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The Future Availability of Strategic Raw Materials Possible and North Atlantic Treaty Organization Actions

Eric A. Kevitz, MAJ, USA
U.S. Army Command and General Staff College
Fort Leavenworth, Kansas 66027

Final report 6 June 1975

A thesis presented to the faculty of the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas 66027

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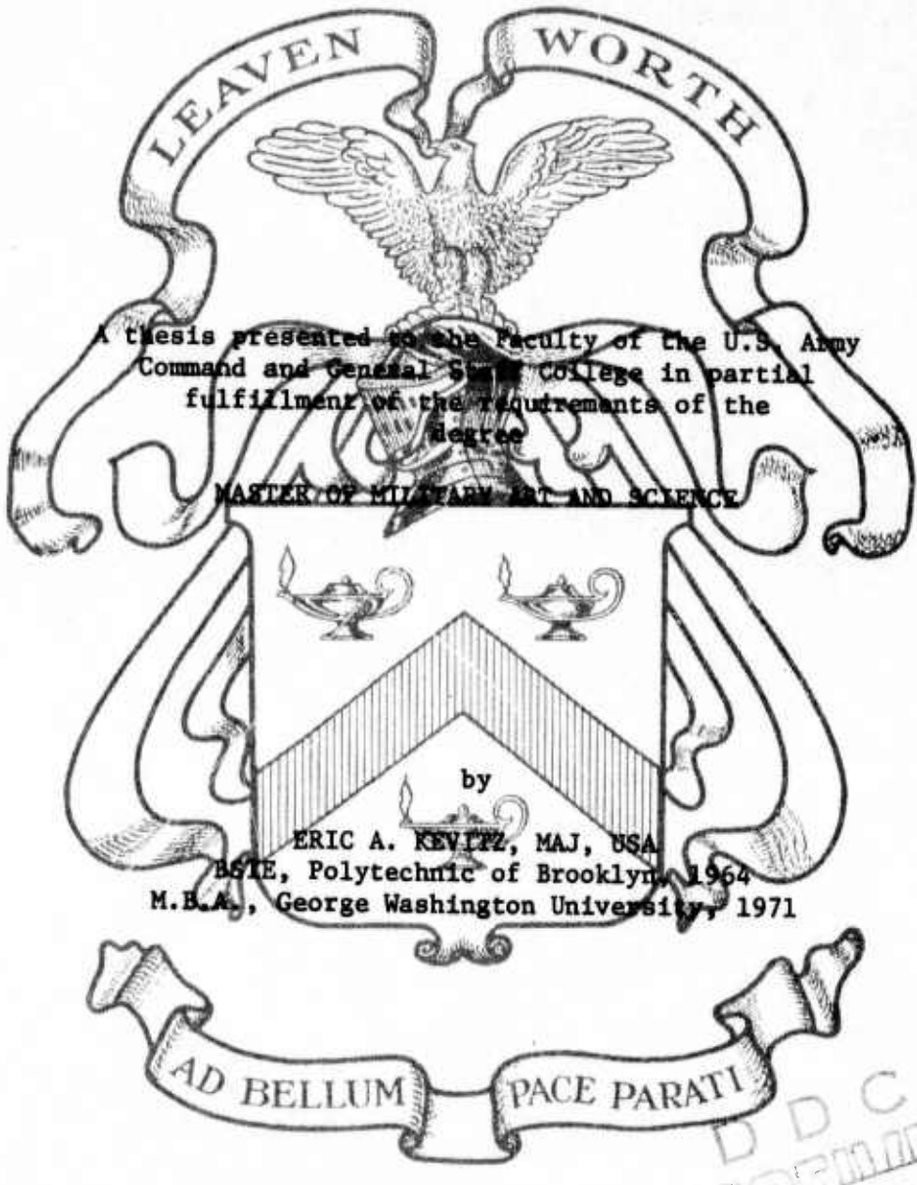
This thesis looked at three courses of action available to NATO in dealing with potential interruptions in the supply of strategic raw materials.

The three courses of action examined were, first, a do nothing approach and leave any action to individual member governments; second, a military approach to safeguard existing sources of supply; and, third, a pre-crisis preparatory approach to lessen damaging effects of any cut-off. The thesis shows that the third approach appears to be the best overall approach and offers the best chance for coping with any future cut-off.

FUTURE AVAILABILITY OF STRATEGIC RAW MATERIALS AND POSSIBLE NORTH ATLANTIC TREATY ORGANIZATION ACTIONS



A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements of the degree

MASTER OF MILITARY ART AND SCIENCE

by

ERIC A. KEVITZ, MAJ, USA
BSIE, Polytechnic of Brooklyn, 1964
M.B.A., George Washington University, 1971

Fort Leavenworth, Kansas
1975

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ABSTRACT

This thesis examines the question of the scarcity of strategic raw materials and the potential for the interruption or cut-off in the supply of these raw materials to the members of the North Atlantic Treaty Organization (NATO). Strategic raw materials are defined as those raw materials that are essential to national defense and consist of bauxite, chromium, cobalt, copper, iron, lead, manganese, mercury, natural rubber, nickel, phosphate rock, platinum, tin, tungsten, and zinc. Once the potential for cut-off of these materials is determined, the thesis examines several possible courses of action available to NATO to insure an adequate supply of strategic raw materials in view of the fact that most of these materials are located outside of NATO.

The recent events in the Middle East which culminated in the Arab oil embargo highlighted the fact that the Alliance is dependent upon many non-Alliance suppliers for its strategic raw materials. The oil embargo added a new dimension to the threat to NATO and revealed that the Alliance is unprepared for raw material cut-offs and does not have a cohesive plan to cope with such a situation. The

obvious lack of unity and complete absence of any coherent policy on cut-offs may tempt other raw material producers to try a repetition of the OPEC oil embargo.

Yet, even today, after the dramatic events of 1973, the threat is not fully appreciated because the best evidence available indicates that it is presently not possible for the producers of other strategic raw materials to seriously limit supplies. These conclusions are drawn from the fact that sources of supply are more diversified and can be readjusted by consuming nations. There does not appear to be a coalescing political catalyst. Substitution opportunities exist in most cases and stockpiles serve as a buffer. Finally, most of the producing countries depend heavily on the continued flow of mineral exports to pay for imports and to provide employment.

Yet, even though cut-offs of strategic raw materials appear remote at the present time, changes in the world situation could dramatically alter prior predictions. The success of the 1973 Arab oil embargo was almost totally unpredicted, and this thesis has attempted to illustrate that a similar situation could occur in the future with some other strategic raw material. It is possible that the confrontation of black majorities in Africa against white minority governments in Rhodesia and South Africa could

provide a catalyst in uniting Black Africa. The black majorities might try to use their control of certain raw materials to influence (or pressure) Western governments. It is also possible that some type of military (guerrilla) action by Black African states against Rhodesia and South Africa could effectively cut off supplies of strategic raw materials from both black and white Africa.

The three strategic raw materials that create the greatest potential vulnerability are cobalt from Zaire and Zambia and platinum and chromium from Rhodesia and South Africa. Two other raw materials--copper from Zaire and Zambia and phosphate from Morocco--also pose problems, but to a lesser degree. Nevertheless, they should not be ignored because of the potential damage of supply restrictions during war. During peacetime the United States can supply Western Europe's strategic needs in the event of a cut-off of African sources; however, such supply restrictions during a war would eventually influence the well-being and efficiency of the entire NATO labor force and could have important secondary effects if sustained over a long period.

This thesis looked at three courses of action available to NATO in dealing with potential interruptions in the supply of strategic raw materials. The courses of action were designed specifically to insure continued supplies from

African countries, both black and white, but could easily provide the framework for a program to deal with all Third World producers of raw materials.

The three courses of action examined were, first, a do nothing approach and leave any action to individual member governments; second, a military approach to safeguard existing sources of supply; and, third, a pre-crisis preparatory approach to lessen damaging effects of any cut-off. The thesis shows that the third approach appears to be the best overall approach and offers the best chance for coping with any future cut-off.

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CHAPTER I

INTRODUCTION

Recent events in the Middle East which culminated in the Arab oil embargo during the 1973 Arab-Israeli war stimulated interest by Western strategists in the vulnerability of supplies of certain natural resources and the corresponding effects on national military, political, and economic power. This thesis examines the question of the scarcity of strategic raw materials and the potential for interruptions or cut-offs in the supply of these raw materials to the members of the North Atlantic Treaty Organization (NATO).[1] Then, once the potential is determined, attempts are made to establish what steps NATO can and should take to insure an adequate supply of strategic raw materials in view of the fact that most of these materials are located outside of NATO and are potentially subject to cut-off during both hostilities and peacetime. This thesis considers only those actions necessary to insure an adequate supply of raw

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[1] Strategic raw materials are defined as those essential to national defense. The basic raw materials deemed strategic are bauxite, chromium, cobalt, copper, iron, lead, manganese, mercury, natural rubber, nickel, phosphate, platinum, tin, titanium, tungsten, and zinc.

materials for military necessity. It does not consider the broader and more complex problem of insuring the availability of sufficient raw materials for everyday domestic industrial demands because this writer believes that task is beyond the scope of the NATO Charter.

Chapter I examines the 1973 Middle East oil embargo and highlights the division of the members of the Alliance during the oil cut-off. It illustrates the fact that the Alliance was unprepared for the cut-off and did not have a cohesive plan to cope with such a situation. As background to support the rationale that NATO should get involved in the raw materials problem, the thesis briefly reviews NATO's increasing concern for economic and political cohesion in dealing with non-military threats both inside and outside the boundaries of the Alliance and also presents examples of past multilateral actions.

Chapter II assesses the present and future potential for interruption or cut-off of strategic raw materials. The chapter is divided into two parts. The first part focuses on the situation *today*. It considers *existing* political sympathies and the *present* trading patterns and highlights the leverage available today and for the next year or two to both producer and consumer of raw materials. The second part of the chapter considers *potential future* threats and how

rising trends of nationalism and demands of black majorities in Africa, with the consequences of possible nationalization, expropriation, sabotage, and blackmail, might affect the Alliance's ability to secure necessary raw materials in the future. In both parts, the potential for supply limitations is examined by looking at the current sources of imports of strategic raw materials for both the United States and its European allies in NATO, the known world reserves, the possible use of substitutes, and the extent of current stockpiles in the hands of NATO governments or industries.

Chapter III looks at the benefits and risks of several courses of action available to NATO in dealing with potential interruptions in the supply of strategic raw materials.

Chapter IV summarizes the thesis and lists the courses of action that should enable NATO to deal effectively with any interruptions or cut-off of strategic raw materials.

The 1973 Middle East oil embargo highlighted the possibility that sources of strategic raw materials may become unavailable. It highlighted the real vulnerability of the members of the Alliance, in particular the European states, to potential interruptions in the supply of raw materials. It also pointed out the divergence of opinions

within NATO.

The heavy dependence of many European members of the NATO Alliance on Arab oil supplies sharply divided the partners concerning support for Israel. The October 1973 war served to illustrate the disparity between NATO's past communiqués and the present actions of NATO members. In the 1950s, Europeans were asking for American assistance in the Middle East with the argument that they were defending the greater interests of freedom. Yet, scarcely twenty years later, when America was heavily involved in the Middle East, the European allies were adamantly avoiding pleas to play an extra regional role. This time they considered their national interests to be paramount, and they did not see any immediate or long term benefit in becoming associated with America's extra-European involvement. Consequently, the Alliance was plunged into a grave crisis marked by an unprecedented exchange of trans-Atlantic recrimination.

Not wishing to jeopardize oil supplies, the Europeans, with the notable exception of the Netherlands, took the public position that the Middle East war was outside of the NATO boundaries and consequently did not entitle Israel or its partner, the United States, to any support, certainly not any military support, from the NATO Alliance. No NATO country was being threatened, they said, and in reality most

Europeans believed the United States was largely responsible for the war because of its failure to bring pressure upon Israel to comply with United Nations Resolution 242 urging withdrawal from occupied Arab lands. Militarily, then, there was no threat and, consequently, no justification for support of the American position of aid to Israel.

Although United States policy-makers did not expect any military intervention by NATO during the October 1973 war, many of them assumed the Alliance would present a unified position and pull together. Just the opposite proved to be the case, and the sharp differences in United States and European positions were highlighted by the type of rhetoric that in previous years had been reserved for ideological opponents. The State Department spokesman, Ambassador Robert McCloskey, voiced his dismay at European actions and publicly stated:

> We were struck by a number of our allies going to some lengths to, in effect, separate themselves publicly from us, and it raises the questions for us as to how the action on their part can be squared with what the Europeans have often referred to as the indivisibility between us on matters of security.[2]

Some European commentators, supporting the American point of view, reacted with feelings that ranged from disappointment to disgust. The *Financial Times*, voice of the

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[2] *Strategic Survey, 1973* (London: International Institute for Strategic Studies, 1974), p. 61.

British business community, commented:

> Faced with the prospect of domestic energy dislocations as a result of the energy crisis, many if not all of the Member States have pursued bargaining tactics designed to maximize short-term national interests, at the risk of jeopardizing the long-term goals of Community solidarity on problems with [which] are essentially common problems.[3]

The Times of London was even more dramatic. It reported:

> Nothing in the realms of cowardice, selfishness, cant, and short-sighted folly is beyond the bounds of possibility in view of what has actually happened already. The first time--*the very first time* --that any external strain is put upon the . . . [NATO] alliance, the ties that bind its members snap. No, they do not snap; the members themselves rush forward eagerly to snap them.[4]

The views expressed by opponents of unified action were primarily economic concerns, but they caused an exasperating divergence in the traditional focus of the Alliance: the security field. Signal actions by members included the following three:

- Public declarations of neutrality in the Middle East conflict by both Greece and Turkey, which prevented the use of American bases there for the airlift to Israel.
- The restriction on the American movement of United States military supplies from stockpiles in Europe.
- The granting by Turkey of over-flight rights to the Soviets for airlift to the Arabs.

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[3] *European Community*, No. 174 (March 1974), p. 13.

[4] Ibid.

The United States viewed this complete lack of cooperation as a virtual breakdown of the Alliance. Yet few in Europe saw any threat to the Alliance. Since no real military threat was perceived in Europe, each nation acted according to its own view of its best interests.

Other political commentators saw a different picture and believe energy or raw material shortages are likely to divide the members of the Alliance and accelerate the disintegration of NATO. Disunity and lack of a coherent policy by NATO countries during the 1973 oil crisis can only tempt others to take advantage of the disarray. Continued disputes and disharmony and aggressive economic nationalism by NATO members could lead to disillusion with and eventual dissolution of NATO.[5] Consequently, if member nations believe that NATO should be maintained and also find that a cut-off of strategic raw materials is possible, they should together provide the mechanisms to deal with the fact that NATO is dependent upon countries outside of the Alliance for these raw materials. Indeed, many believe the real threat to NATO is no longer from the Soviet Union or the Warsaw Pact but rather from Third World countries that control many raw materials that are vital to the economic well-being of

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[5]Seyon Brown, *New Forces in World Politics* (Washington: Brookings Institute, 1974), p. 19.

developed countries.[6]

In the past the highly developed countries, through one means or another, have usually managed to insure for themselves a continued adequate supply at a price that more often than not benefitted the consumer rather than the producer.[7] The 1973 Arab oil embargo pointed out that this situation may not continue indefinitely.

Recently Algerian President Boumediene intimated that the oil cut-off was but the first example and that developing countries must take over all their natural resources and control the machinery governing the determination of their prices.[8] As this may be no idle threat, it could pose a serious problem for most developed countries, including all members of the Alliance. Since many raw materials are strategic in the sense that they are vital to a nation's ability to wage war, it is important that members of the Alliance determine what steps can be taken to insure continued supplies.

Yet the threat of a cut-off of raw materials is

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[6] C. Fred Bergsten, "The Threat from the Third World," *Foreign Policy*, No. 11 (Summer 1973), pp. 102-124.

[7] Ibid., p. 113.

[8] Algerian President Boumediene, "Raw Materials and Development," Address before the General Assembly of the United Nations, 10 April 1974.

somewhat different from previous military threats to NATO and is much more difficult to handle. In a sense it can be viewed as military because it affects a nation's ability to wage war. In this context it poses a problem for the NATO Alliance. However, the issues raised are not strictly military. They are also economic and political, and many NATO military authorities would deny that they have any authority to promote multilateral schemes in these areas.[9] Since the threat is now economic as well as military and NATO is not specifically designed to cope with such problems, they suggest NATO is therefore incapable of doing so.[10] Many question the ability of NATO to act jointly on the problem of possible interruptions in the supply of raw materials since economics has long been held to be a strictly national problem.[11]

The provision of supplies for defense has long been viewed as a national prerogative. Further, in an era of a perceived lessening of the military threat and of economic penny-pinching, it is also viewed as a political problem of

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[9] Geoffrey Ashcroft, *Military Logistic Systems in NATO: The Goal of Integration*, Part II: *Military Aspects*, Adelphi Paper No. 68 (London: Institute of Strategic Studies, June 1970), p. 9.

[10] Robert E. Hunter, "Troops, Trade and Diplomacy," *Atlantic Community*, IX, No. 3 (Fall 1971), 283-92.

[11] Ashcroft, p. 15.

the highest magnitude. However, just as it is absolutely necessary for NATO to have tanks and troops, it is necessary that NATO insure for itself the raw materials necessary to preclude the possibility it will be unable to carry on a war should the need arise. This does not in any way expand the mission of the Alliance. Article 3 of the North Atlantic Treaty specifically authorizes the members to "maintain and develop their individual and collective capacity to resist armed attack."

This writer agrees that the NATO Alliance is not designed to cope with the cut-off of raw materials vital to domestic industrial production, but this does not preclude NATO interest in insuring supplies of strategic raw materials necessary for military defense. Since most strategic raw materials are located outside of Europe and are possibly subject to cut-off, it seems necessary for NATO to take some steps to insure an adequate supply of these strategic materials, both during peacetime and in case of hostilities. However, in making such a statement, it is possible to make a distinction between national economic policy and NATO concern for adequate resources to meet future expected defense commitments. There is no argument that every nation must make policies in its best interests, yet the members of the Alliance also have a joint responsibility to prepare

adequately to meet probable threats of cut-offs of strategic raw materials.

There has never been any question about the need for military cooperation in NATO. There is also much evidence that the need for economic cooperation is now being recognized by the Alliance. In April 1973 Dr. Henry Kissinger delivered his "Year of Europe" address.[12] Kissinger noted the fact that in economic relations the European Community has increasingly stressed its regional personality. He talked about the continued gradual accumulation of sometimes petty, sometimes major economic disputes which must be ended and be replaced by a determined commitment on both sides of the Atlantic to find cooperative solutions. In the race to secure access to raw materials, Dr. Kissinger warned that the influence of national pressure groups and special interests will become pervasive. Consequently, unless a high level commitment of political will to cooperate is made, the inevitable competitiveness of national economic interests will dominate the debate and "there will be no framework for the generous solutions or mutual concessions essential to

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[12]Henry Kissinger, then President Nixon's National Security Affairs Assistant, "Year of Europe," A speech before the Associated Press Annual Luncheon, New York City, 23 April 1973. Dr. Kissinger called for a new Atlantic charter and a revitalization and updating of the trans-Atlantic relationship.

preserve the vital Atlantic partnership."[13]

Just prior to the twenty-fifth anniversary of the Alliance, the Secretary General of NATO echoed Dr. Kissinger's theme of economic as well as military interdependence of the NATO countries. He also warned that the greatest problems concerning relations within the Alliance were

> to agree on where the interests of the Alliance lie in any particular situation; agreeing on what is alliance business and responsibility and what is not; finding means to resolve differences between alliance members where these arise and threaten alliance solidarity.[14]

At the 19th Annual Session of the North Atlantic Assembly,[15] 21-30 October 1973, a similar view was voiced. With regard to the responsibility of NATO member countries toward solving the problems of their own economic relations, the secretary of the Economic Committee, Dr. Erwin Lange, from the Federal Republic of Germany, pointed out that "more

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[13] Ibid.

[14] Joseph M. A. H. Luns, "Prospects for the Alliance," *NATO Review*, Vol. 22, No. 1, 1974, pp. 3-4.

[15] "The Assembly constitutes an unofficial link between the [NATO] Alliance and parliamentarians of member countries. Its Committee of Nine, set up in 1971, consisted of nine prominent present or former parliamentarians from member countries of the Alliance, including the former Secretary General of NATO, Senator Manlio Brosio. The committee's task was to carry out a detailed study of the future prospects of the Atlantic Alliance, giving special attention to the role which the Assembly could play. The Committee, which compiled a substantial report, has now finished its work." The references in this paragraph deal with selected portions of the Committee's report.

than ever we have heard in recent months the warning that transatlantic economic problems could endanger the North Atlantic Alliance."[16] The Assembly passed a resolution on "economic cooperation between members of the Atlantic Alliance" and "urged member governments to establish regular consultation between economics and finance Ministers within the *North Atlantic Council*."[17]

This, once again, is not an expansion of NATO responsibilities. Article 4 of the North Atlantic Treaty calls for "the Parties to consult together whenever, in the opinion of any of them, the territorial integrity, political independence or security of any of the Parties is threatened."

The *Report of the Committee of Three on Non-Military Cooperation in NATO* further amplified Article 4 of the NATO Treaty and stated that

> political *cooperation* and economic *conflict* are not reconcilable [emphasis added]. Therefore, in the economic as well as the political field there must be a genuine desire among the members to work together and a readiness to consult on questions of common concern based on a recognition of common interests.[18]

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[16]Erwin Lange, "Atlantic Economic Questions," Report to the 19th Annual Session of the North Atlantic Assembly, Ankara, Turkey, 21-30 October 1973.

[17]"Report on the 19th Annual Session of North Atlantic Assembly," *NATO Review*, Vol. 21, No. 6, December 1973.

[18]NATO, *Report of the Committee of Three on Non-Military Coop-*

The report further stated that NATO has a positive interest in the resolution of economic disputes which may have political or strategic repercussions damaging to the Alliance.[19]

NATO countries have already had some experience in working together collectively on logistical issues. There is ample evidence that cooperation is possible. As the cost of providing the North Atlantic Alliance with a reasonable level of defense continued to spiral upward, member nations began to look increasingly for ways of getting better value for their money. One way of achieving this aim was to increase the number of projects undertaken on a cooperative basis. Examples of this type of cooperative action are the NATO Maintenance and Supply Organization,[20] the Eurogroup actions,[21] the NATO Pipeline System, and the NATO Air

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eration in NATO, by Dr. Gaetano Martino (Italy), Mr. Halvard Lange (Norway), and Mr. Lester M. Pearson (Canada) (n.p.: North Atlantic Council, 13 December 1956), "Annex I," par. 60.

[19]Ibid., "Annex I," par. 66.

[20]Two good discussions of the NATO Maintenance and Supply Organization (NAMSO) appear in *NATO Review*, Vol. 21, No. 2, pp. 18-24; and *NATO Letter*, Vol. 17, No. 5, p. 22.

[21]The Eurogroup is an informal grouping of European Defense Ministers within the North Atlantic Alliance. It was established in November 1968 and includes Belgium, Denmark, Germany, Greece, Italy, Luxembourg, the Netherlands, Norway, Turkey, and the United Kingdom. Its stated purpose is to strengthen Alliance security through a stronger and more cohesive European contribution.

Defense Ground Environment (NADGE) System.[22] Daily cooperative efforts exist at various lower levels in the NATO structure. A good account of these efforts is found in the NATO Information Service booklet entitled *Aspects of NATO*.[23] It details more than ten ongoing projects of cooperation within the Alliance. Also, the newly formed Committee on the Challenges of Modern Society (CCMS) is sponsoring efforts for joint programs in energy and resources.[24]

Consequently, it is accurate to say that NATO recognizes the need to insure that economic issues do not divide the Alliance and has shown that it can work together in providing the means for effective defense. Since it is not unreasonable to posit that the Alliance will be unable to resist an armed attack if it does not have adequate strategic raw materials to carry out its defensive operations, it follows that NATO can legitimately concern itself with insuring an uninterrupted flow of strategic raw materials

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[22] Good discussions of NADGE may be seen in *NATO Review*, Vol. 19, No. 4 (July-August 1971), p. 8; and *NATO Review*, Vol. 21, No. 1 (January-February 1973), p. 12.

[23] *Aspects of NATO: The Eurogroup* (Brussels, Belgium: NATO Information Service, November 1972).

[24] For a discussion on the Committee on the Challenges of Modern Society, see: "Beyond NATO," *International Journal*, Vol. 29, No. 2 (Spring 1974), pp. 256-67; and *NATO Review*, Vol. 21, No. 5 (September-October 1973) and Vol. 22, No. 2 (March-April 1974), p. 22.

even though this issue has economic and political, as well as military, implications.

This thesis puts the strategic raw materials problem in perspective and outlines what steps are necessary to lessen the possibility that the divisions of opinion witnessed during the 1973 oil embargo will be repeated during another embargo or supply interruption.

CHAPTER II

POTENTIAL FOR CUT-OFFS OF STRATEGIC MATERIALS

Chapter II examines the raw material requirements of the United States and other members of the North Atlantic Treaty Organization (NATO) and how the prospect of a general and global scarcity of these material commodities will affect the Alliance's ability to secure necessary strategic raw materials. The chapter is divided into two parts. The first part focuses on *present* vulnerability, while the second part concentrates on *potential future* threats. The impact of the current energy crisis is all too apparent and is not considered in any great detail. Neither is the impact of worldwide shortfalls in food supplies considered, because both the United States and NATO Europe are self-sufficient in this area. Rather, the chapter concentrates on strategic raw materials and attempts to illustrate the potential for successful collective action by producers of these minerals. The following paragraphs look at the genesis of the minerals scarcity problem, the expected consumption rates in the near term and the year 2000, and the known

sources of raw materials, current stockpiles, and potential substitutes. A substitute is considered as available if it can be substituted for the material in question immediately or without undue new production expenses and is both cost effective and available in sufficient quantity so as to preclude severe price increases under present market conditions. The chapter briefly identifies the principal market characteristics of the strategic raw materials and attempts to determine the feasibility of cartel action now and also in the future.

In view of the heavy reliance of both the United States and Western Europe on imported raw materials, it is natural to question the extent of their vulnerability to possible embargoes, contrived supply limitations, or inordinate price increases. The portion of the United States consumption of critical materials required for defense production is generally regarded as between 10 per cent and 20 per cent in the event of war and only about one-half of that in peacetime.[1]

The European members of NATO spend a somewhat smaller portion of their total gross national product (GNP)

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[1]U.S., Executive Office of the President, Council on International Economic Policy, *Special Report: Critical Imported Materials* (Washington: Government Printing Office, December 1974), p. 10. (Hereinafter cited as *Special Report.*)

on defense.[2] Consequently it is reasonable to estimate that the portion of their consumption of raw materials for defense production is smaller, perhaps in the neighborhood of 7 per cent to 15 per cent in the event of war. Likewise, they also spend about one-half of this during peacetime.

In this thesis it is assumed that supply interruptions or cut-offs of strategic raw materials will cause problems in supporting the defense establishment during a national emergency. Even under peacetime conditions, cut-offs of raw materials will damage the military capability of NATO; however, no attempt is made in this thesis to quantify the extent of damage under peacetime or wartime conditions. This thesis examines only the potential for cartel actions to interrupt or cut off supplies and what actions NATO should take to lessen vulnerability to this type of action.

It is important to realize that any attempts to analyze simultaneously the vulnerability of both the United States and its European allies are complicated by the different sources from which each imports its raw materials. In addition, the risks are different for the United States

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[2] U.S., Department of State, *Economic Interdependence and Common Defense*, Economic Foreign Policy Series 6 (October 1974), pp. 3-4. United States defense spending averages 6 per cent of GNP, while major European allies of the United States spend roughly 4 per cent of their aggregate GNP.

and Europe because of varying import dependence with respect to specific materials. For example, since the United States is virtually self-sufficient in copper and phosphates, these materials are at the bottom of its list of concerns. Presently, despite the existence of a producer group for copper[3] and the aggressive price actions by North African phosphate producers, the United States does not even maintain a stockpile of copper or phosphate.[4] In Europe these two materials are among the chief concerns regarding vulnerability to supply and price manipulation. In addition, the United States relies on Canadian and Latin American sources to a much greater extent than does Europe. Europe relies to a significantly greater extent on Africa. In most instances, United States, Canadian, or Latin American sources cannot be substituted for African or Near East sources without serious short term price consequences because of supply and demand problems and transport costs.

Present Situation

Until 1973, few government or military specialists

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[3] In 1968 Chile, Peru, Zaire, and Zambia established the Intergovernmental Council of Copper Exporting States (CIPEC). The four CIPEC nations account for 52 per cent of the world's copper trade and 33 per cent of the world's copper production.

[4] A list of current selected materials in the United States national stockpile may be seen in Appendix A.

worried seriously about the availability of or access to raw materials so necessary to keep the highly industrialized societies of the United States and Western Europe running smoothly. However, in late 1973 the industrialized world was shocked when the Organization of Petroleum Exporting Countries (OPEC) began a cutback in petroleum production and simultaneously almost quadrupled the wellhead price of oil.[5] Even though some non-oil exporting countries, including the United States, were able to moderate the effects of the OPEC price increases through increased revenues from exports of other scarce commodities, this was not universally true, and by the end of 1974 the balance of payments of almost every NATO member was seriously strained.

Simultaneously, there was an upturn in demand for other raw materials in all major industrial nations. This caused temporary shortages and sent prices soaring. In addition, many commodity exporting countries began attempts to control supplies and prices. For example, the large increases in demand for phosphate, coupled with inadequate world production, allowed Morocco to act unilaterally to quadruple world phosphate prices in a matter of two years. Likewise, Jamaica managed to increase sixfold its taxation

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[5] OPEC consists of Abn Dhabi, Algeria, Iran, Iraq, Kuwait, Libya, Nigeria, Quator, Saudi Arabia, and Venequela.

on bauxite production, and the Dominican Republic, Guyana, and Surinam are now making comparable efforts.[6]

Naturally the industrialized nations viewed all of these actions with alarm. The United States is almost totally dependent on foreign sources for most of its strategic raw materials. Among these are bauxite, mercury, nickel, titanium, manganese, cobalt, tin, chromite, and platinum. There is a much longer list of raw materials where the margin of independence is critically thin. Such basics as lead, zinc, and iron ore already comprise a large fraction of the United States import requirements. Table 1 illustrates the United States net imports of selected raw materials. A recently completed House of Representatives report on global commodity scarcities highlights the fact that the United States depends on imports to satisfy its needs for forty-three raw materials.[7]

United States allies in Western Europe face a similar situation. Table 2 illustrates that Europe, like the United States, depends on imports for 90 per cent or more of

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[6]U.S., Congress, House, Committee on Foreign Affairs, Subcommittee on Foreign Economic Policy, *Global Commodity Scarcities in an Interdependent World*, Committee Print, 93d Cong., 2d sess. (Washington: Government Printing Office, 1974), p. 7. (Hereinafter cited as *Global Commodity Scarcities*.)

[7]Ibid., p. 9.

TABLE 1.--United States Net Imports of Selected Commodities

Commodity	1973 Net Imports: Million Dollars	1973 Net Imports: Per Cent of Consumption[a]	Major Suppliers, 1969-1972, with Their Per Cent
Alumina	209	35	Australia, 50; Jamaica, 22; Surinam, 18
Bauxite	143	90	Jamaica, 54; Surinam, 23
Chromium	63	70	USSR, 32; South Africa (SA), 30
Cobalt	54	95	Zaire, 45; Belgium-Luxembourg, 29[b]
Columbium	. . .	63	Brazil, 62; Canada, 16
Copper	143	5	Canada, 31; Peru, 27; Chile, 22
Fluorspar	52	83	Mexico, 77; Spain, 12
Iron Ore	534	28	Canada, 50; Venezuela, 31
Lead	27	17	Canada, 29: Peru, 21; Australia, 21; Mexico, 17
Manganese	100	82	Gabon, 35; Brazil, 33
Mercury	12	78	Canada, 59; Mexico, 17
Nickel	544	65	Canada, 82; Norway, 8
Platinum[c]	145	95	UK, 39[d]; USSR, 32; SA, 12
Rubber[e]	347	100	Malaysia, 40; Indonesia, 39
Tin	215	65	Malaysia, 64; Thailand, 27
Titanium	48	29	Japan, 73; USSR, 19; UK, 8
Tungsten	27	41	Canada, 61; Peru, 9
Vanadium	. . .	25	South Africa, 55; Chile, 35
Zinc	303	48	Canada, 60; Mexico, 24

[a] In quantity terms. Calculated by dividing net imports by total consumption. In some cases consumption includes withdrawals from (or additions to) government and/or private stocks.

[b] Zaire origin. [c] Platinum Group Metals.

[d] United Kingdom sources are South Africa, Canada, and USSR.

[e] Natural Rubber.

SOURCE: U.S., Executive Office of the President, Council on International Economic Policy, *Special Report: Critical Imported Materials* (Washington: Government Printing Office, December 1974), p. 24.

TABLE 2.--United States and Western European Import Dependence On Selected Raw Materials, 1972

[OECD = Organisation for Economic Cooperation and Development; O&C = Ore and Concentrates]

Material	Import Volume (Thousands of Tons)		Imports as a Per Cent of Consumption	
	United States	OECD Europe	United States	OECD Europe
Aluminum	721	285	14	10
Bauxite & Alumina	13,389	3,726	88	51
Chromium Ore	408	970	100	100
Copper	334	1,877	17	93
Copper O&C	49	562	. . .	. . .
Iron O&C	36,334	75,307	32	37
Lead	222	433	19	75
Lead O&C	92	356	. . .	. . .
Manganese Ore	733	3,696	95	98
Nickel	119	64	90	89
Nickel O&C	21	176	. . .	. . .
Phosphate Rock	52	20,514	[a]	100
Tin	52	40	100	96
Tin O&C	4	76	. . .	. . .
Tungsten O&C	2.7	21.5	42	100
Zinc	484	302	55	61
Zinc O&C	231	1,561	. . .	. . .

[a]Net exporter.

SOURCE: U.S., Executive Office of the President, Council on International Economic Policy, *Special Report: Critical Imported Materials* (Washington: Government Printing Office, December 1974), p. 43.

its supply of chromium ore, manganese ore, nickel, and tin.[8] In contrast to the United States, however, Western Europe is dependent on imports for virtually 100 per cent of its needs for phosphate rock, 90 per cent or more of its consumption of copper, and 75 per cent or more of its supplies of lead. Western Europe has an advantage over the United States only in bauxite, of which the United States imports the bulk of its requirements. Table 3 shows the sources for imports of raw materials to Western Europe. No attempt is made here to equate NATO, Western Europe, or the Organisation for Economic Cooperation and Development (OECD). However, in most cases the problem of strategic raw materials for NATO is the same as for Europe and, consequently, the data for Western Europe are used to illustrate import dependence for NATO's European members.

This is the first time in more than twenty years that the world is experiencing a series of short supply problems and consequent high prices for a large number of

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[8]Differences in United States import percentages in Tables 1 and 2 are because different years are considered and because Table 1 measures imports against primary production plus scrap and sales from the strategic stockpile, while Table 2 measures imports against only primary (new) production of materials. For example, the 1973 figures for United States tin imports (Table 1) show a marked difference from 1972 (Table 2). This is because 20 per cent of the 1973 consumption came from secondary recovery (scrap) and 15 per cent from sales from the strategic stockpile. Similar differences are noted for chromium, manganese, and nickel due to secondary recovery.

TABLE 3.--Major Suppliers of Western European Raw Material Imports (Percentage of 1972 Total)

Material	United States	Australia and Canada	Rhodesia and South Africa	Developing Countries			Communist Countries
				Africa[a]	Latin America and Caribbean	Asia[b]	
Aluminum	14	26	. . .	13	5	2	35
Bauxite/Alumina	. . .	51	. . .	15	12	1	21
Chromium O&C[c]	. . .	. . .	33	12	(d)	9	44
Cobalt	. . .	13	. . .	83	. . .	2	. . .
Copper O&C[c]	2	34	14	6	23	10	11
Iron O&C[c]	. . .	20	. . .	39	37	. . .	4
Lead	1	65	. . .	6	12	1	15
Lead O&C[c]	4	27	. . .	34	28	. . .	7
Manganese O&C[c]	3	80	31	38	15	1	4
Nickel	8	67	. . .	2	4	1	17
Phosphate Rock[e]	22	. . .	. . .	53	. . .	. . .	11
Platinum	. . .	. . .	68	. . .	. . .	. . .	32
Tin	. . .	1	. . .	18	4	66	11
Tungsten O&C[c]	11	16	. . .	4	26	25	18
Zinc	1	43	. . .	15	. . .	. . .	40
Zinc O&C[c]	1	65	. . .	9	21	2	2

[a]Excludes Rhodesia & South Africa. [b]Includes Middle East & Oceania. [c]Ores & Concentrates.
[d]Less than 0.5 per cent. [e]Percentages shown do not account for all imports.

SOURCE: U.S., Executive Office of the President, Council on International Economic Policy, *Special Report: Critical Imported Materials* (Washington: Government Printing Office, December 1974), p. 45.

mineral resources. Examples of how demand for various materials surged in the United States in 1973 are:[9]

- Aluminum consumption, after rising at an annual rate of 5.9 per cent in the five previous years, shot up by 18 per cent in 1973.
- Chromium jumped from an average increase of 1.1 per cent a year to 23 per cent.
- Copper increased from 3.8 per cent to 9 per cent.
- Iron ore jumped from 1.4 per cent to 13 per cent.

Later paragraphs will explain these unusual increases in demand.

A similar dramatic increase in the use of raw materials occurred in Western Europe and the rest of the world. If the period from 1950 until 1974 is examined, one will find that the price for raw materials (nonferrous metals) did not rise either absolutely or relative to manufactured goods until the mid-1960s. Since the mid-1960s, however, the prices of many important nonferrous metals, including chrome, copper, nickel, platinum, tin, and zinc, have increased more than those for manufactured goods. Nevertheless, the prices of iron ore and aluminum materials (alumina and bauxite) did not show marked increases until 1973.[10]

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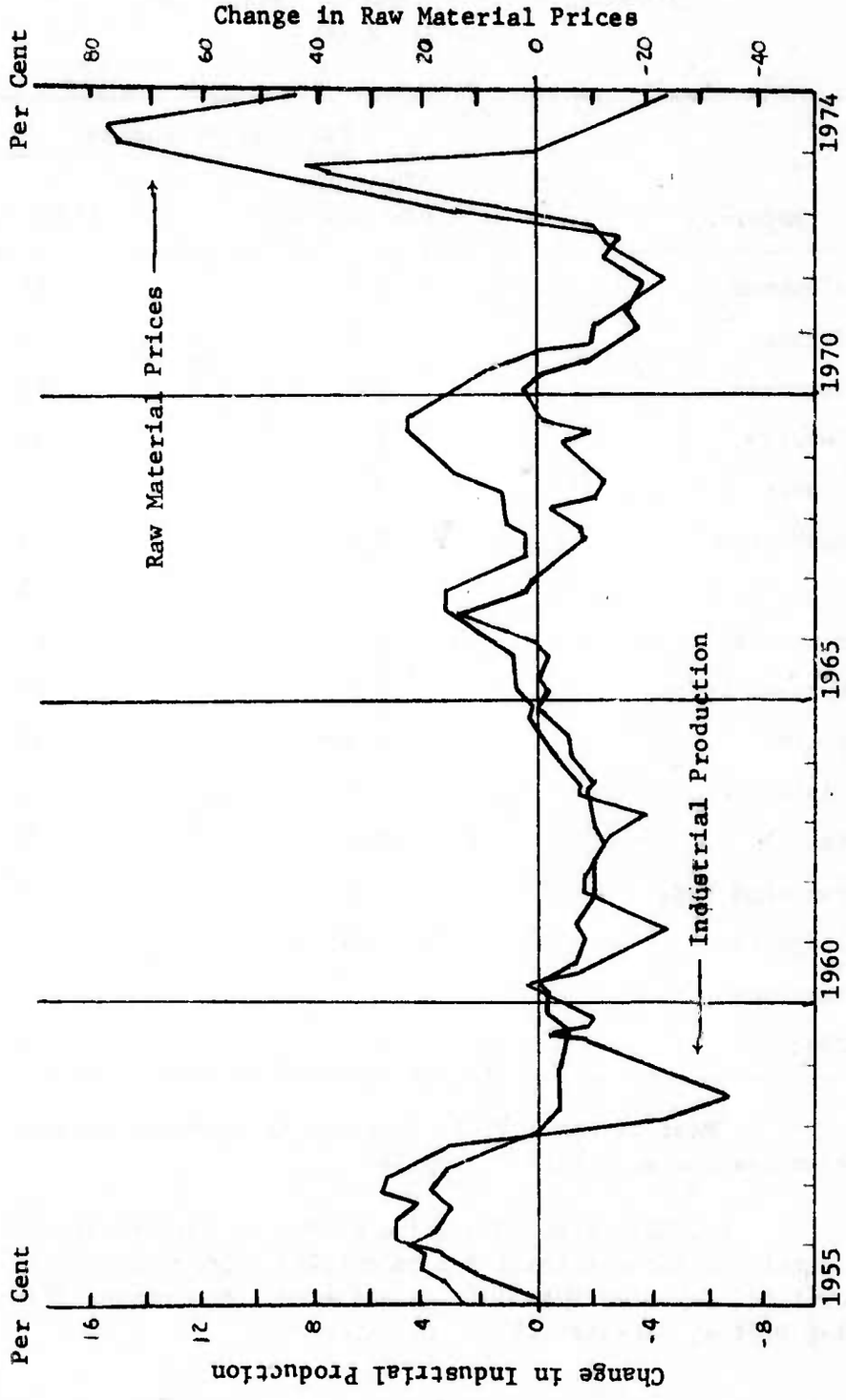
[9] *Special Report*, p. 11. [10] *Special Report*, pp. 7-9.

Figure 1 provides a very clear indication of the magnitude of the departure in 1973 from the historical rates of consumption and price increases. Table 4 illustrates the rate of consumption for the change in United States consumption trends for specific raw materials. These alarming statistics, combined with the action of oil producing countries, caused considerable concern among industrial nations regarding economic blackmail and the serious consequences of possible supply manipulation during periods of national emergency.

Before trying to determine the impact of 1973 trends on near term and future consumption rates, it is important to realize that several key factors occurred simultaneously in 1973 and caused the largely abnormal supply and demand situation. First, an unprecedented sharp upturn in demand occurred in all major industrial nations. This, in turn, strained production capacity, which had not been expanded very rapidly because of very high initial capital costs, low rates of return prior to 1973, and a poor economic and political climate that led to expropriation or nationalization in many mineral producing countries. Second, speculative buying soared as a hedge against rampant inflation. Third, environmental considerations caused serious disruption in United States domestic production. Finally, a large



SOURCE: U.S., Executive Office of the President, Council on International Economic Policy, *Special Report: Critical Imported Materials* (Washington: Government Printing Office, December 1974), p. 10.

Fig. 1.--Industrial Production and Raw Material Prices

TABLE 4.--Apparent United States Consumption Trends

[Considers new production, scrap, and stockpile sales]

Material	Per Cent of Change	
	1968-1973 Annual Average	1972-1973
Aluminum	5.9	18
Bauxite	1.6	8
Chromium	1.1	23
Cobalt	6.3	33
Copper	3.8	7
Iron Ore	1.4	13
Lead	2.6	4
Manganese	1.0	15
Natural Rubber	0.5	14
Nickel	3.4	33
Platinum	3.6	21
Tin	-2.3	9
Titanium Metal	5.2	50[a]
Tungsten	5.8	9
Vanadium	1.5	22
Zinc	2.0	7

[a]Most of the 1972-73 increase in apparent consumption was for strategic stockpile.

SOURCE: U.S., Executive Office of the President, Council on International Economic Policy, *Special Report: Critical Imported Materials* (Washington: Government Printing Office, December 1974), p. 11.

measure of the price increases reflect dollar depreciation and devaluation.

Nevertheless, the abnormal supply and demand situation of 1973 has caused considerable re-evaluation of the future availability of raw materials as well as estimated world cumulative demand and world reserves. In the past there has always been a familiar paradox about reserves of minerals: as world consumption has grown, world reserves have always grown as fast or even faster. Consequently, a collision between expected economic growth and resource availability seemed remote. Past projections which have attempted to show that many mineral resources are almost depleted have always been uniformly wrong even though they were made by the most knowledgeable experts. Technical innovation and discovery have always intervened to change events.

Recently the White House Council on International Economic Policy, in conjunction with the National Security Council, published a document which indicates that there are ample materials available in the earth's crust to meet the world's projected needs for nearly every material beyond the remainder of this century (see Table 5).[11] Like previous

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[11] *Special Report*, p. 15.

TABLE 5.--Proven World Reserves of Selected Minerals as of 1973

Reserve	*Mineral*			
100+ Years	Columbium	Magnesium	Phosphorus	Potash
51-100 Years	Asbestos Chromite	Cobalt Iron Ore	Molybdenum Nickel	Vanadium
26-50 Years	Antimony Bauxite	Manganese Platinum	Sulfur Titanium	
15-25 Years	Barite Copper	Lead Tin	Tungsten Zinc	

SOURCE: U.S., Executive Office of the President, Council on International Economic Policy, *Special Report: Critical Imported Materials* (Washington: Government Printing Office, December 1974), p. 15.

predictions, these probably seriously underestimate true reserves. Vast untapped resources may exist in the Arctic region, China, the Amazon Basin, the USSR, and other regions. In addition, the mineral potential of the seabed is considerable, particularly for nickel, copper, manganese, and cobalt.

Nevertheless, concern over availability of raw materials continues due to the following events that have occurred during the last few years:

- Nationalistic opposition to foreign resource ownership is now a major political factor in many mineral producing countries.
- Competition is intense among industrialized nations for available resources and is often government backed.
- A significant portion of the world primary processing facilities is now distributed among competing users of raw materials.
- Direct investment no longer assures that the investor has precedence over non-investors.
- Political and ideological issues frequently motivate suppliers.

Consequently, even though it appears that no lasting real shortages in mineral raw materials will occur during

the rest of this century, there does appear to be the possibility that a combination of events similar to those that took place in 1973 could happen again and demand could temporarily outstrip supply. To determine whether such a situation poses any real threat to the United States or its NATO allies, it is necessary to examine the potential that producers of mineral commodities will be able to create a sufficiently cohesive cartel to effectively emargo or limit the supply of minerals at reasonable prices.

Before examining each raw material in detail to determine vulnerability, it is important to realize that collective action by exporting countries depends on the number of suppliers, their ability and willingness to restrict supply, the availability of possible substitutes, alternative sources of foreign exchange for the supplier, and the potential for collective bargaining by importing nations. Recently the U.S. House of Representatives studied the possibility of OPEC type cartels in mineral exporting countries and determined that if a cartel is to be successful all or most of the following underlying factors must exist:

Low price elasticity of demand;

Limited intermediate-term substitution possibilities;

Low elasticity of supply, including no significant potential new producers;

Limited number of producers who account for most of world trade;

Sizable foreign exchange reserves, i.e., ability to afford short-term foreign exchange losses;

Low employment of nationals in the industry so reduction in exports would not result in significant unemployment;

Common political or economic goal expectations from collective action;

Political cohesion--shared values and experiences among producers;

Insulation from reciprocal embargoes--lack of consumer resistance; and

Uniform quality of commodity and little variation in production costs or richness of resources.[12]

A detailed examination of the sixteen strategic raw materials and their vulnerability to cut-offs may be seen in Appendix B.

An analysis of alternate sources, substitutes, and known reserves of strategic raw materials and of existing political sympathies and present trading patterns of raw material producers indicates that the producers of mineral commodities are not *at the present time* able to emulate the oil exporting nations and create effective control mechanisms. This conclusion is drawn from the fact that sources of supply are more diversified and can be readjusted by consuming nations. There does not appear to be a coalescing

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[12] *Global Commodity Scarcities*, p. 5.

political catalyst. Substitution opportunities exist in most cases and stockpiles serve as a buffer. Finally, most of the producing countries depend heavily on the continued flow of mineral exports to pay for imports and to provide employment.

Consequently an embargo on strategic raw materials is highly unlikely today and for the next year or two. It usually will not make much economic sense because the producing country frequently relies on the consuming country for revenue. Unless this revenue can be made up in some other way, the embargo will eventually be counterproductive. The case among the Arab oil producers appears to be unique because there existed both political desire and economic strength. This combination is not readily achievable and does not now appear to exist in any other group of producer countries examined in this thesis or in the recent National Security Council study.[13]

The best present evidence indicates that it is not at this time possible for the producers of strategic raw materials to seriously limit supplies. Quotes from the concluding paragraphs of three recent studies support this conclusion. First, a Brookings Institute study concluded:

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[13]*Special Report*, p. 23.

> • The prospect of OPEC-like cartels springing up in various primary commodity markets and being successfully maintained is not supportable by an analysis of the underlying factors. There are wide differences between the circumstances of oil and those of other commodities. To draw parallels between them can be misleading.
>
> • Unilateral ventures into commodity price leadership are subject to the same problems and hazards as collusive group actions. Their life expectancy in nearly all cases is likely to be short.[14]

A White House special report stated:

> Embargoes of raw materials are highly unlikely. They do not make sense in terms of producers' revenue objectives.[15]

A Congressional subcommittee report found that:

> The supply bottlenecks which were significant in the early part of 1974 have eased and there is little prospect that either other commodities [mineral raw materials] or the exporters of other commodities will cause problems of the magnitude that the world faces in oil.[16]

In summary, it appears that at the present time there is no indication that supplies of strategic raw materials will not be available to NATO.

Potential Future Vulnerability

The previous paragraph concluded that cut-offs appear remote at the present time. However, it is important

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[14] Hisao Kanamori and others, *Trade in Primary Commodities: Conflict or Cooperation*, A Tripartite report by fifteen economists from Japan, the European Community, and North America (Washington: Brookings Institute, 1974), p. 33.

[15] *Special Report*, p. 15.

[16] *Global Commodity Scarcities*, p. 31.

to remember that even though present evidence leads to these conclusions, changes in the world situation can dramatically alter prior predictions.

The success of the 1973 Arab oil embargo was almost totally unpredicted. Prior to 1973 the world had successfully coped with Middle Eastern oil crises in 1951, 1956, and 1967. The 1951 nationalization cut off the production of Iranian crude oil and--what was more important--of refined products from Abadan; yet the shortage was overcome by increasing output in other Gulf countries, utilizing excess capacity in European and American refineries, redeploying tankers, and redirecting oil flows. The 1956 crisis arose from the blocking of the Suez Canal and the stoppage of the pipelines through Syria. However, once again, production remained largely unaffected and the rerouting of tankers around the Cape, together with an increased output in the United States and Venezuela, made it possible to meet European needs. In 1967 the Canal was again blocked; the flow through the pipelines was temporarily stopped, and a partial boycott was briefly imposed by some Arab producers, but the abundance of large tankers and the last increase in Libyan output enabled the oil companies to meet their obligations.[17]

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[17]Charles Issawi, *Oil, the Middle East and the World,* Washing-

As late as 1970, Dr. George W. Stocking, a noted economics professor and expert on the Middle East oil situation, confidently predicted:

> *Barring war*, neither Russian encroachment on the Middle East nor the growth of Arab nationalism is apt to impede the flow of Middle East oil to the West more than temporarily. [He further went on to say:] The apparatus for its [oil] distribution in the Western world is complex and expensive and *firmly under the control of the international oil companies*. They have their worries. The terms under which they *take* the oil may grow progressively more burdensome. But neither the Arabs nor Russia can long deny a market to Middle East *low-cost* oil. [Emphasis added.][18]

This confident attitude was shattered in September 1970, when the Libyan Revolutionary Command Council, headed by Muammar al Gaddafi, forced Occidental Petroleum Company to grant significant concessions to the Libyan Government. These included an immediate dramatic increase in the Libyan share of the oil revenues and a likewise dramatic increase in the price of oil. This, of course, was followed by the seizure of Britain's oil installations in Libya and the nationalization of British Petroleum on 7 December 1971.[19]

Prior to 1973 the greatest weakness of the Middle East oil states had always been their inability to stand

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ton Papers, Center for Strategic and International Studies, Georgetown University (New York: Library Press, 1972).

[18]George W. Stocking, *Middle East Oil* (Nashville: Vanderbilt University Press, 1970), p. 461.

[19]Leonard Mosley, *Power Play: Oil in the Middle East* (New York: Random House, 1973), gives a good account of the suddenness and surprise of Libya's actions.

together in an emergency, partly due to their susceptibility to bribery and corruption. Throughout the history of Middle East oil, the Western countries had always been able to play one state or another, or one political faction or another, against its rivals and succeed in preventing a cut-off or undue increase in the price of oil. Yet, the dramatic change of situation in 1973 revealed how completely the West had deluded itself.

The same thing could occur in the future with some other strategic raw material. Tables 1, 2, and 3 (pages 23, 24, and 26, respectively) illustrate quite vividly the great extent to which Western Europe and, to a lesser degree, even the United States are dependent on imports of raw materials from South Africa and the developing countries of Africa and Latin America. Although the cohesiveness of the Organization of Arab Petroleum Exorting Countries (OAPEC), or even OPEC, does not appear imminently possible among other producers of raw materials, it is not difficult to postulate a hypothetical situation that could alter the presently favorable consumer position vis-à-vis the producers of raw materials.

Just as the existence of an expanding Jewish State provided a catalyst to unite the Arab States, it is possible that the confrontation of black majorities in Africa against

white minority governments in Rhodesia and South Africa could provide a catalyst in uniting Black Africa. The black majorities might try to use their control of certain raw materials to influence (or pressure) Western governments. It is also possible that some type of military (guerrilla) action by Black African States against Rhodesia and South Africa could effectively cut off supplies of strategic raw materials from both Black and White Africa. Indeed, with the cessation of hostilities in Portuguese Africa, the black majority in Africa can now turn its attention to South Africa and Rhodesia.

This is one hypothetical situation. It is possible to postulate another African scenario that could also alter the present favorable NATO access to strategic raw materials. For more than two decades communist agitators from both Moscow and Peking have been attempting to exploit the African continent. Soviet activities have been concentrated mainly in eight countries: Algeria, Egypt, Ghana, Guinea, Somalia, the Sudan, Zaire, and Nigeria. The People's Republic of China has penetrated Tanzania, Zambia, Mali, Guinea, Mauritania, Chad, and Ethiopia. The recent completion of the Chinese-sponsored Tan-Zam Railroad pointedly illustrates communist political and military influence. For one thing, the completion of the railroad will remove all restraint on

guerrilla operations from Zambia, which at present relies on the Portuguese controlled railway to Beira for its copper exports, and offers border areas for interior-line operations into Zaire, Angola, Southwest Africa (Namibia), Botswane, Rhodesia, and Mozambique.

Both Moscow and Peking have attempted to exploit the inherent dislike of Black Africa for the white minority governments in South Africa and Rhodesia. Under the guise of assisting black nationalism, communist agitators and supporters could attempt to forcibly oust the present white minority governments in Africa.

The two scenarios are hypothetical, but, should either occur, the flow of strategic raw materials from Africa could be seriously interrupted. Nevertheless, there is no attempt in this thesis to predict when or under what conditions either of these scenarios could take place. They are merely used to illustrate that the potential for supply interruptions does exist and is becoming more apparent daily. On 11 April 1975 the foreign ministers of forty-one African states called on the Organization of African Unity (OAU) to increase its financial and military support for black guerrillas battling to end white minority rule in southern Africa. The ministers attending the special OAU ministerial conference also urged that economic sanctions

against South Africa be tightened.[20]

With the continued increase in black nationalist agitation as a background, the British Foreign Secretary warned the House of Commons that "there is not a lot of time left if Rhodesia is to make the choice between guerrilla warfare and peaceful settlement between blacks and whites."[21] He went on to suggest that England's well-being and existence depend upon continued harmony in the African region. So far, however, the African nationalists have not tried to use their raw materials for leverage. Nor have they been able to curtail the flow of supplies from White Africa. Yet the possibility exists and will continue to grow. In the last five years there has been an immense increase in Britain's investments (even involvement) in Black Africa north of Zambezi. Trade with Black Africa is already as substantial as that with White Africa and is growing at a much faster rate. Similarly, large investments in raw materials extraction have been made in Black Africa by Belgium, France, Italy, and West Germany.[22]

The cut-off or interruption in supplies of strategic

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[20] *Kansas City Star*, 11 April 1975, p. 2.

[21] "Pushing Rhodesia," *Economist*, 18 January 1975, p. 15.

[22] *Third World*, Vol. 3, No. 10 (November-December 1974), pp. 29-35.

raw materials from Africa would pose serious consequences for NATO. Zambia and Zaire supply more than 90 per cent of NATO's cobalt, while South Africa and Rhodesia supply more than 50 per cent of NATO's platinum and chromium. In the case of cobalt, the only alternative source is Canada, and her domestic production is presently insufficient to meet NATO's strategic consumption requirements, even under peacetime conditions. As for platinum and chromium, the other major world supplier is the USSR. Once again, not a favorable position for NATO should South African and Rhodesian sources be cut off. In all these cases there are no substitutes available. Western Europe is also heavily dependent on black African supplies of copper and phosphate rock. Although the United States has sufficient domestic production capability to supply all of NATO's strategic needs for these raw materials, the cut-off of African supplies would put a serious strain on United States facilities. Present worldwide domestic industrial demand exceeds supply, particularly for phosphate rock, and serious shortfalls would be created if African supplies became unavailable.

The scenarios outlined above may seem remote, but the very fact that they might happen has caused many to begin wondering whether NATO should concern itself with Africa. The February-March 1971 issue of *NATO's Fifteen*

Nations, for example, devoted more than half its coverage to the problems beginning to take shape in Africa and detailed the efforts of both the Russians and the Chinese to gain influence in the area. The articles concluded that even though NATO recognizes the importance of the area it was unrealistic to consider such an extension of NATO's responsibility.[23] Less than a year later, however, the same periodical began to discuss the reasons why NATO must concern itself with Africa and how vital Africa is to the continued existence of Western Europe.[24] The African issue and the potential cut-off of supplies have been discussed with increased regularity by many NATO observers throughout 1973 and 1974, but until late 1974 no real threat seemed to emerge and no single policy had been established. The dramatic change of situation in Portuguese Africa has awakened all of NATO to the need to seriously consider the possibility that supplies of raw materials from the white dominated states of Africa could be in jeopardy. Indeed, a protracted racial war in Africa could endanger supplies from all of Africa.

Consequently, this writer believes it is fair to say

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[23] *NATO's Fifteen Nations*, Vol. 16, No. 1 (February-March 1971), pp. 12-34.

[24] Ibid., Vol. 17, No. 2 (April-May 1972), pp. 12-48.

that future political and economic events, combined with rising domestic aspirations and increased nationalistic agitation in Africa, could dramatically alter previous confident predictions about cut-offs of strategic raw materials. Earlier a scenario was postulated that might seriously jeopardize supplies from both Black and White Africa. Although the present demands of black nationalists in Africa may seem like bombastic oratory meant for domestic consumption, it is important to realize that behind these words lie the aspirations of much of the world's population. Robert McNamara, while he was the United States Secretary of Defense, spoke publicly about the connection between world poverty and unrest and unstable relations among nations.[25] Five years later, as president of the World Bank, he commented:

> The outlook for this decade is that the fault line along which shocks to world stability travel will shift from an east-west axis to a north-south axis, and the shocks themselves will be significantly less military in character and substantially more political, social, and economic.[26]

In a later address McNamara warned the United Nations that

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[25] Robert S. McNamara, *The Essence of Security* (New York: Harper and Row, 1968), pp. 23-29.

[26] Robert S. McNamara, *One Hundred Countries, Two Billion People: The Dimensions of Development* (New York: Praeger, 1973), p. 90, quoting his address before the United Nations Conference on Human Environment, Stockholm, 8 June 1972.

"it is only a question of time before a decisive choice must be made [by the desperately poor] between the costs of reform or the risks of rebellion."[27]

To illustrate the feelings of many raw material producers, a quote from a 1974 address by Algerian President Boumediene at the United Nations is presented below.

> Between the needs of the poorer countries--namely, nutrition, schools, hospitals, and the means for the struggle against underdevelopment--on the one hand, and, on the other, the needs of the rich countries--that is, not only the unlimited growth of their wealth but also the continuation of ruinous expenditures for political and prestige purposes--the question arises as to which of these needs are to be sacrificed for the others. The raw materials problem, therefore, is indeed posed in terms of opposition between the priorities of the developed countries and those of the developing countries and, in connection with that opposition, in terms of the distribution of world resources for the satisfaction of those priorities.[28]

The preceding quote aptly describes the opinions held by many African leaders and also the ever-present possibility that the resources which they possess will someday catapult them into a collision course with the highly industrialized developed nations.

Each of the three major studies on raw materials vulnerability cited earlier in this chapter (page 37) concluded that at present there is little likelihood of

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[27] Ibid., p. 112.

[28] Algerian President Boumediene, "Raw Materials and Development," Address before the General Assembly of the United Nations, 10 April 1974.

cut-offs. Yet each of these studies contains qualifying statements that present a much more pessimistic outlook for the future. The Brookings study contains the following statement:

> Political leaders may find it necessary to respond to domestic pressures to get higher returns for indigenous resources; even if the risks of failure are sizable, the effort to create cartels may be made.[29]

Likewise, the White House report cautions:

> We cannot exclude the possibility of a supply interruption that is not overtly political.[30]
>
> The cost [of supply interruptions] would be so great in a war that such interruptions should be guarded against.[31]

In addition, the same Congressional report that indicated little prospect of supply interruptions nevertheless felt that:

> The nation is in need of a strong policy aimed at avoiding cartel action and dramatic price increases in other minerals [excluding oil].[32]

The preceding paragraphs can lead to only one conclusion. Probably more than anything else this thesis has shown that the future raw material situation is not yet clear, but that there is enough evidence that future events could occur that would alter the present advantageous

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[29] Kanamori and others, p. 33.

[30] *Special Report*, p. 16.

[31] *Special Report*, p. 20.

[32] *Global Commodity Scarcities*, p. 31.

position of Western consumers. The three strategic raw materials that create the greatest potential vulnerability are cobalt from Zaire and Zambia and platinum and chromium from Rhodesia and South Africa. Two other raw materials, copper from Zaire and Zambia and phosphate from Morocco, also pose lesser problems. Nevertheless, these also should not be ignored because of the potential damage of supply restrictions during war. During peacetime the United States can supply Western Europe's strategic needs in the event of a cut-off of African sources; however, such supply restrictions during a war would eventually influence the well-being and efficiency of the entire NATO labor force and could have important secondary effects if sustained over a long period.

CHAPTER III

POSSIBLE NATO COURSES OF ACTION

Chapter III looks at the benefits and risks of three courses of action available to the North Atlantic Treaty Organization (NATO) in dealing with potential interruptions in the supply of strategic raw materials. This writer believes each of these courses of action is within the scope of the NATO Charter and does not exceed NATO's authority on political and economic grounds. The courses of action are designed specifically to insure continued supplies from African countries, both black and white, but could easily provide the framework for a program to deal with all Third World producers of raw materials.

As Chapter II indicated, the cut-off of strategic raw materials does not appear to be an immediate threat, but rather a potential future threat. Nevertheless, since it is necessary that NATO insure for itself the strategic raw materials necessary to preclude the possibility that it will be unable to carry out its defensive mission, this writer believes it follows that NATO can legitimately concern itself with insuring an uninterrupted flow of strategic raw

materials. As mentioned in Chapter I, opinion here is that NATO is not the means to insure the continued supply of raw materials needed for domestic production in highly industrialized societies. This task is a separate one that must be accomplished at a much higher level by each individual member of the Alliance. This is an enormously more complex problem and in many cases, if a successful program is adopted by the individual NATO member governments to insure continued raw materials for domestic needs, it will also, to a large degree, insure continued raw material supplies for defense needs. Nevertheless, NATO should not abrogate its responsibilities in regard to strategic raw materials.

Unilateral Approach

The first and most obvious course of action oper to NATO is to do nothing as an alliance and to leave any action to individual member governments. This approach is of course quite attractive if one could be relatively confident that the market forces would rectify the problem of potential cut-offs within a reasonable period of time. In addition, this policy can be considered as very rational if the costs for acting, or preparing for action, exceed the probable damages caused by the producers' measures. Yet further analysis reveals that this alternative may indeed be very

costly because the price for inaction might be very severe. In the postulated scenario, it was seen that supplies of cobalt, platinum, and chromium were potential candidates for supply cut-offs. Each of these metals is necessary for defense, and alternate sources other than African sources either do not exist or cannot be counted on during a confrontation situation. Consequently, cartel type action could produce major political confrontations. Even discounting the damage to domestic well-being caused by a cut-off of raw materials, no nation can be expected to remain idle very long when it cannot obtain the raw materials that it deems necessary for its defense. Furthermore, inaction has the adverse effect of encouraging producing countries to intensify their use of commodity power. The developing countries of Africa are sure to study the example of the Organization of Petroleum Exporting Countries (OPEC) and are unlikely to dismiss quickly, if at all, the policies that proved so effective and boosted so sharply the pocketbooks and prestige of the oil producing countries.

Additionally, for NATO to adopt a do-nothing approach would be the same as sanctioning a unilateral "scramble" by individual countries for special deals. In other words, let each country look out for itself. Once again, on the surface this might appear to be a good

solution. However, in actuality it is not possible for any country to "lock up" supplies. In the case of cobalt, Zambia and Zaire are the major world producers and these countries would undoubtedly be reluctant to enter into any agreements that might limit flexibility. Likewise, any agreement can always be broken if political conditions dictate this action. In the case of cobalt, the producers are in a good position to raise prices or to cut off supplies because there is no readily available alternate source. Consequently, in such a case bilateral arrangements cannot be counted upon to insure a continued flow of supplies. A bilateral approach also favors a country like the United States, which is least dependent on imports of raw materials. For this reason a country that is highly dependent on another country for specific imports might be willing to pay a high price to dislodge another country from a favored position. This approach is likely to increase the probability of economic conflict and also political confrontation between members of the Alliance.

It is also important to realize that a unilateral attempt by any one country to secure access to raw materials or to insulate its economy from the effects of shortages will eventually adversely affect all countries, including the country initiating the action. The misallocation of

investment resources and the disruption of efficient trade patterns will impose losses all around, not just on one region or country. A recent study on trade in primary commodities by the Brookings Institute concluded:

> In times of tension, such as the present, primary product producers may overestimate their bargaining power and primary product importers may be misled into believing that bilateral arrangements will assure them access to raw materials. Such miscalculations would lead to costly inefficiencies for the world economy and dangerous political strains.[1]

Although the above statements may appear to be truisma, France's recent unilateral approach to alleviate its oil crisis serves to highlight the futility of long term unilateral actions. French actions only aggravated an already serious situation and did nothing to insure that supplies would not be cut off once again at some future time. Consequently, a no-action policy by NATO involving a unilateral approach to get "special deals" from producing countries does not seem to offer much in the way of a method of dealing with cut-offs for the long term and probably not the short term either.

Military Approach

The second course of action is to provide active support and assistance to the white minority governments in

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[1]Hisao Kanamori and others, *Trade in Primary Commodities: Conflict or Cooperation*, A Tripartite report by fifteen economists from

Africa, particularly South Africa. At the very least this means that NATO governments would agree to supply those ships, weapons, and equipment necessary for South Africa to protect its frontiers and its shores. Furthermore, NATO could make it clear the sinking of any ship sailing from South African waters to Western Europe would be considered a direct provocation or an act of war which would result in appropriate conclusions and reactions.

However, for NATO as a body to adopt this position requires an expansion of the present Charter. As the Charter now reads, NATO covers the territories of all member countries in Europe and North America, the territory of Turkey in Asia Minor, the islands under the jurisdiction of any member in the North Atlantic area *north of the Tropic of Cancer*, and any Allied forces, vessels, or aircraft in that area or in the Mediterranean.

In 1949, when the North Atlantic Treaty was signed, a number of member countries still had colonial possessions, most of which were south of the Tropic of Cancer. Britain, France, and Portugal had possessions on the Atlantic littoral of Africa and in the Caribbean, and, understandably, other NATO nations were reluctant to become involved in

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Japan, the European Community, and North America (Washington: Brookings Institute, 1974), p. 35.

colonial wars or in the domestic overseas policies of other member nations, so the limit of the Tropic of Cancer was agreed upon and has been accepted by all members ever since.

The situation today, however, is vastly different. Nearly all former colonial territories are now independent, self-governing states, and by no stretch of the imagination could it be claimed that any NATO members would be likely to become involved in colonial wars if the Tropic of Cancer limit of NATO's maritime boundary were to be abolished.

The situation today is also different in another important way. Twenty-five years ago there was little, if any, threat of communist influence in the area and the vital EAST-WEST lines of communications around the Cape of Good Hope were under no jeopardy. The growing Russian naval power in the area could hinder and possibly cut these lines of communication, and South Africa's territory and mineral riches are becoming ever more vulnerable to well-planned and systematically-operated communistic subversive activities.

Naturally NATO cannot, and should not, operate in a vacuum and disregard events outside its boundaries. The *NATO Handbook* makes this quite clear when it states:

> **The definition of the military area in which the Treaty is applicable in no way implies that political events occurring outside it cannot be the subject of consultations within the Council, for it is the overall international situation which is liable to affect the preservation of peace and security in the area in question, and**

> it is to consideration of this situation that the Council must, and indeed does, devote its attention as a matter of course.[2]

South Africa is particularly important to NATO. In a twentieth anniversary message to the Allied Command, Atlantic, Joseph M. A. H. Luns, Secretary General, NATO, emphasized the necessity of protecting sea communications within and beyond NATO's present maritime boundaries.[3]

General H. J. Kruls, Editor, *NATO's Fifteen Nations*, in commenting on the tremendous importance of Europe's lines of communication around the Cape of Good Hope, said:

> Southern Africa is the key to the security of NATO's lines of communications from the Far East, through the Indian Ocean and South Atlantic, to European territorial waters, and South Africa in particular has the facilities required for maritime forces operating in these oceans to provide the surveillance necessary for the security of European interests.[4]

Air Vice Marshal Stewart Menaul, Director General, Royal United Services Institute for Defence Studies, London, commented:

> [The] unbiased student of strategy [must conclude] that Europe's future security cannot be found exclusively in the defence of the European mainland and the sea approaches to it. [He further went on to state that there is an urgent requirement to re-examine some aspects of NATO's defense posture.] High on the priority list must

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[2] *NATO Handbook* (Brussels: North Atlantic Treaty Organization Information Service, 1973), p. 13.

[3] Joseph M. A. H. Luns, "Twentieth Anniversary Message," *NATO's Fifteen Nations*, February-March 1972, p. 13.

[4] H. J. Kruls, "Editorial," *NATO's Fifteen Nations*, April-May 1972, p. 11.

> be NATO's maritime capability in the oceans beyond the immediate maritime boundaries of the Alliance, and especially in the Southern Oceans. Such a review of NATO's maritime boundaries of responsibility must include the elimination of the artificial dividing line at the Tropic of Cancer.[5]

Indeed, both Kruls and Manaul were referring to a situation much more serious than the cut-off of a few strategic raw materials, but, nevertheless, their arguments lend some credence to the statement that NATO should become actively involved on the African Continent.

Trying to revise the Tropic of Cancer limit would certainly not be an easy task. It is fair to say that outside Europe and its clearly defined contiguous waters, NATO has so far failed to act as an alliance. There is no indication, given the disunity witnessed during the 1973 oil crisis, that NATO can adopt a uniform position on the African question. There is an unfavorable attitude of public opinion in the NATO countries toward South Africa and its racial policies. At the same time the budget of each NATO country is seriously strained and there is little cash reserve available for any new military involvement. Even the suggestion made by Secretary of Defense Melvin Laird at the 1971 NATO Council meeting in Rome to admit Spain into

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[5] Stewart Menaul, "The Security of the Southern Oceans: Southern Africa the Key," *NATO's Fifteen Nations*, April-May 1972, pp. 40 & 45.

NATO met with violent opposition.[6] Thus, it seems clear that an expansion of NATO responsibilities to South Africa is probably also remote unless the NATO member nations decide that this is necessary to insure their survival. This is not inconceivable, but such a decision would not be made based only on raw materials cut-offs. The Cape route is still the most important sea route for the gigantic goods traffic between East and West, and some have even suggested that the loss of the Cape route would be the beginning of the end of Europe's independent existence.[7]

Yet, even if one were to assume that it is possible to lift the Tropic of Cancer limitation, the risks might outweigh the advantages. First of all, NATO would have to display a readiness and determination to fight for South Africa, if need be. This implies actions against black nationalists as well as communist agitators who might try to forcibly change the present situation. This might include military action by the Alliance, or at least support for military action by South Africa, against her opponents. This might also include a blockade of various ports on both coastlines of Africa through which arms supplies from

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[6]Earl Hinterhoff, "Arms for South Africa," *NATO's Fifteen Nations*, February-March 1971, p. 33.

[7]Kruls, p. 11.

communist states would be pouring into Africa, in order to deprive the terrorist organizations of their needed arms and ammunition.

Reflections on the disastrous consequences of the war in Indo-China, first for the French and later for the United States, will tend to diminish any enthusiasm for military involvement over a few strategic raw materials. Also, considerable financial aid is probably out of the question. All of the NATO nations are fighting inflation and record unemployment, and cash reserves have been heavily depleted by the increased cost of imported oil. Finally, active support of the present white minority government in South Africa would put NATO on record as supporting an undemocratic and repressive regime. Although this is not something new for NATO, public sentiment would not favor such an extension of NATO responsibilities. The political repercussions to the NATO governments in power could be devastating.

Consequently, this writer believes an active role in South Africa or any extension of NATO responsibility must be considered as unrealistic. Even though some would disagree, it does not appear that at present NATO regards the defending of the South African bastion or protecting the East-West sea communications around the Cape of Good Hope as either an

absolute necessity or its responsibility. Certainly an extension of NATO responsibility to secure the strategic raw materials of chromium and platinum seems even more remote and almost totally out of the question.

Preparedness (or Avoiding Conflict Approach

The third course of action open to NATO is to try to avoid the damaging effects of a cut-off of strategic raw materials by taking preparatory actions now. This thesis has pointed out that the potential for cut-offs is not an imminent threat but a future threat. Consequently NATO does have time to discuss and reflect, but the absence of crisis should not lull NATO into inaction. Thus the first and obvious step in the preparedness approach is for NATO to develop or engender the political resolve among members of the Alliance to begin efforts now. It is clear that in the end each member of the Alliance must make its own decision as to how and when to deal with the potential problem. However, collectively the members must decide that the time to act is now and not wait until the situation reaches crisis proportions. To postpone action on the grounds of political or economic expediency will invite political or economic extremism on the part of raw material producers. To remain indifferent to the social frustrations and

nationalistic aspirations of the Third World will foster their growth. Political will, then, is the first requisite. The greatest mistake would be for the Alliance to sit back and continue to do in the future what it has done in the past--ignore the problem. The 1973 Middle East oil cut-off illustrated vividly the bankruptcy of present Alliance policies in this crucial area.

The preparedness approach will seek to build offsetting pressures to the inherently nationalistic tendencies of both importing and exporting countries. The most straightforward response to individual commodity problems, and perhaps the simplest to execute--yet probably not the cheapest, is the creation and maintenance of stockpiles of strategic raw materials. Since alternate sources of supply exist for most raw materials, the Alliance stockpiles would consist of only those metals where the cost of buying and holding stocks was less than the risks and consequences of potential actions of exporters to interrupt supplies or raise prices to unreasonable limits. Initially this stockpile might consist of cobalt, chromium, and platinum. The Alliance might also desire to include stockpiles of copper and phosphate rock. As the world situation changed or new sources of raw materials were developed or substitutes for certain raw materials were found, the Alliance stockpile could be

adjusted to add or delete specific strategic raw materials.

This approach is by no means original. Since the end of World War II, the United States has protected its defense industry against supply interruptions during an emergency by means of a stockpile of strategic materials. Originally, the strategic stockpile of some ninety materials was intended to meet United States defense needs during a five-year war without seriously affecting the domestic economy. Since the late 1960s, however, the strategic stockpile has been reduced on several occasions to reflect changing demand patterns and changing perceptions of the length of time for which stockpiles should provide protection.

This approach has also been recommended by three different writers in the last four months.[8] It would provide some safeguard against the contingency that exporting countries will seek to control markets or, less probably, to achieve political ends by restricting or interrupting supplies. As James D. Theberge has suggested, the stockpile would be used to deter unfair price manipulation and prevent economic coercion. It would also provide some leverage in seeking more reasonable prices and in discouraging the

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[8] C. Fred Bergsten, "The Response to the Third World," *Foreign Policy*, Winter 1974-75, pp. 16-18; and James D. Theberge, "A Mineral Raw Materials Action Program," *Foreign Policy*, Winter 1974-75, pp. 75-78; see also: Kanamori and others, pp. 37-41.

unilateral abrogation of past agreements which weaken the already fragile fabric of international law.[9]

Theberge also suggested the creation of national stockpiles, but this writer believes that this is not the best approach. Agreement here is with Bergsten and the Brookings study that multilateral stockpiles are necessary. The Brookings study makes a convincing argument for a coordinated, multilateral policy on stockpiling metals. The study states that if stocks were accumulated unilaterally "a country might understandably argue that having borne the cost of accumulating the stocks it was entitled to use them solely to meet domestic needs at a time of worldwide shortages."[10] On the other hand, a coordinated policy for acquisition and disposition of raw materials would provide much greater leverage and be more conducive to the maintenance of orderly trading patterns.

There are, however, two multilateral approaches to the creation of these stockpiles. In the first approach the NATO Council would decide on an appropriate quantity of each strategic material desired for a NATO stockpile and then assess each member nation for funds to allow the NATO Council to create and maintain the stockpile. In the second

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[9]Theberge, p. 78. [10]Kanamori and others, p. 38.

approach NATO would decide on an appropriate quantity for each Alliance member but would leave the creation and maintenance in the hands of each individual member. Each member would be given a specific time to complete the task. Either approach accomplishes the same result and neither is preferred over the other.

Stockpiles, of course, provide some insurance, but other steps can also be taken. However, it is important to realize that many of the additional steps this writer suggests below will infringe upon national sovereignty and will thus require a commitment by the individual NATO governments. NATO officials can study the problem and insure that the potential threat is understood. They also have the responsibility to impress upon their own governmental leaders the necessity for taking appropriate action.

The NATO ministers could encourage their governments to create programs to increase self-sufficiency or at least lessen dependence on potentially unreliable suppliers of raw materials. The consuming countries could lessen their dependence by improving their skill in recycling renewable resources, which include most of the raw materials where supply is threatened. In some cases where substitutes for certain raw materials exist, the consuming countries could develop standby measures to enable quick reduction in demand

--at least for a short period of time. For the longer term, intensive research and development should be initiated to determine whether new substitutes can be found and thus permanently reduce the dependence on uncertain suppliers. If adequate long term reserves are available, attempts should be made where possible to increase domestic production, particularly of cobalt in Canada. If this is not economically feasible, standby facilities could be constructed so as to provide a hedge against interruptions. These facilities would be funded by the entire Alliance, and, consequently, both the burden and the benefit would be more evenly distributed. As a last measure, the Alliance governments could support efforts to find new reserves of raw materials in "safe" countries. Additionally, the Alliance members could encourage new production, both financially, by making world capital markets accessible, and politically, by supporting the aspirations of the producing country.

Alliance programs could be coordinated under the auspices of NATO's Committee on the Challenges of Modern Society (CCMS). Thus individual member efforts could best contribute to the betterment of the Alliance's overall position.

Lastly, it is imperative that NATO governments

understand both long and short term implications of their trade and export policies. Protective tariffs, non-tariff barriers, protectionism, export subsidies, and import quotas may produce desirable short term domestic effects, but they may be extremely harmful in developing mutually beneficial trade relations with Third World countries that supply vital strategic raw materials. Once again, this writer must reiterate that NATO is not the forum for deciding foreign trade policy, yet the NATO Council has a responsibility to review the economic and political policies of Alliance members to determine the overall impact on the Alliance. This was emphatically stated in the *Report of the Committee of Three:*

> It is agreed that the Atlantic Community has a positive concern with healthy and accelerated development in economically underdeveloped areas, both inside and outside the NATO area. The Committee feels, however, that NATO is not an appropriate agency for administering programmes of assistance for economic development, or even for systematically concerting the relevant policies of member nations. What member countries can and should do is to keep each other and the Organization informed of their programmes and policies in this field. When required, NATO should review the adequacy of existing action in relation to the interests of the Alliance.[11]

Some aspects of the program, i.e., the formation of stockpiles and the actions under CCMS, could be acted upon by NATO under its present Charter. Yet other aspects, i.e.,

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[11] NATO, *Report of the Committee of Three on Non-Military Cooperation in NATO*, by Dr. Gaetano Martino (Italy), Mr. Halvard Lange (Norway), and Mr. Lester M. Pearson (Canada) (n.p.: North Atlantic Council, 13 December 1956), "Annex I," par. 70.

trade policy and developmental assistance, would require individual NATO members to ascribe to a NATO designed program. However, the entire program is a comprehensive, interlocking series of proposals that seeks to influence producing countries to supply raw materials at acceptable price levels and also not to attempt supply cut-offs or limitations. It attempts to form a community of interest between producer and consumer, yet it does not leave the consuming countries with the fear of continued dependence on the good will of raw material producers.

CHAPTER IV

CONCLUSIONS

This chapter summarizes the thesis and lists specific actions the North Atlantic Treaty Organization (NATO) should take to enable the Alliance to deal effectively with an interruption or cut-off of strategic raw materials.

Recent events in the Middle East which culminated in the Arab oil embargo highlighted the fact that the Alliance is dependent upon many non-Alliance suppliers for its strategic raw materials. The oil embargo added a new dimension to the threat to NATO and revealed that the Alliance is unprepared for raw material cut-offs and does not have a cohesive plan to cope with such a situation. The obvious lack of unity and complete absence of any coherent policy on cut-offs may tempt other raw material producers to try a repetition of the Organization of Petroleum Exporting Countries (OPEC) oil embargo. Should the Alliance's internal disputes continue and be marked by the aggressive economic nationalism that was displayed during the 1973 oil crisis, it is possible that the members may become disillusioned with NATO and even call for the dissolution of the Alliance.

Consequently it is imperative that NATO establish a unified policy on strategic raw materials.

There has never been any question about the need for military cooperation in NATO, and there is also much evidence that the Alliance is now recognizing the need for economic cooperation. This thesis carefully distinguishes between national economic policy and NATO concern for adequate resources to meet future expected defense commitments. There is no argument that every nation must make policies in its best interests. Yet the members of the Alliance also have a joint responsibility to prepare adequately to meet probable threats of cut-offs of strategic raw materials. This is not an expansion of NATO responsibilities. The existing NATO Treaty provides the framework for dealing with the raw materials problem, yet NATO has been reluctant to take positive action because the threat has always seemed too remote.

Even today, after the dramatic events of 1973, the threat is not fully appreciated because the best evidence available indicates that it is presently not possible for the producers of other strategic raw materials to seriously limit supplies. A Brookings Institute study concluded that there are wide differences between the circumstances of oil and those of other commodities and that to draw parallels

can be misleading.[1] A White House report was even more emphatic and bluntly stated that embargoes of raw materials are highly unlikely. They just do not make sense in terms of producers' revenue objectives.[2] These conclusions are drawn from the fact that sources of supply are more diversified and can be readjusted by consuming nations. There does not appear to be a coalescing political catalyst. Substitution opportunities exist in most cases and stockpiles serve as a buffer. Finally, most of the producing countries depend heavily on the continued flow of mineral exports to pay for imports and to provide employment.

Yet, even though cut-offs of strategic raw materials appear remote at the present time, changes in the world situation could dramatically alter prior predictions. The success of the 1973 Arab oil embargo was almost totally unpredicted, and this thesis has attempted to illustrate that a similar situation could occur in the future with some other strategic raw material. It is possible that the confrontation of black majorities in Africa against white

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[1] Hisao Kanamori and others, *Trade in Primary Commodities: Conflict or Cooperation*, A Tripartite report by fifteen economists from Japan, the European Community, and North America (Washington: Brookings Institute, 1974), p. 33.

[2] U.S., Executive Office of the President, Council on International Economic Policy, *Special Report: Critical Imported Materials* (Washington: Government Printing Office, December 1974), p. 16.

minority governments in Rhodesia and South Africa could provide a catalyst in uniting Black Africa. The black majorities might try to use their control of certain raw materials to influence (or pressure) Western governments. It is also possible that some type of military (guerrilla) action by Black African states against Rhodesia and South Africa could effectively cut off supplies of strategic raw materials from both black and white Africa.

The three strategic raw materials that create the greatest potential vulnerability are cobalt from Zaire and Zambia and platinum and chromium from Rhodesia and South Africa. Two other raw materials--copper from Zaire and Zambia and phosphate from Morocco--also pose problems, but to a lesser degree. Nevertheless, they should not be ignored because of the potential damage of supply restrictions during war. During peacetime the United States can supply Western Europe's strategic needs in the event of a cut-off of African sources; however, such supply restrictions during a war would eventually influence the well-being and efficiency of the entire NATO labor force and could have important secondary effects if sustained over a long period.

This thesis looked at three courses of action available to NATO in dealing with potential interruptions in the supply of strategic raw materials. The courses of action

were designed specifically to insure continued supplies from African countries, both black and white, but could easily provide the framework for a program to deal with all Third World producers of raw materials.

The first course of action open to NATO is to do nothing as an Alliance and to leave any action to individual member governments. On the surface this course appears quite attractive if one could be certain that market forces would rectify any cut-off in a short period of time. Yet, this cannot be assumed. Furthermore, inaction has the adverse effect of encouraging intensified producer action and increases the probability of economic conflict and also political confrontation between members of the Alliance. Consequently, a no action course must be rejected.

The second course of action is a military approach. At the minimum NATO would supply arms and supplies to white minority governments in Africa. In the final stages, NATO could extend its boundaries to include commerce from South Africa. Yet, even if it were possible to change the present NATO Treaty, which is doubtful, the risks might outweigh the advantages. NATO would have to display a readiness and determination to fight for South Africa. The costs could be enormous, both financially and politically. Public sentiment would not favor such an extension of NATO responsi-

bilities and could cause major political repercussions that could not be justified in order to secure a few strategic raw materials. Consequently, the military approach must also be rejected.

The third course of action open to NATO is to try to avoid the damaging effects of a cut-off by taking preparatory actions now. The first step would be the creation and maintenance of stockpiles of strategic raw materials. Initially the stockpile might consist of cobalt, chromium, and platinum. The Alliance might also desire to include copper and phosphate rock. Stockpiles could be adjusted as necessary to meet changing world situations.

The NATO Ministers could encourage their governments to create programs to increase self-sufficiency. This would include improved recycling operations, the use and development of substitutes, and the creation of standby production facilities. The Alliance governments could support efforts to find new reserves of raw materials and encourage new production, both financially, by making world capital markets accessible, and politically, by supporting the aspirations of the producing countries. Lastly, it is imperative that NATO governments understand both long and short term implications of their trade and export policies.

However, it is important to realize that many of the

additional steps that I have suggested infringe upon national sovereignty and will thus require a commitment by the individual NATO governments. NATO officials can study the problem and insure that the potential threat is understood. They also have the responsibility to impress upon their own governmental leaders the necessity for taking appropriate actions.

I think it is fair to say that we are witnessing today a fundamental clash of national policies which are primarily oriented toward solving domestic political and social problems. Businesses, workers, and farmers, particularly in industrial countries recently hit by staggering inflation, expect their governments to manipulate national economies to insure full employment and prosperity. Where conflicts arise with another country's interests, the domestic economic requirements are expected to prevail. Today, we are seeing a resurgence of mercantilism, whereby governments meet economic demands with conscious policies of manipulation, passing the costs of these policies as much as possible onto other countries. The recent dismal balance-of-payments deficits of most developed countries have accelerated demands for programs aimed at earning more while paying out less abroad.

Economic issues will increasingly be the mainstream

issues of foreign relations in the closing years of this century. Economic issues involve the internal domestic interest groups and the politics of each country. Particularly in the developing countries, where a broadening of popular participation in economic development is taking place, economic questions will steadily rise to the top of political priorities.

The politics of the Third World are and will be primarily economic. The developed nations cannot block this inevitable trend. Relationships with the developing nations will be a function of the degree of mercantilism in the rich developed countries. Mercantilism will drive nations into international conflicts, as have ideologies and military imbalances in the past. NATO must be ready to meet the challenge.

In the past, governments could largely ignore the threat of cut-offs of supplies. Since the end of the Korean War the only serious threat to the economies of the developed countries by a foreign move was the recent action by the oil exporting countries. However, these halcyon days are apparently gone forever. It is imperative that NATO now continually reassess potential raw material vulnerability and take collective action to insure that adequate raw materials are available to carry out present and future defense

plans. The consequences of inaction or disunity today can only be the tragedies of tomorrow.

APPENDIXES

APPENDIX A

UNITED STATES NATIONAL STOCKPILE LEVELS FOR SELECTED MATERIALS AS OF 30 JUNE 1974

[New material consumption excludes usage of scrap/reprocessed material]

Material	In Months of Peacetime Consumption of New Material	
	Strategic Stockpile Objectives	Amounts in Excess of Strategic Stockpile Objectives
Aluminum/Bauxite	2-1/2	7-1/2
Chromium	4	36
Cobalt	7	28
Columbium	3-1/2	18
Copper	0	0
Flourspar	1	8
Lead	3/4	8
Manganese	5	13
Natural Rubber	0	2-1/2
Nickel	0	0
Platinum Group Metals	3	5
Tin	9	35
Tungsten	6	85
Vanadium	0	1
Zinc	2	2-1/2

SOURCE: U.S., Executive Office of the President, Council on International Economic Policy, *Special Report: Critical Imported Materials* (Washington: Government Printing Office, December 1974), p. 22.

APPENDIX B

ANALYSIS OF POSSIBILITY OF SUPPLY INTERRUPTIONS FOR SELECTED STRATEGIC RAW MATERIALS

This appendix examines in detail sixteen raw materials and reflects conclusions as to the possibility of supply manipulation or exorbitant price increases for selected strategic raw materials. Unless otherwise indicated, the sources for the information presented were U.S., Congress, House, Committee on Foreign Affairs, Subcommittee on Foreign Economic Policy, *Global Commodity Scarcities in an Interdependent World*, Committee Print, 93d Cong., 2d sess. (Washington: Government Printing Office, 1974) and U.S., Executive Office of the President, Council on International Economic Policy, *Special Report: Critical Imported Materials* (Washington: Government Printing Office, December 1974).

BAUXITE

Bauxite is an aluminous ore which is chemically refined into alumina, which is then electrolytically reduced to aluminum metal. Aluminum is second to steel among metals consumed. In 1972 the United States imported 88 per cent of

its total consumption needs and Europe imported 51 per cent. The major suppliers to the United States were Jamaica (54 per cent) and Surinam (23 per cent). Europe, on the other hand, was supplied largely by Australia (27 per cent), with Jamaica and Surinam each supplying about an additional 10 per cent. Overall, the world's leading producers of bauxite are Australia (21.2 per cent) and Jamaica (19.4 per cent), followed by Surinam (9.9 per cent), Guyana (5.7 per cent), and Guinea (4.2 per cent). In March 1974 seven bauxite producing countries--Australia, Guinea, Guyana, Jamaica, Sierra Leone, Surinam, and Yugoslavia--established the International Bauxite Association (IBA).[1] Except for Australia, and perhaps Yugoslavia, the principal bauxite producing countries which comprise IBA are classified as Less Developed Countries (LDCs).

Aluminous ores, other than bauxite, are among the most abundant raw materials, and known proven world reserves of bauxite are 15.5 billion tons, enough for more than 230 years at current consumption rates. However, the bauxite ores are somewhat unique and are not entirely interchangeable with other aluminous ores. Slightly different grades

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[1]The IBA will come into formal existence when the governments of the founding members ratify the Agreement. The seven countries produce about 65 per cent of the world's bauxite and account for about 80 per cent of the bauxite/alumina trade.

and impurity levels have led many United States and European plants to specialize in the use of a specific type of bauxite. Changes in type of bauxite ore require modifications in processing equipment that result in temporary loss of production and require new investment.

The United States has almost ten months' supply of bauxite ore in strategic stockpiles and industry stocks are equivalent to an additional four-months' consumption (see Appendix A). Consequently, although producers may be able to sustain high prices for a short term period, there seems little chance that sufficient bauxite ores will be unavailable for either strategic or industrial needs. Technology presently exists to enable other types of aluminum-bearing ores which are plentiful in the United States to compete with bauxite. In addition, there is presently no indication that Australia or Guinea will cooperate in any attempt to limit necessary supplies of bauxite to the United States or western Europe.

CHROMIUM

Chromium has three principal uses: as a metal in the manufacture of corrosion resistant stainless steels (64 per cent), as a chemical in the plating of steel and other metals and in the manufacture of paint (16 per cent),

and as a material for refractory bricks to line steel furnaces (20 per cent). Consequently the demand for chromium responds to any strong demand for steel. Both the United States and Western Europe import 100 per cent of their chromium needs. The United States imports 32 per cent from the USSR, 30 per cent from South Africa, and 18 per cent from Turkey, while Europe relies on the USSR (42 per cent), South Africa (33 per cent), and Turkey (15 per cent). At present prices and production rates, known chromium reserves will last well over 100 years. Most of the known Free World chrome reserves are concentrated in two African countries, with South Africa possessing 63 per cent of the total and Rhodesia 33 per cent. Turkey has less than 5 per cent.

United States stockpiles of chromium are in excess of a three-year supply. However, there is no substitute for chromium in making stainless steel. While aluminum, nickel, and titanium can be substituted for stainless steel for some uses, many industrial products require stainless steel. Nevertheless, recent technological advances have reduced United States and European dependence on the USSR and Rhodesia by about 20 per cent. Vast reserves of cheaper chemical grade South African ores can now be cost effectively substituted, yet the absence of any substitute for chromium in making stainless steel means a potential problem does exist.

However, the current political polarization among chromite producers (South Africa, Rhodesia, the USSR, and Turkey) makes the possibility of serious limits in necessary supplies of chromium appear to be remote.

COBALT

Cobalt is used primarily as an alloy. Zaire produces approximately two-thirds of the world's cobalt. Additional producers are Zambia (10 per cent) and Canada (9 per cent). The United States and Europe import almost all of their cobalt. World reserves are estimated to be more than 88 years.

The United States stockpile presently contains 35 months of supply. Nickel can be substituted for cobalt in a number of uses. No short term threat appears to exist as long as the present political and economic situation continues in Zaire. Also, additional production is possible from sources in Canada and Australia. Extensive future sources may exist in seabed manganese nodules which contain significant quantities of cobalt.

COPPER

The chief use of copper is in electrical equipment. The major Free World copper producers are the United States,

Canada, Chile, Zambia, Zaire, and Peru. United States and Canadian production is mainly consumed in North America, while the output of the four other countries is mainly sold to Western Europe and Japan. The United States produces more than 90 per cent of its own copper needs, while Western Europe imports most of its needs. World reserves are estimated to be more than 25 years.

There does not appear to be any threat to the United States; however, Europe appears to be somewhat vulnerable to short term price manipulation, particularly by the CIPEC countries.[2] Long term results are highly unlikely because of the importance of copper in the foreign exchange earnings of CIPEC countries and because known copper reserves outside CIPEC are quite large. The United States and Canada could supply necessary defense and domestic European needs if an emergency situation should arise. Even though it is unlikely producers could maintain limitations or artificial prices for more than a few months, serious problems would develop.

IRON ORE

Iron ore, the principal raw material used to make steel, is found in commercial deposits throughout the world.

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[2] International Council of Copper Exporting Countries (CIPEC)--Chile, Peru, Zaire, and Zambia.

Iron is one of the most abundant elements in the earth's crust. The United States accounted for about 17 per cent of the Free World's iron ore production in 1973. Other major producers were Australia (17 per cent), France (6 per cent), Canada (10 per cent), Brazil (11 per cent), Sweden (7 per cent), India (7 per cent), Liberia (5 per cent), and Venezuela (4 per cent). Imports to the United States in 1972 were 32 per cent of consumption; Europe imported 37 per cent of consumption. World reserves amount to more than 200 years at the present rates of use.

There is some possibility that a sudden disruption in iron ore production could occur if United States owned iron ore production facilities in Latin America were nationalized. However, sufficient short term supplies are available from Australia and Canada. Because of widely scattered sources of iron ore there appears to be little likelihood of any short term threat that could adversely affect defense or domestic capabilities in the United States or Europe.

LEAD

Lead is primarily used in automotive storage batteries and gasoline additives. The United States, Canada, and Australia are the three major producers outside of the Communist World. Belgium, France, and West Germany also

produce some lead. In 1973, lead imports to the United States amounted to about 23 per cent. Europe imported about 74 per cent. World reserves are expected to last through the end of the century.

The current United States stockpile of lead is about ten months of supply. Although substitutes for lead are limited, no serious risk for price manipulation or supply limitation exists because such action would have to involve the United States, Canada, and Australia.

MANGANESE

Most manganese mined is used in the steel production process. World production of manganese ore is concentrated in the USSR (40 per cent of world total). Other producers are South Africa (15 per cent), Gabon (12 per cent), Brazil (10 per cent), Australia (7 per cent), and India (6 per cent). World reserves are estimated to be more than fifty years. In the future, the seabeds could provide almost limitless reserves. Estimates range from 100 to 200 years. United States imports are largely from Gabon and Brazil, while European imports are from these two countries, South Africa, and Australia.

The United States strategic stockpile contains nearly two years' supply. Consequently, any attempt to

limit supply must necessarily involve the major producers, to include Australia, Brazil, South Africa, and Gabon. This is extremely unlikely because Australia and Brazil also have substantial iron ore contracts with Western consumers that would then be in serious jeopardy.

MERCURY

The chief uses of mercury are in electrical apparatus, electrolytic processes, and paint. Mercury is produced in Canada, Algeria, Mexico, Spain, Italy, Turkey, and Yugoslavia. The chief United States sources are Canada, Algeria, and Mexico. European suppliers also include Spain and Italy. World reserves are estimated to be more than 15 years.

The United States stockpile contains almost four years' supply of mercury. In addition, many substitutes are available for mercury, and environmental factors have caused considerable decrease in its use. Sufficient short term resources are available to both the United States and Europe for defense and domestic needs, and no long term supply limitation appears possible because of the diverse political motivations of the producers.

NATURAL RUBBER

More than 75 per cent of the natural rubber consumption is used in the production of tires. The principal natural rubber producing countries are Malaysia (48 per cent of world production), Indonesia (24 per cent), Thailand (11 per cent), India (3 per cent), Sri Lanka (4 per cent), and Liberia (2 per cent). Both the United States and Europe are completely dependent on imports for their natural rubber needs. However, synthetic rubber, which presently accounts for almost 70 per cent of western Europe's rubber needs and more than 78 per cent of United States demands, can readily be substituted for natural rubber in almost every case.

The United States strategic stockpile contains two and one-half months' supply of natural rubber, and United States and foreign rubber industries generally carry about a two-month supply inventory. Since all of the producing countries are LDCs, they are sensitive to political and economic problems associated with any curtailment in production. Consequently, it is unlikely that producers could withhold supplies for any length of time, and the threat to United States and western European defense or domestic industrial interests seems minimal as long as the two principal producers maintain their present political and economic trading patterns.

NICKEL

Nickel is used almost exclusively as an alloying element in the production of steel and other metal alloys. World production is concentrated in Canada (37 per cent), the USSR (21 per cent), and New Caledonia (16 per cent). The United States and western Europe each import about 90 per cent of their consumption needs.

The potential to raise prices drastically or to restrict supplies is quite limited. No short term strategic or domestic threat appears possible, and the possibility of the future recovering of nickel from the seabed makes cartel arrangement difficult and unstable.

PHOSPHATE ROCK

Phosphate rock is used principally as a raw material for agricultural fertilizers. The United States has been producing 38 per cent of the world phosphate production. Other major producers are the USSR (21 per cent), Morocco (16 per cent), Tunisia (3 per cent), and Spanish Sahara (1 per cent). Known world reserves are mostly in the United States and are in excess of 100 years.

The demand for phosphate rock exceeds short term supply and prices are expected to rise sharply but, since

the United States is the major producer and is capable of supplying European needs in an emergency situation, there is virtually no possibility of any supply limitation. Unilateral cartel-like action by Morocco, which supplies about 50 per cent of western Europe's needs, would create serious consequences, both short and long term.

PLATINUM

The most important uses of platinum are as catalysts in the chemical and petroleum industry, in the processing of nitric acid for fertilizer, as furnace components in the glass industry, in various dental and medical appliances, and in jewelry. In 1973 the United States imported platinum from the United Kingdom (51 per cent), the USSR (18 per cent), South Africa (12 per cent), and other countries (19 per cent). Most European imports were supplied by the United Kingdom, with some limited imports from the USSR (8 per cent) and South Africa (7 per cent). These figures, however, are misleading, because most of the platinum imported from the United Kingdom comes from South African ore.

Current United States private inventories of platinum are estimated at ten and one-half months' supply. The United States strategic stockpile now contains about an

eight-month supply. Inventories in the United Kingdom are estimated to be an eleven-month supply.[3]

Only five significant producers of platinum exist and they operate in three countries. The possibility of supply withholding or drastic price increases is therefore present, but, as in the case of chromium, there appears to be little political motivation among the producers to attempt such action.

TIN

The two principal uses of tin are in solder and as a steel coating (tin plate). Malaysia accounts for one-half of the world trade in tin. Malaysia, along with Bolivia, Thailand, Australia, Indonesia, Zaire, and Nigeria, account for 80 per cent of world production. The United States and Europe are 100 per cent dependent on imports for their supplies of tin. World reserves are equivalent to more than 45 years' consumption at present rates.

At present the United States has roughly a three-year supply of tin in the strategic stockpile. In addition, many substitutes for tin exist. Demand and production are just about equal. For more than twenty years the

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[3] *Commodity Year Book, 1974* (New York: Commodity Research Bureau, January 1975), pp. 266-69.

International Tin Council, composed of exporting and importing countries, has regulated the price and supply of tin. No attempt to restrict supplies of tin has ever been undertaken. No short term danger seems to exist because of large United States stockpiles and mutual complementary trade agreements with many of the producing countries.

TITANIUM

The chief use for titanium is as a pigment in paint formulation. About 5 per cent, chiefly in metallic form, is used in airplane production. Australia is the world's leading producer. Canada, the United States, Norway, and Japan are the other large Free World producers. Both the United States and Europe import less than 30 per cent of their titanium consumption needs.

The United States stockpile reserves of titanium amount to more than two months' supply for pigments and almost seventeen months' supply for aircraft uses. Supplies for both the United States and Europe are from defensive partners, and no limitation of supply is foreseeable.

TUNGSTEN

The principal use of tungsten is in metal working and in mining as a cutting or grinding tool. The major

world producers are the United States, Bolivia, Canada, the Republic of South Korea, Thailand, and the People's Republic of China. United States imports amount to 44 per cent of consumption, and European imports are 100 per cent of consumption. Worldwide reserves are estimated to represent 25 years of supply; however, tungsten appears to be the only metal for which published reserve estimates have declined during the last year.

The United States stockpile of tungsten is currently in excess of one year. Because of what appears to be a dwindling reserve situation and the lack of available substitutes, tungsten is a possible candidate for short term price manipulation. However, tungsten does not seem vulnerable to supply limitation in the near term because such action would have to include Canada, Australia, the Republic of South Korea, and Thailand.

ZINC

Zinc is used both as a metal and in chemical form. Major uses are galvanizing and diecasting. The major producers have been Canada, Peru, Mexico, Australia, Belgium, Japan, and Zaire. The United States imports about 55 per cent of its needs and Europe about 61 per cent.

The United States strategic stockpile is about two

months' supply. Industry inventories in the United States and Europe are at the minimum working level of one and one-half months. Sufficient proved reserves exist in the United States and Europe to satisfy projected needs well past the end of this century. Limitations in supply are considered unlikely because such action would cause United States and European producers to expand domestic production and also consider using any one of a large number of potential substitutes.

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