Unsalvageable Phenomena

A DOUBTER'S GUIDE TO MIDDLE EASTERN OIL AND US FOREIGN POLICY

TRISTAN ABBEY

Prologue

> Sleepless, I watch the heavens turn
> Propelled by the motions of the spheres.
>
> —Caliph al-Ma'mun of Baghdad, ca. AD 820

During the summer of 1984, mines mysteriously struck more than a dozen ships in the Red Sea. A Taiwanese oil tanker was severely damaged and nearly sank. The random detonations hit vessels sailing under a panoply of flags—Soviet, East German, West German, Chinese, North Korean, Japanese, Spanish, Polish, Panamanian, Liberian, Saudi, Greek, Turkish, Cypriot—but the accusations were more exclusive.[1] The terrorist group Islamic Jihad claimed responsibility, which earned the praise of Iran, which in turn earned the ire of Egypt and Saudi Arabia. The press said the culprit was probably Libya, but Moscow blamed Washington. The first damaged ship was Soviet, after all, which was confusing because additional public reporting indicated the mines were of Soviet or Eastern Bloc origin.

A multinational force of minesweepers and minehunters assembled—or multinational *forces*, to be more precise. Many Arabs didn't want to work with Egyptians because Egypt had concluded a peace treaty with Israel in 1979. The Soviet navy did its own thing, predictably, but even the French and Italians chose to operate independently from the United States. Meanwhile, the whole affair was largely overshadowed by the intensification of the Tanker War between Iran and Iraq on the other side of the Arabian Peninsula—and US Navy personnel were redeployed from Red Sea demining operations to provide emergency logistics and medevac support when the US embassy annex was bombed in Beirut the following September.[2] Islamic Jihad again claimed responsibility.

Questions abound and confound. Some may never be answered. We must simply embrace the mystery.

Introduction

> There seems no impediment to prognosticating the destiny and disposition of every human being.
>
> —Claudius Ptolemy of Alexandria, ca. AD 160

It is an irony of history that the science of orderly arranging (*nomia*) the stars (*astro*) was born in the Middle East, a land so often characterized by disorder. For a region brimming with hydrocarbon resources, it expends a great deal of energy fighting against powerful entropic forces that seek to tear it apart. In the last century alone, the Middle East has endured European and Ottoman imperialism and then imperial decline; United Nations mandates, annexations, and border redrawing; pan-Arab, Shia, Ba'athist, and communist revolution; and innumerable assassinations, coups, countercoups, invasions, liberations, insurgencies, and terrorist attacks.

For perfectly understandable reasons, crude oil features prominently in most conventional explanations for these phenomena. Petrodollars are impossible to ignore. Wars are fought for control of oil fields, revolutions are driven by the distribution of oil revenue, and foreign powers only care because of oil access—or so the story goes. In particular, proponents and opponents of US military intervention both agree on one thing: the primary reason for our continued presence is the presence of oil reserves.

This essay argues that it is time to revisit the petrocentric assumption at the heart of US foreign policy in the Middle East. The essay does not argue that oil plays no role, or even only a minor role. Rather, it challenges the myopic focus on oil, which can engender misunderstandings and bring to light puzzles that go unaddressed. As Nobel laureate Steven Weinberg notes: "We know how to calculate the motions of bodies in the solar system with exquisite precision, but we still can't predict earthquakes or hurricanes."[3]

The first section presents a brief introduction to the historical cosmology of Claudius Ptolemy, the Greco-Roman polymath based in Egypt whose pioneering work in the second century AD defined the contours of classical and medieval astronomy—in both the Western and Islamic traditions—for a millennium. The second section develops a conventional or Ptolemaic view of Middle Eastern oil, US national interests, and the foreign policy that is derived from this confluence. The third section identifies anomalies that force a reconsideration of the Ptolemaic view of energy security but do not challenge its fundamentals, in the same way that Ptolemaic astronomy adopted several mathematical devices to explain celestial phenomena without discarding geocentrism. The fourth section echoes the Arab scientific *shukuk* tradition of expressing doubts, questioning the veracity of the Ptolemaic view of American policy in the region historically and today. Finally, the essay concludes with some speculation about the potential for a post-Ptolemaic revolution in our conception of US energy security and the Middle East.

Classical Astronomy

> Can you bind the chains of the Plei'ades,
> or loose the cords of Orion?
> Can you lead forth the Maz'zaroth in their season,

or can you guide the Bear with its children?
Do you know the ordinances of the heavens?
Can you establish their rule on the earth?

—Book of Job, ca. 500 BC

Legend holds that the Abbasid caliph al-Ma'mun, who reigned from AD 813 to 833, once concluded a cease-fire with the Byzantine emperor in which he made a quixotic stipulation. The treaty required the delivery of an ancient Greek manuscript to Baghdad, where the scholars in the House of Wisdom would dutifully translate it into Arabic and blast it across the literate world.[4] Its title was the *Almagest*, the astronomical masterpiece penned by Claudius Ptolemy more than half a millennium earlier. The tale is emblematic of the multigenerational, cross-cultural blending of Egyptian, Babylonian, Greek, Roman, Byzantine, Indian, Persian, and Arab geometry, trigonometry, arithmetic, algebra, physics, and astrology that culminated in modern astronomy.

In keeping with the theme of this essay, it is notable that our comprehension of mathematical astronomy's evolution is tentative. "Although the details of this transmission may never be known, eventually the geometry of earlier Greek science was wedded to Babylonian arithmetic practice," one historian of mathematics notes.[5] "The remains of Greco-Roman astral science," cautions another, "are a tiny fraction of what once existed, and are very unevenly distributed."[6] Massive plot holes loom large in the biographies of other elder statesmen of ancient and classical science, from Pythagoras to al-Khwarizmi, respectively godfathers of geometry and algebra. The legacy of the Great Library of Alexandria, the eponymous school to which Euclid and Ptolemy belonged, is similarly shrouded in mist: we know neither its size, nor who burned it down.[7] Of Ptolemy himself, George Sarton—last century's dean of science historians—lamented: "We do not even know when and where he was born and died."[8]

Sketchy origin stories notwithstanding, the *Almagest* defined advanced civilization's configuration of the universe for more than a thousand years. "More than any other book, it contributed to the idea, so basic in all scientific endeavour, that a quantitative, mathematical description of natural phenomena, capable of yielding reliable predictions, is both possible and desirable," wrote the late Danish historian of science Asger Aaboe.[9] The chief reason for this seismic impact is that Ptolemy's model worked remarkably well at telling its users (for it was, after all, a tool) where and when the sun, moon, stars, and planets would be. Navigators, farmers, and merchants rejoiced.[10] Mathematicians of the time knew *a priori* that celestial motion must be perfect (circular and uniform), but it behaved imperfectly (not circular and not uniform). So, they developed mathematical models that would account for this irregular motion and still preserve perfection—that would "save the phenomena," as Plato directed from beyond the grave.[11] The irregularities were called "anomalies," and efficacious models employed mathematical devices that explained them.[12]

Naturally, the models were complex. Ptolemy's was the pinnacle. In vastly simplified terms, an imaginary "eccentric" displaced the Earth from the center of the universe; the planets, sun, and moon orbited along an imaginary path called the "deferent" and also "epicycled" around points on that path; these orbital motions would appear uniform if observed from the "equant," another imaginary point in space; and the stars remained fixed on a rotating sphere. One historian of science concluded: "The three geometrical constructions—eccentric circle, epicycle-on-deferent, and equant—were all effective ways of employing uniform circular motion (whether that uniformity was strict or not so strict) to account for apparent irregularity in the heavens."[13] The anomalies lay vanquished.

This is an essay on energy security, not the exact sciences.[14] In fact, as a field of study, energy security ranks among the most inexact. Nevertheless, the longevity of the Ptolemaic achievement—described by physicist Eric Rogers as "a complicated, clumsy system but workable and successful"—serves as a cautionary tale across disciplines.[15] A conception of the world developed in the Middle East, embraced to varying degrees by the most advanced civilizations from the Atlantic to the Indian subcontinent, explained so much, so well, yet was still fundamentally *wrong*.

Classical Energy Security

> The Earth is in the middle of the cosmos and occupies the position of center.
>
> —Euclid of Alexandria, ca. 300 BC

In the American strategic mind, petroleum is synonymous with the Middle East. It is a composite word, blended from ancient Greek and Latin, that literally means "olive oil from rocks." This seems appropriate, given the American body politic's deep-seated distaste for the region's deadly flavor of geopolitics.

In the conventional view, everything revolves around oil. Middle Eastern states are ranked by their production and reserves, which serve as a proxy of their influence and power. Countries are often viewed as stable if oil prices are high enough globally to generate revenue sufficient for any particular government to pay its bills—to its debtors, soldiers, and citizens, lest they conspire, rebel, and unseat. When oil prices fall below these "break-even" estimated price points, the alarm bells begin to ring in risk analysis firms across the world. Disputes between countries and factions are viewed, whenever possible, through the lens of oil: the civil war in Libya is reduced to a fight over the eastern Ras Lanuf refining, storage, and export hub; strife between Kurdistan and Baghdad comes down to the division of oil revenue between the north and south; Russian-American tension in Syria springs from the desert wells of Deir ez-Zor; when Iran or its proxies attack Saudi Arabia, they target the Abqaiq processing facility or the Ras Tanura refinery; the war in Yemen is boiled down to the Saudi drive to build a pipeline through the coastal governorate of al-Mahrah.[16]

Atop this petrocentric (or petrolemaic?) conception of the region sits US foreign policy. "The fundamental US interest in the security of the Persian Gulf is oil," stated one senior administration official in the prelude to Saddam's invasion of Kuwait in 1990.[17] Indeed, the conventional wisdom holds, the Aristotelian "first mover" of US engagement for nearly a century has been its alleged "oil for security" agreement with Saudi Arabia. Whether this agreement was implicit or explicit, hatched by President Franklin Roosevelt and King Ibn Saud aboard the USS *Quincy* in 1945 or simply an evolved outgrowth of the intensifying relationship over the following half century, it is so widely accepted as a basic tenet that articles are written advocating for the agreement's termination.[18]

The petrocentric narrative flows easily from 1945. Oil featured prominently in British strategic thinking, ever since Winston Churchill famously shifted the Royal Navy away from coal in the 1911–14 period, placing Britain's nautical eggs in the Anglo-Iranian Oil Company's basket.[19] The British political system has always been more comfortable with overtly supporting British commercial interests abroad than its more moralistic American counterpart is with overtly supporting American commercial interests. In the aftermath of World War II, the British government allegedly embarked on a "managed decline" of its imperial position.[20] After one last hurrah in the form of the Suez Crisis of 1956, Britain turned over the keys to the Middle East to its far more powerful cousin across the Atlantic. In 1971, the British finally withdrew from the Persian Gulf sheikhdoms, with which it had long maintained oil-for-security relationships. The Americans constructed an air base in Dhahran, near the Saudi east coast, and expanded Aramco's footprint throughout the kingdom. During the Tanker War, the US Navy intervened to protect oil-laden commerce, and a few years later liberated Kuwaiti oil fields and prevented Saudi oil fields from falling to Saddam. The US-led coalition imposed an "oil for food" sanctions regime, then overthrew the dictator and restored his oil fields to the international market. When the Islamic State seized Iraqi and Syrian oil fields, the United States struck back. When the petrostates of the Arab world needed to deter the Iranians, American defense contractors sold them weapons and supplied them with advisors.

The narrative is elegant and logically simple. We were running out of oil, the Middle East had oil, and we had to ensure our access to it. Now American forces operate from bases in the United Arab Emirates, Qatar, Bahrain, and elsewhere, protecting undemocratic autocracies so liberal democracies can prosper.

Anomalous Behavior

> The whole sky lit up, not with the light of one sun, but as if ever so many more heavenly bodies were contributing their light. . . . Verily the cries of this army must have reached the orb of heaven.
>
> —Princess Anna Komnene of Constantinople, ca. AD 1150

But even superficially we know that Ptolemaic energy security is an incomplete theory. Modelers observed an intense bipolar rivalry between Riyadh and Tehran, Sunni and Shia, Arabia and Persia—probably the single most pronounced irregularity. Both ends of the dipole were, nonetheless, unified in their opposition to Israel. The petrocentric configuration expanded to include these epicycles with little effort. The Iran-Iraq War, for example, may have pitted Sunni and Shia against each other, but the Tanker War was self-evidently about oil, and Saddam's invasions of Iran and Kuwait could be understood as naked grabs for oil reserves.

Petrocentrism logically implies that Saudi Arabia is the center of gravity. The kingdom produces more oil than the United Arab Emirates, Kuwait, Qatar, Oman, and Bahrain combined. Yet Qatar pursues a completely independent foreign policy, as evidenced by the 2017–21 blockade of the peninsula by a Saudi-led coalition. Oman has also displayed a certain level of independence in its role as mediator with Qatar and Iran and its withholding of support for the Saudi-led war in Yemen. Meanwhile, Dubai has been accused of operating as a reincarnation of Casablanca, wheeling and dealing with Saudi Arabia's foes in black-market souks.[21]

Cycles within cycles are introduced to maintain overall system stability, but some phenomena cannot be explained away as epicyclic behavior. First, if the United States went to war against Iraq in 1990–91 and again in 2003 for the sake of its energy security, how do we explain the relatively low levels of oil imports from the Middle East to the United States? Only 25 percent of US oil consumption was supplied by Persian Gulf barrels in 1990, 22 percent was in 2000, and approximately 10 percent is today.[22] An eccentric is introduced by the learned observer: the rationale is not that US energy access is threatened but instead that the energy access of our allies and trading partners is threatened. Defending the Saudi border and liberating Kuwait had more to do with ensuring the *Japanese* economy hummed along smoothly than with supplying *American* refineries with crude feedstock.

Second, if we must sustain our military presence in the Middle East on the basis of ensuring access to energy supplies for our allies, then how do we account for historic increases in exports of US crude oil and petroleum products to those allies? US gross petroleum exports stood at under one million barrels per day in 1990, hit one million barrels per day in 2000, and are currently peaking near nine million barrels per day. Today, the United States is fluctuating right around the net exporter marker.[23] Enter the equant: the rationale is not only that the United States must defend allied energy access but also that oil is a global commodity subject to global prices, and it is those prices that must be kept stable. Maintaining a defense presence has more to do with volatility at Midwest gas stations than with ensuring physical deliveries to Yokohama.

The system remains fundamentally petrocentric, artfully enhanced by epicycles, eccentrics, and equants that smooth over the most acute of anomalous behavior. If it's not about our

oil, then it's about our friends' oil, and if it's not about our friends' oil, then it's about the price we all pay for oil. The phenomena have been saved. Or have they?

Doubts concerning Ptolemy

> You are wearied with your many counsels; let them stand forth and save you, those who divide the heavens, who gaze at the stars, who at the new moons predict what shall befall you.
>
> —Book of Isaiah, ca. 740 BC

The Ptolemaic system of an Earth-centered cosmology drew its fair share of critics, primarily due to the imperfections of the geometric devices it required. The most organized critical chorus emerged among Islamic scientists from Andalusia to Persia in the period approximately AD 950–1350. These scholars published their *shukuk*—"doubts" or "objections"—to Greek science, with figures such as Ibn al-Haytham focusing especially on weaknesses in Ptolemy's construction.[24] The extent to which their work influenced the sun-centered revolution ushered in by Copernicus remains a matter of some academic dispute, but it really is a question of degree, not of principle.[25]

The Ptolemaic approach to US foreign policy and energy security in the Middle East accounts for phenomena at an impressive scale. As we have seen, oil plays some role in just about everything. Frequently, however, the breadth of that macro-explanatory power comes at the expense of micro-level consistency with the details. We will consider two categories of doubts: historical and contemporary.

Historical Doubts

One reason why the petrocentric theory flows so effortlessly is due to the alleged imperial handoff from Britain to the United States after World War II (or after the Suez Crisis of 1956 at the latest). Far from solemnly handing over its sword-and-shield responsibilities to a new guarantor of peace, the British actually doubled down on their imperial commitment to the Middle East, running through a series of evolving strategic rationales. First, they needed their bases as a lifeline to India, but India declared independence in 1947, so using the Palestine Mandate to defend Egypt in the event of a Soviet land invasion became the new priority. Then the British withdrew from Palestine in 1948 and lost the Suez Canal in 1956, so the focus shifted once again—to its "East of Suez" bases in Iraq (lost in 1958), in the Aden Protectorate (withdrew in 1967), and in the Persian Gulf (withdrew in 1971). The British government blamed budget cuts but appears to have rebuffed offers of financing by Gulf Arab sheikhdoms eager to extend the British presence. This is punctuated collapse, not managed decline.[26]

If the United States inherited the United Kingdom's strategic assets and liabilities in the region, then oil was the prime asset and security was the prime liability. The oil-for-security calculus of US foreign policy loses its origin story, however, if the notion of a strategic

handoff is simply a nostalgic or romantic gloss that overlays an embarrassing series of miscalculations on the part of London. At best, the British bequeathed tacit defense agreements with trucial sheikhs that furnished such little benefit they refused to stay even if the Arabs covered their expenses. At worst, the British bungled their decline over a period of two decades and stuck the Americans with the bill—just before the energy crisis of the 1970s. The final nail in the coffin of the managed-decline theory is the fact that the United States vigorously opposed Britain's withdrawal from the Middle East.[27]

A second example of historical doubt arises less than a decade after the British departure. In 1979, Saddam Hussein came to power in Iraq and the ayatollahs overthrew the shah of Iran. A year later, one of the deadliest conventional wars ever fought was under way. Locked in apocalyptic combat, the two powers launched missiles at each other's oil terminals, refineries, and offshore platforms. The Tanker War was on. Because Iraq transported its oil by pipeline to the Levant and by truck to Aqaba, Iran's threats to close the Strait of Hormuz were threats to the global economy, not merely to the Iraqi treasury. From 1981 to 1987, some 450 ships—many flying under the flags of third countries—were attacked in the area by either belligerent. Targets included hundreds of petroleum tankers and refined product carriers.[28] Saddam Hussein hoped to internationalize the conflict by goading Iran to block Hormuz and to attack neutral ships.[29] Eventually, a cease-fire was secured, but not before an Iraqi aircraft attacked the USS *Stark* in 1987 and the USS *Vincennes* accidently shot down Iran Air Flight 655 in 1988.

Why, exactly, Saddam invaded Iran in the first place is something of a mystery. Historians granted access to Iraqi archives and captured regime loyalists paint a puzzling picture. "Perhaps the most serious weakness in the Iraqi invasion, however, was the fact that no strategic conception lay behind the campaign," notes the official report.[30] In fact, if capturing Iranian oil was the purpose, then the Iraqi army's massacre of Iraqi-friendly Arab tribesmen in the oil-rich Iranian province of Khuzestan makes little sense.[31] Gulf Arab states financed Saddam's war against Iran yet soon thereafter found themselves financing America's war against Saddam. Was there any underlying logic to these topsy-turvy geopolitics, and to what extent was oil at the root of it all? What role did generally declining oil prices play during the Iran-Iraq War?[32] These questions are ponderable, but only varying degrees of answerable.

Contemporary Doubts

The ambiguities associated with the British withdrawal from East of Suez and the conventional combat of the Iran-Iraq War serve as historical antecedents for a vast range of ambiguities in the present day. Consider the following brief survey of the scene.

First, the closure of the Strait of Hormuz has always been the nightmare scenario for energy-security planners and analysts. The US Strategic Petroleum Reserve, for instance, is modeled

generally after the emergency response that would be required in the event of a Persian Gulf lockdown. The related vulnerability of Kuwaiti, Emirati, and Saudi oil infrastructure is self-evident, as are Qatar's exposed natural gas facilities. The Ras Tanura refinery and the Ras Laffan liquefaction complex literally face Iran across the open water. Given the Red Sea episode highlighted in the prologue of this essay and the scope of the Tanker War, the question isn't whether Hormuz remains the nightmare scenario but instead, why isn't the Gulf ablaze more frequently? Indeed, the most significant oil logistics challenge to emanate from the Middle East in recent memory was the Tetris-reminiscent closure of the Suez Canal in 2021, a highly disruptive yet utterly benign accident of geometry.

Second, the US military presence in the region is often predicated on stability in some form or another. In the context of this essay, that stability concerns oil supplies, oil prices, or both. Over the past two decades, however, the region has been strikingly unstable. Tunisian president Ben Ali: ousted in 2011, deceased in 2019. Egyptian president Hosni Mubarak: ousted in 2011, deceased in 2020. The Islamic State, the interminable Syrian civil war, the wider Arab Spring, the war in Yemen, Iranian-Saudi-American-Russian proxy wars, Israel-Palestine—the list goes on. If the region's stability is so sensitive to US balancing efforts, and if the world economy's energy security is so sensitive to the region's stability, then why do financial markets seemingly shrug off frequent threats to that stability? Indeed, none of these events eclipse the destruction to the oil sector inflicted by the COVID-19 pandemic's shattering of global demand. The dog has not barked.

Third, the growth of US crude oil and petroleum product exports, as well as the entry into global markets by American liquefied natural gas (in addition to significant volumes of natural gas exports by pipeline to Mexico), may mark fundamental change in the global energy system.[33] Time will tell, but US production thus far appears durable and more significant than a temporary anomaly. The hydraulic fracturing and horizontal drilling innovations that enabled this domestic energy expansion also have not been successfully adopted at scale in any other country, despite much interest in doing so. The conventional wisdom often invokes these newfound barrels as the great enabler of sanctions against Iranian oil because they provided alternate supply to erstwhile customers of Iran. These same barrels, or at least some of them, offset lost production in Libya, Iraq, and Venezuela. Counterfactual thought experiments provide some indication of the role American oil has played over the past decade in global markets, but the barrels cannot be double counted. This is the fog of oil price war.

Finally, mainstream academics typically assert that an increasingly favorable trade balance on energy products will enhance the geopolitical power of the United States. At face value, this certainly seems like it should be true. After all, heavy reliance on imports constrains a nation's freedom of action and reducing those imports on a net basis should liberate it. But the United States was already a major exporter of petroleum products before the crude oil export ban was lifted in 2015, and already exported significant volumes of natural gas

to Mexico before liquefaction terminals were constructed. Nobody suggested that these refined product exports gave us greater influence in Latin America, where they often went, or that natural gas pipelines gave us more leverage over Mexico City in negotiations of any kind. In the Middle East, oil exports generate petrodollars that can be spent on wars, economic development, and prestige-enhancing projects, but Iraq produces more oil than the United Arab Emirates, and Kuwait produces as much oil as Iran. Would anybody suggest that the Iraqis and Kuwaitis are more influential than the Emiratis or even the Iranians? The search for geopolitical power continues.

The argument of this essay is not that oil explains *nothing*. The argument is that the petrocentric conception seems woefully inadequate to explain *everything*, in light of these enumerated questions and doubts.

On the Revolutions

> The discovery of truth is difficult and the way to it is rugged.
>
> —Ibn al-Haytham of Cairo, ca. AD 1025

It took centuries, but eventually Ptolemy's vision of the cosmos crumbled under the cumulative weight of doubt and contradiction. Scientific revolutionaries asked what the theory had done for them lately and found the answer wanting. The *De revolutionibus* of Nicolaus Copernicus (AD 1543) replaced the Earth with the sun, while the *Astronomia Nova* of Johannes Kepler (AD 1609) found elliptical rather than circular orbits. Newton finished the job; Ptolemy had been eclipsed.

Just how close to complete fracture is the conventional wisdom on US foreign policy and energy security in the Middle East? Revolutions, as the region well knows, come in all shapes and sizes. If grassroots fossil fuel divestment campaigns and the Biden administration and its successors roll back domestic US hydrocarbon production and exports, this will strengthen petrocentric tendencies by increasing US petroleum imports directly, making American allies more dependent on Middle Eastern oil supplies and increasing global oil prices, which will generate more petrodollars. If the "first mover" of US foreign policy morphs from oil-for-security to save-the-environment, then outsourcing pollution and other environmental degradation to the Middle East moves the problem but does not solve it. If the first mover is specifically climate change, then blocking domestic natural gas production may lower carbon dioxide emissions (though that is questionable, given fuel-switching capabilities), but it also further empowers Qatar as the global leader in liquefied natural gas exports.[34] Petrodollars may get the headlines, but methane-dollars are convertible currency, too.

The convergence of China's Belt and Road Initiative and Saudi Arabia's modernization ambitions under Vision 2030 poses the possibility of further fundamental change. This

is no conspiracy theory. In 2020, the Chinese ambassador to Saudi Arabia stated: "The Belt and Road Initiative and Saudi Vision 2030 are highly compatible and enjoy huge potential for cooperation in the fields such as artificial intelligence, digital economy and high technology."[35] The two countries have been courting each other for years, to varying degrees, and both are flush with cash. Reduced exports from the Middle East to the United States may strengthen export flows to Asia, specifically China, though these trade routes are already well ingrained in global markets. Indeed, increased energy demand in China may even bring China and the United States closer as the latter seeks to improve its bilateral trade balance and could export energy products that climate-concerned Europeans reject. To the extent that US foreign policy makes Europe an inhospitable destination for Russian hydrocarbons, the persistent flirtation between Moscow and Beijing will continue.[36] Whether any of these putative developments actually enhance Chinese power in the region in real terms is unclear. After all, Asia is already the top destination for Arabian oil supplies, and the Japanese, South Koreans, and Taiwanese do not appear to wield tremendous geopolitical leverage over Persian Gulf capitals.[37]

Chinese influence may be decisive in one respect: the desire of Arab royals to shift their economies away from crude oil. In some cases, the shift will be cosmetic—fewer crude oil exports, but more exports of refined products. This is essentially the Saudi plan for the Yanbu hub on the Red Sea. Decreased burning of Arab petroleum for electric generation probably betters the world for everyone, but if that crude is refined and exported as value-added goods, then petrodollars may not be impacted that much. The Chinese can bring to bear their growing technical expertise in the construction of all types of energy-related infrastructure, including the buildout of renewables, infrastructure to facilitate greater consumption of natural gas, and much else. Chinese Belt and Road investments may seem unnecessary given the magnitude of Arab treasuries, but even those are not limitless.

Note that Ptolemaic cosmology was overthrown in stages, not one fell swoop. Even the heliocentrism of Copernicus was flawed. But the doubts about the system accumulated across cultures and generations. Mysteries are accumulating today with respect to Ptolemaic energy security. As yet, there is no singular competing theory that can boast the explanatory power of the conventional wisdom. Perhaps the petrocentric conception is only slightly wrong, and all that is needed are more equants, eccentrics, and epicycles. Perhaps, as with astronomy, the solutions will emerge where the mainstream views originated, in the Middle East itself.

A theory of everything may be impossible to devise. The phenomena may simply be that disparate and that impenetrable. Nonetheless, a theory of many things or many theories of some things are surely attainable. Such discoveries could explain aspects of American policy in the region in the past or guide it in the future: US strategic competition with China, Russia, or both; Western domestic interests, from the humanitarian to the commercial; or a deep cultural embrace of *translatio imperii*, the imperative to inherit the

empires of the past—conquest, capital, and crown—exemplified on occasion by leaders as varied as Mussolini and the Shah of Iran.

And maybe the splintering spider crack in the classical glass begins with neither a Copernican switch of the center point, nor a Keplerian bending of alignments and trade flows, but something else entirely. It was, after all, the *De nova stella* of Tycho Brahe (AD 1573) that recorded the Cassiopeia supernova. These observations shattered Ptolemy's immutable outer shell of fixed stars forever and proved the heavens themselves could erupt.

NOTES

1 The seminal work on the Red Sea mining episode is Scott C. Truver, "Mines of August: An International Whodunit," *Proceedings* (US Naval Institute) 111, no. 5 (May 1985): 94–117. See also Tamara Moser Melia, *"Damn the Torpedoes": A Short History of US Naval Mine Countermeasures, 1777–1991* (Washington, DC: Naval Historical Center, 1991), 118–19, and David Crist, *The Twilight War: The Secret History of America's Thirty-Year Conflict with Iran* (New York: Penguin Books, 2012), 235–37.

2 Melia, *"Damn the Torpedoes,"* 119; and Roy A. Grossnick, *United States Naval Aviation, 1910–1995* (Washington, DC: Naval Historical Center, 1997), 343.

3 Steven Weinberg, *To Explain the World: The Discovery of Modern Science* (New York: Harper Perennial, 2015), 98.

4 In the land of apocrypha, the literate man is king. The claim of a "manuscript clause" in the treaty or treaties signed by Emperor Theophilus or Michael III (for the latter of whom the chronology does not compute) is repeated variously in John William Draper, *History of the Conflict between Religion and Science* (New York: D. Appleton, 1897), 112–13; Florian Cajori, *A History of Mathematics* (New York: Macmillan, 1894), 104–5; Uta C. Merzbach and Carl B. Boyer, *A History of Mathematics*, 3rd ed. (New York: Wiley, 2011), 205–6; Joseph A. Angelo, "al-Battani," in *Encyclopedia of Space and Astronomy* (New York: Facts on File, 2014), 78; and Wilford J. Bisson, "Islamic Astronomy to 1000 CE," in *Science and Technology in World History*, ed. William E. Burns, vol. 1 (Santa Barbara, CA: ABC-CLIO, 2020), 286. For more general background on the translation movement, see David C. Lindberg, *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, Prehistory to AD 1450*, 2nd ed. (Chicago: University of Chicago Press, 2007), 163–92; Jonathan Lyons, *The House of Wisdom: How Arabs Transformed Western Civilization* (London: Bloomsbury Publishing, 2008), 66–92; Jim al-Khalili, *The House of Wisdom: How Arabic Science Saved Ancient Knowledge and Gave Us the Renaissance* (New York: Penguin Press, 2011), 35–48.

5 Glen Van Brummelen, *The Mathematics of the Heavens and the Earth: The Early History of Trigonometry* (Princeton, NJ: Princeton University Press, 2009), 33.

6 Alexander Jones, "Greco-Roman Astronomy and Astrology," in *The Cambridge History of Science*, vol. 1, *Ancient Science*, ed. Alexander Jones and Liba Taub (Cambridge: Cambridge University Press, 2018), 521, Google Play Books PDF.

7 Roger S. Bagnall, "Alexandria: Library of Dreams," *Proceedings of the American Philosophical Society* 145, no. 4 (December 2002): 356: "This is a murder mystery with a number of suspects, each at least with opportunity and means." He identifies six possibilities.

8 George Sarton, *Ancient Science and Modern Civilization* (Lincoln: University of Nebraska Press, 1954), 42.

9 Asger Aaboe, *Episodes from the Early History of Mathematics* (Washington, DC: Mathematical Association of America, 1998), 102. See also R. E. Langer, "Alexandria—Shrine of Mathematics," *The American Mathematical Monthly* 48, no. 2 (February 1941): 120: "No product of the genius of the entire classical era ever rivalled it for its profound influence upon human conceptions of the universe, and none achieved such unquestioned authority over so many centuries of time."

10 J. M. Roberts and Odd Arne Westad, *The History of the World*, 6th ed. (Oxford: Oxford University Press, 2013), 193: "For all the inadequacies of Ptolemy's system, predictions of planetary movement could be made which would still serve as adequate guides for oceanic navigation in the age of Columbus, even if they rested on misconceptions which sterilized cosmological thinking until his day."

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