International political equilibrium in power cycle theory

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The purpose of this paper is to deepen understanding of the concept of international political equilibrium developed within power cycle theory. In particular, it seeks to explain and amplify the relationship between short-term decision-making in a critical interval and the long-term dynamic of power and role change on the power cycle.

Part I summarizes the essentials of power cycle analysis to provide a firm, substantive understanding of the concepts, perspectives and issues involved in international political equilibrium. In part II, a schematic model of these concepts and perspectives is analyzed systematically, yielding further insight into why critical intervals are prone to major war.

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1. POWER CYCLE ANALYSIS

Power cycle analysis [2] probes the unique 'international political' perspective of statecraft. While economics and other social sciences focus on the absolute level of power, what is most important in world politics is changing relative power. Relative power is the power of one state compared to that of other states in the system at any given time.

The fundamental difference between absolute and relative power lies in the nature of their respective trajectories. Over lengthy periods of history, the absolute power of the nation-state has tended to increase at greater than linear rates. A middle power today could outshine the mightiest state of the seventeenth century, for example, on almost every indicator of capability and performance. Power is derived from an underlying base of national capability whose components such as level of military spending, armed forces size, economic size, wealth, and population form an overall index that in absolute terms has tracked upwards. However, the relative power of these same states has traced a pattern of rise and decline that is called the 'power cycle'.

The power cycle encompasses state and system in a single dynamic of relative power change within the system. A system is bounded by the limited number of shares of systems-wide capability. States compete for these shares, but the system's bounds impose constraints on the capacity of any state to acquire share. As a state ascends the hierarchy of power in the system, eventually its increase in relative power slows down, relative power peaks and enters decline, and the state 'cycle of power and role' in the major power system comes to an end. Taken independently and in the aggregate, the various state cycles constitute the changing structure of the international system.

From the international relations perspective, this reality of the cycle of power and role, etched in dynamic terms for each

[2] C.F. Doran, *The Politics of Assimilation: Hegemony and Its Aftermath*, Baltimore, The Johns Hopkins University Press 1971; C.F. Doran *Systems in Crisis: New Imperatives of High Politics at Century's End*, Cambridge, Cambridge University Press 1990.

state across time, is the feature which most shapes foreign policy behavior. Governments 'think' in relative terms because power itself is always relational. Once it is accepted that the relative power perspective shapes foreign policy thought, a number of important implications are laid bare by power cycle theory.

The Theory of the Power Cycle

Power cycle theory reveals the structural bounds on statecraft and the trauma of adjusting to the 'shifting tides of history'. The first part of the theory explains the dynamic of the power cycle and the determinants of systems transformation. The second part demonstrates the sudden reversal of foreign policy and security perception during critical intervals on the power cycle, explaining why the likelihood of major war greatly increases at that time.

Regarding the dynamic of the power cycle, two underlying principles describe its operation. 1) A state's relative capability in a system will increase when its rate of absolute growth is greater than the absolute growth rate for the system as a whole (the systemic norm). Moreover, a single state growing faster than the systemic norm will initiate momentum of change on power cycles throughout the system. 2) Even when absolute growth rates continue unchanged, a state's relative capability growth will accelerate for a time and then (at a point of inflection) begin a process of deceleration, due to the bounds of the system, which causes a logistic peaking and a turn into relative decline. Similarly, accelerating decline ultimately (at a point of inflection) begins to decelerate to a minimum level prior to leveling out or beginning a new upturn. Each «inflection point» and «turning point» – the «critical points» in the relative power dynamic where the prior trend suddenly undergoes an inversion – corresponds to the intuitive notion of the 'shifting tides of history' or the 'shifting balance of world forces' [3].

[3] C.L. Mowatt, (editor) *The New Cambridge Modern History. Vol. 12, Shifting Balance of World Forces 1898-1945*, Cambridge, Cambridge University Press 1968.

The power cycle thus provides a post-hoc depiction of a state's rise and decline as a great power (as indexed) and history's shifting tides. But it is an even more potent analytical device. For the power cycle records, at each moment in time, the state's clearly-defined past and the likely trajectory of its yet-to-be-determined future.

It records the political development of the state as an evolving phenomenon, revealing at each step how contemporaneous statesmen perceive the state, its past history and its projected future. With the direction of causation thereby preserved, the sudden, unexpected inversion in the prior trend that occurs at each of the critical points on the power cycle is seen as a key to the understanding of statecraft – in past history and as a guide for future policy.

Regarding the impact of the power cycle on the origins of major war, three sets of processes are at work, all intimately involved with the evolution of the cycle of power and role for each state.

1. Paramount is the effect of passage through critical points on the power cycle, causing shock, uncertainty, problems of adjustment for state and system, and belligerency. Substantively, critical points are points in a nation's diplomacy where everything of importance to foreign policy conduct changes. At these points of non-linearity on the power curve, all past assumptions about future foreign policy role and security position are proven wrong. Suddenly and unexpectedly, expectations about foreign policy matters that involve the highest stakes face monumental revision. It is scarcely surprising that on matters of such importance, with consequences so far-reaching, challenges occur to the stability of the international system as governments have in the past struggled unsuccessfully to adjust.

The decision model underlying crisis at the critical point is familiar and very simple. Future expectations are based on a linear extrapolation of past experience. Why linear? Linear extrapolations are right most of the time, more of the time than for any other specific model. Additionally, the number of alternate, possibly more complex models is infinite, a few too many for the practical decision-maker to cantemplate.

But the problem with the simple linear extrapolation model

is that, when it is wrong, it is very wrong. Moreover, the dynamic of the power cycle ensures that the conclusions about future foreign policy role will be wrong at the four critical points of non-linearity on the curve. Unfortunately, no forecast or other predictive device can with any precision identify a critical point in advance of its occurrence. In politics, «to be right at the wrong time is to be wrong». So the shock-value of traversing a critical point, even for the astute, is probably about as great as for the ignorant.

Mathematically, the course of future foreign policy role expectations is traced by a line drawn tangent to the power curve. At the critical point a discontinuity occurs in these role projections. Easily evident based on the first derivative at the upper and lower turning points, the perceptual discontinuity occurs at the level of the second derivative at the two inflection points, but it is a discontinuity with at least as much impact upon conflict behavior, perhaps in part because of its apparent subtlety. The trend of future role projection changes direction at the critical point, causing a disjuncture of expectation. Hence, at a critical point, future role projection with respect to where the state will be, affecting status, security, and alliance relationships, all come up for radical revision.

In international politics, the lower turning point on the power cycle releases the energies of the state to consolidate its territory as it begins to experience ever increasing rate of relative power increase. This released energy is interpreted as a threat by neighbours, and it is threatening in territorial as well as other terms. The first inflection point is the initial discovery by the state that its projections about future growth are wrong, fundamentally miscalculated. Its rate of growth is no longer increasing; in fact, it is beginning to decline. All past assumptions about relative power increase are thrown into doubt. The upper turning point is self-explanatory in terms of interpretation and impact. For the first time, precipitously, the state is in actual decline as to the level of relative power. The second inflection point is complex, and destabilizing because of the complexity. On the one hand, the state enjoys a reprieve from the ever increasing rate of decline; on the other hand, the level of relative power continues to decline. It is the tension between

the hopes raised by the former influence, and the anxieties caused by the latter, that drags state and system into trouble.

Historically, massive systems-wide war has occurred during systems transformations. System transformation is defined here as that situation in which a number of major states are passing trough a critical point at about the same time. System transformation is a systems level effect brought about by changes at the state level. The entire structure of the system is undergoing radical change at the top. Structural uncertainty is at a maximum and statesmen are unable to assimilate all of these changes without precipitating the violent behavior that in principle they all wish to avoid (some in defiance of security, some in concordance with security).

2. A second set of processes that contribute to instability in the critical interval is the existence of gaps between power and role. Governments normally have a propensity to leave these gaps concealed for as long as possible. But the stress of passage through a critical point brings these gaps to the surface. Even if the state experiencing the gap does not want to acknowledge its existence, other governments probe and challange, especially in the midst of adverse adjustment at the critical points on the power curve where newly discovered vulnerability occurs.

Altough there are many important nuances of behavior and perception here, the basic relationship between power and role is this. On the upside of the power curve, the increase in power tends to exceed the acquisition of role. The system is reluctant to yield role to the ascendant actor. A surplus of power over interests generates frustration and even belligerence that may be released, especially at a time of uncertainty and stress, during a critical interval when the tides of history suddenly turn against the state. On the downside of the power curve, there is a tendency for the role to exceed power. The once-ascendent state is reluctant to yield role in some circumstances, and in others it finds that the system itself is reluctant to adjust to new situations of power/role balance. An excess of interests compared to power is the familiar problem of 'over-extension'.

Power/role gaps aggravate the uncertainty and tension that already exists at critical points on the power cycle. The problem of adjustment at these points, already profound, is further

worsened by the belated discovery or admission of serious power/role discrepancy in the foreign policy of one or more of the major states.

3. Finally, the process of the inversion of force expectations contributes to the increased probability of major war at the critical points on the power cycle. The elasticities of role ascription and power achievement are such that under normal circumstances a potential deterrer is not called upon to threaten force use overtly, and a potential aggressor is not tempted to use force to obtain an objective. In the critical interval, these normal force expectations become inverted as the uncertainties and shocks occurring to foreign policy sensibility cause both potential deterrer and aggressor to regard force use, previously thought of as 'unthinkable,' now as 'thinkable'. This transmutation of mentality is analogous roughly to the inversion of demand and supply expectations that occurs in so-called inverted markets such as during the shock market collapse of 1929, and the oil price run-up of 1979.

What happens in the critical interval to cause this inversion of expectations? At a critical point, the decision 'atmosphere' hardens. The inelasticity of the role ascription and power achievement curves increases sharply as various sources of anxiety and instability come together to intensify the sense of threat throughout the system. Attitude and action rigidify. The sense of uncertainty becomes monumental further exaggerating foreign policy response and contributing to the rigidification of behavior. As the role ascription and power achievement curves become more inelastic, a shift occurs such that, schematically, one curve actually cuts the other from above rather than from below, and the devastating process of inversion of force expectation is completed. Expansion to major war has been precipitated.

In short, three basic processes underlie the impact of the dynamic of the power cycle on the occurrence of major war. First, passage through critical points is itself destabilizing, for the future power and role expectations of the state are suddenly and unexpectedly constrained by the bounds of the system. The tides of history abruptly seem to shift against the state, proving its future security projections dangerously misguided. Second, power/role gaps long in the making are

squeezed to the surface of foreign policy consciousness at these points, and appear formidable indeed as the state tries to cope with the shifting tide. Third, the process of the inversion of force expectations worsens conflict behavior of states in a critical interval. All of this is magnified and multiplied as to effect in a period of systems transformation as a number of major states pass through critical points simultaneously.

A New Concept of International Political Equilibrium

Resolution of the dilemma of peaceful change has long been a goal of world politics. While the balance of power is an essential concept, it is also flawed. When the balance of power has failed, it has failed monumentally. Yet a notion of equilibrium is essential in world politics as in any system of interaction and behavior. How can the dilemma of peaceful change be resolved in terms of a new concept of equilibrium that more fully takes into account the dynamics of the power cycle and the structural contradictions at the critical points?

The problem is that governments failed to integrate the effects of the state power cycle into balance of power thinking. The balance of power has traditionally been conceptualized as though it operated on a flat chessboard. The number of leading actors is known. The approximate distribution of power is ascertainable. The norms of action and response, of balance and checkmate, are credible and familiar to to decision-makers. Decisions deal with a single predominant issue, coping with an aggressor in the short-term. Power is the foremost variable to consider. Because the operation of the balance of power is so simple to comprehend, it has become a conscious element of statecraft at last since the seventeenth century. When an aggressor threatens the security of another state, it forms a coalition or alliance to check the aggression. Power shifts against power.

While this simple formula for the preservation of stability may work most of the time, in particular when the structure of the system is not itself in rapid transformation, the balance of power is a recipe for cataclysmic misjudgment in periods when movement on the state power cycle meets with sudden change

and great surprise. In such an interval, all of the assumptions of the balance of power go unmet.

The number of actors in the central system is uncertain because of the movement into and out of that system. The likely future relative power of current members in decline and likely candidates for entry is difficult to predict, or to accept, or to factor into foreign policy strategy. Regime norms, never sufficiently robust, tend to break down altogether. But most seriously, gaps between interest and power, long in the making, tend to become unambiguous in these crisis intervals, thoroughly altering the relationship among the leading governments. Enmity explodes into conflict.

In general, the balance of power is unable to cope with the situation where legitimate interests get seriously out of alignment with power. Power cycle theory provides the clue to the past failure of the balance of power. Balance of power logic provided exactly the opposite strategy of what is required to sustain long-term equilibrium when the rise and decline of states drives interests and power awry. The balance of power tries to bolster weakness through alliance aggregation.

From the power cycle perspective, what is needed is an adjustment both in terms of foreign policy role and in terms of power across all of the leading actors. It reminds the statesman that in the long-term rising power cannot be halted and declining power cannot be artificially bolstered through external assistance. What is necessary is that foreign policy roles must be brought into allignment with state power directly.

When a state declines it must yield foreign policy role, not merely seek to reinforce its declining relative strength through outside help. Rising actors must be expected to assume larger roles commensurate with their greater capability. Of course territorial security can never be sacrificed. Indeed, the only way that territorial integrity can be guaranteed in the absence of major war among the leading actors experiencing structural transformations is for both power and foreign policy role to be brought into mutual adjustment.

In sum, the essence of international equilibrium from the power cycle perspective is to use a strategy of balance when that is appropriate to the dynamic of state rise and decline and to use concession and adjustment when that strategy is the

more appropriate. By realizing that one state's increase in power or role comes at the expense of another state, and that the structural change of rise and decline itself cannot be halted or offset through any of the normal instruments of statecraft, the nature of general equilibrium becomes intuitive, even obvious, but more importantly imperative.

The Balance of Power Failures Newly Interpreted

By pursuing a simplistic strategy of balance, the European states, assisted by isolationist America, precipitated the First World War. France, Britain and Austria-Hungary were in significant relevant decline. Both the United States and Russia (albeit at a much lower position in its power cycle) were in relative ascendancy, but for different reasons neither sought a conspicuously larger foreign policy role. Following the isolationist language of Washington's Farewell Address, the United States still heeded both halves of the Monroe Doctrine. In addition to its economic backwardness, Russia was preoccupied with domestic social and political issues, notwithstanding its Balkan interests. Germany was the ascendant state *par excellence*, seeking a grander foreign policy, fearing encirclement, sensing the disparity between its power and its role in Europe and the colonial areas.

With the resignation of Bismarck, the stage was set for a European contest for role. The three declining powers refused to yield status and perquisites, relying instead on balance and encirclement to contain the increasingly powerful, and belligerent, Germany. But it was the sudden and unexpected peaking of German power, even as its absolute gains were accelerating, that suddenly provoked the angst and belligerence that finally triggered the war itself.

In contrast, by attempting to correct the mistakes that led to the First World War, the allies contributed to Hitler's aggression. By yielding to a Germany that was now in severe relative decline, the allies, including Roosevelt's America and Stalin's USSR, appeased Germany. Germany had no claim to a larger world role. Its reduced power base demanded firm resistance to Hitler's pretentions to *grandeur*; and whatever Ger-

many's power base, Hitler's blandishments and intimidation and illegitimate territorial ambitions demanded firm resistence. Instead, the effort to overcome the mistakes prior to the First World War became the avenue for aggression in the Second World War.

Power cycle theory reveals that the dynamics of state rise and decline demanded a firm strategy of opposition to German claims in 1938-39 for increased role. That this strategy was not adopted is due to a loss of faith in balance at precisely the historical moment when that sustained strategy was most necessary. Territorial aggrandizement is illegitimate, and states must always be prepared to defend against it with balance. The Second World War showed that states ignore the balance of power at their peril. The First World War showed that states also ignore power-role equilibrium at their peril. A minimum public morality requires both policies of balance and policies of accomodation regarding non-vital issues of foreign policy role and status, properly timed to changes on the state power cycles.

2. BROKEN TRENDS, THE VISCOSITY OF POWER, AND MAJOR WAR [4]

This section of the paper explores the relationship between long-term structural change on the power cycle and the short-term decision calculus regarding power-role equilibration. How is the long-term structural change translated into the conditions that come to underlie decision-making crisis at a critical point?

Schematically, the problem of equilibrium has been represented in two ways in power cycle theory. 1) The 'cycle of power and role' can be dissected into power and role components, and the power-role «gap» or «disequilibrium» can be explained and analyzed via lagging of the two curves [5]. 2)

[4] Dr. Marcucci developed the model in this section in a paper for the course *Contemporary Theory in International Relations* at the Johns Hopkins University, Washington D.C., SAIS 1989.

[5] C.F. Doran, *A conceptual and operational comparison of frustration-aggression, rank disequilibrium, and achievement discrepancy models: Towards synthesis via a general theory of conflict dynamics*, Paper presented at the International Studies Association Annual Meeting, St. Louis 1974; C.F. Doran,

Short-term «equilibrium graphs» can depict the relation between the state's 'Achieved Power' and the 'Ascribed Role' that the system has attributed to it [6].

By conceptualizing a two-actor competition between the State and the State Complement (called System for short) [7], we bring the two schemas together. We show that elasticities for power achievement and role ascription in the short term can be derived directly from the long-term movement of the power cycle itself. We also use a 'power cobweb theorem' to gain further understanding of factors contributing to movement away from equilibrium in a critical interval.

The Model

The shape of power cycle, and the actual quantitative scores for a given state, reflect comparative measurements on material capabilities, or what we here will call 'real power' [8]. However, if one assumes isometry between power and role, then the curve of the power cycle can be thought of as the place where there is equilibrium between real power of the state and recognition of this power by the system (role). This can be compared to the economic principle of viewing the U-shaped cost curve as the place within the plane where there is equilibrium

Modes, mechanisms, and turning points: perspectives on the analysis of the transmission of the international system, «International Political Science Review» I, 1 (1980), pp. 35-61; C.F. Doran, *Systemic disequilibrium, foreign policy role, and the power cycle: Challanges for research design*, «Journal of Conflict Resolution» XXXIII, 3 (1989), pp. 371-401; C.F. Doran, *Systems in Crisis: New Imperatives of High Politics at Century's End* cit.

[6] C.F. Doran, *Equilibrium and Rank Disequilibrium*, «Working Paper», Rice University, mimeo circulated extensively; C.F. Doran, *A conceptual and operational comparison of frustration-aggression, rank disequilibrium, and achievement discrepancy models: Towards synthesis via a general theory of conflict dynamics* cit.; C.F. Doran, *Modes, mechanisms, and turning points: Perspectives on the analaysis of the transformation of the international system*, «International Political Science Review» I, 1 (1980), pp. 35-61; C.F. Doran, *Systems in Crisis: New Imperatives of High Politics at Century's End* cit.

[7] The State Complement (System) is the whole system under consideration minus the State.

[8] We begin with the assumption that there is no slippage between real and perceived power. Relaxing this assumption at a later stage will prove that the conclusions one reaches within the model we propose are strengthened.

between supply and demand. Hence, the curve of the power cycle can be conceptualized as the locus of the resultant of short-term decisions yielding equilibrium between power and role. Since statesmen in the short-term base their decisions on a linear extrapolation from the long-run power cycle curve (tangent to the curve)[9], we can associate the tangent to the long-run curve at any point whith the 'Achieved Power' line in the short-run equilibrium graph.

To bring the two schemas together requires that the curve for the System's 'Role Ascription' be depicted in the same graph. To this end, we first assume, for the sake of semplicity, that the international system has the following characteristics:

1. there are only two actors: the State and the System (State Complement);
2. the sum of the power the State holds plus the share the System holds equals one(1) [10];
3. the System is isometric;
4. there is no slippage between real and perceived power.

The approach taken here can be compared to static comparative analysis in economics. The model at this stage of development attempts neither dynamic representation nor prediction [11].

Since for these purposes the international plane is assumed to be a zero-sum locus, the power cycle curve for the State Complement (System), and the power cycle curve for the State are mirror images. Although no new information about the dynamic is obtained from it, the State Complement curve enables us to visualize the past trends and anticipated future trends which the other states experience relative to the State. Decisions about role ascription emerge as much out of how the System views its own future trend relative to the State as how it regards the State's past and future trajectory, and both of

[9] Short-term refers to approximately five to ten years; long-term refers to several decades or even hundreds range.

[10] There is no spillage of power and there are no intermediate actors. We assume that the situation can be thought of as a zero-sum game in the short-run, with technological change, large new additions of information, and the like held constant.

[11] The model should not be taken to have predictive qualities. We are not proposing a model to forecast the evolution of the international system.

these perceptions are encapsulated by the System curve. The System curve traces the trend of role adjustment needed to maintain power-role equilibrium on the State power cycle: it creates (and thus mirrors) the State role curve. By superimposing the two curves on a single graph, we thus can more clearly assess the various perspectives affecting the process of role adjustment.

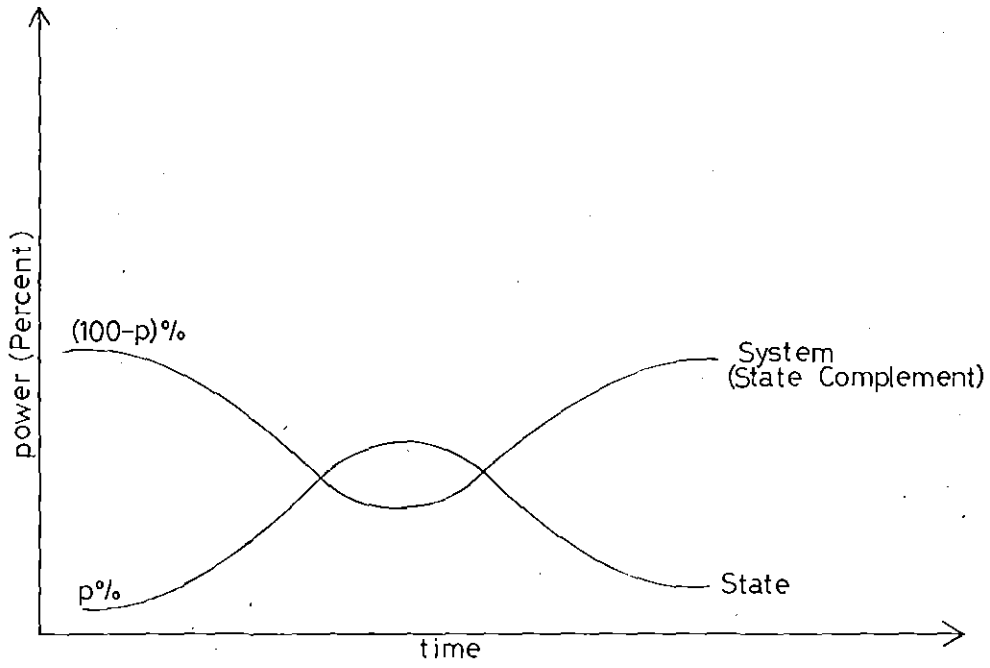
We thus obtain the following graph in the coordinate plane, with time on the horizontal axis and Power (Percent Share of total Systemic Power) on the vertical axis (Fig. 1).

The State and System power cycles can be moved symmetrically inwards untill they intersect a specified time t. The tangent lines on the two curves at that point of intersection (whose slopes are negative inverses) can be considered the Achieved Power and Ascribed Role lines in a short-term equilibrium graph at t. Construction of the model is now complete.

How does this model enhance understanding of power cycle theory? First we note that under the assumption of equilibrium, the mirror-image curves have equal elasticities (equal but opposite slopes), so that we can observe how position on the power cycle itself affects the degree of inelasticity of the Achieved Power and Ascribed Role curves. The rule is straightforward. The greater the slope (positive or negative) of the line, the greater the inelasticity -- that is, the greater the viscosity of change on that line.

It is immediately apparent that the model captures in a natural way how non-linearity on the power cycle itself affects the issue of short-term equilibration. The power a state has does not change linearly through time but increases or decreases at different rates of acceleration. Inelasticity (rigidity to change) increases as relative power growth or decline accelerates along the respective power cycles. That is, inelasticity increases as relative power growth accelerates up to the first inflection point, and as relative decline accelerates up to the second inflection point [12]. This demonstrates that, irrespective

[12] Whenever one refers to specific points on the power cycle, these points should be regarded as falling within a temporal interval. Changes in the structure of the international system tend to be gradual, altough sometimes history speeds the pace.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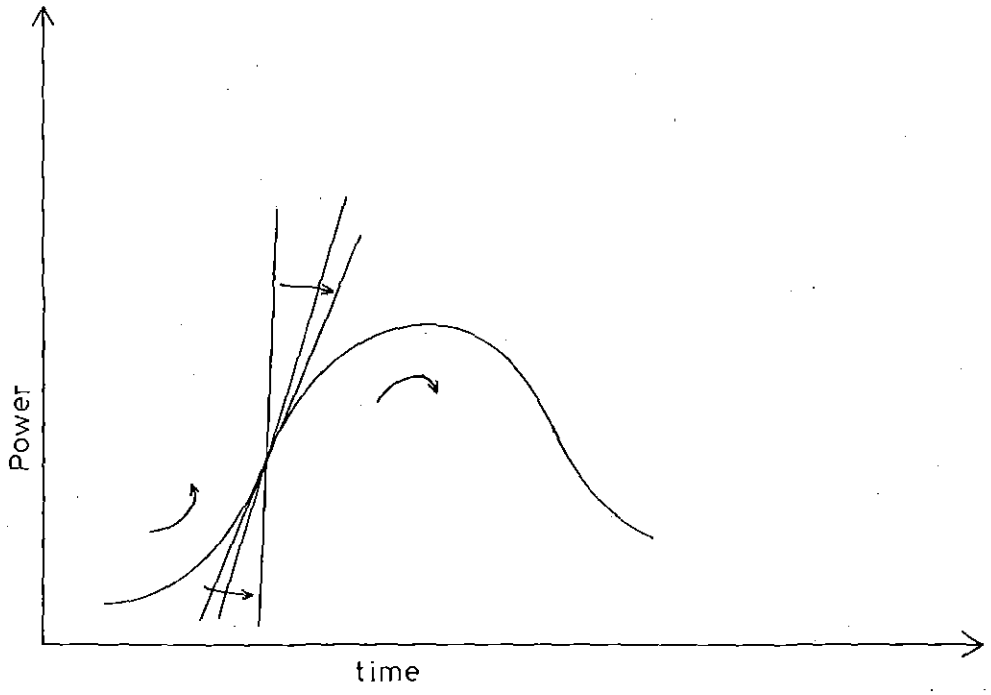
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of whether or not any power-role disequilibrium exists, states become increasingly sensitive to changes in both power and role as they approach the first and second inflection points.

How power-role disequilibrium increases inelasticity is also natuarlly represented in this schematization. If we wish to model power-role disequilibrium, we would shift the System power cycle curve to the right (a lag occurs in the System's response to changes in Achieved Power), in which case the slopes of the tangent lines would no longer be negative inverses — one of the lines would have a greater slope, and hence greater inelasticity, than the other. For a rising curve prior to the first inflection point, the State's inelasticity is greater (the lagged System curve has a less steep tangnet). Prior to the second inflection, the State again has the greater inelasticity in a situation of power-role disequilibrium because of the lag. But, as explained later in this section, the way in which State and System respond *at* the first versus second inflection point differs because of how the respective inversion affects the party pressing for adjustment.

Finally, the model naturally depicts how elasticities of the State and System curves change at a critical point. Critical points occur where trends on the power cycle are broken. The characteristic that is common to the first and second inflection points, and to the maximum and minimum, is that the rate of the increase or decrease is changing drastically. At the inflection points, the drastic change refers to the inversion in the rate of increase or decrease of power; at the turning points, an inversion occurs in the level of power itself. Since statesmen in the short-run base their decisions on a linear extrapolation from the long-run power cycle curve, the mistake in forecasting one own's future position becomes greatest right after the passage through a critical point. The inversion in linear extrapolation at the turning points is unambiguous in the graph of the cycle, as is the obvious error in the prior projection of continued rise. Altough less immediately apparent in the graph, the inversion of the inflections points is no less obvious to the statesman. The linear extrapolations prior to the inflection become steeper as relative power accelerates, so that they project a continued rise far above the actual trajectory the curve must take after the inflection point occurs (Fig. 2).

Hence, at these points statesmen suddenly realize that their relative power position is undergoing a major structural change. This sudden qualitative change in level, velocity, and acceleration at the critical points stimulates a sudden increase in inelasticity for the State and/or the System, activating the process of challenge and response that results in inverted force expectations and the decision for war.

Before examining changing elasticities in the various critical intervals, let us review the four major factors which, according to power cycle theory, explain why the likelihood of major war is greatest at critical points than at other times in a state's history.

First, a critical interval involves an abrupt perception of future structural change and an inversion of both power and security projections. At a critical point, the short-run linear extrapolation of future expectations, which is usually the best approximation of reality, is suddenly proven to be invalid. Indeed, it is seen to be very far from the actual future trajectory.

Second, the sudden and painful realization of structural change may rigidify and electrify the system to the extent that other minor or domestic sources of inelasticity may acquire more relevance and render the sense of instability more acute. Sources of domestic political instability, authoritarianism of leadership, and the like, can thereby be transfused into the international system.

Third, given the overall increase in the sense of uncertainty, the State experiences a rigidification of its expectations regarding both future role and security. The State feels that its achieved power has not been rightly acknowledged via a commensurate increase in role. Although this concern could previously be dismissed because of anticipations of ever increasing capability, the sudden discovery of a new trend of diminishing future growth rate makes the State fear that the desired role will never be attained [13].

[13] This reasoning is based on the analysis of the first inflection point in C.F. Doran, *Systemic disequilibrium, foreign policy role, and the power cycle: Challanges for research design* cit. and C.F. Doran, *Systems in Crisis: New Imperatives of High Politics at Century's End* cit. but, *mutatis mutandis*, the same applies to the other critical points as well.

Finally, at the same time, the System (State Complement) is undergoing a similar process of rigidification due to misperception of the behavior of the State and its own reaction to the new trends. When the State is experiencing a decline in relative power either in terms of rate or level, the System fears any perceived attempt by the State to expand its role past a 'legitimate' level – uncertain even about what level of role ascription would be appropriate for the now declining State. Once such fear, uncertainty, and rigidification is actualized, the most likely outcome is an 'inversion of force expectations'.

As we have seen in our schematic, all of the factors that tend to increase the inelasticity of the State and System lines are at their greatest at and just after the critical point. First, inelasticity increases for both State and System as movement accelerates towards the inflection points. Then, just when both State and System are most sensitive to changes in power and role, something really nasty happens – a qualitative change that threatens all prior assumptions about the future trajectory of power and role. At the very time when inelasticity is greatest for both State and System, something happens to further increase the inelasticity. Second, the slope of the lines for State and System changes sign at the turning points, suddenly driving the state onto new, untried paths. There is a qualitative switch in the equilibrium graph regarding which line cuts the other from above or below. Third, when the Systemic lag produces a power-role disequilibrium, inelasticity increases with the size of the gap, and the gap increases in size up to and just beyond the first inflection point on the power curve [14].

Clearly, all the conditions which increase rigidity in the decision-making process are at their greatest at and just after the occurrence of a critical point. Before exploring the effect of this rigidification on the stability of the situation in the presence of a power-role disequilibrium, let us explore the case of non-critical intervals. The presence of disequilibrium itself, as we have

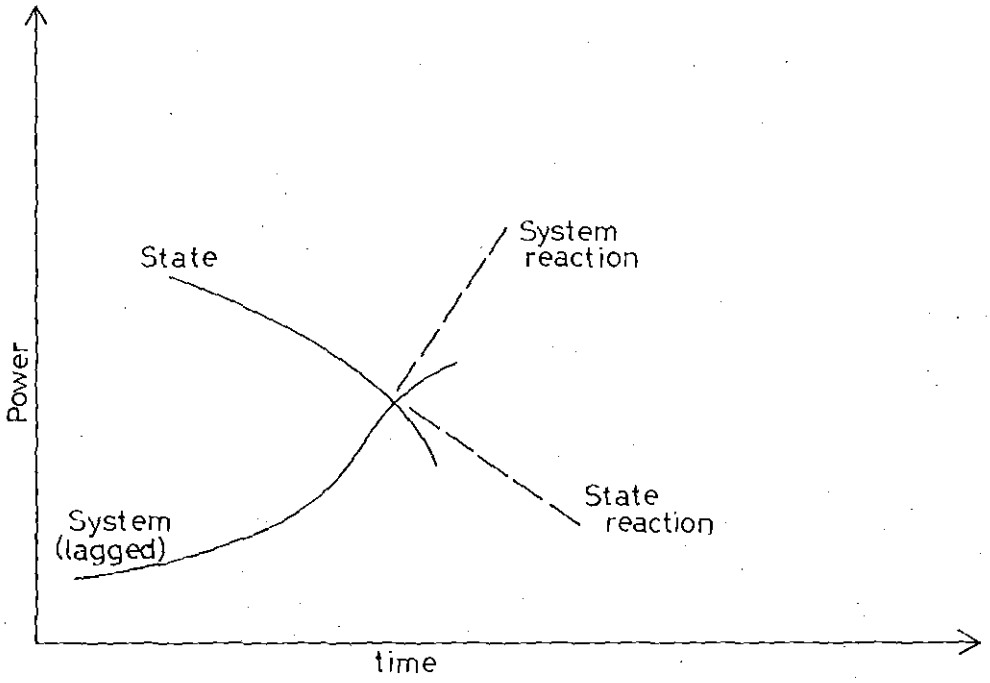
[14] As shown in C.F. Doran, *Systemic disequilibrium, foreign policy role, and the power cycle: Challanges for research design* cit. and C.F. Doran, *Systems in Crisis: New Imperatives of High Politics at Century's End* cit., assuming perfect lag, the gap is largest midway between the inflection points of the State power curve and the lagged State role curve.

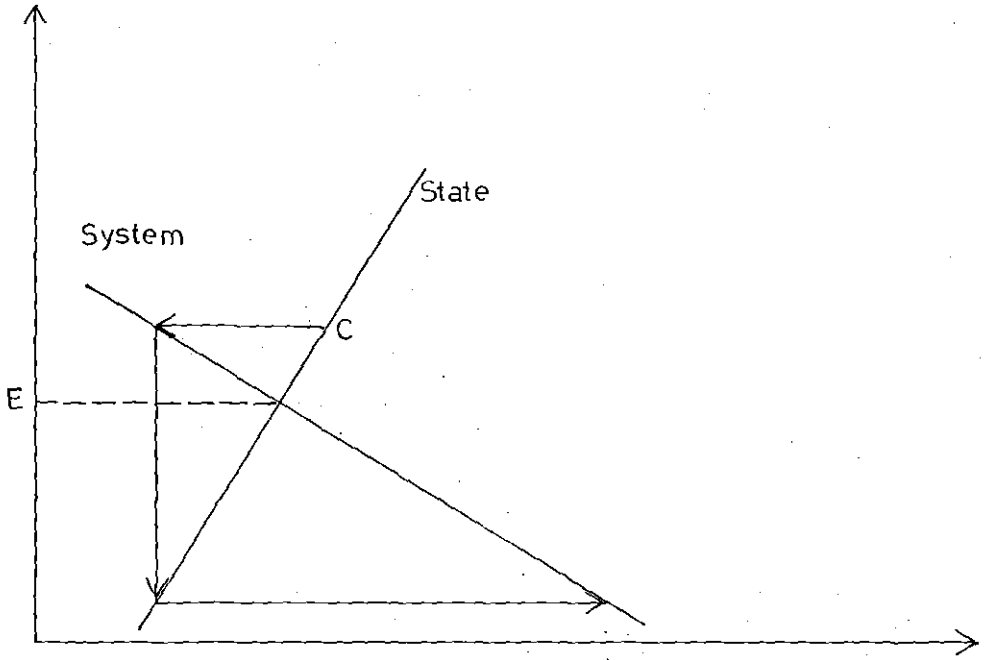
shown, automatically makes one line more inelastic than another. Indeed, movement toward the inflection point automatically increases inelasticity due to the size of the gap (assuming no adjustment and constant lag) and due to accelerating rise or decline. But because both State and System are proceeding in a mutual and coordinated fashion, they see that the future trends will require adjustment of the power-role disequilibrium. In other words, their anticipations lead them to adjust the elasticities of their curves in a fashion conductive of equilibrium. For this reason, any demands for adjustment are likely to be met in a mutual and coordinated fashion prior to an inflection point (and likewise prior to a turning point). Hence, before reaching a critical point, the short-run equilibrium is stable and there is a centripetal tendency toward the equilibrium point.

In contrast, the very condition that reinforces stability prior to a critical point is inverted at a critical point and serves to exacerbate the existing instability there. The very existence of a disequilibrium (represented by the lagged System curve) leads to a situation in which the dynamics of the two curves are completely opposed to one another at and just after a critical point! The mutual and negatively correlated change in the speed of adjustment thus becomes a triggering cause of instability in the critical interval.

We can use the cobweb theorem to probe further the instability in a critical interval. One can safely assume that in the short-run, power projections will not change significantly. Moreover, the disequilibrium is represented by shifts along the short-run curve, not by shifts of the tangents to the long-run curves. This is supportable given the meaning of short-run and due to the statesman's tendency to use *linear extrapolation* models for the short-run. We begin by looking at the situation at the two inflection points.

Regarding the first inflection point, one assumes that the disequilibrium will arise on the State's power curve rather than on the System's ascribed role curve since the State's power is rising relative to the system. Statesmen that perceive a decline in the rate of increase of their state's power will normally take the initiative to push for a faster or more substantial recognition of their state in the international arena. A


Power
State
System reaction
State reaction
System (lagged)
time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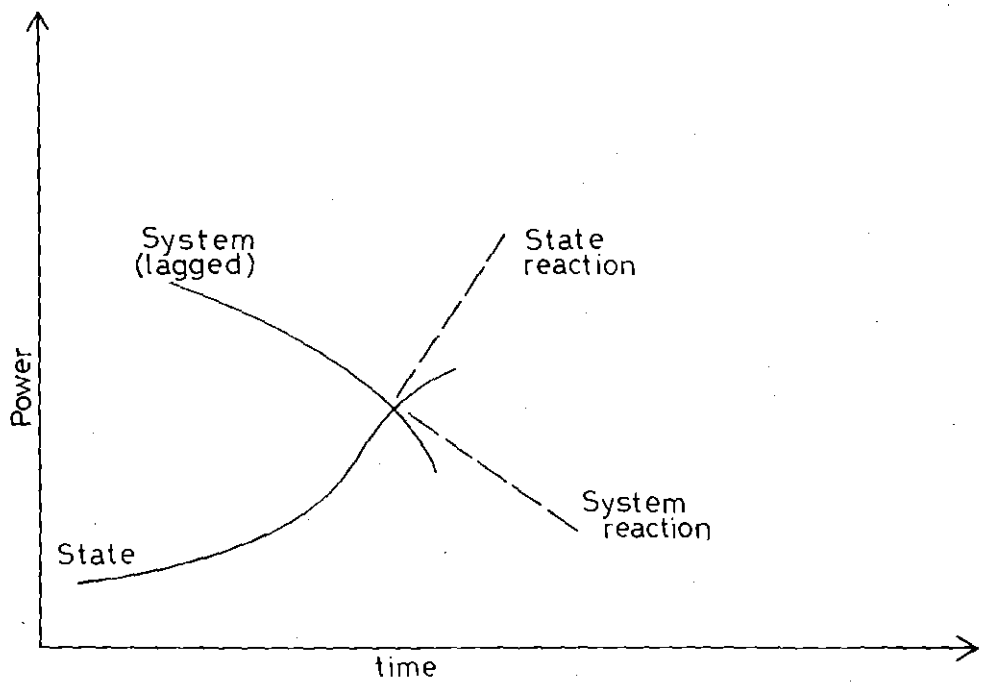
System
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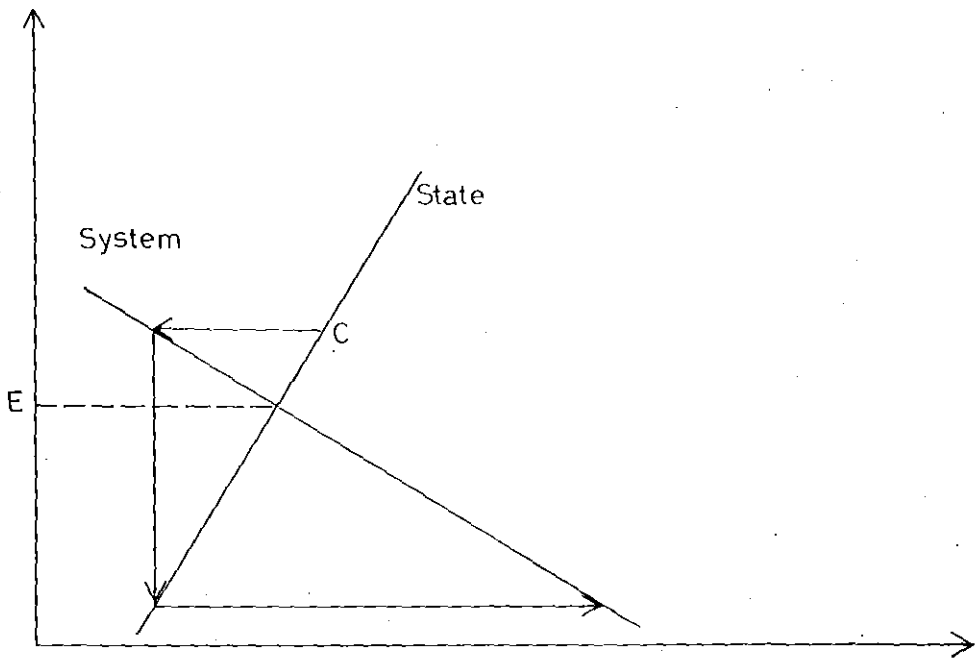
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situation of relative power deficit for the state, which the state ignored when projecting continued accelerating rise in relative power, will now be felt as very real and as increasingly unacceptable. The situation will be manifested by a rigidification of the State's power curve in the short-term and the medium-term. This situation is depicted in the following figure (Figg. 3A e 3B).

In this figure, one witnesses a centrifugal tendency away from the 'power legitimacy point', E, given a situation of disequilibrium along the State's power curve at point C [15]. Even a small disequilibrium gap translates into a magnification of the discrepancy between ascribed and real power. Clearly, even a small movement away from E along the State power curve implies the kindling of a self-perpetuating imbalance in this critical interval since the elasticity of the State's power curve is much lower than that of the System's role ascription curve. In other words, at the first inflection point, the acceleration of the State's power peaks just before entering the decline phase, whereas the System's role ascription curve had not yet peaked – the System is acting too slowly. At the moment when the State decides the System must accelerate faster, the System sees the State's acceleration in power increase has ended and is likely to resist any further acceleration in role ascription.

The same explanation applies at the second inflection point. Here the relative decline of the State's real power is much faster than the change in System role ascription curve (similar to the case of relative rise on the other side of the curve). However, now the eleasticity of the State power curve is greater than the elasticity of the System role ascription curve: the System's short-term power curve is more rigid than the State's curve. Instability derives from actions elicited by the System in this case. The System sees that the State is over-extended, even if it is because other members of the System are demanding such role from the State. When the System observes the sudden improvement in the rate of decline of the State, it suddenly decides that the State may refuse to yield any of its surplus role

[15] We will refer to E as the power legitimacy point, since at E, and only at E, there is a perfect equalization of the State's aspirations and the System's willingness to attribute to the State a certain role. At E there is a zero probability of major war.

in the future. Again, mutual and uncoordinated change in the speed of adjustment is the factor triggering instability at that point. As the following figure shows, an initial movement away from the power legitimacy point E induces a centrifugal movement away from equilibrium (Figg. 4A e 4B).

In sum, the negative correlation among the differentials in the speed of adaptation to the changes in the real world, both on the System's side at the first inflection point, and on the State's side at the second inflection point, increases the probability of major war when those critical points occur. At the first inflection point, the System reacts too slowly to the State's demands for adjustment; at the second inflection point, the State reacts too slowly to the System's demands for adjustment. In both cases, we see the viscosity of power at work in the sense that those who must eventually yield power seek to delay the process of adjustment and maintain the *status quo*. Both the sudden demand for adjustment and this rigidification of attitude are prompted by the sudden inversion in the prior trend which has created the situation of disequilibrium.

The analysis of the upper and lower turning points is essentially the same as at the inflection points, notwithstanding the qualitatively different nature of change taking place there. At the high and low points, the change involves an inversion in the trend itself, not a change in the rates of acceleration or deceleration. However, these high and low points can be shown to correspond to inflection points on the integral of the power cycle, representing the area under the curve of the power cycle at successive points in time. The total power (relative to the system) accumulated by the State over time accelerates up to the time it reaches its maximum on the power cycle; then the total accumulated power begins to slow down and approach a constant value. Thus, the integral of the power cycle is a curve whose shape is homologous with a rising logistic, and analysis of instability at the turning points can reduce to that just given for the inflection point.

One can also examine the maximum and the minimum directly in terms of what happens to the elasticities with and without a lag in role ascription, and in terms of differing rates at which the power of the state approaches the maximum. Clearly, the situation in which a state does not approach its

maximum gradually, but instead suddenly 'bumps against the upper limit to further growth' is much more startling, and hence much more unstable, than a situation in which approach to the maximum is very gradual. Germany's very rapid rise in the European system was characterized by just such an abrupt discovery of the upper bounds of the system [16]. Likewise, the situation in which role ascription has been denied, and a sizeable gap between power and role exists, is much more destabilizing than one in which the state at its turning point is not suffering from disequilibrium. Once again, Germany met the criteria conducive to increased rigidities. Hence, the sudden inversion of the Achieved Power line at the maximum, together with a still steep slope for the lagged Role Ascription line, represent the extreme nature of the instability in the system prior to the First World War.

This analysis demonstrates that there is indeed a dangerous increase in the probability of war when a critical point occurs on the power cycle curve. When the previous trend is broken and the viscosity of power is great, the probability of conflict increases. Whether the change is due to sudden reversal of acceleration, or to the reversal of the power trend, the behavior of the actors in the international arena may lead to vicious action and reaction patterns. Misunderstanding, fear, and war has resulted in the past. The underlying problem is the timing of the adjustments and the actor's perceptions of these adjustments. At each of the critical points, the velocity of the adjustment to the new situation is critical.

The international system is not as simple or as regularized as we have assumed it to be in this model. The model is meant to be only a skeleton representing the essentials of power, role, and stability. By relaxing these very strong assumptions, the model can approach reality more closely. For example, one could relax the zero-sum representation of the international system by acknowledging the existence of neutral and nonalligned powers that have not been considered an integral part of the core system. The relaxation of this hypothesis would probably cause a modification in both the shape and height of the

[16] C.F. Doran, *Systems in Crisis: New Imperatives of High Politics at Century's End* cit.

system ascribed role curve. By utilizing a series of matrices representing the power of each state, the resulting summation becomes a proxy for overall systemic power. Moreover, the assumption that slippage does indeed exist between the real power of a state and the perception of that power by the system should not be too problematic. Slippage reinforces the characteristics of instability at the critical points by introducing a further element of variability in the already precarious equilibrium.

3. Contemporary lessons re the power cycle: Iraq and Kuwait

At the time of this writing, a crisis is occurring in the Middle East. It involves Iraqui invasion of Kuwait. In opposition, a major military build-up is led by the United States but features a UN supported embargo of Iraq and the military partecipation of many governments inside and outside the region. What conclusions can one draw about the nature and outcome of this crisis from power cycle theory?

Power cycle theory is predicated on the assumption that prediction in any full sense of the term is impossible, both in social scientific analysis and in the halls of statecraft. Indeed, if prediction were possible, the power cycle theory explanation for past war would largely be invalidated, since governments would have tended to discount the future and avoid hurtful outcomes. But power cycle theory can in advance identify conditions such that, when they occur, the effort to preserve security and peace will be much more difficult, and the probability of doing so much lower.

This means several things in the present Middle East context. First, the Soviet Union, although still the second most powerful state in the system, is at the upper turning point on its power cycle. Should perestroika fail to reengage the Soviet economy, the Soviet Union will enter relative decline, perhaps precipitously, especially if accompanied by more internal dissension from the nationalities. So unpredictable is the outcome that a Great Russia could emerge in isolation, fringed by a series of smaller 'Warring States'. Whatever the outcome of the movement on the Soviet power cycle, the Soviet Union wants

peace in the Middle East at this time so as to solve its domestic problems. Yet it has very little time or diplomatic energy to devote to the actual resolution of hostilities. Hence its willingness to restrict its role to mediation, thus allowing the United States to take the lead in a dispute whose outcome is equally important to Moscow.

Second, the United States, while at a much higher level of absolute overall capability than the Soviet Union, is already in nascent relative decline. Washington understands its limits very well, constrained by deficits and the political unwillingness to increase revenue through substantial tax increases. But it perhaps understands those limits too well, in that it underestimates its contemporary potential for global influence. But structural economic problems also constrain the American hand in any long-term solution to the Iraqi-Kuwait situation where large unilateral investments of capital are required. Where enormous transfers of capital to OPEC are occurring because of the embargo on Iraqi oil, gaps between perceived role are evident. The United States seeks to close these gaps by two methods. First, it seeks a multilateral effort at collective defense rather than unilateral peace enforcement. Second, the United States has attempted to get the beneficiaries of energy security to help foot the cost of collective defense as well as the cost of higher oil prices to the poor energy importing nations.

But the greatest lesson to be drawn from the power cycle at the great power level is that the United States is both the strongest nation in overall military and economic terms and a country that is slowly entering relative decline on its cycle. This creates a peculiar dynamic which places special demands on the United States while at the same time it is attempting to restructure its own foreign policy. Hence, the United States is likely to be firm, cautious, and very anxious concerning long-term unilateral commitments of force to the region, a posture that makes the United States much more desirous of quick outcomes than would otherwise be true of its foreign policy behavior at this point on its power cycle.

At the regional level, power cycle analysis is appropriate to both the 'regional system' and the broader 'major power system'. But in each case, the analysis is complicated for one salient reason. States at the regional level often obtain so much

outside assistance, or are subject to so much influence from the top of the system, that the dynamic of their own internal cycle (in each system) becomes less distinguishable. Hence, an assessment of the Iraqi position on its power cycle, a very useful item of information, is quite problematic.

Despite these difficulties, made all the more glaring for Iraq because of the Arab regional assistance it received during the Iraq-Iran War and because of arms sales that have inflated its weapons capability, a conclusion is possible. In the context of the regional 'Middle East system', Iraq's relative military power, financed by debts it could not easily repay, was at a peak. Regarding the broader mix of economic and other indicators, it is difficult to determine without access to relevant data whether Iraq has advanced to the first inflection point point on its relative power cycle (as indexed). The invasion of Kuwait could well have occurred, however, because Iraq was fearful of suddenly discovered slower growth, heavy debts, and the prospect that port facilities would permanently remain outside its reach. In the broader systemic context, Iraq is located in the early phase of an ascending power cycle, often characterized by foreign policy 'exuberance' and expansionist proclivity.

Expansionism must be halted by a firm balance of power. Saddam's psychological profile, more like that of Stalin's than Hitler's perhaps, adds urgency to this observation. Notwithstanding this need to stop its aggression, Iraq is probably deserving of a more visible foreign policy role. There may indeed be a gap between its ostensible role and its current power. But this larger role must not involve intimidation of its neighbours or aggression.

Hence the United States and its allies must pursue a complicated policy of military presence and balance on the one hand, and of an effort to coopt Iraq into a fuller regional and perhaps even extra-regional framework of diplomatic effort on the other. That is why both a two-track arms control policy and a larger US military presence was advocated in April of 1990 (though in the complacence of the interval, largely ignored).

What the dynamics of these power cycles suggest is that the dire warnings of armageddon over Iraq are probably quite exaggerated. This is a serious dispute. It could lead to signifi-

cant force use. But it does not have the prerequisite characteristics of a World War Three, largely because the Great Powers are not at points on their power cycles where their collective anxiety and uncertainty would lead to multiple and opposed involvements and an inversion of force expectations. The Iraq-Kuwait conflict ought to elicit concern but not melodrama on the part of the world community as that community slowly moves toward much deeper and fuller systems transformation.