Reflections on the Drive to Technological Maturity *

I. Introduction

Having accepted the invitation of the editors of the *BNL Quarterly Review* to reflect on the evolution of my "intellectual developments, theoretical debates, and so on," I was, for a time, puzzled as to how to proceed. The unlikely catalyst proved to be a single sentence written by two respected old friends: [1] "Rostow's book, published in 1960, generalized to all human history and to all the future a model based on the experience of eighteenth- and nineteenth-century Britain, partially repeated by the United States". So far as the intellectual basis for *The Stages of Economic Growth*, its structure and pretensions to universality are concerned, they are quite wrong; and I shall shortly indicate why. But I have not responded to much more extreme and colorful misstatements of my views. As I said in the introduction to the volume of the International Economic Association reporting the 1960 Konstanz conference on the take-off:[2] "As for the take-off, it will have to look after itself... Like all intellectual constructs it will survive only if it meets the hard pragmatic test of usefulness to others — if it illuminates problems that deeply concern them. No market is — or should be — more ruthlessly competitive than the market place for ideas..."

I have replied temperately to critics on a few occasions for sake of the record or because editors or publishers insisted.[3] But I do not, in

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[1] RICHARD E. NEUSTADT and ERNEST R. MAY, *Thinking in Time: The Uses of History for Decision-Makers* (New York; The Free Press, 1986), p. 207.

[2] W. W. Rostow (ed.), *The Economics of Take-off into Sustained Growth* (London: Macmillan, 1963), p. xiii.

[3] For those who may be interested, my responses to critics are to be found (beyond the Konstanz volume) in *The Stages of Economic Growth* (Cambridge: at the University Press, 1971)

fact, believe such defenses much matter. The market for ideas is, indeed, oligopolistic; but over a reasonable period of time I don't think attack or defense (the equivalent of advertising) much affects the elasticity of the demand curve facing a given author.

Thus, the offending sentence generated by my friends on the Charles River triggered this piece not because it stirred me to gladiatorial combat but because it recalled that in my current research and writing one little discussed stage is proving highly relevant to a key phenomenon in the world economy.[4] The neglected stage is the drive to technological maturity.[5] The key phenomenon is the rapidly emerging capacity of the more advanced developing countries to absorb sophisticated industrial technologies and, with the special advantage of lower wage rates, to compete successfully in a widening array of manufactures with the older industrial states of Western Europe, North America, and, increasingly, Japan as well. They are collectively beginning to repeat the process whereby, say, Germany and the United States closed the gap separating them from Britain as of 1815; and Japan closed the gap separating it from Western Europe and the Unites States as of 1955.

In this perspective, the drive to technological maturity has thus moved on to center stage, to a degree replacing with the passage of time and progress the much-discussed take-off. This has happened for two underlying reasons: because most of the population of the developing regions now lives in countries experiencing the drive to technological

(second edition), Appendix B; *The World Economy: History and Prospect* (Austin: University of Texas Press, 1978), pp. 778-77 (note 2); "Development: The Political Economy of the Marshallian Long Period" in Gerald M. Meier and Dudley Seers (eds.), *Pioneers in Development* (New York: Oxford University Press, 1984), pp. 232-237 and 247-249; and my review of ANGUS MADDISON, *Phases of Capitalist Development*, in *The Journal of Economic History*, December 1985, Vol. 45, No. 4, pp. 1027-1028.

[4] I say "little discussed" because a recent study substantially focused on "semi-industrial" countries is much concerned with what I would call the drive to technological maturity. The study is: HOLLIS CHENERY, MOISE SYRQUIN and SCOTT ROBINSON, *Industrialization and Economic Growth* (New York: Oxford University Press, for the World Bank, 1986). BELA BALASSA's, *The Newly Industrializing Countries in the World Economy* (New York: Pergamon Press, 1981) is also focused on specific countries beyond take-off. These valuable studies, however, are primarily concerned with the relative success of export-oriented (if not export-led) growth patterns. Chenery and his colleagues have more to say about the progressive absorption of sophisticated technologies than Balassa; but their method for dealing with the degree of technological absorption in the course of the whole growth transition is highly aggregated; *i.e.*, via the relative scale of "intermediate" industrial production in the structure of GNP.

[5] Characteristics of the drive to technological maturity are defined and illustrated in *The Stages of Economic Growth*,Chapter 5. See also *Politics and the Stages of Growth* (Cambridge: at the University Press, 1971), Chap. 4.

maturity; and because it is in this stage that technological absorptive capacity accelerates and the efficient use of the most modern technology spreads from a few sectors across the whole terrain of industrial and agricultural output and the services. At its close, an economy must normally rely for growth on the flow of new technologies emerging from the global investment sector we call R & D.

I shall begin by responding to our editors' request by briefly recalling the origins and character of *The Stages* analysis, with special attention to the drive to technological maturity; and then suggest briefly the relevance of this stage to three major problems on the world scene: development assistance policy; managing the competition between older and newer industrial societies; and phasing out the Cold War.

II. How *The Stages* came about

I am skeptical that anyone — including the creator — can provide a full and accurate account of how he hit upon a given idea. It's generally a messy, only half rational business. But I am reasonably confident that the following sequence was the framework from which my notion of the stages of economic growth emerged.

The story begins with a kind of informal black market economic theory seminar in 1933-1934, when I was a sophomore, majoring in British history, at Yale. The seminar was conducted on Thursday nights by a talented graduate student, Richard M. Bissell Jr., fresh from a year at LSE. (As I recall, this meant we read Wicksteed as well as Marshall.) I was one of Bissell's four students. He was one of the most gifted expositors I have ever known, presenting to us the bone structure of both micro- and macro-theory, a good deal of it in mathematical terms.

Before the year was out, I decided, aged seventeen, to devote my professional life to combining history with economic theory in two senses: using economic theory systematically both to illuminate economic history and to explore the complex interactions of the economy with the non-economic sectors of society. And this is what I have tried to do ever since.

I set to work immediately on the British economy and British society of the nineteenth century. By the time I had completed my

doctoral thesis (formally 1940, in fact 1939) I had concluded that neither British growth nor fluctuations could be explained without introducing the large forces at work in the world economy, including the interaction of British growth with growth in other countries. When I came, after the Second World War, to publish my first book, I stated the proposition as follows: [6]

> "Much of Britain's investment was foreign investment, related to development on distant continents, in which Britain participated, but which British initiative did not wholly determine. And the course of events at home, in other respects as well, derived in part from forces generated abroad. The fluctuations and trends in Britain were shared, with variations, by most other areas in the world. It is likely that the optimum unit for the study of economic history is not the nation, but the whole inter-related trading area..."

While teaching at Cambridge, England, 1949-1950, and preparing to settle down as an economic historian in the United States, I began to work out a way to make good that vision; that is, to capture the interplay between the forces of national development and those generated in the world outside. Two conclusions emerged: the task required the study of certain pervasive international phenomena (*e.g.*, cycles, prices of major commodities which enter in international trade on a large scale, the impact of wars); and, equally, it required a method for analyzing the stories of national growth. It was in contemplating the latter requirement that I decided I had to formulate my own theory of economic growth — a process carried forward by a memorable discussion with D. H. Robertson.[7]

I had also concluded by that time that conventional economic theory suffered from four weaknesses which rendered it grossly inadequate as a framework for studying and teaching the history of the world economy as it had evolved since the mid-eighteenth century. First, it could not accommodate within its structure the process by which major new production functions were generated and diffused. It provided no credible linkage between science, invention, and the production process. And there is no way a serious economic historian can accept the evasions which seem to have satisfied a good many theorists; for example, to render innovation exogenous or embody it in gross investment; or to treat it as an incremental consequence of widening the

[6] *Essays on the British Economy of the Nineteenth Century* (Oxford; at the Clarendon Press, 1948), pp. 12-13.

[7] For reference to my discussion with D. H. Robertson, see *The Process of Economic Growth* (Oxford: at the Clarendon Press, 1953, 1960), pp. 5-7.

market or learning by doing; or to bury it in the "residual", or the marginal capital-output ratio, or "intermediate production". Second, mainstream theory provided no credible explanation for trend periods, longer than conventional business cycles, in the prices of basic commodities relative to manufactures. Third, it provided no credible linkage of conventional business cycles to the process of growth. For a historian it is palpable that cycles are simply the form growth historically assumed. The separation of cycle and trend, of the Marshallian short from the long period, is an act of intellectual violence that cuts out the heart of the problem of both cycles and growth. But it will be recalled that 1950 was a time when mainstream business cycle theorists were ringing the changes on the interaction of the multiplier and the accelerator, thereby effectively separating growth from cycles, relegating innovation to exogenous investment.[8] Fourth, contemporary economic theory provided no mechanism for introducing non-economic factors into the analysis of economic growth when it was quite clear that economic growth — notably in its early phases but, in fact, throughout — could not be understood except in terms of the dynamics of whole societies.

Thus, as I began teaching the history of the modern world economy at M.I.T. in September 1950, I worked simultaneously on *The Process of Economic Growth*, which, among other things, tried to remedy these weaknesses. That study has remained the theoretical framework for my work in historical and contemporary economic analysis down to *The World Economy: History and Prospect* and beyond.

The first modest, unnoticed appearance of the take-off was in *The Process*, first published in 1952.[9] The take-off arose as an inescapable discontinuity from my own research and the papers of my seminar students, as together we turned around in our hands the stories not simply of Britain and the United States, but also of Belgium and France, Germany and Japan, Sweden, Russia, and Italy, Argentina, Brazil, Mexico, Turkey, Canada, Australia, and others. The discontinuity was inescapable because I began with the proposition that modern economic growth resulted from the generation and efficient absorption of increasingly sophisticated technologies. And if one studies the introduction into the economy of new technologies, one must disaggregate down to the level of the sectors (sometimes even to particular factories) where

[8] For my reaction at the time to mainstream cyclical analysis of the period, see "Some Notes on Mr. Hicks and History", *American Economic Review*, Vol. XLI, No. 3, June 1951, pp. 312-324.

[9] *The Process of Economic Growth* (Oxford: at the Clarendon Press, 1953), pp. 17, 71, 103-108.

the new technologies are introduced. The discontinuity induced in those sectors — and related sectors — by the absorption of new technologies is then obvious; and it is quite possible to trace out in rough approximation at least the consequences for the aggregate performance of the economy induced by these multiple linkages.

Parenthetically, I would note that modern economic theory has focused on either the firm or the national economy; and it has not successfully linked micro- to macro-analysis. That is, in part, because it had no place in its formal structure for the analysis of sectors. Alfred Marshall wrestled with, but never solved, the problem with his representative firm and other devices. As an examination of any contemporary mainstream economic textbook reveals, modern economists generally ignore the problem. Behind this evasion is, explicitly or implicitly, the assumption of a Walrasian equilibrium in which, with technology and other Marshallian long period factors fixed, labor and capital yield equal marginal returns in all uses. Indeed, with such assumptions, why bother with sectors?

Dynamic growth analysis, embracing the generation and absorption of new technologies, requires the sectors because it is in the sectors that the dynamism initially occurs, altering the marginal rates of return in substantial segments of the economy and, therefore, patterns of investment, the allocation of labor, and other structural and institutional characteristics of the economy. That is why serious economic history is full of sectoral analysis for which there is no counterpart in mainstream economic theory where, via micro- and macro-theory, we blithely take our students from "one side of the moon — [to] the other without knowing what route or journey connects them...". [10]

In any case, my seminar students and I went about our business in the early 1950s by trying to link technological, sectoral, and aggregate analysis as we examined growth patterns, case by case. If any one country in this initial array of case studies was of particular importance, it was neither Britain nor the United States. It was Japan. Here was a nation rooted in a wholly non-western culture whose movement through the pre-conditions and take-off could be analyzed within precisely the same framework — by answering the same matrix of questions — as the nations of the West. After Japan, the major Latin American countries and Turkey which entered take-off in the 1930s were most illuminating.

[10] J. M. KEYNES, *General Theory* (New York: Harcourt Brace, 1936) p. 292.

By 1955, having conducted projects and written books on Russia, China, and U.S. policy towards Asia while teaching economic history,[11] and having worked over the concept for five years in my seminar and applied it — and seen it applied by my students to many countries — I was ready to write an article on "The Take-off into Self-Sustained Growth".[12]

III. The drive to technological maturity emerges

Up to this point I did not attempt to distinguish any stages beyond take-off and the arrival of self-sustained growth. This, for example, is the formulation in the 1956 *Economic Journal* article: [13]

> "...The sequence of economic development is taken to consist of three periods: a long period (up to a century or, conceiveably, more) when the preconditions for take-off are established; the take-off itself, defined within two or three decades; and a long period when growth becomes normal and relatively automatic. These three divisions would, of course, not exclude the possibility of growth giving way to secular stagnation or decline in the long term".

But as I worked forward with my seminar students, two further definable stages emerged within the general rubric of self-sustained growth; the drive to technological maturity and high mass consumption. The former was defined as follows in *The Stages* (1960):[14]

> "After take-off there follows a long interval of sustained if fluctuating progress, as the now regularly growing economy drives to extend modern technology over the whole front of its economic activity. Some 10-20% of the national income is steadily invested, permitting output regularly to outstrip the increase in population. The make-up of the economy changes unceasingly as technique improves, new industries accelerate, older industries level off. The economy finds its place in the international economy: goods formerly imported are produced at home; new import requirements develop, and new

[11] These enterprises yielded *The Dynamics of Soviet Society* (New York: W. W. Norton, 1953, 1967); *The Prospects for Communist China* (New York: Technology Press, M.I.T., John Wiley, 1954); and *An American Policy in Asia* (New York: Technology Press, M.I.T., John Wiley, 1955).
[12] *Economic Journal*, Vol. 66, February 1956, pp. 25-48.
[13] *Ibid.*, p. 27.
[14] *Stages of Economic Growth*, p. 9.

> export commodities to match them. The society makes such terms as it will with the requirements of modern efficient production, balancing off the new against the older values and institutions, or revising the latter in such ways as to support rather than to retard the growth process.
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> "Some sixty years after take-off begins (say, forty years after the end of take-off) what may be called maturity is generally attained."

The essentially non-economic process behind this stage, permitting it to happen, is the build-up within the society of scientists and engineers, workers and entrepreneurs, foremen and managers, capable of absorbing — and motivated to absorb — the backlog of relevant, hitherto unapplied technologies. This implies not only an extension of education at every level and the emergence of a wide range of modernized institutions, but also a succession of generations each born into and taking for granted a technologically more sophisticated world. The upshot is the progressive diffusion, beyond the relatively few leading sectors of take-off (quite often confined to one or a few regions), of modern attitudes and motivations as well as modern technologies. The emphasis on the process by which the expanding backlog of technologies comes to be absorbed should be contrasted with the virtually universal assumption of mainstream economics that all profitable inventions are incorporated into the capital stock as innovations and, therefore, no technological backlog exists. Moreover, since neo-classical economics assumes that net value product is equated at the margin in all uses, it is quite unnecessary to consider the allocation of investment resources as opposed to the aggregate proportion of GNP invested and the over-all marginal capital-output ratio.

In the three academic years beginning in September 1955, as I elaborated and refined the processes beyond take-off, I directed a project and wrote a rather long book focused on the interplay of American domestic life and foreign policy.[15] It included a substantial introductory historical section covering that interplay from the beginning of the American republic to 1940. As I noted in the preface to *The United States in the World Arena*, it was my wife who suggested that I use the emerging, refined version of the stages of economic growth to help frame the analysis. (The other two concepts used for that purpose were the national style and the national interest.) *The Arena* went off to the publisher in August 1958; and we left for a sabbatical year in Cambridge, England.

[15] *The United States in the World Arena* (New York: Harper and Row, 1960).

It was initially my intention to use the year to begin writing a two-volume book on the stages of economic growth, embracing the full historical and contemporary evidence then available bearing on the concept; but I agreed to a request of the Cambridge economics faculty that I deliver eight lectures to undergraduates in the Michaelmas term of 1958 on "The Process of Industrialization" and packed what I had to say about the stages into those lectures. Since I wrote them during each week in a small office in the tower above the Marshall Library, for delivery on Friday mornings, they were rather fresh — a fact, I think, appreciated by students, who are shrewd in these matters.

After an interval in public service (1961-1969), I returned to academic life, resumed in Austin my seminar on the history of the world economy, refining along the way my theory of economic growth and its various components, including the stages.

So far as the drive to technological maturity is concerned, those refinements can be tersely summarized as follows:

— The identification of the political and social problems which typically characterize the drive to technological maturity (and other stages).[16]

— The demonstration, from post-1945 experience, that the drive to technological maturity, typically requiring about forty years beyond take-off in the pre-World War Two era, could be transitted more briskly under appropriate conditions.[17]

— Confirmation from improved historical and cross-sectional statistical data that a sharp rise in the proportion of GNP invested occurred during take-off and a further rise in the drive to technological maturity after which the investment rate tended to level off.[18]

— Evidence from improved historical and cross-sectional statistical data that the drive to technological maturity was typically the stage characterized by the maximum rate of growth.[19]

[16] *Politics and the Stages of Growth*, pp. 98-183 and 196-218.

[17] See, for example, the extraordinary rates of technology absorption and growth of Taiwan and South Korea in Chapters 45 and 47 of my *World Economy: History and Prospect*.

[18] See, *ibid.*, p. 55-59, and my *Why the Poor Get Richer and the Rich Slow Down* (Austin: University of Texas Press, 1980), pp. 275-288.

[19] *Why the Poor*, etc., Chapter 6 as a whole.

IV. Defining stages: GNP *per capita* versus technological virtuosity

Before turning to the contemporary relevance of the drive to technological maturity, it may be useful to compare briefly how stages of economic growth have come to be defined by the World Bank, by Kuznets and his followers, and by me.

The World Bank uses as its over-ridding criterion GNP *per capita* in constant U.S. dollars.[20] It then arrays nations as "low income", "lower middle income", "upper middle income", "industrial market economies". Aware that this criterion involves some important anomalies, the Bank provides some corrective calculations and categories. For example:

— Calculations are presented indicating how GNP *per capita* would vary if purchasing power parity rather than exchange rates were used in making the conversion from local currencies into U.S. dollars.

— For unexplained reasons China and India are lumped together in a separate category as well as arrayed with other "low income economies". In my view, the separation is legitimate because these two most populous nations in the world combine vast low income rural sectors with some of the most technologically sophisticated industrial sectors in the developing world.

— Oil exporters and importers are averaged separately as well as among "middle-income economies". This is presumably because the World Bank is conscious that, depending on the oil price, an oil export or import position can distort the implied linkage between GNP *per capita* and stage of development. "High income oil exporters" are also separated out to distinguish them from poorer developing countries which export oil (*e.g.* Nigeria, Indonesia).

— "East European Non Market Economies" are separately presented because of dollar conversion and more general data difficulties.

Kuznets, in his apparently head-on, across-the-board clash with my concept of take-off at Konstanz, argued rather modestly in the end that

[20] See Table 1 and relevant notes in 1980's edition of World Bank's *World Development Reports*.

the data were simply not sufficient as of 1960 to validate the assumed course of the investment rate and that the concept of entrance into the "early phase of modern growth" was a better designation than "take-off".[21]

But an important difference did exist between us. It lay in his insistence on measuring the critical transition primarily in terms of a sustained rise in income *per capita* and a shift of labor out of agriculture *versus* my insistence that such aggregate movements reflected a deeper process which required explicit analysis; *i.e.*, the absorption of new technologies in particular sectors which, along with their multiple linkages, accounted for the structural changes Kuznets used to identify modern economic growth.[22] Here is Kuznets' summary statement of his criteria.[23]

> "Let us begin by agreeing that modern economic growth displays certain observable and measurable characteristics, which in combination are distinctive to it, i.e., were not evident in earlier economic epochs... What these characteristics are is a matter for discussion; but I believe that agreement could easily be reached on some of them, e.g., those relating to rates of growth of national product, total and *per capita*, and to structural shifts that commonly accompany them. Let us assume for purposes of illustration that identification of such growth requires a minimum rise in *per capita* income sustained over a period of at least two or three decades, a minimum shift away from agriculture, and any other identifiable indispensable components of modern economic growth that we may specify".

Later Kuznets used the single criterion of accelerated urbanization to date "the beginning of modern growth" emerging with dates virtually identical with my dates for the beginning of take-off.[24]

[21] W. W. Rostow (ed.), *The Economics of Take-off Into Sustained Growth*, p. 43. In his 1971 *Economic Growth of Nations: Total Output and Production Structure* (Cambridge, Mass.: The Belknap Press of the Harvard University Press), pp. 61-69, Kuznets quietly capitulated to the Rosenstein Rodan-Arthur Lewis-Rostow view. He concluded that the net domestic capital formation proportion rose "from about 5 or 6 percent at the beginning of the modern growth process" to a "characteristic" 15 percent as a peak terminal value (pp. 64-65).

[22] Here is how I compared Kuznets' full criteria for modern growth *versus* my criteria for take-off in *The World Economy: History and Prospect* (p. 778 n. 2):

"Kuznets' full criteria for modern growth are: the application of modern scientific thought and technology to industry; a sustained and rapid increase in real product per capita, usually associated with high rates of population growth; a shift of the working force out of agriculture to industry and services; significant contacts with the outside world. My view of what lies at the heart of take-off and the beginning of modern growth is the effective absorption of a limited range of modern technologies, yielding a high rate of expansion and significant scale in an identified leading sector complex, with evidence of spreading effects, bringing about in the usual case an acceleration of increase in GNP per capita, a rise in the investment rate, and an acceleration of the pace of urbanization. I regard accelerated urbanization as evidence of the 'lateral spreading effects' of leading sectors".

[23] *Economics of Take-off*, p. 42.

[24] *World Economy: History and Prospect*, pp. 778-779, where sources are indicated and minor discrepancies between Kuznets' dates and mine discussed.

Kuznets himself did not define stages beyond the beginning of modern growth; but Ohkawa and Rosovsky, in an evidently Kuznetsian spirit, arrayed three phases of modern growth in Japan in a fashion easily reconciled with my stages, the dating being, for all intents and purposes, identical.[25]

The primary criterion for defining my stages of growth, up to the stage of high mass consumption (which is a joint product of the level of consumption *per capita* and the income elasticity of demand), is the degree to which an economy has or has not absorbed efficiently the pool of then existing technology relevant to its natural resource base and the sectoral structure of its economy.

OHKAWA-ROSOVSKY	W.W. R. STAGES OF GROWTH
A. *The First Modern Phase of Modern Economic Growth, 1868-1905*	
I. Transition, 1868-1885	Pre-conditions for take-off (late period)
II. Initial Modern Economic Growth, 1886-1905	Take-off
B. *The Second Phase of Modern Economic Growth, 1906-52*	
III. Differential Structure: Creation, 1906-30	Drive to technological maturity (choice of military option;
IV. Differential Structure: Economic and Political Consequences, 1931-52	postwar recovery; completion technological maturity on civil basis)
C. *The Third Phase of Modern Economic Growth, 1953-present*	High mass-consumption

Thus, the difference between Kuznets' approach to growth measurement and mine is simple enough. Kuznets and I wholly agreed that the systematic application of science and technology to specific sectors was the basis for the sustained rise in real income *per capita* and structural change that distinguished modern growth from all previous history. By his own description, "frustrated" by the difficulties of measuring formally the generation and sectoral diffusion of technology, he settled

[25] KAZUSHI OHKAWA and HENRY ROSOVSKY, "A Century of Japanese Economic Growth," in W. W. Lockwood, *The State and Economic Entreprise in Japan* (Princeton: Princeton University Press, 1965), pp. 52-53.The comparison of the two sets of stages is presented and discussed in my *Politics and the Stages of Growth*, pp. 378-379.

for GNP *per capita* and structural change, notably under the highly aggregated headings of primary, secondary, and service sectors.[26]

Although Chenery has refined these categories somewhat and, especially, characterized growth patterns according to the development strategy pursued, he has generally dealt with technological absorption on a highly aggregated structural basis.

Using statistical and other data, I have preferred to deal with the evolution of national economies by disaggregating down to the sectors in which the major technologies are actually introduced and then linking sectoral to aggregate national income analysis and structural change. In effect, Part Five of my *World Economy: History and Prospect*, covering the history of twenty countries, containing about two-thirds of the world's population, generating perhaps 80 percent of global product, is a sustained exercise in that method. This disaggregated approach, coming to rest on the rapidly changing pool of existing technologies, is, I believe, highly relevant to the three contemporary issues to which we now turn.

V. Implications for international development policy

The first of these issues is development policy. It arises because, as noted earlier, most of the population of the developing regions lives in countries experiencing the drive to technological maturity. By the method of identification I applied in *The World Economy*, this group includes China and India; the major countries of Latin America, a considerable group of countries in the Pacific Basin (*e.g.*, Taiwan and South Korea); Turkey and, potentially, some other countries of the Middle East now caught up in the tragic pathology of the region.

This is a quite different state of affairs than in the 1950s when a good deal of development thought and policy was generated and, to a degree, institutionalized. Then most of the developing world (including

[26] For discussions of Kuznets' dilemma and his acknowledgment of it, see, for example, my review of his *Economic Growth of Nations: Total Output and Production Structure* (Cambridge, Mass.: The Belknap Press of Harvard University Press, 1971), in *Political Science Quarterly*, Vol. LXXXVI, No. 4, December 1971, pp. 654-657. Kuznets' discussion of the problem is on pp. 314-343.

China and India) was struggling to get into take-off, moving through, or completing that phase. Under heavy pressure from relatively falling export prices for basic commodities after 1951, some of the Latin American countries were also experiencing rapid deceleration in their leading sectors of take-off. They were, it turned out, in a rather painful transition to the more diversified and sophisticated technologies and sectors of the drive to technology maturity, a fact which became apparent in the 1960s. Turkey was in a similar transition.

In his engaging Presidential Address delivered at the meeting of the American Economic Association in December 1983, W. Arthur Lewis cited the following "list of new models invented by development economists of the 1950s and 1960s":[27]

Two-gap model	dependency
unbalanced growth	indicative planning
vent for surplus	appropriate technology
Dutch disease	big push
dual economy	growth pole
disguised unemployment	rising savings ratio
structural inflation	low-level equilibrium trap

Almost all of these concepts arose from analyses of countries struggling to move from what I would call the pre-conditions for take-off into the take-off or to make the transition from take-off into the drive to technological maturity. After that transition, one hoped, they could rely increasingly on private international capital markets, rather than official aid, to supplement capital formation from domestic sources. And to a significant degree that has happened.

The developing world can now be roughly split between countries in or beyond take-off and those often hard cases which have not yet entered take-off; and this fact is, indeed, reflected in the increasing reliance of the former group on private rather than official capital imports.[28]

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[27] W. ARTHUR LEWIS, "The State of Development Theory", *American Economic Review*, Vol. 74, Number 1, March 1984, p. 3.

[28] For a full discussion of the changing structure of the international capital accounts of developing countries, see, especially, *World Development Report, 1985* (New York: Oxford Press for the World Bank, 1985). Virtually the full text is devoted to the evolution of foreign borrowing, repayment, rollovers, etc.

The shift of the more advanced developing nations to private capital markets has not, of course, ended the need for formulating international development policies towards them. Immediate problems posed for such nations by excessive debts, slow OECD growth, high OECD unemployment, and the consequent rise of protectionism are all on the agenda and by no means resolved. Before the debt burden is somehow lifted and rapid growth resumed in the more advanced developing nations (with important advantages to the OECD countries) large additional official as well as private aid transfers will be required; although higher OECD growth rates and lower interest rates combined with liberal trading arrangements would do just as well in most cases.

We shall return to OECD relations with developing countries in the drive to technological maturity in dealing with the second issue of policy identified in this paper. Before doing so, I would note one problem of domestic development policy which has risen autonomously in more advanced developing countries in every region; *i.e.*, the need to shift the balance in the economy from the state to the private sector, from planning to market.

The existence of excessively large public sectors resulted from the convergence of technical economic and political forces and certain strongly held attitudes in the developing countries of the 1950s.

On the economic side, there was the pattern, set for some in the 1930s by the inability to earn or borrow, at tolerable rates, sufficient foreign exchange to avoid highly protectionist import substitution policies. These led directly to insufficient competition in domestic markets, idle industrial capacity, damping the entrepreneurial quality of both the private and public sectors. Foreign exchange rationing was also a policy that required large powerful bureaucracies to decide what should be imported. In many countries that process was the heart of what passed for "planning". On the political side there was the fear of explosions in the volatile cities and a decision, in effect, to exploit the farmer on behalf of the urban population. This had, of course, the effect of reducing incentives in the agricultural sector and slowing the rate of increase of agricultural production, forcing increased grain imports at the expense of manufactured good imports required for industrial development.

With respect to attitudes, the 1950s were times when, on balance, capitalism was an unpopular word, socialism a popular word among the educated élite in the developing regions. Capitalism was associated with colonial or quasi-colonial status, representing an intrusive external

power. There was also considerable sentimental appeal in socialism during the 1950s: some of the European social democratic governments were doing quite well; Mao's Great Leap forward and Chinese Communist policy in general generated a considerable appeal among those who did not investigate it too deeply; and even Khrushchev's boast that the U.S.S.R. would soon outstrip the U.S. in total output had a certain credibility in the late 1950s. To all this one can add that many of the emerging political leaders were intellectuals or soldiers, both types inherently suspicious of the market process and inclined, for different reasons, to have excessive faith in the powers of government administration.

Obviously, the answer now is not and should not be a compulsive Friedmanesque reliance on the market process. But the time has come to examine afresh and skeptically the accumulated economic functions of government, and to strike new balances between the public and private sectors — balances which would exploit the potentialities of private enterprise and competitive markets a good deal more than they are exploited at present.

The drive to technological maturity is peculiarly relevant to the public-private sector balance because public authorities have proved everywhere clumsy and inefficient in trying to manage the production of the increasingly diversified manufactures which characterize the drive to technological maturity; and, much more than was the case a generation ago, the private entrepreneurs now exist in the developing world capable of producing diversified industrial products competitively for world markets.

Although this complex and rather sophisticated set of problems confronts a good many countries in the drive to technological maturity, others have still not moved into take-off. Indeed, some of these, notably in Africa, have regressed in terms of real income *per capita* in recent years.

Their plight was made vivid by a question put to me by an African agricultural technician attending an international center in India where I spoke in 1983. He said in effect: "Many African countries became independent twenty years ago but have not entered take-off. What's wrong with your theory?" When laughter had subsided I discussed the wide range of mainly non-economic forces which have historically determined the length of the period I call the pre-conditions for take-off; short for Japan (32 years from Commodore Perry's arrival, only 17 from the Meiji Restoration); long for China (110 years from the

Opium Wars), even longer for Mexico (120 years from independence). Evidently no uniform time period could be defined for developing the pre-conditions for take-off. I concluded that, basically, the people of each country, suffused with their respective cultural, social, and political heritages, would determine if, when, and how their entrance into sustained growth would begin; each case would be different; but the advanced countries — especially their development economists — owed the lagging aspirants more thought and attention than they had been thus far given plus a good deal of patience. The African heritage, including arbitrary boundaries derived from colonial history, was likely to make the interval between independence and take-off rather long but, I would guess, less than for China or Mexico.

By definition, the problems the Africans confront are extremely difficult. If not, they would have long since been solved given the aspirations of the people, the efforts of many dedicated men and women on the spot, and almost forty years of sustained international political and social science attention to development.

These laggard cases, of course, transcend Africa. At one end of old Hispaniola is the Dominican Republic whose political and economic progress since 1965 far exceeds the visions of the greatest optimists, of whom there were few; at the other end, Haiti. There are the two Yemens, Burma, and Bangladesh. And, intellectually as challenging as any, the Pacific Islands, some of which are even denied tourism by their geography.

A part of the challenge posed by these hard cases is that our profession cannot usefully come to grips with them unless we economists are willing to make cultural, social, and political factors — as well as history — a living part of our analyses. We paid a price in our studies of and prescriptions for more advanced developing countries when we set these factors aside, as we have often done. But still we could find areas of usefulness. This is much less likely to be the case in analyses of the pre-conditions for take-off.[29]

But my point here is that the emergence of a large part of the developing world into the drive to technological maturity has dramatized the wide range of countries we have traditionally included in the rubric "developing." *The World Development Report, 1986* records

[29] The reader of Part Five of my *World Economy*, providing short economic histories of twenty countries plus stages of growth identifications, will note the disproportionate amount of space allocated to the pre-conditions period and the inevitably large part played by non-economic factors in the argument.

among countries called "developing" a GNP *per capita* range from $ 110 (1984) *per annum* (Ethiopia) to $ 7,260 (Singapore). (This range of 1/66 compares to a range of less than 1/4 among "industrial market economies".) The average for "low income" developing countries is $ 260; for "upper middle income", $ 1,950. Clearly, in dealing with a spectrum of this sweep a uniform "development economics" does not suffice. Shiva Naipaul wrote: "To blandly subsume, say, Ethiopia, India, and Brazil under the one banner of Third Worldhood is as absurd and as denigrating as the old assertion that all Chinese look alike. People only look alike when you can't be bothered to look at them too closely".[30]

So far as development aid policy is concerned, the major conclusion is that, while each country, like each student or doctor's patient is unique, we need, broadly, two types of policy: one addressed to pre-take-off countries, the other to countries in the drive to technological maturity, a subject to which we now turn.

VI. Broad implications of the contemporary drive to technological maturity for OECD relations with developing regions

My second proposition is that the developing countries now in the drive to technological maturity are destined to be at once a major source of trade and growth for the OECD world and a major challenge to its primacy. This is because they can be expected to experience their maximum growth rates; and these are almost certain to be higher than those in OECD. These countries are also moving quickly into a position where they will be able to absorb the technologies of the Fourth Industrial Revolution (micro-electronics, genetic engineering, etc.). This is, in one sense, repetition of an old story. Britain, for example, experienced a mixture of economic opportunities and strains as the United States, Belgium, Germany, France, and Italy acquired the technologies of the Second Industrial Revolution (railroads, steel, etc.). The Atlantic world as a whole confronted a similar adjustment when Japan and Russia acquired those of the Third (electricity, internal combustion, chemicals, etc.). Now the whole of the industrial North confronts in the decades ahead a parallel challenge as the more

[30] SHIVA NAIPAUL, *An Unfinished Journey* (London: Hamish Hamilton, 1986), pp. 34-35.

advanced countries of Latin America (led by Brazil), of the Pacific Basin (including China), plus India, having pretty well caught up with the first three industrial revolutions, acquire the fourth.

This proposition requires a bit of elaboration. First, then, growth rates. Table 1 and Chart 1 exhibit the behavior of growth rates *per capita* in relation to real income levels (and roughly equivalent stages of growth) for the period 1960-1970. Historical sequences of growth rates exhibit similar patterns of rise and subsidence with the growth rate surge of 1950-1972 something of an explicable exception in the OECD world.[31]

The reason for the peak growth rates during the drive to technological maturity is, as suggested earlier, that the progressive expansion in the size and quality of the cadres of entrepreneurs, engineers, foremen, skilled workers, etc. increases the society's capacity to absorb rapidly the backlog of unapplied technologies. That accelerated absorption elevates growth rates in the affected sectors and those linked to them. The investment rate rises not because the savings rate rises with the rise in average income *per capita*, as the generalized Keynesian consumption function suggests, but because profits rise in the new, more sophisticated, fast-moving leading sectors; and a high proportion of profits are ploughed back by ebullient entrepreneurs. Thus, as I have argued since the 1956 *Take-off* article, rising investment rates are substantially a result of accelerated growth *via* the absorption of new technologies in key sectors, rather than its initiating cause.[32]

The question then arises: Are the more advanced developing countries likely to be able to absorb and apply efficiently the technologies of the Fourth Industrial Revolution?

These technologies have four distinctive characteristics: they are closely linked to areas of basic science also undergoing revolutionary change; they are galvanizing the old basic industries as well as agriculture, forestry, animal husbandry, and the whole range of services; they are immediately relevant to developing countries to a degree depending on their stage of growth; and they are each so diversified that no single country is likely to dominate them as, for example, Britain

[31] For a full discussion, see my *Why the Poor Get Richer and the Rich Slow Down*, Chapter 6, "Growth Rates at Different Levels of Income and Stage of Growth". The accumulation during the depressed inter-war years and the Second World War of unapplied technologies makes the acceleration of growth rates for post-1945 Western Europe and Japan somewhat less of an exception than at first appears.

[32] For further discussion, see *ibid.*, especially pp. 275-288. Also, *Pioneers in Development*, pp. 232-237 and 247-249.

TABLE 1

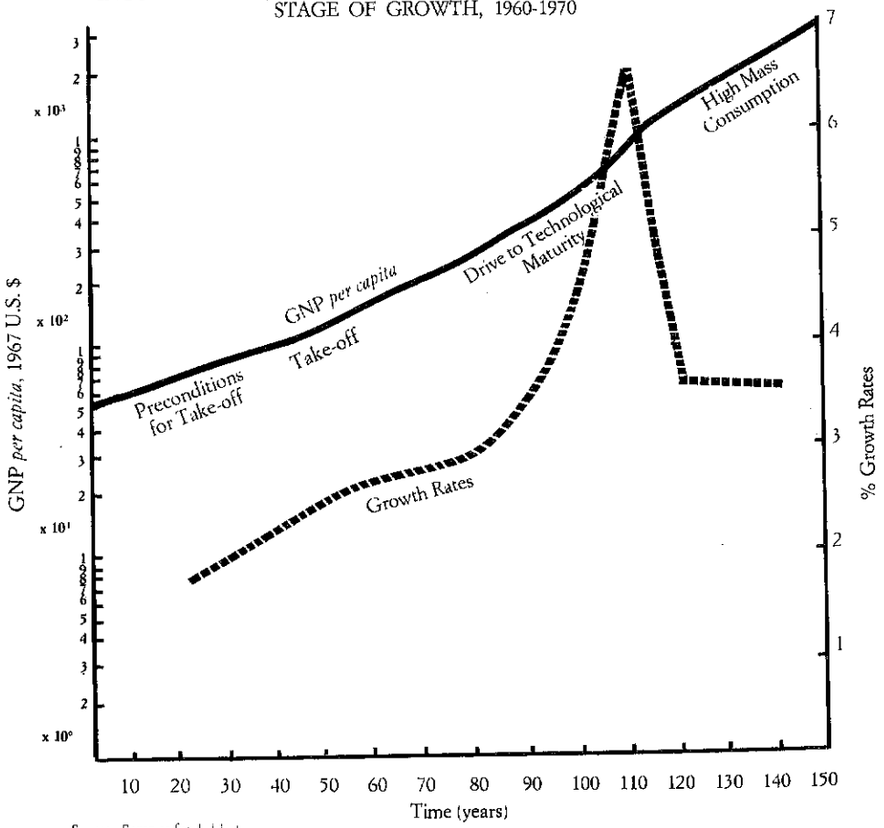
INCOME LEVELS AND GROWTH RATES, 1960-1970

	Population 1967 (millions)	GNP *per capita* 1967 US $	Average Annual Growth Rate 1960-1970	Approximate Stage of Growth
		$	%	
United States	199	3,670	3-2	High Mass Consumption
Group 1 ($ 1,750 - $ 3,670)	307	3,120	3-4	
Group 2 ($ 1,000 - $ 1,750)	238	1,490	3-5	
Group 3 ($ 700 - $ 1,000)	444	930	6-5	Drive to Technological Maturity
Group 4 ($ 400 - $ 700)	161	550	4-4	
Group 5 ($ 200 - $ 400)	299	270	2-9	
Group 6 ($ 100 - $ 200)	376	130	2-6	Take-off
Group 7 ($ 50 - $ 100)	1,580	90	1-7	Pre-conditions
World	3,391	610	3-2	

Source: THORKIL KRISTENSEN, *Development in Rich and Poor Countries* (New York, 1974), pp. 156-9. Stages added by W. W. R.

CHART 1

INCOME LEVELS, ANNUAL GROWTH RATES, AND APPROXIMATE STAGE OF GROWTH, 1960-1970



Source: Same as for Table 1

Note: The US price level (GNP deflator) increased by approximately 3 times between 1967 and the third quarter of 1986.

dominated the early stage of cotton textiles and the United States the early stage of the mass produced automobile.

Meanwhile, the developing regions have been mounting a human revolution of their own. Over-all, the proportion of the population aged 20-24 enrolled in higher education in what the World Bank calls "lower middle income" countries rose from 3 to 10% between 1960 and 1982; for "upper middle income" countries the increase was from 4 to 14%. The increase in India, with low income *per capita* but a vital educational system, was from 3 to 9%. For Brazil, fated to be a major actor in this drama, the increase from 1965 to 1982 was from 2 to 12%. To understand the meaning of these figures it should be recalled that in 1960 the proportion for the U.K. was 9%, for Japan 10%.

There has been, moreover, a radical shift towards science and engineering. In India, for example, the pool of scientists and engineers has increased from about 190,000 in 1960 to 2.4 million in 1984 — a critical mass only exceeded in the United States and the Soviet Union. In Mexico, for example, the annual average increase in Mexican graduates in natural science was about 3%, in engineering 5%, in the period 1957 to 1973. From 1973 to 1981 the comparable figures were 14% to 24%, respectively — an astonishing almost five-fold acceleration.

Even discounting for problems of educational quality, the potential absorptive capacity for the new technologies in the more advanced developing countries is high. Their central problem — like that of most advanced industrial countries — is how to make effective the increasingly abundant scientific and engineering skills they already command. This requires, in turn, an ability to generate and maintain effective, flexible, interactive partnerships among scientists, engineers, entrepreneurs, and the working force.

I would guess that, despite current vicissitudes, the developing countries of the Pacific Basin (including China), India, and those containing most of the population of Latin America will absorb the new technologies and move rapidly forward over the next several generations. Much the same would happen, I believe, if the Middle East could find its way from its chronic, tragic bloodletting to a twentieth century version of the Treaty of Westphalia.

Thus, if my view of what lies ahead is broadly correct, and the late-comers continue to gain ground, the world economy and policy face an adjustment familiar in character but unprecedented in scale. The advanced industrial countries (including the U.S.S.R. and Eastern

Europe) now constitute about 1.1, billion people, or, say, 24% of the world's population. At least 2.6 billion people, or about 56%, live in countries which will, I would guess, acquire technological virtuosity within the next half century. Moreover, population, in the decades ahead, will increase more rapidly in the latter than the former group. We are talking about a great historical transformation.

The phenomenon of poor countries catching up with the rich goes back, in fact, at least three centuries from, say, the rise of Britain relative to the initially more advanced Netherlands and France. But the dynamics of the process has attracted less attention than it deserves.

David Hume was, at once, the first analyst of what has been called the rich country-poor country problem and the most eloquent advocate of reconciliation rather than confrontation.[33]

> "It ought... to be considered, that, by the encrease of the industry among the neighbouring nations, the consumption of every particular species of commodity is also encreased; and though foreign manufactures interfere with them in the market, the demand for their product may still continue, or even encrease. And should it diminish, ought the consequence to be esteemed so fatal? If the spirit of industry be preserved, it may easily be diverted from one branch to another; and the manufacturers of wool, for instance, be employed in linen, silk, iron, or any other commodities, for which there appears to be a demand. We need not apprehend, that all the objects of industry will be exhausted, or that our manufacturers, while they remain on an equal footing with those of our neighbours, will be in danger of wanting employment. The emulation among rival nations serves rather to keep industry alive in all of them.... I shall therefore venture to acknowledge, that, not only as a man, but as a British subject, I pray for the flourishing commerce of Germany, Spain, Italy and even France itself. I am at least certain, that Great Britain, and all those nations, would flourish more, did their sovereigns and ministers adopt such enlarged and benevolent sentiments towards each other....
>
> "Nor needs any state entertain apprehensions, that their neighbours will improve to such a degree in every art and manufacture, as to have no demand for them. Nature, by giving a diversity of geniuses, climates, and soils, to different nations, has secured their mutual intercourse and commerce, as long as they all remain industrious and civilized."

[33] *David Hume Writings in Economics*, edited and with an introduction by Eugene Rotwein (Madison: University of Wisconsin Press, 1955), pp. 79-82. For an account of Hume's and other views, see, especially, ISTVAN HONT, "The 'rich country-poor country' debate in Scottish classical political economy", Chapter 11 in Istvan Hont and Michael Ignatieff (eds.), *Wealth and Virtue: The Shaping of Political Economy in the Scottish Enlightenment* (Cambridge: at the University Press, 1983).

Hume's elaboration of his argument came to rest on two propositions for the short and medium run:

a) the composition of trade would change, but the rich country should benefit in an open trading system from the two-way expansion of trade with the up-and-coming poor country; but

b) to cope with the inevitably increased competition in certain sectors, the rich country would have to adjust its output and use of resources, exploiting its advantages in "the mechanic arts", transport facilities, banking institutions, etc.

In the long run, Hume granted that economic leadership might prove transient; but he regarded that proposition as part of a philosophy of history rather than a guide to current policy.

Adam Smith's position on the rich country-poor country problem was close to Hume's but not identical.

1. A rich country had a number of inherent advantages over a poor country which ought to permit it to retain its lead, barring failure to conduct correct policies.

2. Despite higher real wage rates, these advantages included lower unit labor costs, resulting from the greater division of labor, in turn made possible by the abundance and cheapness of capital. They included also a more elaborate and efficient transport system, reducing the relative prices of basic commodities.

3. Therefore, a rich country could afford to move towards free trade where it would enjoy the advantages of a large and productive commerce with its partners in the world economy, even with its potential military adversaries.

The flavor of Smith's views is well captured in the following passages:[34]

> "The more opulent therefore the society, labour will always be so much dearer and work so much cheaper, and if some opulent countries have lost several of their manufactures and some branches of their commerce by having been undersold in foreign markets by the traders and artisans of poorer countries, who were contented with less profit and smaller wages, this

[34] The quotations are to be found, respectively, in Istvan Hont, *op. cit.*, p. 300 (where original sources are provided), and ADAM SMITH, *The Wealth of Nations*, edited by Edwin Cannan (New York: Random House, 1937), p. 462.

will rarely be found to have been merely the effect of the opulence of one country and the poverty of the other. Some other cause, we may be assured, must have concurred. The rich country must have been guilty of some error in its police [policy]."

* * *

"A nation that would enrich itself by foreign trade, is certainly most likely to do so when its neighbours are all rich, industrious, and commercial nations. A great nation surrounded on all sides by wandering savages and poor barbarians might, no doubt, acquire riches by the cultivation of its own lands, and by its own interior commerce, but not by foreign trade."

With Britain's primal take-off of the 1780s and its post-1815 widened lead in the new technologies, the rich country-poor country debate shifted to the legitimacy of tariff protection for infant industries in a country lagging technologically behind the front runner. The seriousness of the issue was heightened by the perception of Alexander Hamilton in 1791 that more than money was at stake:[35] "Not only the wealth but the independence and security of a country appear to be materially connected with the prosperity of manufactures". By and large, Hamilton's formula, with its security as well as welfare strand, was to be the fundamental rationale for industrialization in relatively underdeveloped countries over the subsequent two centuries. It was first accepted in countries of the Atlantic world conscious by 1815 of the widened technological gap with Britain. Thus the American and Continental tariffs of the post-Napoleonic period.

Britain was the only nation to move into take-off in the first graduating class in the last quarter of the eighteenth century. The next graduating class of, say, the second quarter of the nineteenth century included the United States, Belgium, France, and Germany. It was the movement of this second class to the drive to technological maturity — the stage beyond take-off — that revived the rich country-poor country anxiety in Britain. In the last quarter of the nineteenth century, post-Civil War America drove its railroads to the Pacific, rounded them out with feeder lines, and pushed population to the limits of the frontier; Bismark, consolidated his empire, which exploited fully its potentialities in the age of coal and steel, surpassing British steel production in the 1980s. Britain became conscious that its time of

[35] ALEXANDER HAMILTON, "Report on Manufactures" (1791), in *Alexander Hamilton's Papers on Public Credit Commerce and Finance*, edited by Samuel McKee (New York: Columbia University Press, 1934), pp. 227.

lonely primacy was passing and that late-comers did indeed command the potentiality of catching up with early-comers. Alfred Marshall was one of the most thoughtful commentators on the process. He reflected not only on the long run industrial prospects of the United States, Germany, and France but also of the British dominions and Japan, Russia and China (with "great futures"), and India.[36]

In the more than two centuries since Hume generated a lively discussion among his contemporaries of the rich country-poor country problem, two important empirical studies bearing directly on the economic issues it poses were conducted: *Industrialization and Foreign Trade*, mainly the work of Folke Hilgerdt, and Eugene Staley's *World Economic Development*.[37] They were products of the League of Nations and the International Labour Office, respectively, as their secretariats looked to the future with considerable prescience during the Second World War. Hilgerdt's study constitutes, in effect, a systematic analytic test of Hume's propositions, based on statistical data covering the years 1870-1938.

Its three major findings were:[38]

"*first*, that until about 1930 the growth of manufacturing, far from rendering countries independent of foreign manufactured goods, stimulated the import of such goods;

"*secondly*, that again up to about 1930, those countries in which manufacturing developed most rapidly as a rule increased their imports of manufactured goods more than did other countries; and

"*thirdly*, that after the breakdown of multilateral trade early in the 'thirties', this relationship between the growth of industry and of trade in manufactured goods was severed."

But Hilgerdt's story was distorted by the pathology of the inter-war years as well as by the autarchic economic policies of the Soviet Union. Nevertheless, the process of mutual adjustment envisaged by Hume went on and is well captured in Hilgerdt's conclusion on the changing composition of manufactures as "poor countries" industrialize, and on the related problem of "adaptation" in "rich countries".[39]

[36] ALFRED MARSHALL, *Industry and Trade* (London: Macmillan, 1919, reprint, New York: Augustus M. Kelley, 1970, *Reprints of Economic Classics*), Chapters III-V, especially pp. 95-106, 157-162.

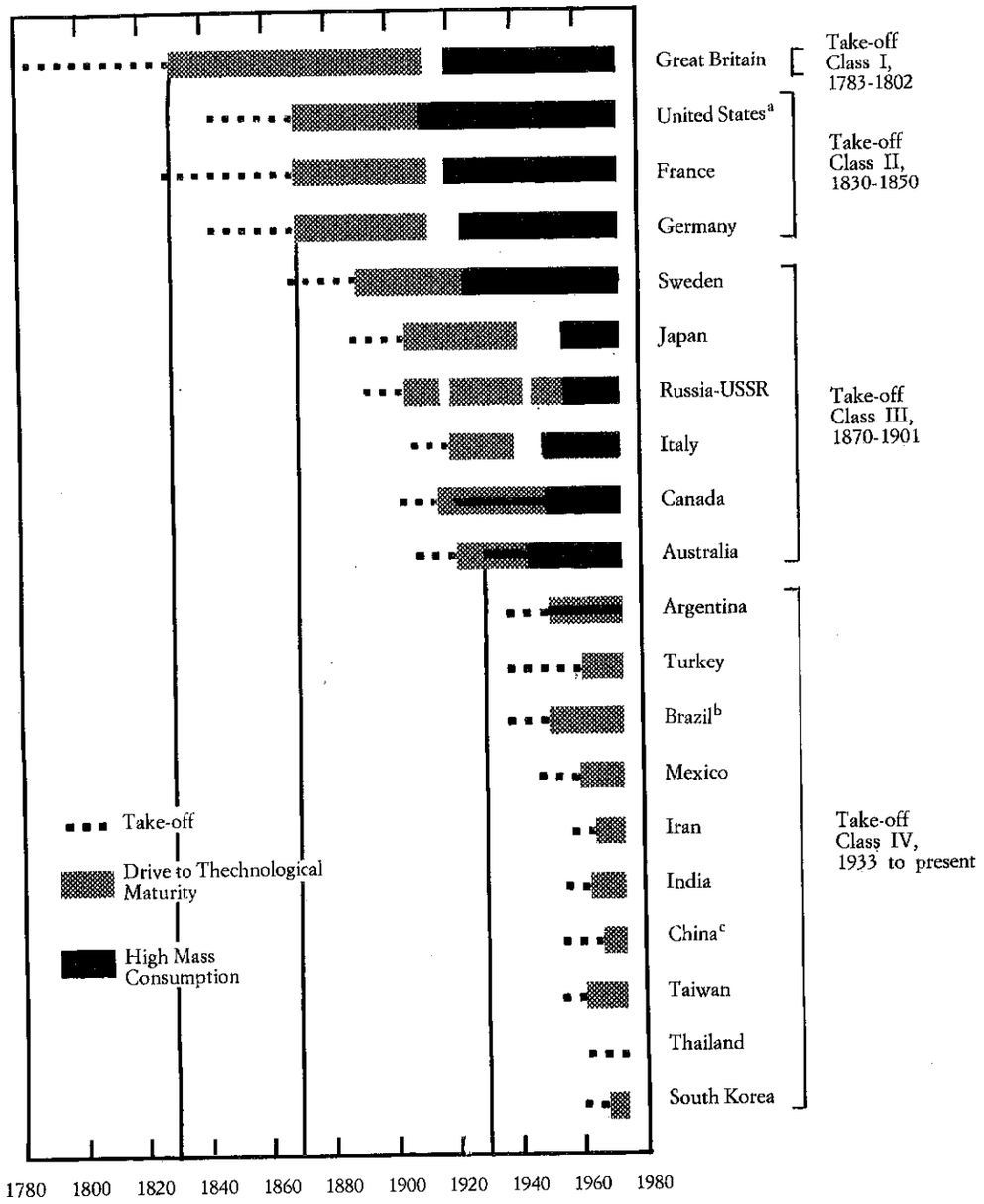
[37] LEAGUE OF NATIONS, *Industrialization and Foreign Trade* (New York: distributed in the U.S. by International Documents Service, Columbia University Press, 1945), with a Preface by A. Loveday, Director of Economic, Financial and Transit Department, dated July, 1945. The full reference for STALEY's study, commissioned by the I.L.O., is: *World Economic Development* (Montreal: International Labour Office, 1944).

[38] *Op. cit.*, p. 5. This summary passage is from Loveday's Preface.

[39] *Ibid.*, p. 117.

CHART 2

FOUR GRADUATING CLASSES INTO TAKE-OFF:
STAGES OF ECONOMIC GROWTH, TWENTY COUNTRIES



[a] New England regional take-off, 1815-1850.
[b] São Paulo regional take-off, 1900-1920.
[c] Manchuria regional take-off, 1930-1941.

Source: See *The World Economy: History and Prospect* (Austin: University of Texas Press, 1978), p. 51 and Part Five.

> "While normally the import from older industrial countries is thus not likely to decline as a result of industrial growth elsewhere, these imports are likely to change in character, for the countries in which industry develops will diversify their demand for consumption goods and increase their demand for manufactured capital goods. Different supplying countries will thus be differently affected; and even those able to raise their sales may experience some difficulty in affecting the necessary adaptation. Under normal conditions, however, time for adaptation is likely to be afforded, for in the majority of countries, particularly those with a dense population, there are strong forces resisting the industrial development which is accordingly, as a rule, relatively slow."

The resistance to industrial development appears to have diminished sharply in the second half of the twentieth century.

Staley's substantial monograph is, in fact, a policy manual on the rich country-poor country problem. His objective was to define policies which would yield the greatest mutual benefit to advanced industrial and developing countries. With a barrage of statistical data he drove home the first of Hume's *dicta*; *i.e.*, growth in less advanced countries enlarges exports from more advanced countries to adjust to the expanded competitive exports of the rising, less advanced countries.

The take-offs of the major Latin American countries and Turkey, beginning in the 1930s, inaugurate the fourth graduating class. They were joined in the 1950s and 1960s by India and China as well as by the extraordinarily dynamic smaller countries along the western rim of the Pacific. Although strongly affected by the rise and subsidence of the relative price of oil, their role in world trade for the period from the early 1960s to the early 1980s broadly validates the three basic Hilgerdt propositions:

— The period down to 1981 was marked by an extraordinary expansion in manufactured exports from developing countries;

— This surge was accompanied by continued high (but lesser) rates of increase in exports of manufactures to developing countries;

— There was an evident sensitivity of exports from developing countries to the rate of growth of advanced industrial countries; but the shift towards manufactured exports altered the relationship.

> "This diversification away from primary products does not mean that foreign demand no longer matters. Developing countries depend on developed-country markets for their manufactured exports; short-run fluctuations in the demand for their exports due to fluctuations in growth in industrial countries can still be important. But the diversification of exports

> toward manufactures has changed the medium- and long-run competitive position of developing-country exports in developed-country markets.... Developing-country exports increased twice as fast in relation to developed-country income in the 1970s; for each 1 percent change in real income in developed countries, the volume of developing-country exports increased by only 0.9 percent in the 1960s, but by 1.7 percent in the 1970s."[40]

As we all know, things have not gone as well in the 1980s. Both the rich and the poor have slowed down to their mutual disadvantage, under the weight of chronic high unemployment in the Atlantic community and severe debt problems in important parts of the developing regions. Protectionist pressures have palpably strengthened. The world economy, taken as a whole, does not appear particularly industrious or civilized.

VII. How to organize an industrious and civilized world economy

Jean Monnet used to say that nations should not come together to negotiate but to stare at a common problem. When they have explored the problem together a solution will emerge. When the solution is translated into action, legitimate areas for negotiation will naturally appear at the margin.

Right now we are dealing, after a fashion, with some of the most acute short run problems in the world economy. We are, for example, buying time by rolling over the international debts of important developing countries; and we have co-operated to bring the dollar down closer to purchasing power parity. But we are still far from long run solutions to these problems, and others are being swept under the rug. International gatherings of Common Market and OECD leaders — let alone the United Nations — are still mainly dialogues of the deaf. In good part, that is because we are without a clear agreed vision of our great common problem. Lacking a common vision working politicians concentrate on the short run idiosyncratic problems of their own economies and their possible impact on the next election. Such parochial considerations never wholly disappear. But solutions to national problems would come easier if consensus were reached that the

[40] *World Development Report, 1984* (New York: Oxford University Press for the World Bank, 1984), p. 43.

great long run common task is to work together to assure that the inevitable transition in the contours of the world economy takes place without either a neo-mercantilist fragmentation or war, both of which are clearly possible. When we stare at the hard, inescapable facts long enough, the solution likely to emerge — if we have the will to seize it — is to set about organizing together an industrious and civilized world economy which will exploit the large constructive opportunities open to us and fend off the dangers. One of the straightforward, immediate common interests that should render this vision potentially attractive even to the least visionary politicians is the significant degree to which prosperity in developing countries still depends on momentum in the advanced industrial countries and the fact that high momentum in the countries moving well through the drive to technological maturity should render exports to those countries a substantial leading sector in the next OECD boom.

Briefly, the larger task of Humeian reconciliation has three dimensions: First, within the advanced industrial countries there must be an acceptance of the fact that the great era of expansion of the welfare state (from, say, the 1870s to the 1970s) is over. Historians are likely to judge a limit was reached in the mid-1970s when the great surge, which had brought welfare outlays in the major OECD countries from 14% of GNP to 24%, peaked out. Politics addressed to the division of a pie assumed to be automatically expanding must give way in significant degree to concerted national efforts to assure the pie will continue to expand.[41]

Second, if we are to find solid ground between hegemony and chaos, something new and difficult but not impossible will be required. Western Europe, Japan, and the United States will have to generate the collective leadership no one can now provide on his own. They will have to work with each other and the developing regions to exploit the possibilities and make the peaceful adjustments cooperation could render realistic and mutually profitable.[42]

Third, the intensified co-operation required between the more and less advanced nations requires some institutional innovation. Although I can not argue the case fully here, I am inclined to believe that the process of adjustment is likely to be pursued most effectively through

[41] This argument is elaborated, for example, in my article published in *The Washington Post*, December 28, 1986.

[42] This argument is elaborated in "Is There Need for Economic Leadership?: Japanese or American?" *American Economic Association Papers and Proceedings*, Vol. 75, No. 2, May 1985.

greatly strengthened regional organizations containing societies at different stages of modernization. The United Nations, as a whole, is too big for serious business and lends itself to sterile and over-simplified political polarization. Regional organizations are smaller, closer to the day-to-day pragmatic problems which must be solved and, potentially, their operation can be softened and the risk of confrontation reduced by a sense of a neighborhood.

Specifically, strengthened enterprises should be encouraged in the Pacific Basin, the Western Hemisphere, and Euro-Africa. In happier times, a Middle East regional organization might be envisaged and one for South Asia, the basis for which already exists. In the Pacific Basin, the Asian Development Bank might be the organizing center; in Latin America, the Inter-American Development Bank and the OAS; in Africa, the African Development Bank and OAU. The World Bank and IMF would engage actively in each region. The advanced industrial countries might work with all these groupings although their relative roles would evidently vary with their historic and current interests.

There would be no lack of items for serious regional agendas: urgent debt, trade, and balance of payment problems; co-operative exploration of possible applications of new technologies; co-operation to deal with acute environmental problems; and co-operation in assisting the pre-take-off hard cases in which more advanced developing countries of the region should play a major role.

VIII. Implications for the cold war [43]

Historically, completion of the drive to technological maturity has proven to be a dangerous age. We have seen in this century two efforts by Germany, one by Japan, and one by Russia to seek hegemony in their regions when they, as late-comers, finally caught up technologically with early-comers, and were led to challenge the primacy they had earlier established. As its imperialist stirrings round about the turn of the twentieth century suggest, the United States was by no means exempt from this temptation to assert itself in the global arena of power and did not wholly resist that temptation.

[43] The following argument is elaborated in "On Ending The Cold War," *Foreign Affairs*, Vol. 65, No. 4, Spring 1987, pp. 831-851.

Evidently in a nuclear age, both the pursuit of hegemony by a new major power and the defense of their interests by resistant older powers must be conducted with restraint if a cataclysm for the human race is to be avoided. Thus, the Cold War has proceeded now for four dreary decades in three rough cycles marked by successive phases of vigorous but still cautious Soviet efforts to exploit perceived laxness or weakness in the non-communist world and belated and rather restrained efforts to retrieve their positions by the United States and others who shared its interest in preventing Soviet hegemony in Europe, Asia, or elsewhere. We are now in the third relatively quiet interval in the Cold War, the other two being 1953-1955, 1969-1972. The question is: Can we convert this interval into a progressive liquidation of the Cold War or will we behave in such a way as to induce a fourth downswing? Is a soft landing possible? The answer relates in part to a fairly steady trend which operated quietly as these noisy, dangerous, and often bloody cyclical phases proceeded; *i.e.*, the diffusion of effective power away from both the United States and the Soviet Union. This resulted not only from higher postwar growth rates in Western Europe and Japan than in the United States — and their catching up in technological virtuosity — but also from the dynamism of the developing countries that moved successfully into technological maturity. The combined total of U.S. and U.S.S.R. GNP may have declined from about 44% to 33% of the global product between 1950 and 1980.

First, Soviet difficulty in absorbing effectively the new technologies and, more broadly, reversing the protracted decline in the productivity of its economy poses searching political and institutional problems which may divert its energies to domestic concerns unless the non-communist world provides temptations to adventure too attractive to resist, too easy to exploit.

Second, the dynamism of the countries caught up in the drive to technological maturity is likely to strengthen a perception already widespread in Moscow; namely, that the power of nationalism, the diffusion to the developing regions of increasingly sophisticated technologies, and the diminished attraction of communist development dogma and methods make it increasingly clear that the emerging world community is not going to be dominated by the Soviet Union or by any other single power.

Third, if the non-communist world can mount a reasonable approximation of the three dimensional policy required to fulfill Hume's injunction to be "industrious and civilized", a rather good

foundation exists for initiating evenhanded, serious negotiations with Moscow to bring the Cold War peacefully to an end.

The narrower conclusion to be drawn is for development economists. In retrospect, the pioneers of development economics of the 1950s focused sharply (and understandably) on how to make the transition into Simon Kuznets' Modern Economic Growth, Arthur Lewis' Industrial Revolution, Paul Rosenstein-Rodan's Big Push, my Take-off. Our common task two generations later is to understand better and prescribe more wisely for two cases: where the preconditions for take-off have proved particularly difficult and for the drive to technological maturity.

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