has risen to postwar highs, and the European Economic Community faces a mounting crisis with agricultural surpluses which threaten the fundamental structure of the Community system.

At the same time, such serious world issues as the debt of the Third World and rising protectionism linger, with few new ideas and no decisive action in sight.

II

What is the cause of all this uncertainty and change? Why the difficulty in understanding what is under way?

No single reason adequately explains what has occurred. But I believe there is one circumstance which overshadows all else and has set the current period apart: unprecedented, deep and continual technological change. In the 1970s and 1980s extraordinarily rapid technological change has thrust upon us new and as yet unresolved problems of governance in the national and international spheres.

There appears to be a fundamental lag between the current

rate of technological change and the rate of adjustment to these changes among decision-makers. Technology that evolves much more rapidly than the body politic can absorb creates strains and stresses which lead to dislocations, instabilities and paralysis of action—and sometimes perverse responses. This is what characterizes our situation today. The problem is further complicated because the private sector accepts technological change more rapidly than the government.

Today's situation differs in one fundamental aspect from earlier periods of rapid technological change (e.g., during the invention of the steam engine or the telephone). The current period of revolutionary change is occurring in a much more interdependent world in which purely or largely national efforts to adapt to change have ceased to suffice. Furthermore, existing international institutions have been rendered obsolete by technological change, and the capacity for making international reforms is even less developed than that for making domestic reforms. In the absence of adequate institutions, progress on adjusting to the new technology is reduced to a slow crawl.

III

What is the new technology?

The range of significant recent technological changes is large and diverse. But one development, I believe, lies at the heart of many of the changed circumstances with which we must come to terms.

We need to understand, and master, the full implications of the accelerating advances in microelectronics, which began with the invention of transistors at Bell Laboratories in 1947 and were continued a decade later by the development of integrated circuits—the ability to group a large number of transistors on a single silicon chip.

Through miniaturization it has been possible, on the average, to double the number of transistors on one tiny chip each year since—with dramatic implications for performance and, above all, for cost. As a result one random-access memory chip can today accommodate as many as one million bits, which is 125,000 separate characters of information, on a device no bigger than a fingernail and at a tiny fraction of the earlier cost. The scientists at Unisys assure me, based on work now in progress in the laboratories, that we will soon be able to place four times as many characters on that same small device.

The results have been spectacular. In 1961 we achieved the ability to handle as many as 34,000 arithmetic operations per second in one computer; only 20 years later, we learned to handle as many as 800 million arithmetic operations per second in a single computer. By the end of this decade that number will have been far surpassed.

Another extraordinary development of the 1960s, the microprocessor, is now affecting our lives in even more startling and revolutionary ways. For this breakthrough now enables us to combine not merely within one computer, but on a single small chip, a vast array of complex features and functions for both memory and logic processes. A single standard microprocessor can handle as many as 20 million individual and varied instructions per second. An annual rate of increase of 20 percent in that capability is likely for years to come. This revolution with regard to size, speed and complexity has equally revolutionized cost, which has dropped by over 90 percent in the last two decades and continues to decline steadily year after year, albeit now at a decreasing rate.

The effect on an ever increasing range of human endeavors is as profound as it is pervasive. And what makes it particularly powerful is that all this has occurred in conjunction with far-reaching changes in other technologies as well. The most important of these changes have been in jet aviation, space satellites, biotechnology and, especially, the technology of new materials, particularly ceramics and glass fibers.

The impact on communication and transportation has had special meaning. Our capability to establish virtually instantaneous worldwide electronic links, combined with the technology of television satellites and jet transportation, has revolutionized how we live, where we go and what we do.

Technological breakthroughs invade every aspect of our lives. Just four decades ago the world had just one computer, the ENIAC, built at the University of Pennsylvania in 1946. It weighed 30 tons, utilized 18,000 vacuum tubes, stood two stories high and covered 15,000 square feet. It cost many millions.

Ten years later, in 1956, there were but 600 computers in the entire United States. Two decades ago there were 30,000. In 1976 there were about half a million computers in use across this land. Today there are several million, and we now estimate that by the end of this century half of all the households in the United States will have at least one free-standing computer.

Within less than three decades of the birth of the computer age, the industry was producing, for a few hundred dollars, a microcomputer that was 20 times faster than the ENIAC, ten times more reliable, required 3,600 times less power and took up 300,000 times less space! Today, untold numbers of microprocessors perform a myriad of complex tasks in factories, offices and homes.

The results? In the seventeenth century it took Johannes Kepler four years to calculate the orbit of Mars. Today a microprocessor can do it in four seconds flat.

In factories, parts are conceived, designed and produced at one-hundredth of their old cost and in a fraction of the time. Robots with preprogrammed microchip brains do complex routines requiring superhuman strength and handle the chores that are particularly dangerous or dull. They can hear, see and touch. In automobiles, a single throwaway microprocessor controls ignition, fuel, suspension and brakes, and almost everything else that makes the car go.

Information has become the key to modern economic activity—a basic resource as important today as capital, land and labor have been in the past. Information is not and cannot any longer be geographically limited or confined. The new technology moves it instantaneously across national boundaries, anywhere and at any time. We are, in fact, not far from the point where the entire store of human knowledge is available worldwide and where new developments and changes are communicated in split seconds to anyone, at any place on the globe.

The combining of electronics with biotechnology and the application of engineering methods to the study of live organisms are resulting in equally stunning new possibilities for mankind; in agriculture, we have raised productivity substantially and have grown plant species in new environments; in genetics, we are learning to reprogram and create new proteins nonexistent in nature, and can now utilize these techniques to unlock the genetic code with dramatic implications for world population growth, medicine and health.

Medical science has leapt ahead. CAT scanners provide composite images with resolution beyond the capability of conventional X-ray machines. Expert systems can suggest diagnoses from a menu of thousands of symptoms and hundreds of diseases.

The new technology has fundamentally altered what we produce and how we do it, what we trade, how we communi-

cate, and how quickly and widely information can be passed along; who travels and by what means; how we educate our children and care for the sick; how we compose music and write books. So little has remained the same that we can no longer hope to govern our affairs as before. Because of the microchip, mankind can now accumulate, store, manipulate, access and utilize information, data and knowledge in vastly more efficient ways and in volumes exponentially greater than only a few short years ago. Ten billion bits of information can be put on a single video disc no larger than a phonograph record. The entire contents of the Library of Congress can be stored in a cabinet hardly bigger than a medium-sized medicine chest.

A simple little experience impressed upon me the scale of these changes more deeply than anything else. Not long ago, far from high-tech civilization in the interior of China's Anhui province, a local farmer showed me his new television set on which he was just then watching excerpts of the ABC evening news, featuring Sam Donaldson, firing pointed questions at the president as he boarded his weekend helicopter—but of course getting not much more than a cheerful grin and a wave in return, even in dubbed Chinese. The farmer thought it was great and I have not forgotten it since. When I was growing up in China, that illiterate peasant's horizon and knowledge about the outside world was limited by the distance he could walk or, if he had one, peddle his bicycle. I doubt that he would have ever been to the provincial capital, Hefei, not all that many kilometers away.

In sum, the world is not what it was only a few short years ago.

IV

World industry and commerce are being reshaped by technological change in many other ways, as are the national and international problems to which new technologies give rise.

We are witnessing the development of entirely new materials, and we can now endow old ones with changed and vastly enhanced new properties to reduce cost, improve strength, add flexibility and so forth.

Older materials like copper, tin, aluminum, even steel are increasingly faced with new competition and the threat of obsolescence, with potentially serious impact on the economies

of countries such as Bolivia, Chile, Peru and others in Southeast Asia and Africa.

Secondly, as noted previously, the impact of technology on agriculture is probably as profound as it is in industry. Biotechnology and biogenetics are creating tremendous opportunities for mankind but also present us with new challenges and problems. Genetic engineering promises to revolutionize agriculture in the years to come. Genetically engineered seed and the development of highly drought- and herbicide-resistant species are likely to lead to rapid and continuing improvements in productivity and total output, eventually making traditional food importers largely self-sufficient and eliminating, or at least sharply restricting, many markets for temperate-zone agricultural goods. Further advances in productivity enhancement, crop varieties and animal breeding techniques promise to continue these shifts in the balance of world demand and supply.

Technological change is also altering world trade. In fact, for one who spent four long years in arduous negotiations to lower tariff barriers and increase world trade, it is a sobering thought that technological change appears to be having a far greater impact on the nature and volume of international commerce than all the trade negotiations since the 1948 establishment of the General Agreement on Tariffs and Trade (GATT) combined.

Service trade was not a problem in the Kennedy Round twenty years ago. Today, it is *the* issue. In an advanced country such as the United States, 75 percent of the work force is now employed in the service sector overall, and two-thirds of that number are connected in one way or another with information or with the knowledge industry itself. The estimate is that by the year 2000 only 15 percent of all employment in the United States will be devoted to the manufacture of goods.

Increasingly, then, a country's comparative advantage lies in its ability to utilize effectively the new information technology, in the speed of its absorption into the productive process, and in the relative efficiency with which it is applied. Less and less it is the other factor endowments, the availability of raw materials or the cost of labor, that determines which country has the advantage and which has the lowest total cost.

As the new technology becomes an important input of the traditional production process, fundamental changes in the cost structure occur. As recently as a decade ago, for example,

many electronic assembly operations were being shifted out of the United States, first to Japan and subsequently to Hong Kong, South Korea or Taiwan.

Now a reverse move may be taking place. Labor cost differentials between us and the Far East may, quite apart from exchange rates, become less important in determining the location of production or plant. For it is now high technology applied to manufacturing, including robots and computer modeling, that permits the introduction of "just in time" delivery of inputs and high levels of automation and reduces or totally offsets the advantages of low labor costs. At Unisys, we can assemble computer terminals in the United States at a cost roughly equivalent to the Far East, even though wage rates differ substantially between our plant in Flemington, New Jersey, and those in South Korea or Taiwan.

For a company like ours, the location of manufacturing and service facilities for our worldwide operations can now be determined more by market and customer considerations than proximity to needed raw materials or areas with low labor rates. Increasingly, we can ship products by jet and make delivery from anywhere to any place on the globe in 48 hours or less.

My own view is that not only the interrelationships but also the volume of world trade will as a consequence continue to grow. Some trade flows have obviously become obsolete, and there is a debate whether these are now or soon will become so large as to offset the new opportunities being opened up. Intuitively, I do not believe that to be so, but it remains to be seen.

This enhanced interdependence is changing trade in another important way: the national origin of a product is becoming more and more difficult to define. As a smaller number of large players are able to organize their operations on a worldwide scale, their products cease to be truly American or German or Japanese. Parts, components, subsystems, products and services are intermingled and exchanged in ways that render debates as to the final product's national origin not much to the point.

In the financial marketplace it is clear that technology, the ability to develop and gain access to vast data bases, to handle complex computing with lightning speed, and to communicate instantaneously, has had a profound impact in at least four critically important ways. First, information is now universally

available, in real time, simultaneously, in every financial center of the world. Second, technology has tied all the principal countries and world financial and banking centers together into one integrated network. Few countries or parts of the world can any longer remain insulated from financial shocks and changes, wherever they may occur. Third, technology has made possible the establishment of a new, comprehensive system and highly efficient world market to match lenders and borrowers, to pool resources and share risk on an international scale, without regard to national boundaries. Finally, technology has engendered a vast amount of innovation or new "products," mostly to hedge against changes in interest rates or exchange rates.

Technology has made the system more efficient. But new systemic and policy problems have also been raised, as the recent unstable performance of the securities markets clearly showed. The problem does not lie here. It lies rather in the public sector and in our political and institutional framework, where adaptation to technological change is slow and where obsolete institutions and outmoded rules create the uncertainty and tensions that have adversely affected the quality of macroeconomic management in our newly pluralistic world.

V

How well have governments, severally and jointly, adjusted their thinking and practices to modern technological trends? How much progress has been made in developing new practices and approaches that take account of what has changed?

The record is uneven at best. In most countries monetary policy, for example, still reflects the illusion that the pursuit of an independent national policy remains an effective and appropriate means of setting interest rates, controlling inflation and influencing the overall level of economic growth. Individual countries often still adhere to the obsolete notion that monetary policy can be effectively managed nationally, and that not only the sovereign right but also the power of each country to make its own decisions and make them stick remain intact. Politicians, central banks and finance ministries too often still hold to the erroneous assumption that the national currency can be protected by unilateral intervention in the foreign exchange markets.

To an important degree, these concepts are out of date. Purely national action on domestic policy and exchange rates

has been rendered essentially obsolete by the growth of a true world capital market of gargantuan size and many interconnections—the vast range of financial innovation with its array of new money and money-like instruments crisscrossing through the world's computer and telecommunications networks, without regard to borders, as fast as the speed of light. The very question of what is the national money supply is no longer easy to answer. Determining how to control the supply nationally becomes equally difficult. The rules of the game have changed fundamentally.

The traditional monetary techniques of influencing the level of economic activity, in any case, no longer work quite as before. We lack a clear idea of the real impact of financial innovation, and whether the myriad techniques to hedge risks have not taken much of the force out of traditional national or international policy moves. This is because technology has dramatically lowered transaction costs, and because the variety and substitutability of instruments available to market players has greatly increased. It is doubtful, therefore, whether the old techniques of influencing what the players do can have much value if they remain unchanged. Yet that is still our situation today.

Controls and regulations that remain purely national in scope lose some of their effect unless they are at least compatible with the larger international context. It is not that national rules and policies are obsolete or no longer needed. On the contrary, each government has an even greater responsibility than before to pursue sound economic policies at home. But national measures cannot work unless close attention is paid to what is being done elsewhere. Failure to appreciate the interdependencies, and the continuing attempts to apply purely national methods to solve many of today's problems, are important reasons why our separate economies no longer respond to traditional government measures as before, and why the course of economic events has become so much harder to understand and predict.

Much needs to be done. As deregulation in individual countries proceeds—itself a general worldwide response to technological change—we require much deeper consultation and agreement on what kind of new rules should pertain in a much broader range of affairs. If the market is to function smoothly, eventually there will have to be agreement on more key standards for international banking and finance, including account-

ing rules and the national treatment to be accorded institutions established on foreign soil.

But international cooperation regarding banking rules and regulations, as far as it goes, is still the exception rather than the rule. There is as yet little evidence that governments are facing up to the need for a greater convergence of other national security market rules, where the need is equally great. That certainly remains a necessary next step. After all, "Black Monday" showed us, more graphically than we might have liked, how closely linked these markets have become and how directly events in one place are mirrored elsewhere.

If there is one world market for capital and money then there is, or soon will be, essentially one world market for securities as well. You can buy Unisys stock somewhere in the world at virtually any time of the day. So the logic for the coordination of rules in one area is equally persuasive across the board.

The inescapable conclusion is that technology requires that many traditionally national policies be rethought. In some cases, strictly national rules lose much of their meaning. In others, at least the thrust of the rules requires change.

Antitrust legislation at once comes to mind. Already there has been a kind of tentative, albeit reluctant, recognition that technology has made obsolete the traditional definition of the market and that some old restrictions no longer make sense. One such example here in the United States is the government's stamp of approval for the creation of a Microelectronics Computer Consortium, originally under Admiral Bobby Inman. Allowing a group of strong U.S. competitors in the information industry to pool their resources and collaborate on research would not have been acceptable in earlier days. But it makes sense under the different conditions of today.

Of course, there is no area of national economic decision-making where technology has made the interdependencies more evident than in fiscal policy. Capital movements have become a powerful force. Trade has become so much more important for all: even in the United States trade has more than doubled in relation to GNP. Flexible exchange rates now transmit the effects of action or inaction in one country to the others much more rapidly than before—on exports, on the price level as import prices change, and on the level of economic activity overall.

That is why the budget in Washington or in Tokyo or Bonn

is now a deeply international issue for all: the more so as gridlock in one place can lead to capital movements and exchange rate changes, which in turn influence trade flows and give rise to protectionist urges elsewhere.

We must realize our structural interdependencies and adjust institutions to deal with a whole range of issues which simply did not exist at an earlier time, or at least not in their present form, and which can now significantly influence the course of economic affairs and international relations: energy, the environment, transnational investments, transborder data flows and trade problems in services immediately come to mind. Even old problems need to be viewed in a new light. Macro policies, agriculture, East-West trade, relations with the less developed countries (LDCs)—all these raise new problems and require different interaction than before. But if governments have trouble changing their ways at home, they find it even more difficult in the international sphere.

There is not even enough agreement as yet on how the economic world works. The Germans think fighting inflation must always come first. The Japanese cling to trade and exports as the number-one priority, and the French believe that reform of the international monetary system stands at the top of the list. The American emphasis on the need to come to grips with the impact of technology on services is viewed with suspicion by all. Under these circumstances, managing international economic policies in the light of a new set of technological facts of life, so that the world as a whole comes closer to optimizing the collective welfare, remains a far distant goal.

VI

The position of the GATT on trade matters is perhaps the best case in point. It is in this area that we emerged from World War II with possibly the earliest and clearest insight into the limits of sovereign national power, and the best understanding that in trade matters, at least, unilateral action by one country does no one much good.

Although the GATT signatories failed to implement the more ambitious International Trade Organization planned at Havana in 1947–48, the GATT as it did evolve proved an extraordinary success for the first quarter-century of its existence. Successive negotiations led to the dismantling of a large part of industrial tariffs throughout the developed world. The resulting huge increase in world trade was a major factor in the

rapid postwar recovery and growth, and helped developed and developing countries alike.

I recall the cynical prediction by one of the most negative European delegates during the Kennedy Round, the most successful GATT negotiations, that the demise of direct tariffs would make trade problems not better but much worse because nations would now resort to other more insidious protective means.

An objective assessment of trade developments in the 1970s and 1980s, and of the GATT's declining ability to achieve any far-reaching positive new results, might lead to the conclusion that my cynical friend was not entirely wrong. But the principal explanation for why new forms of protectionism have arisen and why the problems have become much more difficult to resolve lies elsewhere. The major factor is that technology has created a fundamentally different world from that which prevailed when the Kennedy Round was held: neither the member governments nor the GATT have as yet fully adjusted their thinking and their practices to those differences and to what they mean.

Services are now an important issue in international trade. Factors of production are not as fixed as before. Knowledge flows rapidly across the borders of developed countries and LDCs alike; new competitors come up fast. Technology has affected agricultural output and productivity and created new substitutes for primary goods. Above all, floating exchange rates and sophisticated world electronic networks have made obsolete the fixed tariff and have altered international economic relations in ways no one could have foreseen.

The rise of the multinationals and their capacity to take advantage of technology without regard to frontiers, the rapid dissemination of technology and its effect on newly industrialized countries like Brazil, Mexico and Taiwan—all this has changed the trade problems the world must now face.

But the GATT has remained as it was, and the rules no longer cover a large portion of what is now relevant in world trade. The result has been a slowing of progress, a trend more toward cartelization than cooperation, and more frequent resort to so-called administrative intervention and all manner of other new devices to protect domestic producers from the effects of competition and change.

As currency values change, as the level of frustration rises, the pressure for restrictive measures increases as well. Thus

twice as many protectionist proposals now find their way into the congressional hopper as was the case a decade ago, and positive moves in the trade field become infinitely more difficult to achieve.

Yet the case for cooperation in trade, for limiting sovereign national power through agreement on rules of conduct, for adjudication of disputes and for the reduction of national protection remains no less persuasive today than it was two decades ago. The rising tide still lifts all the boats.

There has been some progress. The Tokyo Round agreement to deal with subsidies, procurement, import licensing and national standards was a good step forward, and in the current Uruguay Round there is encouraging evidence of a willingness finally to begin dealing with the service issue as well. Bilaterally, perhaps the most significant advance in trade has been the U.S.-Canadian agreement to remove virtually all tariff and trade barriers over the next five to ten years. That is a really important move forward which deserves the fullest support.

The basic problem, though, remains. It is that we need new trade rules to fit our new needs and a greater willingness by all countries to come to terms with the way in which technology has altered what occurs in today's trading world.

VII

There are other advances and some sound initiatives to help us come to grips with the needs of our pluralistic economic world.

Some progress has been made on improving consultation and international cooperation through the institutionalization of the annual Group of Seven summits, since the first one at Rambouillet in 1974, and in the meetings of the smaller groups—the regular meetings of the finance ministers and central bankers of the principal countries.

Summitry has been the subject of considerable debate. Part of the current conventional wisdom is that the process has ceased to be of much use—if it ever was. The summits are criticized as annual rituals long on media hype and little else. Some think that nothing definitive has ever been decided and the whole effort is largely a waste of time. As a participant in three economic summits, I do not share these reservations. In my view, the summits are only a beginning, but a good beginning nevertheless, of a necessary evolutionary process from which we must learn and which we would do well to deepen

and to expand. At a minimum, summitry over the last decade is concrete evidence of a growing recognition among the principal countries that their economies are interlinked and that better understanding and common approaches are an important, if not an essential, prerequisite for the prosperity of all.

Summits are an important means of exposing presidents and prime ministers to the realities of our world, a valuable learning experience of how the viewpoints of key countries on major issues mesh or diverge and of the limits to strictly national action on economic matters. The meetings also have the important advantage of bringing home to congresses, parliaments and the public the connection of national economic problems to the world economy as a whole. They can serve as a subtle and important barrier to wrongheaded and counterproductive unilateral moves. The very fact that a summit meeting is in the offing can and does at times act as a counter to ever-present pressures to go it alone, particularly when it comes to protectionist trade solutions.

Summits are the one most visible opportunity for bringing together for discussion the whole range of national and international policies and concerns. My view is that the inevitability of continuing technological advances in our pluralistic world argues strongly not for abandoning summitry, but rather for striving to improve and to build on the process as best we can.

Obviously, an annual two-day meeting of political leaders is at best a highly limited affair. The experience of the last decade reveals its more obvious inadequacies and why, even with improvements, there are a lot of other things that will have to be done. For example, it seems to me that the experience of the "sherpas," who help set the agenda for summits and do much of the preparatory work, and of the Group of Seven ministers should be utilized and built upon for deepened and expanded contacts.

The sum total of our common problems needs to remain under constant review, perhaps by establishing more permanent machinery for discussion and, where possible, resolution of the major matters on which international understandings need to be reached.

VIII

If my basic thesis is valid that rapid, revolutionary technological change has profoundly and permanently altered the domestic and world economic scene, where do we go from here?

How can we find ways to adapt national and international decision-making? Are there practical avenues for a positive and constructive evolution toward more suitable responses to today's needs?

The logic of the electronics revolution leads to a first conclusion which is basic to everything else, though it is not yet fully understood and accepted. Simply stated, it is that technology is rapidly making the basic notion of national sovereignty obsolete in many areas of economic affairs—at least for some of the major nations of the world, and ultimately for most:

—There is now one world capital market. How then can any major nation hope to conduct a truly effective national monetary policy all on its own?

—Exchange rates quickly transmit the effects of key tax, spending and budget decisions from one major country to another. How then can there be a truly independent national fiscal policy?

—Factors of production are less fixed and knowledge flows freely across borders. How then can strictly national rules and regulations remain effective if they are out of step with the rest of the world?

—And if technology can rapidly override the effects, how can national import restrictions and protectionism possibly still achieve their stated aims?

The conclusion is inescapable that technology has created a world no longer effectively composed of individual national economic entities. Thus, if we continue to act as if nothing has changed, our persistence in applying strictly national policies is bound to prove frustrating, and often counterproductive as well.

The second conclusion strikes me as being as obvious as the first. Regardless of where the technology moves, nation-states will continue to exist for a long time to come, and more important, will behave as if they can continue to control key economic events a great deal more effectively than may actually be the case.

There are several reasons for this. The practice has been deeply ingrained over the centuries and will not easily give way; as yet there is no ready, practical alternative to continuing national action much as in the past; even if national measures on key issues can no longer work, they can still *appear* to do so, and thus influence the behavior of markets and managers.

It is an interesting paradox, but not one that obviates the validity of the underlying need for change.

My third conclusion is that we need to give greater attention to the issues and implications raised by the deep impact of technological change on our lives, on what we do and how it is done. What is missing is a better and more comprehensive analysis and an integrated view of the new issues underlying our current economic problems in light of technological change.

Yet even with more understanding of the forces at work, it may still be that the sight of the gallows will have to become clearer before we can make real progress toward a constructive response. Perhaps we need more failures and crises before real changes occur. One hopes not, but history would suggest the likelihood that it will turn out to be so.

Who will show the way?

My answer to that question is unequivocal and clear. No real progress is likely or possible without the leadership of the United States. We are no longer the dominating world economic power, but we are still the largest and most powerful nation. Ours is the world's largest single market and our currency remains at the center of international finance. We remain the political and strategic leader of the West. And we have the greatest military strength, with worldwide interests and commitments that span the globe. What happens in the United States affects world economic events profoundly. We were the principal architect of the existing framework created in the wake of the Second World War, and none of these international economic institutions can evolve without our active initiative and support.

We are expected to lead, and it is in our interest that we make the effort to do so. That is as true today as it was 40 years ago, and the importance of doing so, I would say, is now no less. In fact, one of the great problems of the recent past is that we have not done so, and that our domestic economic policies, quite apart from their impact on us, have shown insufficient evidence of an appreciation of their impact on the rest of the world.

There is then a further conclusion which few will question or doubt. An indispensable prerequisite for leadership must be that our own domestic economic affairs are first put back into tolerable shape. We cannot suggest solutions to others if we cannot ourselves apply the right ones at home. We cannot be

the world's largest debtor and the world's economic leader at the same time. No improved collaboration on monetary and fiscal matters is possible without a more assured prospect for better balance in our domestic budgetary accounts. No fundamental solutions for solving the LDC debt problem are really possible if our own debt is not brought under control. And no effective steps for tackling the new issues in world trade can be taken if we continue to run $150-billion trade deficits and hope that a declining dollar alone will absolve us from the need to make the painful domestic structural reforms.

But leadership toward what? What kind of program would make sense? That is the central and most difficult question of all.

IX

We need to define a bold and comprehensive new philosophical underpinning for the management of domestic and international economic affairs, a kind of new economic Weltanschauung that explicitly recognizes the new problems but also the enormous opportunities for mankind which technology has opened up. What I have in mind is a general framework for the gradual restructuring of domestic and international economic relations that corresponds more closely to the technological realities of our day. The process no doubt will be gradual and evolutionary, but the underlying principles require clear definition from the start.

The effort to define a new strategy must be based, first, on realism, on a willingness to think about the world as it is and not as it once was, and second, on a recognition that U.S. hegemony in economic affairs has come to an end; the triangular power bloc of the United States, Japan and the European Economic Community, and the three-currency grouping of the dollar, mark and yen has taken its place.

The third principle will be particularly difficult to put across, but strikes me as a prerequisite for intelligent progress on almost any front. We need to lead the way in redefining, for others and for ourselves, the meaning of "national interest" in broader terms than in the past. Implied here is the proposition that national interest now dictates for all a limiting of unilateral moves in economic affairs, and that for all the key actors it must encompass greater concern over the impact of major domestic measures on others. It implies acceptance of the principle of common responsibility for internationally compat-

ible solutions to domestic needs, and for the creation of and support for the institutions necessary to coordinate these efforts on a broader scale.

The fourth principle is a corollary of the third. It involves the commitment to renounce, or at least to limit wherever possible, those measures that are particularly incompatible with the expanded definition of what the true national interest now means. Protectionist policies immediately come to mind. The unwillingness to collaborate on environmental issues, it can be argued, is another case in point.

Fifth and finally, the principle of nonexclusivity, that is, the need to take account of the broader interdependencies of economic problems affecting the many, should also be recognized and understood. Technology will tie all of us together on this earth. And more than before, broad interrelationships will have to be taken into account, whether they concern the communist bloc or the wider range of LDCs, and whether they deal with currency problems or the connection between market access and economic aid.

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Such a framework for dealing with economic problems, in light of the new interdependencies technology has wrought, can create the much-needed political impetus to adjust national as well as international practices and institutions to 21st-century needs. New initiatives can become more acceptable within such a framework if seen as part of a general new strategy to bring the benefits of technology to all in an interdependent world. We must recognize, however, that U.S. leadership along these lines requires long-overlooked changes in our domestic decision-making institutions and machinery.

The American president should have a single statutory chief economic officer to advise him on all domestic and international economic affairs. We should create a cabinet job for that, equal in importance and stature to that of the secretary of state.

All elements of economic affairs should be placed under this new secretary's charge, and his role should be fully analogous to that of the secretary of state in foreign affairs. A more formal, closer means for relating monetary to fiscal policies between the executive and the Federal Reserve is also an important need, and the congressional structure should evolve to mirror these executive branch reforms in a more rational

way. Based on my own experience over the last 25 years, I can think of nothing that holds greater promise for improving the quality of economic governance in the United States than a reorganization of the way economic decisions are made in Washington.

On the international scene, the strategy should focus on the search for improved techniques to coordinate those decisions that affect the welfare of all in our pluralistic world. I am aware that there are those who point to the problems and failures of the past and question whether coordination is possible at all. My own view is that the record of the past holds as many instances of success as of failure and that, in any case, the reality of interdependence dictates that we continue to try to make coordination work.

We must be pragmatic in the means we choose to employ. The pooling of better, more consistent statistics and information would be a step forward. Sometimes merely consultative mechanisms, more or less formal, may suffice. Elsewhere, new institutions involving specific multilateral commitments by member nations will be needed. And we should not shy away from thinking about entirely new techniques and ideas, even if they may at first seem as revolutionary as the development of the microchip itself.

For the joint management of our world financial market, some bold new thinking is especially needed. Is a single world central bank as yet too visionary an idea? A case for it certainly could be made. Are there lesser steps that can more realistically be conceived? Should the chief currency countries have representatives present when their central banks consider key policy moves? Or are there other even less far-reaching formal coordination or consultation devices that might be tried? These are the kinds of initiatives, it seems to me, that now require our serious attention.

For better fiscal policy management and for coordination of the broader range of economic issues, expanding and strengthening the existing machinery provides the most practical opportunity for progress. A permanent secretariat doing substantive work for the Group of Seven governments between meetings and for the improved functioning and effectiveness of the periodic economic summits holds promise. And the new strategy could encompass initiatives toward expanded understandings on a whole list of international economic issues which technology has raised up, but on which no informal or formal

means for cooperation or agreements as yet exist. Transnational investments and East-West trade immediately come to mind.

The point is simply this. Whether the issue is trade and the future of GATT, or the problem of LDC debt and development and its connection to North-South economic and political relationships as a whole; whether the concern is our common environment or the evolving economic scene within the Soviet bloc—in each case technology has created new imperatives which nations must learn to accept. We must do better in managing the new economic environment and the new interrelationships. In no major country can economic policies remain unaffected by the realities of technological change. No one can escape the conclusion that some issues now require the surrender of a greater degree of national sovereignty. It is a deeply political issue, both at home and abroad, but one with which all countries must come to grips.

Above all, a common strategy is needed to avoid the conflict which lack of attention to these problems would undoubtedly create, and to seize the opportunity for advancing the well-being of mankind which technological change has opened up.