

Building Blocs: Raw Materials and the Global Economy in the Age of Disequilibrium

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“Building Blocs” charts a global history of the last great crisis of globalization—the transwar decades from the 1880s through the 1940s—by centering strategic minerals needed to make steel. Little studied, but critically important, alloying minerals like tungsten and manganese were only needed in small amounts, but they were essential to the foundations of both national prosperity and security: steel and military production. Herein lay a fundamental problem: none of the industrial powers possessed adequate domestic deposits of these minerals, which were concentrated in remote locations such as central India, the Caucasus, southern China, Brazilian jungles, the Australian outback, and southern Africa. In a world in which steel was power, “Building Blocs” shows that resource anxieties motivated interwar quests for autarky and autonomy in the form of self-contained blocs. The scramble for strategic minerals escalated tensions and put rivals on the road to war, reshaping the forms and structures of geopolitical entities and international institutions throughout the transwar period.

Keywords: raw materials, minerals, blocs, globalization

Overview

“Building Blocs” charts a global history of strategic minerals during the last great crisis of globalization—the transwar era from the 1880s through the 1940s. Mineral resources were a cornerstone of economic and political power and formed key components of the interwar “raw materials problem,” which stemmed from both the uneven distribution of and access to the world’s resources. Little studied, but critically important, alloying minerals like tungsten and manganese were only needed in small amounts, but they were essential to the foundations of national prosperity and security: steel and military production. Herein lay a fundamental problem: none of the industrial powers possessed adequate domestic deposits of these minerals, which were concentrated in remote locations like central India, the Caucasus, southern China, Brazilian jungles, the Australian outback, and southern Africa. In a world in which

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steel was power, this dissertation shows how resource anxieties created geopolitical conflicts and motivated interwar quests for autarky and autonomy in the form of self-contained blocs.

During the transwar period, the road to geopolitical power and autonomy went through heavy steel industrialization, which clustered around steel's bulk mineral inputs: iron ore and coking coal.¹ Making good steel, however, required more than just iron and coal. Manganese was just as important, because it made steel hard, ductile, and strong. Although the earth's crust is dotted with thousands of manganese deposits, there were few known concentrated, high-grade sources. The two most important sources of manganese ore, in terms of both quality and quantity, were the Central Provinces of India and the Caucasus (near Tchiaturi, present-day Georgia). The province of Minas Gerais in Brazil was the third-most important, with new important sources coming online later in the Gold Coast and South Africa.² Like manganese, tungsten was a critical ingredient for industrialization due to its special steel-hardening properties. Tungsten ore was found overwhelmingly in East Asia and Southeast Asia. Over half of the world's tungsten was mined by hand in the Chinese provinces of Hunan and Jiangxi. There were other significant deposits in Burma and Bolivia, and the only tungsten in Europe was on the Iberian Peninsula—mostly in Portugal, and mostly low grade. Although the United States had some manganese and some tungsten, much of it was low grade, very expensive to extract and process, and came nowhere near satisfying the country's needs.

Minerals like tungsten and manganese are a special class of raw material and play a unique role in global history. They are nonrenewable, territorially fixed, irreplaceable, wasting assets that require considerable capital outlays to develop. They occur in narrow geographic ranges, and never in pure form. They cannot be conjured into being by legislation or synthetization, and substitution possibilities are either limited or impossible.³ Alongside these physical constraints, policy choices surrounding mining, transportation, foreign investment, tariffs, freight rates, and surveying create clusters of physical infrastructure and expertise that contribute to the structural condition of resource interdependence while frustrating strategies of self-sufficiency. Wheat can be cultivated in lots of places. Rubber can be planted elsewhere and eventually synthesized. But tungsten cannot be planted. Manganese cannot be synthesized. There are no suitable substitutes for either. Without them, a country cannot have a modern industrial sector.

The raw materials problem pervaded matters of international relations between the wars. From the Paris Peace Conference onward, it plagued state and market actors alike, and vexed internationalist efforts to restore an idealized vision of nineteenth-century free trade, stable exchange rates, and capital movements. The raw materials problem was central to international conferences, treaties, pacts, and dozens of academic studies. In an age of disequilibrium, the search for economic and political stability engendered policy experimentation, efforts to restore multilateralism, and even endeavors to submit the global economy to supra-national management. Instead of international cooperation, however, resource interdependence

1. Fertik, "Steel and Sovereignty"; Sampson, *Mineral Resources and International Strife*.

2. Leith, "World Manganese Situation." About 85 percent of the world's manganese ore came from India, the Soviet Union, and Brazil, and about 85 percent of the world's manganese was consumed by the United States, Germany, France, and Britain.

3. Leith, "Role of Minerals in Present World Unrest," 35; Leith, Furness, and Lewis, *World Minerals and World Peace*, 49.

spurred economic nationalism and autarkic policies. States looked to carve out spheres of influence in pursuit of self-sufficiency while industrialists stockpiled key inputs, integrated their operations, and harnessed the power of the state to protect their foreign and domestic interests. Amid currency instability, reparations, war debts, throttled international credit, and intractable resource interdependence, cooperation disintegrated and the world splintered into hostile blocs. Then, during World War II, experts and policymakers drew lessons from interwar economic nationalism to forge a plan in which a permeable US sphere of influence would span the hemispheres, securing access to territories producing strategic raw materials: the *Pax Americana*.

Arguments and Methods

“Building Blocs” advances two broad arguments. First, it argues that raw materials are key drivers of global history. Raw materials shape geopolitical rivalries, economic relationships, and the configurations of world orders. In particular, the dissertation situates minerals as unexpected motors of geopolitics due to their outsized importance for industrialization, energy transitions, and, indeed, modernity. Unlike bulk commodities like cotton, sugar, oil, or rubber, “Building Blocs” shows how small amounts of some things can have enormous consequences. It is, for example, impossible to make strong, ductile steel without a few pounds of manganese, while tungsten-tipped cutting tools are indispensable to modern engineering industries. These minerals have an importance that far outweighs their tonnage. The need to access these steel inputs propelled geopolitical and commercial actors to build up their resource bases to fuel their steel industries. But the industrial centers of the world now depended on access to minerals located around the world. Resource interdependence drove two interrelated dynamics: geopolitical competition that pushed industrialized rivals to war, and a global trend toward larger territorial, commercial, and industrial agglomerations, culminating in a world divided into competing blocs.

Second, “Building Blocs” argues that internationalism is the outcome of geopolitics. Orthodox interpretations of post-1945 internationalism emphasize how interstate cooperation shattered the interwar blocs, replacing them with a rule-based international order underpinned by multilateralism, rule of law, democracy, and collective security. But beneath the idealism of cooperation, the animating force of the *Pax Americana*, I suggest, was the need for secure, steady access to raw materials in foreign territories. The architects of the *Pax Americana* resolved the interwar raw materials problem by rooting their vision in multilateralism, convertible currencies, and US military supremacy. But surprisingly, the interwar blocs did not go away—instead, they were reconfigured. By historicizing these blocs, and counterposing them as rival models for managing the frictions of global interdependence and competition, “Building Blocs” unearths the mechanisms driving the reconfiguration and changing structures of geopolitical entities. What looked like a US-led postwar global economy was, in fact, the largest geopolitical bloc ever assembled.

“Building Blocs” uses the archives of steel and mining companies, state bureaucracies, banks, and international organizations across four continents. Throughout the dissertation, I adopt a comparative methodology across regional spheres of influence—including the

Western Hemisphere, British and French Empires, Central Europe, and East Asia. Through corporate archives, I zoom into localized case studies of sites of extraction and consumption of manganese and tungsten. The interstate “blocifying” dynamic had an analog in intercorporate competition, as commercial units and industrialists sought to protect their positions by stockpiling key inputs, integrating their operations, coordinating markets with other firms via cartels, forging long-term government contracts, and harnessing the power of the state to protect their foreign and domestic interests. These dynamics overlapped and fed into each other.

By focusing on global political economy and geopolitics, “Building Blocs” moves interwar historical narratives and analyses beyond the typical purview of Europe and the well-documented failure of liberal hegemony. It does this by following the resources, money, and networks of understudied key agents affected by—and affecting—the geopolitical and security concerns of states. It focuses on mining companies extracting raw ores for hungry blast furnaces; mid-level bureaucrats toiling in government agencies; commercial attachés embedded in world-spanning intelligence-gathering apparatuses; industrialists seeking insulation from market volatility; and international civil servants and economic geologists mapping the contours of resource interdependence through Herculean data-gathering. Their spadework created the foundation for the *Pax Americana*, while the political-economic crises of the interwar period underscored the need for credible mechanisms of global governance to manage the frictions of interdependence.

Raw materials were arguably the biggest issue of international politics and commerce between the world wars, so it is remarkable that historians have neglected centering them in their studies of the interwar period, beyond perfunctorily placing raw materials in laundry lists of diffuse influential factors. Those histories that do foreground raw materials concerns, however, tend to adopt narrower national frames of analysis, underestimate the influence of structural geopolitical forces, or dismiss the resource anxieties of state officials and businesspeople as red herrings.⁴ Understanding resource interdependence requires a global lens and an examination of how imbricated private- and public-sector anxieties over access to foreign resources shaped the interwar years.⁵ “Building Blocs” complements these works by adopting a global, transwar lens to show that the implications of raw material rivalries and anxieties are much more profound. When situated globally, raw materials can be seen as motors of history, shaping the ideas, institutions, and interests that determine the geopolitical structuring of world orders.

In contrast with the intellectual, diplomatic, and legal histories of the interwar period, I take a materialist approach, examining interwar political economy through the lens of global rivalries over industrial raw materials.⁶ Historically, attentiveness to materiality helps scholars to understand not only what a substance does but also how its physical properties can affect how it is controlled, moved, or manipulated. Nature is neither passive nor inert, and

4. Krasner, *Defending the National Interest*; Eckes, *United States and the Global Struggle for Minerals*; Priest, *Global Gambits*; Black, *Global Interior*; Vitalis, *Oilcraft*; Kelanic, *Black Gold and Blackmail*.

5. See, for example, Tooze, *Wages of Destruction*; Limbaugh, *Tungsten in Peace and War*.

6. More recent global histories have opened new vistas on the transwar period by returning to problems of political economy and geopolitics. Lambert, *Planning Armageddon*; Tooze, *Deluge*; Beckert, “American Danger”; Link, *Forging Global Fordism*.

does not simply wait for ideas, culture, or politics to act upon it. Nature and human actions shape one another. For my purposes, it matters where mineral deposits are located. Their presence or absence can shape human activities. Things occurring in nature can only become “raw materials” through knowledge production and application. Their exploitation generates new knowledge and applications and can, in some instances, serve as globalizing mechanisms, especially when physical infrastructure and clusters of expertise are built up around them.⁷ I am interested in how the dynamic interplay between the physical world—geography, geology, raw materials, finished goods, infrastructure—and human agency shapes global history.

Chapter Summaries

Chapter 1 argues that new steelmaking techniques helped to inaugurate a new era of globalization by making steel production cheaper and faster. While the Bessemer Process and open-hearth methods decreased the real cost of steelmaking by 80 to 90 percent, it was Robert Hadfield’s discovery of manganese steel in 1882 that kicked off the “Age of Alloy Steel.” Manganese steel was quickly followed by applications of other ferro-alloying minerals to steelmaking, like chromium, nickel, and tungsten. Indeed, the Age of Alloy Steel created an ongoing need for an increasingly large and diverse diet of raw materials. These innovations stimulated a global search and competition for mineral steel inputs, intensifying great power competition and spurring emulation among rivals. During the Age of Alloy Steel, metallurgical advances using ferro-alloying minerals created strong, ductile steels that comprised the infrastructure of globalization and the instruments of power: railways, steamships, telegraph lines, and munitions. The distribution of minerals established nodes of extraction and consumption, imparting a degree of path-dependence that shaped the transwar period. The scramble for territory and minerals led to a global war, while industrialists and state officials discovered the perils of interdependence. The Age of Alloy Steel, I argue, created a rupture in global history, cementing the structural condition of resource interdependence that continues to define the world we inhabit today.

World War I catapulted minerals like manganese and tungsten into the reports and briefings of state officials across ministries and departments in London, Paris, Washington, Moscow, Berlin, and Tokyo. Chapter 2 zooms into war-planning bureaucracies to show how the world’s minerals, in the words of one economic geologist, became “pawns in a diplomatic game rather than mere commodities.”⁸ I show how the belligerents not only managed and surveilled material shortages during the war but also how they responded with new strategies geared toward self-sufficiency. The chapter argues that the raw material problems generated by waging total war prompted new modes of thinking, strategizing, and organizing to minimize geopolitical and market vulnerabilities and to maximize autonomy in an unstable, disequibrated, and multipolar world. I examine the emergence of what I call “bloc thinking”—the strategies dreamed up to stabilize world order by creating self-sufficient, self-contained blocs

7. Fischer, *Globalisierte Geologie*; Seow, *Carbon Technocracy*.

8. Leith, Bain, and Marshall, *Elements of a National Mineral Policy*, 61.

of territory and trade networks to circumvent the potentially disastrous consequences of global interdependence. The ability of some powers to deny access to vital materials necessary for modern warfare compelled some to see resource interdependence as an existential threat rather than an economic boon. Great military powers were also great industrial powers, and acquiring access to resource-rich hinterlands became seen almost universally as a critical ingredient for geopolitical and economic success. This was an enduring lesson of World War I.

The war changed great power rivalries and perceptions of raw materials. Businesses struggled to adapt to the new reality of blended commercial and geopolitical considerations. Chapter 3 analyzes the convulsive 1920s manganese ore markets through a series of company case studies in the United States, Soviet Union, Australia, India, and South Africa. Scholars emphasize the problem of postwar glut, as wartime production created supplies that outstripped peacetime demand. I reframe the problem in terms of access. The collapse of currency stability and closure of credit markets spelled doom for primary product producers, foreclosing the means and facilities for consumers to acquire them. The inability to sell their wares devastated primary product-producing countries, while the inability to import strategic minerals heightened anxieties about resource interdependence among industrialized and industrializing states. While economists railed against the crisis of “overproduction,” the imperatives of the Age of Alloy Steel and geopolitical rivalry pushed the allegedly uneconomic extraction of minerals. Through the case studies, I highlight different strategies geared toward stabilization: foreign direct investment, consolidating monopolies, combination or cartelization, and seeking government assurances and protections. The chapter shows how the decision making of businesspeople—either in response to, in cooperation with, or as a stimulant to government action—deepened trends toward larger, increasingly self-sufficient economic and political units.

While businesses adapted to new geopolitical realities, Chapter 4 shows how states and new international institutions confronted what became known as the “raw materials problem.” The raw materials problem referred both to the uneven distribution of and access to resources needed for both modern industrial life and modern warfare. Some territories were relatively rich in raw materials, others were relatively poor, dividing the world into “have” and “have not” countries. The “haves” included those with access to raw materials and markets, either domestically or via colonial or mandatory territories: Britain, the United States, France, and, to a lesser degree, the Soviet Union. The “have-nots” were those either without colonial territories or those perceived to be lacking in raw materials; generally, this meant Japan, Germany, and Italy. These “have-nots” insisted that they needed colonies not only for resources but also as markets for their manufactured goods and outlets for excess population. The “haves,” along with internationalist economic experts, tended to describe the problem in terms of trade and exchange restrictions. Despite outward rhetoric, however, the “haves” were the first movers toward interwar illiberalism, igniting global blocification through a series of “closed door” commercial policies. The “have-nots,” on the other hand, wanted the freedom to purchase resources on terms equal to imperial powers, which often imposed discriminatory conditions on exploration, exploitation, and transport while offering preferential prices to nationals. The collapsing gold standard exacerbated the problem, as the “have-nots” suffered chronic foreign exchange shortages, limiting their ability to purchase resources from the sterling or dollar blocs. Despite internationalist efforts to restore liberal,

multilateral capitalism, state and market interests pushed for mechanisms such as protectionism, cartelization, rationalization, or outright colonial expansion to guard against volatility and create industrial self-sufficiency. With the doors to trade closing around the world, attaining self-sufficiency through self-contained, autarkic blocs was pursued nearly universally as a solution to the raw materials problem.

Blocs needed to be built. Carving out a bloc was widely seen as a path toward autonomy, allowing states to escape crippling debt arrangements and chronic balance-of-payments problems while accessing raw materials without interference or disruption from foreign powers.⁹ But blocs were not only a form of defensive national security—they were also an offensive measure taken by aspiring states to climb the ranks of the world's great powers.¹⁰ Chapter 5 examines the onset of the Great Depression, which radicalized bids at autonomy as state and market interests tried to extricate themselves from webs of globality and interdependence. Given the contours and nodes of mineral production and control, industrial self-sufficiency would be impossible without a significant revision of the status quo. This chapter shows how bloc thinking, engendered by World War I, was translated into bloc building. The chapter analyzes two bloc-building case studies—the French and Japanese Empires—to show how bloc-building mechanisms and tools worked in different contexts. These case studies demonstrate that the Greater East Asian Co-Prosperity Sphere and *la plus grande France* were not mere abstractions or imaginaries. They were grounded in strategic, material realities stemming from the raw materials problem. Indeed, this chapter argues that bloc building should be considered as part of a broader resource war among rivals to prepare themselves for the possibility of future wars.

As bloc thinking turned to bloc building, it produced increased militarization, aggression, and pushback. Rearmament programs were humming along, helping to drag economies out of the Great Depression while the world spiraled into another global arms race. The centerpiece of this chapter is the League of Nations' Raw Materials Committee, which took shape amid the Abyssinian Crisis. The findings of the committee's final report were largely predetermined: blaming the policies of the "have-nots" for their difficulties sourcing raw materials, and stressing that colonial acquisition could not solve their problems because colonial territories furnished only 3 percent of the world's raw materials. Historians have often taken these figures and arguments at face value. However, the 3 percent figure was a fabrication concocted by manipulating definitions and statistics. The Raw Materials Committee marked another failure of the increasingly discredited liberal order. Instead, a world partitioned into a series of roughly self-sufficient great power blocs seemed not only more likely but also more capable of preserving peace by circumventing the combustible interdependence of the transwar period. This was the vision of the "blocifiers"—groups of geopoliticians, businesspeople, internationalists, and, increasingly, economic and political actors who would plan the post-1945 peace. Contemporaries were witnessing the world trending toward larger political and commercial units before their very eyes, and a world of blocs seemed to offer a hope for stability.

9. Link, "How Might 21st-Century De-Globalization Unfold?" 358–359.

10. Kindleberger, "Commercial Policy between the Wars."

The final chapter shows, first, how the raw materials problem is an overlooked cause of World War II. There is a deep irony here: although World War I taught the world lessons about the strategic imperative of mineral access, the continued geopolitical dynamics of competition and emulation drove the “haves” to protect and enhance their privileged access to strategic materials, which fueled the aggression of the “have-nots.” Germany and Japan fought a war so that they might be able to win a war.¹¹ That is, they went to war as part of a long-term aim of carving out autonomous, self-sufficient spheres of influence. In the short-term, however, both needed to amass a raw materials base to attain their ultimate objective. To those ends, mineral and metal needs shaped the overall political, economic, and military strategies of both. Second, Chapter 7 examines the decision of American policymakers to underwrite a secure system of free trade in the post-1945 era. During the war, experts in the fields of foreign relations, economics, and geology infiltrated the overworked US State Department to undertake massive studies for planning the postwar world. As the size, reach, and power of the US economy ballooned, these policymakers drew on recent experiences of economic nationalism and the creation of self-sufficient blocs. The work of these foreign policy elites was animated by bloc thinking. They attached enormous importance to the raw materials problem in outlining a grand strategy grounded in an expansive, self-contained economic and political unit—the Grand Area. US experts believed that by using US military power to provide collective security and secure access to raw materials in foreign territories, relative stability could be obtained in an international order. Indeed, the interwar blocs persisted, albeit in reconstituted forms—and what looked like a US-led global economy was, in fact, the largest geopolitical and economic bloc in history.

Conclusion

Before World War II, experts and politicians either believed or paid lip service to the notion that freer trade promotes peace and prosperity. This has often been heralded as the lesson of the *Pax Americana*. But it is only partly true. Geopolitical blocs constitute the bedrock of global order—indeed, from the late nineteenth century, blocs were a way to manage interdependence and the disequilibrium created by uneven territorialization and integration. Bloc thinking evolved and drew on the insights of geological economists and geopoliticians through the interwar years, and creating autonomous blocs was increasingly seen as an historical progression toward world peace. Blocs were built through processes of rivalry, emulation, and adaptation. And the blocs are still with us, albeit in different forms. The United States created a bloc that looks like a “global economy,” and it incorporated others into its semi-hierarchical fold. The Soviet–Chinese communist bloc existed separately, and Russian power persisted without ever being brought into the American sphere. The German bloc was divided up and anchored in the European Union. Remarkably, the Japanese bloc came back after 1945, with basically the same sphere of influence. It was the French and British Empires that could no longer compete and ultimately folded. Through the transwar period, we see how

11. Stephen Kotkin, “Cold War Never Ended,” *Foreign Affairs*, April 6, 2022, <https://www.foreignaffairs.com/reviews/review-essay/2022-04-06/cold-war-never-ended-russia-ukraine-war>.

geopolitical rivals emulated one another, feared the interdiction of critical materials, fought for access to raw materials, and waged wars in order to be able to wage wars. The interwar quests for autarky and autonomy in the form of self-contained blocs clashed with the fundamental Open Door visions of Anglo-American policymakers and planners—even as they sometimes succumbed to nativistic, protectionist pressures at home. These fundamental facts gave us the world in which we continue to live.

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