

Resource Geopolitics

Cold War Technologies, Global Fertilizers, and the Fate of Western Sahara

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ABSTRACT: When, after years of geological and geophysical exploration, a phosphate mine was discovered at Bu-Craa in 1964, Western Sahara received renewed geopolitical attention. Several countries competing for the control of the world fertilizer market, including Morocco, Spain, France, and the United States, developed diverging strategies to gain control of the mineral. After intense negotiations revolving around the materiality of mining technologies and involving reserve estimations, sabotage, and flexing of diplomatic muscles, Morocco took over the Spanish colony in 1975. While this secured Morocco's place in the world market, it condemned the local population to exile and domination. This article explores three technological stages of the exploitation of phosphate in Western Sahara that underpin the geopolitical history. This perspective yields new visions of cold war technology and postcolonial markets.

Given that half of the world's population faces nourishment deficits, the ability to produce food has acquired a political meaning equivalent to that of sending spaceships to the Moon or producing atomic weapons. Unless the current population explosion halts, the political and economic equilibrium will be in the hands of those nations controlling the main factors that affect food production. Spain could play a much larger role as an international power.

—International Minerals and Chemicals
to the Spanish government, 1967¹

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1. IMC, "Preparado especialmente para el gobierno español," 1967, 29; Box 3776, code 419821, Folder 15 (II), in SEPI.

Many in Morocco consider phosphate to be our oil. Undoubtedly, this connects phosphate to the issue of Western Sahara.

—President of Office Chérifien des Phosphates to Spain's ambassador in Rabat, secret meeting, 1973²

Resources' Realpolitik

Here is a paradox: While not a single country recognizes Morocco's sovereignty over Western Sahara, most count Western Sahara's phosphate reserves as part of Morocco's.³ This is no small matter. Morocco is the top world phosphate exporter and its production rate follows closely that of the United States and China. More to the point, its reserves are by far the world's largest. While the Western Sahara reserves add only about 10 percent to Morocco's total, their control allows Morocco to maintain a virtual monopoly among African producers and thus over the European market. This paradox reflects a gap between international law and natural resource sovereignty. Western Sahara is the last African country figuring in the list of non-self-governing territories.⁴ Despite the lack of official recognition for Morocco's control of Western Sahara, according to the United Nations under-secretary-general for legal affairs, Morocco can exploit Western Saharan resources as long as the benefits go to the territory's inhabitants. But with a large portion of the Sahrawi population of Western Sahara exiled in Algeria, this leaves unexamined the question of who counts as an inhabitant.⁵ In the meantime, Morocco acts as the de facto owner of the territory and its resources. Current world maps make this ambivalence visible. Some of them depict no border between Morocco and Western Sahara, while others use a straight line separating both countries, and still others such as Google Maps adopt a dotted line (fig. 1).

The purpose of this article is to resolve this paradox. It does so by developing a phosphate-centered historical analysis that illuminates the geopolitical alliances behind the current scenario. Phosphates often figure in the historical literature on the political developments of Western Sahara. Some authors see them as the main motivation for the Moroccan invasion while others stress "political" motivations.⁶ As historian Mark Drury has noted, however, the dichotomy between economic and political accounts of Morocco's march into Western Sahara results from disembodiment of state

2. López Bravo to López Letona, Madrid, 10 October 1973: Archivo de Altos Cargos. Claudio Boada. Box 3697, n. 44, in SEPI.

3. Carlos Muñoz Cabezon, "The Bu-Craa Phosphate Deposit"; Carlotta B. Chernoff and G. J. Orris, *Data Set of World Phosphate Mines*: 209 in part A and 197 in part B; U.S. Geological Survey, *Mineral Commodity Summaries*.

4. There are sixteen countries in that list; Western Sahara is by far the largest: United Nations, "Non-Self-Governing Territories."

5. Claes Olsson, ed., *The Western Sahara Conflict*.

6. Examples of both views can be found in Tony Hodges, *Western Sahara*; Virginia

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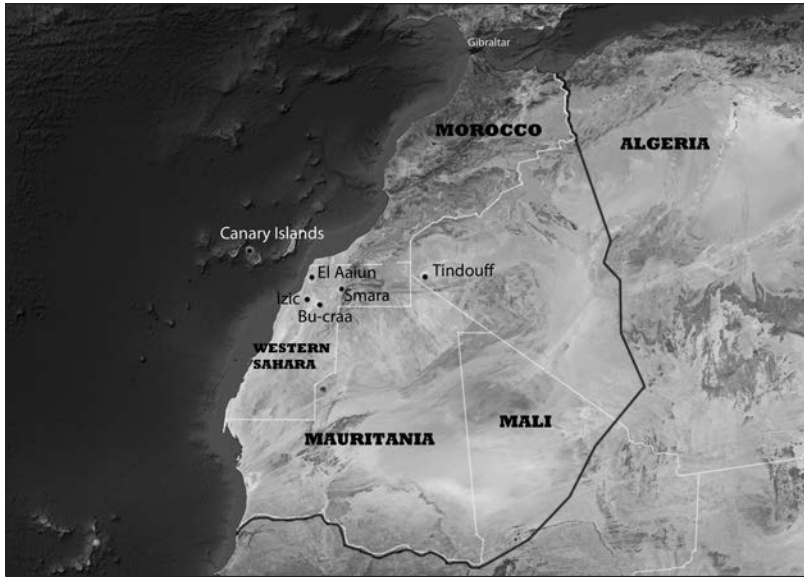


FIG. 1 Map of Western Sahara (note the dotted line separating it from Morocco). (Source: Google Earth. Labels and black line representing the vision for Grand Morocco added by the author with the help of Sofia Matz.)

politics and imagining it as independent from territory management and resources appropriation.⁷ Yet sovereignty and resources were intimately linked throughout decolonization in Africa.⁸ Following Gabrielle Hecht, moreover, turning rocks into “resources” and then turning those resources into “commodities” implies a variety of layers through which sovereignty is distributed.⁹

Thus, the historical question is how Western Sahara’s phosphate rock became an issue of prime significance to a variety of players competing in the world’s political economy of fertilizer. Surprisingly little is known about the specific geopolitics of the world phosphate market and its role in deciding the fate of Western Sahara. To develop this topic, we need to pay close attention to the technologies of fertilizer production and the global division of labor regarding these technologies.

There are three successive if interlinked technological stages involved in the transformation of rocks containing phosphate minerals into sellable

Thompson and Richard Adloff, *The Western Saharans*, 127 and 169; Stephen Zunes and Jacob Mundy, *Western Sahara* (who downplay the original importance of phosphates), 35; Jerome B. Weiner, “The Green March in Historical Perspective.”

7. Mark Drury, “Global Futures and Government Towns”; See also Gustavo Bueno, *Panfleto contra la democracia realmente existente*.

8. Nico Schrijver, *Sovereignty over Natural Resources*.

9. Gabrielle Hecht, *Being Nuclear*, 115–22.

fertilizer: exploration and production of reserve estimates, extraction and transport, and refining and marketing. In Western Sahara, geopolitics was relevant in each of these stages. Spanish international isolation, which prompted its officials to explore for minerals in Western Sahara, was gradually replaced by technical agreements with international firms which brought in technologies for geophysical exploration. This allowed the territory to be understood in new ways, which in turn led to the discovery and reserves calculation of a mine at Bu-Craa, soon declared to be one of the world's largest and richest (stage one). Since several countries regarded resource security as part and parcel of national security, geophysics entered into cold war diplomacy and the reorganization of postcolonial markets. These markets were characterized by a changing division of labor between producers of raw materials and producers of refined fertilizer (stage two). For Bu-Craa phosphate, entering this uneven scenario meant that technologies for production coexisted with technologies for sabotage and scarcity (stage three). The technological transformation of the Saharan human and physical landscape from a desert land populated by nomadic groups into a militarized phosphate production facility was a political endeavor in which geophysics, research apparatuses, industrial machinery, and global markets came together as central components of sovereignty disputes.

Two points on sources are relevant to the argument developed here. First, the transnational nature of the phosphate world market has required the use of archives from a variety of countries. Second, secrecy has affected most of this archival material, as a good number of these sources were untapped before this research. Current Spanish legislation on accessing foreign affairs and personal documents has not made things easier.¹⁰ But access restrictions are also historically informing. Determining who could see what was a part of cold war politics, which inevitably reflects its historical traceability.¹¹ Thus, it is telling that the archive of the Instituto Geológico y Minero Español (IGME) had never been consulted before by a historian and its existence is nowhere advertised—I found it thanks to the serendipitous help of the IGME staff. This impressively rich deposit of geophysical data on Western Sahara is currently classified as “restricted,” as was all news concerning Western Sahara from 1965 to 1974. After Morocco's seizure of Western Sahara in 1975, Spanish authorities clearly wanted to avoid sharing information on geological resources without compensation. Condemning geophysical knowledge to oblivion was, as the Western Saharan stalemate is also, a matter of resource geopolitics.

10. Antonio Niño and Carlos Sanz, “Los archivos, la intimidad de las personas, y los secretos de Estado.”

11. Ronald Doel, “Scientists as Policy Makers, Advisors and Intelligence Agents”; Peter Galison, “Removing Knowledge.”

Mapping for Autarky

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Scarcity induced by World War II, and postwar international isolation, made Francoist officials turn toward Western Sahara. While it had been a Spanish colony from the late nineteenth century, the Spaniards held no more than a few military posts on its coast. At the end of the Spanish Civil War, however, the new regime's relative isolation and its aspirations for an autarkic, self-sustaining economy of raw materials made the prospects of finding new resources a priority. One of the first measures of the new state was to create the Instituto de Estudios Africanos (IdEA), which depended on the Colonial Administration, controlled directly by the minister of presidency, Luis Carrero Blanco—Francisco Franco's right-hand man until his car was bombed in 1973.¹² From 1941 to 1947, the IdEA sponsored a number of expeditions aimed at obtaining more knowledge of these territories. Major experts in disciplines ranging from botany to anthropology took part in these scientific voyages.¹³

Underground resources, particularly oil, coal, iron, and water, were an important part of this program. Thus over twenty geological expeditions took place from 1941 to 1955. Geologist Manuel Alía Medina assisted in two of them and in 1943 completed his doctoral work with a general geological analysis of the northern Western Sahara region, the "Sagua el-Hamra" or "red canal."¹⁴ Its name refers to the dry riverbeds that formed during desertification. These riverbeds opened natural cuts through the continuous black cluster of silex, which allowed Alía to collect samples of fossils and minerals at different depths. After observing relevant parallelism between Sagua el-Hamra and the phosphate-bearing regions in French Morocco and Algeria, and sending some samples for analysis, Alía concluded in 1947 that the region was rich in phosphate deposits.¹⁵

Alía met with Franco in October 1947 and was commissioned to prepare an exploration plan for the National Institute for Industry (INI)—the cluster of state companies representing the pillar of the Spanish autarkic political economy.¹⁶ By then, Western powers had imposed political and

12. I use "Colonial Administration" to refer to Dirección General de Marruecos y Colonias, later renamed Dirección General de Plazas y Provincias Africanas, and finally, Dirección General de Promoción del Sáhara.

13. Emilio Guinea, *España y el desierto*; Julio Caro Baroja, *Estudios Saharianos*; Gervase Clarence-Smith, "The Impact of the Spanish Civil War and the Second World War on Portuguese and Spanish Africa."

14. Manuel Alía Medina, *Características morfológicas y geológicas de la zona septentrional del Sahara Español*; Francisco Hernández-Pacheco, "Discurso de contestación," 47.

15. Since phosphates present themselves under such varying shapes and colors, only chemical and petrographic analysis allows for their identification. Samples were sent to the Instituto Geológico y Minero Español, which depended on the Ministry of Industry: IGME, "Informe sobre unas muestras de fosfatos," 24 October 1947, exp. 107, in SEPI.

16. Manuel Alía Medina and José de la Viña y Villa, "Memoria de la investigación

economic sanctions on Spain and the lack of fertilizer hampered Spanish agriculture in a time of starvation.¹⁷ In particular, France, Europe's main manufacturer of fertilizer thanks to the phosphate coming from its African territories, would not sell phosphoric acid to Spain.¹⁸ Hoping to overcome this situation, the INI launched a systematic research program that went on for over ten years. Thinking (wrongly) that phosphate deposits resulted from marine sediments left in land depressions during flood periods and hoping to find phosphate closer to the coast, INI's geologists surveyed the area between the Izic Plateau and the coast¹⁹ (see figure 1). However, INI managers grew less and less enthusiastic the more they explored. First, the quality of the phosphate found was not sufficient for profitable extraction. Second, the regime's political isolation was coming to an end, among other reasons because Franco clearly aligned Spain with the anticommunist bloc formed by the Western powers. Thus, during the 1950s French fertilizer again started to be available. In 1957, the INI officials decided to cancel the phosphate prospecting program, "unless overriding interests" recommended otherwise.²⁰ As the next section will show, these "overriding interests" concerned Spanish sovereignty over the territory.

In the meantime, Alía had been looking for other uses of the Izic phosphate. As first director of the Colonial Administration's Geological and Mining Service, he presented the first geological map of Western Sahara at the Nineteenth International Geological Conference in Algiers, a meeting which highlighted the growing interest in phosphate genesis globally (fig. 2). One factor contributing to this renewed interest was not agriculture but atomic energy. After confirming that the Saharan phosphate showed significant radioactive levels, Alía developed a research program for obtaining uranium from superphosphate.²¹ And in 1953 he was ap-

de fosfatos en el Sahara Español," Madrid, 26 February 1948, Altos Cargos, Joaquín Planell, E-2225, in SEPI.

17. Carlos Barciela et al., "Sector agrario y pesca," on 338–39. For the politics of French North African phosphate supply to Spain during War World II, see David A. Messenger, "Rival Faces of France."

18. Letter from Suanzes to Planell, 26 July 1950, E-107, in SEPI.

19. Aitor Anduaga Egaña, *Geofísica, economía y sociedad en la España contemporánea*, 296–300.

20. Letter from José Sirvent to Suanzes, "Explotación de fosfatos en el Sáhara español," 22 March 1956; letter from Suanzes to Carrero Blanco, Madrid, 26 October 1956; letter from Carrero to Suanzes, "Explotación de fosfatos en el Sáhara español," Madrid, 16 December 1958; and letter from Suanzes to Carrero, "Fosfatos del Sáhara," Madrid, February 1959, all in E-280, SEPI.

21. Charles F. Davidson and D. Atkin, "On the Occurrence of Uranium in Phosphate Rock"; Manuel Alía Medina, "Informe sobre la posible conveniencia de investigar el beneficio de uranio en la fabricación de los superfosfatos," 23 May 1954, and Alía, "Resultados de una prospección efectuada en las zonas septentrionales del Sáhara español," 5 May 1954, both in (13) 4.13, Box 71/8814, in AGA.

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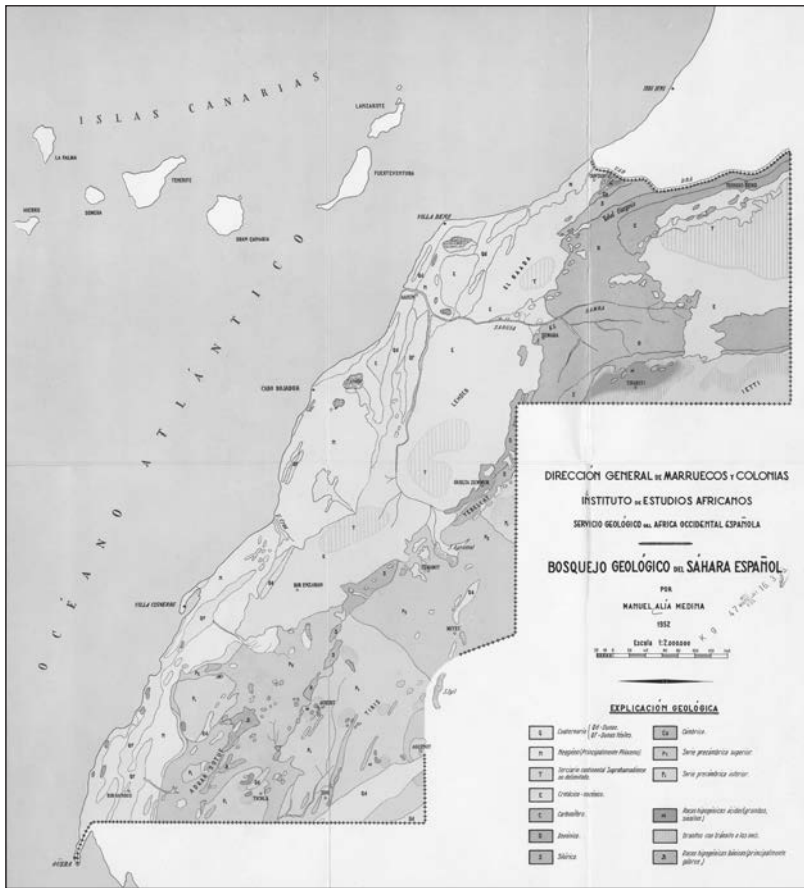


FIG. 2 Manuel Alía Medina, Bosquejo Geológico del Sáhara Español (Madrid: Instituto de Estudios Africanos, 1952).

pointed the chief geologist for the newly funded Junta de Energía Nuclear (JEN), which was busy prospecting for uranium in the Iberian Peninsula but wanted to expand its search into the Sahara as well.²² From 1954 to 1957, the IdEA and the JEN commissioned photo-aerial maps from the army and co-financed four radioactivity surveys in the phosphate areas and elsewhere.²³ In 1957, after some debate over the sedimentary origins of

22. Matthew Adamson, Lino Camprubí, and Simone Turchetti, "From the Ground Up."

23. Alía to José María Otero Navascués, "Nota sobre la existencia de mineral radiactivo en el Sáhara meridional español," London, 1 May 1955, (13) 4.13, Box 71/8814, in AGA; Alía and Félix Cañanda Guerrero, "Avance de informe de las zonas radiactivas costeras del Sahara Meridional Español," Madrid, June 1956, (13) 4.13, Box 71/8794, in AGA.

the Saharan uranium, the JEN geologists decided to prioritize uranium prospecting in the Iberian Peninsula.²⁴

These prospecting efforts proved fruitful. In 1958, a more complete version of the Sahara's geological map was published with special attention to radioactive areas.²⁵ That same year, the Spanish government approved a more open policy regarding foreign investments and offered international oil companies the possibility of prospecting in the area.²⁶ It provided detailed geological and photo-aerial maps and granted specific areas for exploration to about twenty companies.²⁷ Hundreds of prospectors changed the face of the territory, challenging nomadic life and the desert's environment—El Aaiún, a military enclave founded in 1940 and declared the administrative capital, swelled from a population of 2,000 to 10,000 (today the city numbers 235,000).²⁸ The prospectors brought with them new exploration techniques and technoscientific apparatuses. The territory was now read in terms of magnetometers, scintillation counters, and electrical gauges.²⁹ Although the findings were poor and oil companies soon lost interest, the geophysical recasting of Western Sahara would prove its significance once Spanish sovereignty in the region was called into question.

24. Demetrio Santana, "Informe sobre la visita efectuada al Sáhara con objeto de visitar la zona del Tercat durante los días 20 al 29 de marzo," 7 June 1957, docs 2684, in IGME.

25. De la Viña and Muñoz, "Mapa geológico del Sahara Español y Zonas Límites" (Madrid: IGME, 1958), map 2675, in IGME. Alía continued his research on the tectonic structure of the Western Sahara; using his position within the IdEA he organized a geodesic network and in 1964 published a tectonic map of the Western Sahara as part of UNESCO's Sub-commission for the Tectonic Map of the World. Alía, "El origen tectónico de las sebas del Sahara Español," 7 July 1956, (13) 4.13: Box 71/8794, in AGA; Alía, "Red Geodésica del Sahara Español," 1961, docs. 7440–7460, in IGME.

26. Aitor Anduaga Egaña, "Autarchy, Ideology, and Technology Transfer in the Spanish Oil Industry, 1939–1960."

27. D. Boyd, "Informe preliminar de la investigación aérea radiactiva llevada a cabo por Hunting Geophysics LTD. en el Sáhara español. Marzo–abril 1959" (1959) and Ronald R. Hartman, "Informe geofísico de la investigación aeromagnética del Sáhara español para la Dirección General de Plazas y Provincias Africanas" (1959), docs. 4103–4199, in IGME.

28. Rosa Ortega Canadell, *Provincias africanas españolas*, 221; José Antonio Valverde, *Memorias de un biólogo heterodoxo*, 127.

29. Rufino Gea Javaloy, "Prospección geofísica aérea de la Provincia del Sáhara, año 1962, para el Servicio Minero y Geológico de la Dirección General de Plazas y Provincias Africanas," 3 vols., Madrid, February 1964, 4118, in IGME; Gea, "Estado actual de nuestros conocimientos sobre las anomalías aeroradiactivas del Sahara," Madrid, June 1965, 2664, in IGME. For the shift from geology to modern earth sciences, see Naomi Oreskes and Ronald E. Doel, "The Physics and Chemistry of the Earth."

Resource-based Sovereignty

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After years of intense unrest, Morocco obtained its independence from both the French and the Spanish protectorates in 1956. Soon, Mohammed V, the new Moroccan monarch, presented the UN with his claims over “Grand Morocco,” the alleged area of the sultans’ precolonial influence that would reach from a good part of western Algeria and Mali to most of current Mauritania and Western Sahara (see figure 1). He also armed pro-Moroccan groups in Western Sahara; they were defeated by a Franco-Spanish joint military operation.³⁰ In 1960, Mauritania also put an end to French colonial rule and claimed ownership over Western Sahara on the grounds of anthropological links through the common nomadic population. Simultaneously, in December 1960 the UN’s General Assembly approved its declaration for independence of colonial countries and would soon include Western Sahara in the list of non-self-governing territories awaiting self-determination. This made Spain legally a colonial administrative power despite its face-saving move of giving Western Sahara the status of a province.³¹

In view of the weakening of the Spanish position, the regime sought to anchor the Spanish state in the region through economic development.³² INI president Juan Antonio Suanzes had already argued that making the territory productive was a duty for the Spanish state.³³ The new geopolitical challenges made the development of the Saharan “province” a necessary step for gaining both the consent of the indigenous population and justification of Spanish presence vis-à-vis the international community. On several occasions, Franco himself insisted on the importance of reinvesting part of any possible future benefits back into the territory.³⁴ In 1960, the government turned once more to phosphate ores.

After reassessing the available data, Carrero ordered the INI to resume its phosphate program in 1962.³⁵ Soon the company Empresa Nacional Minera del Sáhara (ENMINSA) was created.³⁶ ENMINSA geologists had at their disposal a new wealth of geophysical data made available by oil companies. Of special interest were two distinct layers of dark flint between

30. Hodges, *Western Sahara*.

31. Fernando Hernández-Pacheco and José María Cordero Torres, *El Sáhara español*, 143–60.

32. For how technology helps nations take place, see Sara Pritchard, *Confluence*, 8.

33. Suanzes to Carrero, “Constitución por el Instituto Nacional de Industria de una Empresa Nacional para la explotación de los yacimientos de fosfato del Sahara español” (about 1967): 6, E-107, in SEPI.

34. José María Ríos García, *¡¡Sahara!!* 280.

35. Dirección General de Plazas y Provincias Africanas, “Nota sobre fosfatos en Ríos de Oro,” 17 April 1959, Doc. 2783, in IGME; INI, “Inversiones previstas para 1962 en la cuenca de fosfatos del Sáhara,” January 1962, E-280, in SEPI.

36. Carrero to Suanzes, 6 June 1962, E-280, in SEPI; ENMINSA, *Memoria 1962*, Anexo.

which seemed to be the phosphate-bearing layers. These two layers were easy to trace and thus could be used to produce correlations between different areas of the desert containing them. The location of the Cretaceous-Eocene contact was much clearer now and it marked a Paleocene coast that coincided with the levels where Alía had first found phosphate.³⁷ New knowledge of phosphate genesis made this last finding particularly important. Most theories pointed toward explanations of sedimentary phosphate that combined deep marine concentrations in cold conditions with their rise by convection toward shallow coastal waters during prolonged geological periods.³⁸ The problem was thus to follow the direction of the Paleocene coast toward older layers of presumably greater purity.

For this, ENMINSA contracted the French state-owned Institut Français du Pétrole (IFP), which had prospected the Izic area for its concessionary oil company and was also known for its sediment analysis of phosphate in Algeria and Morocco.³⁹ IFP technicians suggested using a Widco Logger geophysical-electrical counter together with an attached gamma-ray counter to produce detailed well loggings. Together with micro-paleontological analyses carried out in Spain, this technology allowed ENMINSA to trace the phosphate layers underneath the *hammada* (rock-strewn desert region)⁴⁰ (fig. 3).

Following the paleo-oceanic boundary, in June 1963 ENMINSA technicians drilled a hole at Bu-Craa, a region identified by one lonely tree that nomadic groups took as a geographical reference point. They struck on a fairly superficial vein of surprisingly high quality. The next year was spent in further explorations and in producing complex reserve estimates through geostatistical methods.⁴¹ In 1964, ENMINSA reported that hidden beneath the Bu-Craa tree were 1,600 million tons of phosphates of 68 percent average quality with veins of 80 percent purity, well above that of most mines. These conclusions suggested that the region was one of the largest and richest deposits in the world.⁴² The consequences of such a discovery could therefore no longer be of significance for the geophysicist alone; the growing thirst for fertilizer across the world made Bu-Craa the *trait d'union* between earth studies and geopolitics.

37. ENMINSA, *Descubrimiento, cubicación y evaluación del yacimiento de fosfato de Bu-Craa*, 30–84.

38. José María Ríos García, *Yacimientos y criaderos de fosfatos y su génesis*, J1–J18.

39. The concessionary company had been Champlin Oil & Refining Co. For ENMINSA-IFP see Comisión Gestora de Fosfatos del Sáhara, “Resumen mensual de trabajos,” April 1962, doc. 2813, in IGME; and ENMINSA, “Resumen mensual de trabajos,” July 1962, doc. 2819, in IGME.

40. ENMINSA, “Resumen mensual de trabajos, enero 1963,” doc. 2831, in IGME.

41. ENMINSA, *Descubrimiento, cubicación y evaluación del yacimiento de fosfato de Bu-Craa*.

42. IFP, “Etudes géologiques concernant les couches à phosphates du Sahara espagnol” (July 1963), doc. 2807, in IGME.

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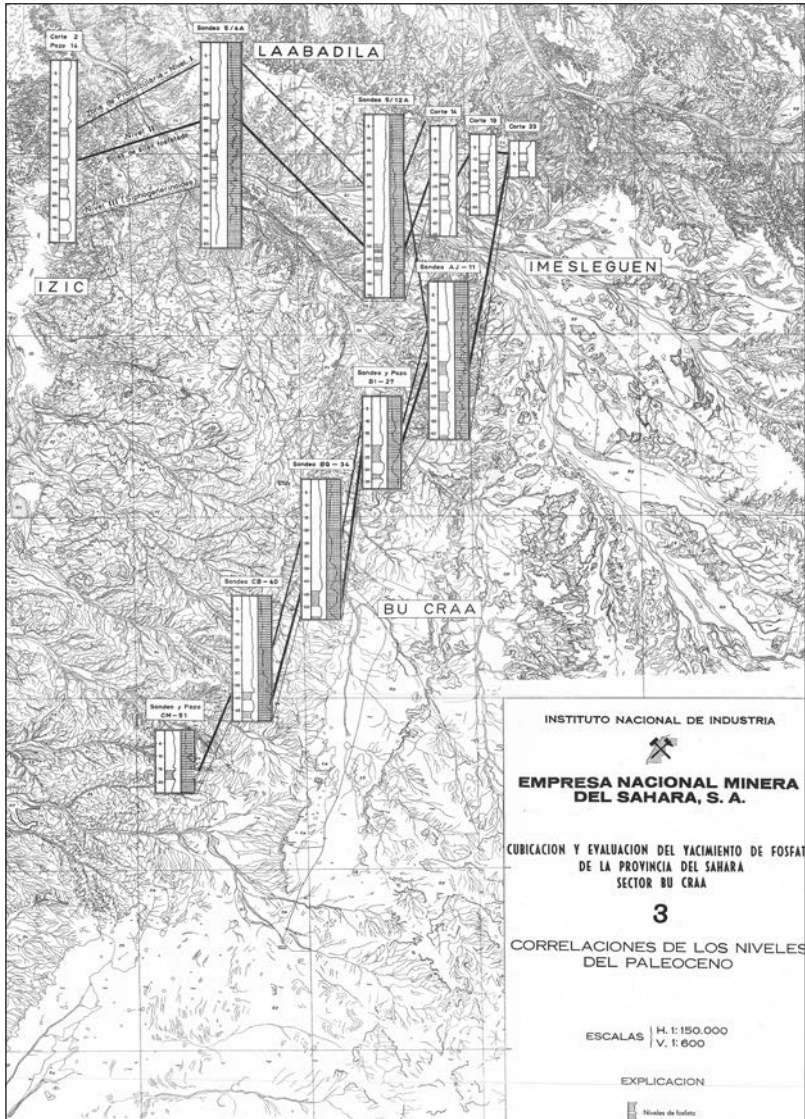


FIG. 3 Well-logging results and correlation of phosphate-bearing layers from Izic to Bu-Craa. (Source: ENMINSA, *Cubicación y evaluación, 3. Correlaciones de los niveles del Paleoceno* [1965], Box 3776, code 419825 [A], in SEPI. Reprinted with permission.)

Postcolonial Markets: Cartelization and Sabotage

The Bu-Craa finding occurred at a time of rapid developments in the phosphate world market. In the golden age of capitalism and of Nikita Khrushchev's Seven Year Plan, demand for fertilizer had boomed. Between 1954 and 1964 annual production of fertilizer doubled from 18 to 36.5 million tons and it was expected to double again in the next ten years to satisfy demand. 1964, the peak year of the phosphate rush, showed a 14 percent increase in production.⁴³ The first effects of developmental aid to third world countries were partly responsible for this boom, but the main consumers of raw phosphate continued to be in Europe—particularly France in the West and Poland in the East—accounting for 75 percent of all world imports. From there, fertilizer was manufactured and exported to other areas, mainly in the form of phosphoric acid.⁴⁴

On the supply side, producers were few. The first- and second-world producers, the United States and the Soviet Union, used most of what they extracted at home, although U.S. manufacturing companies were starting to compete with European ones in the processed fertilizer market. It was North African countries that supplied raw phosphate to the European market. In particular, Morocco was already the leading world exporter and its economy was dependent on phosphate, which represented 24 percent of its total exports. The Office Chérifien des Phosphates (OCP), the French state company that owned Moroccan mines, employed more people than any other company in the country.⁴⁵

Other producers in the region were far behind in terms of reserves; these were Egypt, Tunisia, Algeria, Senegal, and Togo. The first four had been French colonies and, together with Morocco, had belonged to either the OCP or the French Comptoir de Phosphates de l'Afrique du Nord, an agency created in the 1920s to put the commercialization of raw phosphate at the service of the metropolis. After independence, however, these countries nationalized production and the resulting state companies sold their raw phosphate through bilateral agreements with consuming countries.⁴⁶ In 1961 the Comptoir was dissolved and the OCP had become Moroccan. That year, the Union Phosphatier Africaine (UPA) was created under French auspices. It included all producers except for the most relevant one: Morocco.⁴⁷ Although France had retained certain financial and technical leverage over the Moroccan OCP, French officials complained that the

43. ENMINSA, "Resumen mensual de trabajos, diciembre 1964": 63–78, doc. 2878, in IGME.

44. A. E. Cascino, "Futuro de la industria del mineral fosfatado en Florida" (original in English at *The World of NPKS*, May 1967): 4, Box 3776, code 419825 (A), in SEPI.

45. ENMINSA, "Resumen mensual de trabajos," March 1964, 2857, in IGME.

46. ENMINSA, *Industria de fertilizantes fosfatados en España*, 157.

47. Directeur des Intérêts Economiques to Ministre des Affaires Etrangères, 26 June 1965, 424, in AD.

postcolonial market was “ruled by anarchy,” by which they meant that the main producer was no longer under French control.⁴⁸

In this anarchic and competitive market marked by the divide between producers of raw phosphate and manufacturers of fertilizer, the Bu-Craa mine created challenges and opportunities for all parties involved. Soon, they started gauging their positions and making their first moves in what would be a game of equilibriums revolving around the concrete materiality of mining technologies, reserve estimates, and transport lines from the mine into refineries and markets. The resource that was expected to strengthen Spanish rule could become the most dangerous threat to it.

ENMINSA officials immediately understood that the Bu-Craa mine exceeded Spanish needs and saw an opportunity to enter the lucrative phosphate world market. Their hopes that phosphate’s skyrocketing prices would finally put an end to the Saharan economic and political troubles were explicit.⁴⁹ Already in 1963, ENMINSA started producing detailed monthly internal reports on the phosphate world market that were rich with geopolitical considerations. ENMINSA’s experts concluded that entering the world market would be easier through an international venture that included U.S. and French manufacturers. In 1965 they prepared a long memo on the Bu-Craa mine that expounded particularly on the technicalities of reserve estimates and sent it to foreign companies and governments along with invitations to start negotiations. Simultaneously, access to the territory and the mine was protected and restricted, and the tension between what knowledge was to be shared and what concealed became pervasive in the following years.

Among the first countries to react to announcement of the Bu-Craa discovery was Algeria. King Hassan II’s ambitions for a “Grand Morocco” had led to a short war with Algeria over the Tindouff region immediately after Algeria obtained its independence in 1962. Bu-Craa allowed Algerian diplomats to build aspirations for a friendly, independent, and rich state in Western Sahara and they played a leading role in pressuring the United Nations to enforce the Sahrawi referendum allowing the inhabitants to vote on independence or affiliation with Morocco. In 1965, the UN issued a formal request to Spain to start a decolonization process.

Moroccan officials rapidly understood that these significant Western Saharan reserves of high-quality phosphate were a threat to its European market. Furthermore, King Hassan II knew that an international venture exploiting phosphate would leave the territory out of reach for Morocco.⁵⁰

48. Sephos to Fosbucraa, “Aide-memoire,” Paris, 26 February 1970, Archivo de Altos Cargos. Claudio Boada. Caja: 3697, n. 44, in SEPI.

49. Ríos, “Pasado, presente y futuro de las actividades de ENMINSA”: 5, April 1964, doc. 2797, in IGME.

50. Editorial, “Le Maroc vat-il-perdre la richesse que constitue le phosphate de la Séquiât al-Hamra?”

Not surprisingly, Moroccan claims over the Sahara became more vocal, as did the Mauriticians in response. Morocco made clear that it would consider any international agreement with Spain regarding the Bu-Craa mine to be illegitimate. As early as 1965, the Moroccan minister of foreign affairs traveled to Washington to lobby against any such agreement.⁵¹

The next year, former ambassador to Washington Ali Benjelloun was named OCP's president. He cut ties with France and approached the United States in a strategy to hinder any possible negotiations with Spain. As a result, Occidental Petroleum agreed to build a refining plant in Morocco. Morocco now had the opportunity to turn to manufacturing, thus challenging the French position in the European market for phosphoric acid. But not everyone within the Moroccan government agreed with leaving France out of the diplomatic picture. In 1967, Benjelloun was replaced by Mohammed Karim Lamrani, whose strategy was to navigate between U.S. and French interests as a means to maintain an independent and strong position regarding Moroccan and Western Saharan phosphate.⁵²

The new mine was also a challenge for France. As a producer of raw phosphate through the *Compagnie Financière de l'Outre Mer (COFIMER)*, a para-state postcolonial giant which owned significant shares of the phosphate companies in Togo and Senegal, the French government saw Bu-Craa as a competitor. But as a consumer, joining Spain in Western Sahara could allow France to regain its lost control over North African phosphate. Equally important, being left out of a possible U.S.-Spain partnership could endanger France's position in the European market.⁵³ Cutting into that market was precisely the U.S. companies' goal. Occidental Petroleum tried to bring together Spain and Morocco to create a new partnership that could threaten the Paris monopoly. Occidental's selling point to Spain was that only collaboration would "tie in Morocco's interests with Spain's and thereby head off political-diplomatic confrontations developing over Morocco's claims to sovereignty over the Spanish Sahara."⁵⁴

But neither Morocco nor Spain was eager to undertake collaboration. The Spanish strategy was to capitalize on the conflict between Morocco and Mauritania over Western Sahara, to maintain good economic relationships with both countries, and to reassure Morocco that Bu-Craa phosphate would be shipped to non-European markets and thus not be put into direct competition with Moroccan ones.⁵⁵ This last point was one of the

51. French ambassador in Morocco to Minister of Foreign Affairs, 22 December 1965, 424, in AD.

52. Commercial assistant to the French ambassador in Morocco to Minister of Foreign Affairs, 25 March 1968, 424, in AD.

53. Direction des Affaires Politiques du Afrique de Nord, "Note. Phosphate d'El Aioun," 424, in AD.

54. Occidental Petroleum, "Note on the Sahara" (1966), Box 3776, code 419825 (A), in SEPI.

55. Hodges, *Western Sahara*.

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reasons negotiations with the French COFIMER came to an abrupt end in 1966. Despite several visits of COFIMER's president to Spain to meet with members of the government, Carrero ordered ENMINSA to pursue negotiations with U.S. companies only.⁵⁶

Carrero saw two main advantages to a partnership with U.S. interests. On the one hand, he hoped that it would divert Saharan phosphate to markets far from Moroccan interests—the United States, Latin America, and the Pacific. On the other, he trusted that it would reinforce the Spanish-American alliance established in 1953 through military bases and financial aid. In the event of Moroccan direct aggression or of nationalizations by a future Sahrawi independent state, Spain would benefit from having U.S. military muscle by its side. Commercial negotiations became of prime importance for future sovereignty over Western Sahara and its resources. As the minister of industry told ENMINSA's negotiating committee, "the issue of independence will soon be pressing. . . . The future of the territory depends to a great extent on what you will be able to achieve."⁵⁷

Carrero's assumptions were too optimistic, as demonstrated by the tough negotiations between ENMINSA and U.S. companies that followed. First, most U.S. companies that expressed interest in the Bu-Craa mine did so wishing to compete with Morocco in the European market without the inconvenience of high transatlantic transportation costs.⁵⁸ Phosphate rock was bulky and it took lots of containers to move it, so geographical proximity was central in crushing or maintaining regional monopolies. The explicit goal of U.S. firms was to manufacture a truly global market that challenged regional "natural markets" (in the expression of one of these companies), but for that they needed to become producers in the richest phosphate region.⁵⁹

Second, as several Spanish officials noted, some of those companies, particularly the big oil companies wishing to expand into the fertilizer market, would have little problem double-crossing Spain if Spanish sovereignty was put into question.⁶⁰ As these issues emerged in negotiations, by mid-1967 the sole candidate left was the fertilizer manufacturer giant International

56. Director of Economic Affairs to Director of North Africa, 25 March 1966, 424, in AD. Ríos to Sirvent, 20 December 1965 and Carrero to Sirvent, 14 January 1966, both in Box 3776, code 419825 (A), in SEPI; Sirvent to Carrero, Madrid, 24 January 1966, Box 3766, code 419822, in SEPI. The Spanish Ministry of Industry may have also taken the decision of negotiating with the United States to pressure France to accelerate Spain's entrance in the European Economic Community: "Spain Picks U.S. Firms Only for Possible Stake in Sahara Phosphate," *Oilgram News Service*, 4.

57. Comisión Negociadora, "Sesión del día 23 Febrero 1966. Acta 1." Madrid, February 1966, 6–7, Box 3766, code 419822, in SEPI.

58. Cascino (IMC vice-president), "Futuro de la industria"; Occidental Petroleum, "Note on the Sahara" (1966), Box 3776, code 419825 (A), in SEPI.

59. IMC, "Preparado especialmente para el gobierno español," 5.

60. De Corral to López Bravo, 22 March 1966, Box 3776, code 419825 (A), in SEPI.

Mineral and Chemicals (IMC), based in Florida.⁶¹ Negotiations revolved around the extent of IMC's financial commitment, the percentage of a special tax to be reinvested in the region, the control of technical decisions, respective compensation fees for previous prospecting costs, and previous knowledge of commercialization. Nevertheless, in late 1967 IMC withdrew all previous offers on the grounds of the stagnation of phosphate prices.⁶²

As often happens with resources, the main technopolitical controversy centered on reserve calculations. Even today, global reserve estimates vary dramatically; some foresee a phosphate peak in fifteen years, and others in 300 years.⁶³ In the late 1960s, geophysical knowledge of phosphate genesis was key to the predictions of both sides. ENMINSA's technicians presented their views at the 1967 UN meeting on fertilizer in Bangkok and commissioned the IFP to analyze the origins of phosphate concentrations in Africa taking into account recent developments in plate tectonics.⁶⁴ Their argument was that demand was still growing, with China and Brazil as new emerging consumers, and production sites would remain few. Thus, low prices were artificial and would soon regain their upward trend. They blamed price stagnation on the attempt by Morocco to prevent an ENMINSA-IMC agreement. This, ENMINSA's officials protested, was a form of sabotage.⁶⁵

This was not the only time sabotage factored into the developments of Western Sahara. As historian Timothy Mitchell has argued, the ability to interrupt the flow of materials is as important to participants in global markets as the capacity to produce and move goods around.⁶⁶ In the case of Bu-Craa, the most vulnerable point of passage was the line connecting the mine to the port at El Aaiún. During 1966 and 1967, ENMINSA had started working on the mining facilities, including lodging for workers, a treatment plant, storage facilities, and a 3.5-kilometer-long wharf at El Aaiún port, able to deliver the expected production of six to ten million tons a year. Between the mine and the port, the project was to lay a 100-km-long conveyor belt. By far the longest in the world, the belt was presented as a technological wonder. But this very novelty helped opponents

61. Loren Jenkins, "U.S. Group Withdraws Bid for Sahara Phosphates"; Richard Spielberg, "IMC Joins Spain in Phosphate Deal."

62. Nelson C. White to Corral, 24 November 1967, Box 3766, code 419822, in SEPI.

63. Dana Cordell, *The Story of Phosphorus*, appendix A. See also the Global Phosphorus Research Initiative response, "GPRI Statement on Global Phosphorus Scarcity," 26 September 2010, to the "World Phosphate Reserves & Resources" report released by the International Fertilizer Development Center.

64. Ríos García, *¡¡Sahara!!* 170; Ríos García, *Yacimientos*, P1-P3.

65. ENMINSA, "Nota sobre las posibilidades de mercado de fosfato en los momentos actuales," 1 December 1967: 5, Box 3776, code 419825 (A), in SEPI. Also, Commercial assistant to the French ambassador in Morocco to Minister of Foreign Affairs, 22 May 1967, 424, in AD.

66. Timothy Mitchell, *Carbon Democracy*.

stress the risks involved. The issue was already controversial within ENMINSA, where two military engineers who specialized in sabotage prevention had opposing views regarding the belt's safety.⁶⁷

The controversy over the belt's vulnerability made the larger project vulnerable, and in 1966 IMC technicians managed to force a halt in its construction as part of the negotiations. When the negotiations were terminated in late 1967, ENMINSA's technicians felt that IMC had effectively delayed production for almost two years. Thus, they went as far as accusing IMC of acts bordering on sabotage.⁶⁸ In early 1968, ENMINSA resumed the project and commissioned the German firm Krupp to construct the belt, which started running in 1971. As the next section explains, the belt suffered the first literal sabotage in 1974 in an increasingly tense geopolitical scenario revolving around phosphate production, circulation, and scarcity.

Technologies of Scarcity

The failure of negotiations showed that getting the Saharan phosphate to the world market without Morocco's collaboration would be harder than expected. But huge investments had been put into the mine and prospects of revenue for the state and economic development for the region were still high. The Spanish government officially agreed to conduct a self-determination referendum in 1966, but argued that the Sahrawi people were not yet ready for it. It hoped to buy enough time to gain Sahrawi favor through the country's economic development.⁶⁹ In early 1968 ENMINSA was renamed Fosbucraa and Alfonso Álvarez Miranda appointed its new president. He was charged with finding a solution to commercialization.

Álvarez argued that breaking into the world market without previous agreements with other strong producers would lead to a price war that Spain, a newcomer, could not win. Fortunately, other producers were also willing to avoid fierce competition. A COFIMER representative proposed himself as a mediator between Spain and Morocco. His explicit goal was to refund the Comptoir, unifying the interests of North African producers with those of European manufacturers as a way of countering increasing competition coming from U.S. manufacturers. For Álvarez, this approach served only French interests and he pushed ENMINSA toward establishing

67. Comisión Negociadora, "Sesión del día 13 mayo, 1967. Acta 36." May 1967, Box 3766, code 419822, in SEPI; Boada to Letona, "Nota informativa sobre instalaciones de transporte" 22 June 1970, and INI, "Tercera reunion (Carrero, López Letona, López Bravo, General Alegría, Álvarez de Miranda)," 19 June 1971, both in Archivo de Altos Cargos, Claudio Boada. Box 3698, n. 45, in SEPI.

68. Ríos García, *¡¡Sahara!!* 156–58 and 172; Carlos Muñoz Cabezón, "La verdadera historia de los fosfatos del Bucraa," on 48.

69. Comisión Negociadora "Sesión del día 23 Febrero 1966," 7.

direct arrangements between producers of raw phosphate. In particular, he suggested, if Spain joined forces with the United States and Morocco they could extend collaborations to manufacturing phosphoric acid, an industry which had gained some importance in Spain. The urgency of such an arrangement was made clear to the Spaniards in 1973, when a cluster of U.S. companies and the OCP created the World Phosphate Institute. Based in Paris, it was meant to negotiate contracts with consumers and gathered most producers except for Spain and Israel, which Morocco had requested be excluded. To avoid isolation, Álvarez resumed negotiations with U.S. companies, particularly with IMC, and obtained the government's permission to establish direct contacts with his Moroccan counterpart, Lamrani, who had his own interests in building bridges.⁷⁰

Hassan II faced growing opposition and suffered two coup attempts, in 1971 and 1972. He had only two political assets to gain legitimacy: refloating an economy based on phosphate and fulfilling his territorial claims regarding Western Sahara. That he and his government perceived both things to be deeply connected is shown by Lamrani's statement that only Morocco had the right to sell Bu-Craa's phosphate because only Morocco could claim rights over the territory.⁷¹ Because of this perceived interconnection, Lamrani, while keeping his position as the OCP's president, was promoted to minister of finance in 1971, prime minister for economic affairs later in the year, and president of the state bank in 1972. His goal was to prevent Bu-Craa phosphate from entering the market, which would have forced Morocco to bring down prices.

Álvarez and Lamrani had the first of a series of secret meetings in March 1972. Lamrani went as far as to offer to withdraw sovereignty claims in exchange for 49 percent Moroccan participation in Fosbucraa. Spanish officials rejected this possibility on the grounds that it did not help their prospects to gain the Sahrawi people's favor in the case of a self-determination referendum. Instead, Álvarez offered yearly secret agreements that affected only the amount of phosphate that each country would sell, to which clients, and at what minimum prices. This arrangement allowed Spain to sell the first cargo to a Japanese company in 1972, and by 1973 Fosbucraa was selling more than half-a-million tons of phosphates. The agreement allowed Morocco to pressure other producers to increase the price of phosphate almost fourfold between 1973 and 1975.⁷² But Lamrani made it clear that if Fosbucraa maintained its plans to produce six million tons a year by 1975 and twelve million in the following decade, competi-

70. Letters and reports at Archivo de Altos Cargos. Claudio Boada. Box 3697, n. 44, in SEPI.

71. "Press Interview by Mohammed Karim-Lamrani, Director General of OCP."

72. Neuman (U.S. embassy, Rabat), "Justice Department Anti-Trust Action: Outcome of Visit by David Coldsweig," 17 July 1975, 1975RABAT03465_b, in NARA.

tion would be too strong for Morocco to stand, which would destabilize its economy and bring the sovereignty question back into the spotlight.⁷³

Simultaneously, international pressure for Spain to call for a self-determination referendum was increasing and the situation in Western Sahara was no more reassuring for Spanish prospects. Political activism had been rising for some years and in 1973 a group of Sahrawi founded an armed anticolonial movement, the Polisario Front. Aware of the political power invested in the mine's technologies, some of the most politically active groups were to be found among Bu-Craa native workers.⁷⁴ The vulnerability of the phosphate conveyor belt also attracted these activists' attention. In October 1974, the Polisario burned down fourteen kilometers of the belt.⁷⁵

Having the capacity to disrupt the circulation of phosphate, the Polisario demonstrated the power to affect Spanish political and economic strategy. The Spanish government thus started preparations to conduct the referendum in 1975. Fearing a negative result, Hassan II decided to take over the territory through diplomatic and military muscle, including the famous Green March of about 350,000 of his subjects toward the border with Western Sahara. Algeria's support for the Polisario and its ties to the Soviet Union, along with the strong socialist opposition in Morocco, made U.S. officials fear a "sovietization" of the region.⁷⁶ When discussing the U.S. position toward the problem with President Gerald Ford, Secretary of State Henry Kissinger put it in simple terms: "If he [Hassan II] doesn't get it [the Sahara] he is finished; we should now work to ensure he gets it."⁷⁷

To ensure a peaceful process, Spain needed to comply, and the United States found it easy to pressure the regime, with Franco on his deathbed and rampant political uncertainty spreading.⁷⁸ On 14 November 1975, a week after the spectacular march hit its final destination and a week before Franco's death, Spain, Morocco, and Mauritania signed a secret agreement in Madrid by which Spain unilaterally ceded its administrative powers to the other two countries. Not surprisingly, the Madrid agreement contained important sections regarding resources, particularly fishing and mining. Of course, phosphates were included: 65 percent of Fosbucraa was sold to the OCP, while the INI retained 35 percent and secured the presidency for Álvarez and an annual share of raw phosphate.⁷⁹

73. Letters and reports at Archivo de Altos Cargos. Claudio Boada, Box 3697, n. 44, in SEPI.

74. Maurice Barbier, *Le conflit du Sahara Occidental*, 26.

75. Fosbucraa, "Acta 28 octubre 1974," sig. 3129.3., n. 5383, 1974, in SEPI.

76. Hodges, *Western Sahara*.

77. Brent Scowcroft, "Memorandum of conversation. White House," 10 November 1975, in Gerald R. Ford Presidential Library.

78. Wells Stabler (U.S. embassy, Madrid), "Spanish-Moroccan Negotiations on the Sahara. Conversation with Solis," 25 October 1975, 1975MADRID07471_b, in NARA. Stabler, "Spanish Sahara," 7 November 1975, 1975MADRID07794_b, in NARA.

79. "Cooperación con Marruecos," attached to "Objetivos del viaje a Marruecos,"

A long war between the Polisario and Morocco followed in which the relevance of phosphate was pervasive. First, phosphate allowed Morocco to navigate between the two blocs, becoming the Soviet Union's main commercial partner in Africa while receiving one-fifth of all U.S. developmental aid to Africa, a good share of it in weapons to fight the Polisario, which in turn was armed by Algeria.⁸⁰ Second, the Polisario made sabotaging the conveyor belt the cornerstone of its technopolitical strategy. Production was halted from 1976 to the mid-1980s and Morocco was forced to use heavily escorted trucks instead of the belt. Nevertheless, this was not always a problem to the OCP, whose principal preoccupation had been to rule out its southern competitor. The production of scarcity is a basic strategy in world markets, and it certainly allowed the OCP to maintain high prices.⁸¹ Finally, Morocco also based its war strategy around the mine. As the Polisario grew stronger, Moroccan forces abandoned most of the territory and focused on keeping hold of the so-called "useful triangle" containing the cities of El Aaiún and Smara and the Bu-Craa mine. "We," Hassan II wrote in 1978, "did not invade the Sahara because of its phosphates, but in order to build new cities and roads."⁸² And yet soon the territory was turned into a military camp traversed by sand walls, stones, and barbed wire installed to protect phosphate.

In 1991, with the cold war over, the two parties signed a truce and Morocco agreed to conduct a referendum, which it has managed to delay up to the present.⁸³ Whenever the United Nations Mission for the Referendum in Western Sahara (MINURSO) attempts to enforce a resolution, a number of countries stop it.⁸⁴ As diplomat Frank Ruddy, former MINURSO vice-president, recently put it discussing the Western Sahara stalemate: "the UN has no authority. It can't require anybody to do anything. They get people together and they sit around, and meet . . . and agree to do nothing. And that's essentially how the UN works. It's a big political machine. It has nothing to do with right or wrong."⁸⁵

But it does have to do with phosphate. The same countries which do

no signature, no date, Archivo de Altos Cargos. Antoñanzas. Caja: 4257, n. 159, in SEPI; Neuman, "Sahara: economic aspects," 19 October 1975, 1975RABAT05218_b, in NARA.

80. Yahia H. Zoubir, "Soviet Policy toward the Western Sahara Conflict"; Stephen Zunes, "Nationalism and Non-Alignment"; Yahia H. Zoubir, "The Western Sahara Conflict"; Anthony G. Pazzanita, "Morocco versus Polisario"; Leo Kamil, *Fueling the Fire*; Martha Wenger, "Reagan Stakes Morocco in Sahara Struggle"; Phillip C. Naylor, "Spain and France and the Decolonization of Western Sahara."

81. Stabler, "Algeria seen as unwilling to provoke war with Morocco," 24 December 1975, 1975MADRID09028_b, in NARA. Mitchell, *Carbon Democracy*, 39.

82. Hassan II, *The Challenge*, 163.

83. Erik Jensen, *Western Sahara*, chapters 5–7.

84. Colum Lynch, "Susan Rice Gets the Morocco Block"; Philippe Boloïon, "Sahara occidental."

85. From the 2012 documentary film by Álvaro Longoria, *Los hijos de las nubes, la última colonia*; William J. Durch, "Building on Sand."

not recognize Morocco's sovereignty over Western Sahara sign commercial agreements with Morocco regarding the Saharan phosphate. As the price of phosphate multiplied fourfold in 2008, keeping its hold on Western Sahara remains a priority for the Moroccan monarchy.⁸⁶ Nevertheless, the technopolitical struggle for resources has not yet ended, and the conveyor belt suffered its last attack to date in 2007.

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Conclusion

This article makes resources and technology central to any correct understanding of the recolonization of Western Sahara. The three stages in the transformation of the Bu-Craa minerals into fertilizer were mutually interdependent. Each of them required specific technologies, such as loggers for geophysical exploration, transport facilities, and price agreements. Paying close attention to these technologies and to their geopolitical implications, that is, to the materiality of phosphate production and commodification, places them into technopolitical entanglements specific to the cold war and decolonization.

In turn, new visions of cold war science and technology, as well as of their interconnections with decolonization and diplomacy, emerge from this resource-centered perspective.⁸⁷ Recent literature approaches the cold war as a set of conflicts revolving around resource security.⁸⁸ Paying attention to the technicalities of these conflicts calls for a history of cold war science and technology that moves beyond weaponry, computers, and nuclear and space programs. As with other cold war commodities, the phosphate world market was a booming business deeply traversed by politics.⁸⁹ Fertilizers entered the cold war through their connection to "food security," a concept coined by U.S. policymakers in the 1960s.⁹⁰ As seen in the quote which opened this article, the IMC assured the Spanish government that controlling the resources necessary for feeding large populations was an asset comparable to launching nukes and spaceships.

Thus, focusing on the mineral side of the fertilizer political economy inevitably invites us to see geology and geophysics as cold war sciences. Information on minerals and their availability made these sciences a strategic priority, as emerging literature on earth and environmental sciences

86. World Bank, Commodity Price Data (Pink Sheet).

87. Gabrielle Hecht, ed., *Entangled Geographies*.

88. Michael L. Ross, "The Political Economy of the Resource Curse"; Robert Jervis, "Was the Cold War a Security Dilemma?"; Philippe Le Billon, "The Geopolitical Economy of 'Resource Wars.'"

89. Hecht, *Being Nuclear*; Per Högselius, *Red Gas*.

90. John H. Perkins, *Geopolitics and the Green Revolution*; John Robert McNeill and Corinna R. Unger, eds., *Environmental Histories of the Cold War*; Nick Cullather, *The Hungry World*.

during the cold war confirms.⁹¹ The technification of these sciences, in the two senses of becoming more specialized and more dependent on apparatuses, was related to unprecedented sources of funding often linked to military and security priorities.⁹² Correspondingly, the technologies developed to generate geophysical knowledge on the minerals' location or to calculate and make predictions about world reserves enabled cold warriors to frame their geopolitical strategies in technical terms.⁹³ The same was true for technical assistance for extraction, transport, and refining, as well as for financial cooperation or pricing agreements.

A geopolitical history centered on resources is thus at least in part a history of technology, and one that enriches the historiography of technology with new contexts and perspectives. Approaching the cold war from the point of view of resources, and particularly of food security, also puts cold war science and technology in connection with the history of decolonization and development. Competition between the two superpowers accounts for only part of the story. Regional and transnational perspectives have come to acknowledge the importance of third powers as agents within cold war politics, unveiling processes of co-constructed hegemony, nonalignment, and the transgression of the two-bloc structure.⁹⁴ Engineers promoting technical assistance and developmental programs now appear as agents of empire rather than mere tools for imperial power.⁹⁵

Neither late Spanish colonies nor Morocco as a colonizing power is present in this literature.⁹⁶ This article shows that these two competing peripheral metropolises had to negotiate their colonial status with stronger powers in a context characterized by the distinction between industrial manufacturers and producers of raw phosphate. In order to perpetuate old monopolies or to create new ones, this distinction needed to be revisited. It was in the third technological stage of phosphate production—manufacturing—when the mineral acquired value in the fertilizer world market. Thus, for France and the United States to keep producers of raw materials in a situation of dependency, they needed to control manufacturing. How-

91. Kai-Henrik Barth, "The Politics of Seismology"; Jacob D. Hamblin, *Arming Mother Nature*.

92. Theodore M. Porter, "How Science Became Technical"; Evaristo Álvarez Muñoz, "El cierre categorial e historia interna de la ciencia a propósito de la gnoseología de la tectónica de placas."

93. Hans Weinberger, "The Neutrality Flagpole."

94. Odd Arne Westad, *The Global Cold War*; John Krige, *American Hegemony and the Post-War Reconstruction of Science in Europe*; Simone Turchetti, Néstor Herran, and Soraya Boudia, "Have We Ever Been Transnational?"

95. Daniel Headrick, *Power over Peoples*; Suzanne Moon, "Place, Voice, Interdisciplinarity"; Sara Pritchard, "From Hydroimperialism to Hydrocapitalism."

96. Alberto Elena and Javier Ordóñez, "Science, Technology, and the Spanish Colonial Experience in the 19th Century"; Rosa Medina-Doménech, "Scientific Technologies of National Identity as Colonial Legacies."

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ever, the exploration and extraction of “raw” phosphate were equally technopolitical enterprises. As such, they granted Spain and Morocco an ample margin for negotiating alliances in attempting to move toward manufacturing or simply to get access to better market conditions. International diplomacy, whether discussed in the cold terminology of reserves and investments or through sabotage and military action, could decide the fate of producers. Western Sahara’s failed decolonization is a product of the complexities of those negotiations.

The global political economy of phosphate was seen by its different actors as a complex political field in which any imprudent decision could unleash wars and overthrow crowns. As natural resources became central components of disputes over sovereignty, the sovereignty over resources was itself the subject of much political conflict. In 1974, the UN’s General Assembly adopted the New International Economic Order (NIEO), the final step in the formal recognition of states’ full sovereignty over the resources found in their territories. This forced former colonial powers to frame their control of African resources in terms of development and cooperation.⁹⁷ Shortly after the NIEO declaration, National Security Advisor Henry Kissinger, speaking with then NATO ambassador (soon-to-be White House chief of staff) Donald Rumsfeld and Vice-President Gerald Ford, debated how to work around the issue. While economist Alan Greenspan opposed it on theoretical grounds, Kissinger thought that it would be more effective to tame the NIEO through down-to-earth economic arguments regarding particular raw materials and aid programs. “The trick in the world now,” Kissinger said, “is to use economics to build a world political structure.”⁹⁸ The Bu-Craa mine was one of the local geological, technological, and economic battlefields in which the fight for regional and global politics took place.

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97. Hecht, *Being Nuclear*, 79–82.

98. Scowcroft, “Memorandum of conversation,” 5.

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