GOLD MINING IN ARABIA AND THE RISE OF THE ISLAMIC STATE

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Abstract

The financial and economic strengths of the early Islamic state have been a source of ongoing speculation, causing some scholars to even question medieval Makkah’s economic reason to exist. This article explores the role of precious metals—gold and silver—in lending vitality to the economy of Western Arabia in the formative years of the Dār al-Islām. Combining primary source evidence with artifacts and qualitative and quantitative analysis of mining residuals, including carbon 14 dating, it produces evidence suggesting that such metals played a far more significant role in contemporary commerce and industry than has been heretofore generally acknowledged.

The Historical Perspective

The economic dynamic that impelled the early Islamic state remains a source of current intellectual controversy. Even now, after decades of focused Western research, works continue to appear that add challenging new dimensions to scholarly debate over the incipient vitality that characterized the commerce of the fledgling Muslim empire. Most recently, Shaykh Ḥamad al-Jāsir has appended illuminating new insights into the production of precious metals in medieval Arabia in his annotated edition of al-Hamdānī’s seminal work: Kitāb al-Jawharatayn al-fī Atqatayn al-Māṭīyatayn: al-Ṣafra’ wa al-Baydā’. A 1991 article by Ḥuṣayn Sābir, technical advisor to the French Geological Mission to Saudi Arabia, likewise adds valuable input based on in situ knowledge and recent archaeological discoveries that support the evidence provided by the medieval Islamic sources.1)

Today Arabia, which legend holds was home to the famed mines of biblical King Solomon, is experiencing a significant rebirth of this historic industrial heritage, as precious metals mining, a source of significant wealth at the time of the rise of Islam, is once again gaining attention. Currently there are 782


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JESHO 42,3

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major known gold occurrences in the Kingdom of Saudi Arabia—in sites that usually also contain associated admixtures of silver, copper, lead, zinc, and iron ores. Of these sites, 31 are estimated to contain more than 1,000 kilograms of gold, and 99 contain gold reserves in the 100 to 999 kilogram range. Many of these deposits are extremely rich in gold content—averaging twenty to thirty-five grams per metric ton, contrasted with an average worldwide yield of about 7 grams.2) The Saudi Directorate General for Mineral Resources, in fact, has identified more than 800 potentially commercially viable hard mineral sites in modern Saudi Arabia. At many of the sites identified, there is clear geological evidence confirming previous mining activities. Indeed, more than 1,000 locations in Western Arabia show signs of historic mining. Carbon 14 datings from wood residuals at the smelters that supported these mining operations indicate that many of these activities dated to the classic period of Islam.3) Currency minting operations also may have taken place using the ore yields of these sites. Suggestive of this possibility, an Umayyad coin dating to the year 105/724, includes the phrase: “the mine of the Commander of the Faithful in the Hijāz.” There are likewise numerous contemporary copper coins (fulûṣ) bearing the same inscription.4)

Currently, several of these sites are under active development. Operations at Mahd al-Dhahab commenced in 1990. The production of this mine, believed to contain 1.1 million tons of ore, is projected to reach 2.5 metric tons of gold per year. The Ṣuḥaybarat mine, situated 187 miles east of al-Madīnah on the historic Arabian commercial route to Iraq, also started up in September, 1991. Its ore reserves are assessed at 8.4 million tons. Though its annual production was originally estimated at 3,300 pounds of gold, more than thirteen tons of gold already had been produced by the close of 1996—valued at nearly $155 million at then current global market prices. Mining activities at this location are expected to extend over a 13 year period, and two other medieval mines, al-ʿAmīr and al-Hajar, are scheduled to re-commence production by the year 2000.5)
MAP A
Active Mining Sites of Medieval Arabia

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Leasing licenses similarly have recently been granted to commence operations at a site known as “al-Mašâni,” meaning the factories—so-called for its proliferation of medieval smelting operations—located in Wadi Şa‘dah, 75 miles northwest of Najrân (at 18 degrees, 8 minutes N latitude, 43 degrees, 51 minutes E longitude) on the key inland medieval commercial route connecting Makkah with Yemen. It is estimated to contain some 8.5 million tons of gold, silver, zinc, and copper ore, requiring 17 years of production employing current technologies.6) Development licences likewise are pending at Hamdah, Jabal Sayyid, and Bulgah; and another historic mine in this region—called al-Ma‘malah, also meaning factory—is also currently under active exploration. It is located in Wadi Turabah, on al-Ṭå‘if-al-‘Aqiq road (at 21 degrees, 4 minutes N latitude; 41 degrees 20 minutes E longitude), and is believed to contain 960,000 metric tons of ore. In all, the Kingdom is estimated to possess more than 20 million tons of commercially exploitable gold ore.7)

That Saudi Arabia should now emerge as a major hard minerals producer, however, should come as no surprise to serious students of the region’s history. The ancient and medieval sources abound with references to such mining activities. The classical Greek, Roman, and Persian sources, among them Agatharchides,8) Pliny,9) Strabo,10) Polybius,11) and Diodorus Siculus,12) all attest to the abundance of gold and silver on the Arabian Peninsula in their eras. The latter states that Arabian gold was so pure that no smelting was necessary. Biblical Midian, a region historically legendary for its gold, was situated in the region surround-
ing modern Tabük. The 4th/10th century Yemeni geographer, al-Hamdāni, indicates that the Sāsānids mined silver in the Najd and the Yemen, and even opened up an overland route through central Arabia to transport silver from the region back to Persia.\(^3\)

Indeed, among the Arabo-Islamic sources, there are quite incredible claims of widespread precious metals availability, suggesting that they permeated medieval Hijāzī lifestyles. Ibn Ḥanbal, in discussing the entrepreneurial prowess of famed Companion of Prophet Muḥammad, ‘Abd al-Raḥmān b. ‘Awf, for example, asserts that it was impossible for him to lift a stone in the Hijāz without finding gold and silver. Others, among them al-Ṭabarî and al-Muqaddasī, indicate that precious metals were a major source of wealth and commerce for Makkān businessmen.\(^4\) Ibn Iṣāq openly asserts that silver was the prime economic impetus of the al-Quraysh: “wa ḥayya ‘uzm tijāratihim;” whereas others such as Ibn al-Athir suggest that gold and silver were foremost components of Arabian northbound trade.\(^5\) In alluding to the proliferation of precious metals in the Hijāz, the Qurʾān laments the attractiveness of gold and silver for the masses—and explicitly warns that those who hoard these metals, rather than putting them to productive use, will suffer God’s everlasting wrath.\(^6\)

Similar claims extend to documentary contentions attesting to the buoyancy of contemporary commerce. Seventy Makkān prisoners captured by Companions of the Prophet at the “Battle of Badr” reportedly ransomed themselves by paying 4,000 silver dirhams each, for a total of 280,000 dirhams. The Makkans financed their campaign against the Muslims at the “Battle of Uhud” at a cost of 50,000 gold dinārs. Al-Wāqīdī describes a Hijāzī commercial caravan bound for Syria wherein members of the baḥrā Makhzūm tribe were carrying 4,000 mithqāls of gold; members of the baḥrā ‘Abd Manāf 15,000 mithqāls of gold; and two individuals, al-Hārīth b. ‘Amīr b. Nawfal and Ṣumayyā b. Khalaf, were each carrying 1,000 mithqāls of gold.\(^7\) In another instance, Abū Baqā Ḥibatallāh relates the amazement of a medieval customs official upon discovering: \(^8\)

> A Quraysh caravan coming to Syria to trade without gold? That is not possible!

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\(^3\) Al-Hamdāni 1987, pp. 13, 87 ff.


\(^6\) Qurʾān, Sūrah III:12, 85; IX:34.


He also notes that the Ghassanids transacted commerce with Hijazi merchants using gold as the currency basis for their transactions.  

Al-Waqqâdi and Zubayr ibn Bakkâr, in turn, assert that Caliph 'Umar I, prior to his caliphal appointment, had engaged in gold transactions between the Hijaz and Syria. Al-Waqqâdi, Ibn Sa‘d, Ibn Hishâm, and al-Balûdhuri refer to a raid conducted by Prophet Muhammad at al-Qaradah in the Najd in Jumâdâ I, 3/December, 624. This attack occurred on a Makkah commercial caravan led by Umayyad chieftain Abu Sufyân travelling to Iraq on the famed Darb Zubaydah pilgrimage route, wherein Muslim troops captured over 300 mithqâls of gold and silver. This sum, though again quite large, may not be surprising. As the sources indicate that Abu Sufyân customarily carried substantial quantities of precious metal bullion with him on his trading expeditions to Syria and Iraq.

Three years after al-Qaradah incident, in 6/627, Prophet Muhammad’s forces at al-‘Is once again intercepted a Syrian-bound caravan laden with silver. Al-Waqqâdi and Ibn Sa‘d likewise describe the seizure by the Muslim forces of 4,000 ounces of silver in booty upon their victory over dissident tribes, among them the banû Hawâzîn and banû Thaqîf, at Hunayn in 8/630; whereas al-Waqqâdi, al-Balûdhuri, and Ibn Hanbal relate information on numerous silver-denominated loans contracted by Prophet Muhammad at various times from prominent Makkah citizens.

Indications of such buoyant economic activity, if accurately captured in the sources, cannot have failed to occasion a significant requirement for capital liq-

uidity and, in turn, for precious metals to mint currency. Indeed, when the Islamic caliphate began to issue massive quantities of its own high quality currency, commencing with the reign of Umayyad Caliph ‘Abd al-Malik b. Marwân (d. 86/705), the mines of Arabia were exploited to meet the mounting demand for gold bullion. The demand was readily met, as such precious metals the medieval Muslims had in abundance. It was the proliferation of gold, silver, and copper in the region, in fact, that later produced the high quality tri-metallic coinage that would power the Islamic empire’s monumental 2nd/8th-3rd/9th century global trade offensive. As properties such as the prodigious banû Sulaým mine, among others, continued in operation well into the 3rd/9th century.24)

This availability of precious metals was a critical economic consideration. For because of the relative paucity of agrarian and industrial resources in the Makkan region, its imports greatly exceeded exports at the time of the rise of Islam. This imbalance created the need for voluminous supplies of bullion, at first to trade in bulk, and later to mint currency in the form of gold dînârs, silver dirhams, and copper fulûs, to compensate for the commodity trade deficit.25)

At the time of the rise of Islam, bulk countertrade using gold and silver bullion (bi-l-tibr), denominated in weights equivalent to the Byzantine gold and Sasânîd silver currencies circulating in the Hijâzî marketplaces, was the prevailing commercial practice. Ibn Sa’d indicates that on one occasion, Prophet Muhammad dispatched Shu‘á b. Wahb al-Asadî on a mission to al-Ḥârîth b. Abî Shammar bearing one hundred mithqâls of gold. Another trade transaction involving Muhammad resulted in the delivery of twelve “âqiyah” (ounces) and one “nashsh” of silver, equal in currency value to 500 dirhams. Indicative of the volume of such activities, economic demand soon precipitated the need for a massive bullion weight, known as the “qiṣṭâr,” which equaled 4,000 dinârs, to transact contemporary commerce.26)

One need only survey at random some of the prices cited by chroniclers to ascertain the currency demand that, according to the medieval Arabic sources, characterized Islam’s commercial “Golden Age.” Al-İşfahâni relates that horses customarily sold for 100 dinârs. Quality clothing was equally precious. While he was governor of al-Madînah, ‘Umar b. ‘Abd al-‘Azîz is said to have owned a silk gown valued at 100 dinârs and other vestments valued at 1,000 dinârs. ‘Abd Allâh b. ‘Abbâs reportedly purchased a “thawb” priced at 1,000 dirhams

and vestments also valued at the same amount. One prominent Hījāzi, ʿAbd al-Muṭṭalib b. Ḥāshim, grandfather of Prophet Muḥammad, was reportedly buried in clothing embroidered with 1,000 mithqāls of gold. He also gave his wife a dowry of one hundred ṭalās of gold. The estate of Abd al-Raḥmān b. ʿAwf, invested primarily in gold ingots, was valued at more than 400,000 dinārs; whereas that of Prophet Muḥammad’s chancery clerk, Zayyid b. Thābit, contained an equally prodigious amount of gold bullion. 27)

There are likewise reports in the medieval sources of slaves selling for 10,000 dirhams, 40,000 dirhams, 5,000 dinārs, and even as much as 100,000 dirhams. Muḥāwiya b. Abū Sufyān is said to have purchased a house in al-Madīnah from Huwaytīb b. ʿAbd al-Ghazzā for 40,000 dinārs. There are reports of other houses in the region selling for 100,000 and 200,000 dirhams respectively. 28)

The brisk commerce and velocity of capital at work in the markets of the nascent Dār al-Īslām also is suggested by the size and impressive aggregate commodity values of caravans engaged in Makkah trade. Al-Wāqīdī and al-Ṭabarī mention one commercial caravan containing more than 2,500 camels. Another managed by ʿAbd Allāh b. Judfūn consisted of more than 2,000 camels; yet another was composed of 1,500 camels, carrying the value of 50,000 gold dinārs in merchandise. Indeed, one wealthy trader, Abū Ḥayyāḥ Saʿīd b. al-ʿAbbās, in the year 6/627, had over 30,000 gold dinārs invested in a single Umayyad caravan led by Abū Sufyān. 29)

This proliferation of precious metals also led to burgeoning jewelry-making and decorative embellishment industries throughout the region. Al-Samḥūḏi indicates that there were more than three hundred jewelry smiths in the Medinese suburb of al-Zuhrah alone. Indeed, they and the goldsmiths of Fādak and Khaybar were regionally renowned for the quality of their craftsmanship. Al-Azraqī and al-Fāṣī relate that in pre-Islamic times, Quraysh tribal chieftains would take great pride in embellishing the Kaʿbah with elaborate gold and silver overlay—a practice that has been perpetuated until the modern era.

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and window frames were a particular focus of gold leaf decoration. While it is
difficult to estimate the quantity of bullion involved in this activity in historic
times, some indication may be suggested by the fact that the total weight of
gold in the present day twin entrance doors to the Ka’bah exceeds 286 kilo-
grams.30)

Accordingly, while many of the assertions advanced by the Islamic sources
may be apochryphal and shrouded in the mists of Arab lore, it is the underly-
ing body of residual physical evidence attesting to the abundant availability
of precious metals on the medieval Arabian Peninsula that is the focus of the
present inquiry—examining a body of compelling evidence that supports long-
standing claims of a 1st/7th century Hijāzī regional economic buoyancy that has
heretofore been largely unsubstantiated.

The Economic and Geographic Perspective

The primary medieval Arabic sources indicate that the treasury of the nascent
Islamic state benefitted greatly from mining revenues starting from its inception.
Al-Bakrī and al-Samhūdī assert that Prophet Muḥammad issued a formal docu-
ment that granted as qaṫī’ī (property concessions) the Qabaliyyah mines, includ-
ing “ma’din al-Nuṣub,” located in Jabal Quds, near al-Madīnah, to Bilāl bin
al-Hārith al-Muzani. Other sources relate that several other prominent mine
owners customarily gave portions of the proceeds from their gold production as
charitable contributions (sadaqāt) to the nascent Islamic state. Such production
was subject to an official 2.5% zakāt levy, except for several mines in the north-
west Hijāz which, al-Balādūri states, were subject to a 20% khums levy. Ibn
Sa’d confirms that the Qabaliyyah, Juḥaynah, and banū Sulaym mines all yielded
great revenues for the Islamic fiscus. Indeed, the sources directly link Prophet
Muhammad’s tribe, the Quraysh, to at least four of them—ma’din banū Sulaym,
ma’din al-Nuqrah, ma’din Bahrān, and a mine called “ma’din al-Biram,” located
near al-Ta’if.31)

Many other mine sites are also noted in the sources. Ibn Khurraḍhbih and
Qudāmah b. Ja’far, for instance, describe a mine on a commercial route that

Riyadh Daily, April 26, 1992, p. 2.

Hazm 1983, p. 262, states of Ḥājjāj b. ‘Īlāt that: “he was among the best of the Companions
of the Prophet—may God bless them—who had a mine that was in the region of the banū
Sulaym, and it was a gold mine.”
coursed “from al-Yamāmah to al-Kharj, then to Nab‘ah, then to al-Majāzah, then to the mine” (al-ma‘ādin). Al-Bakrī, and al-Mas‘ūdī refer to another mine called “Bahrān,” owned by al-Hajjāj b. ʿIlāl al-Bahizi al-Sulami, located in al-Furū’ on the route from Makkah to al-Madīnah. Al-Balādthuri and al-Waqīḍi suggest that this was but one of several mines that al-Hajjāj owned in this vicinity. Al-Waqīḍi, al-Samhūdī, Ibn Sa‘d, and al-ʿArbī, in turn, describe sites on a main medieval commercial and pilgrimage route (Darb Zubaydah) running northeastward from Makkah toward Iraq known as the “Sulaym mines,” and belonging to the Sulaym tribe (“ma‘ādin al-dhahab alatī bi-arḍ bānī Sulaym”). Actually, as Al-Waqīḍi and other sources make clear, this operation also was not a single mine, but rather a series of mines dispersed through the region. There is residual evidence, in fact, of at least ten separate medieval mining sites in this immediate vicinity. Al-ʿArbī testifies to their productivity:

Al-ma‘ādin kāna bihi dhahab kathīr yustakhraj fi qadīm al-dahr wa yu‘far fīhaul al-mafi‘anah.

Thus, while some could argue that the various references to mines in the lands of the bānū Sulaym suggest a single site, there is powerful countervailing evidence that a significant number of proximate mines actually were in production. One of the bānū Sulaym mines appears to have been located near the modern site of Qurān. Al-ʿIsfahānī states that below Ublā‘ and Qurān are two mountains, and that the bānū Sulaym mine was located there on al-Kūfah-Makkah road. Al-ʿArbī and ‘Arrām al-Sulami note that there was an alternate route that passed this mine, coursing from al-Suwārqiyyah southeastward to Ṣafaynah, then connecting with the main Darb Zubaydah north of Ḥadhayh. Al-Samhūdī similarly describes the bānū Sulaym mine as in the valley of Qurān, beside Ublā‘, on the Najd road, about 100 miles from al-Madīnah. He notes that it is near al-Suwārqiyyah, “which belonged to the bānū Sulaym.”

Al-İsfahâni, on the other hand, states that north of Qurân was “Sharûrâ, wherein lie the mountains of banû Sulaym.” While al-Samhûdi does not differentiate between the sites, al-Hamdânî indicates that this mine was distinct from “ma’din banû Sulaym,” and was known as “ma’din banû Fârân.” The sources also refer to two mountain peaks known as al-As’hath and ‘Unayzât between the Sulaym mine and al-Suwârqiyyah; and to a well in Ublâ’ between the mine and al-Suwârqiyyah, located less than 10 miles northwest of Qurân. Al-Bakrî claims that this site was in operation in the reign of Caliph ‘Umar b. al-Khaṭṭâb (r. 13-23/634-44).37) (See “Site I,” Maps B and C. The site described appears to be at approximately 23 degrees, 24 minutes N latitude, 40 degrees, 28 minutes E longitude.)

Thus, while various sources indicate that there was a “ma’din banû Sulaym” in operation at the time of the rise of Islam at a site called Qurân near al-Suwârqiyyah, their descriptions are not entirely consistent with the location where others believe the famed “banû Sulaym” mine actually was, and where it is commonly believed to have been today. The conflicting contentions can be readily reconciled, however, through other references in the sources indicating (i) that the mining activities of the banû Sulaym were carried out on a variety of properties, and not at just one site; and (ii) that the “banû Fârân” actually were an offshoot of the Sulaym tribe whose lineage traced through one Fârân b. Bâliy, as al-Bakrî asserts:38)

The Sulaym mine was operated by Fârân bin Bâliy, of a group of Bâliy. They are of banû al-Âkhthâm bin Âwîf bin ‘Âbîb bin ‘Usâyêyân bin Khufâyŷ bin Âmirî’ al-Âqays bin Buhthah bin Sulaym.

The linkage of the banû Sulaym to the Qurân mine site thus can be tenuously established, albeit indirectly through the banû Fârân branch of the Sulaym family.

Some 30 miles to the northeast of the Qurân site, however, lies what today is called the “Mahd al-Dhahab” (Cradle of Gold), a mine that definitely was a property of the banû Sulaym. Operated in classic Islamic times by the aforesaid

MAP B
Active Mining Sites of Medieval Arabia

SITE I: Mā’din bani Farān at Qurān, 23 degrees, 24 minutes N latitude; 40 degrees, 28 minutes E longitude
SITE II: Mā’din Mahd al-Dhahab, 23 degrees, 55 minutes N latitude; 40 degrees, 50 minutes E longitude
SITE III: Mā’din bani al-Sharid at Bi’r ‘Umaq, 23 degrees, 58 minutes N latitude; 40 degrees, 59 minutes E longitude
SITE I: Ma’din bani Farân at Qurân, 23 degrees, 24 minutes N latitude; 40 degrees, 28 minutes E longitude
SITE II: Ma’din Mahd al-Dhahab, 23 degrees, 55 minutes N latitude; 40 degrees, 50 minutes E longitude
SITE III: Ma’din bani al-Sharid at Bi’r ‘Umaq, 23 degrees, 58 minutes N latitude; 40 degrees, 59 minutes E longitude
SITE IV: Ma’din al-Nuqrah (al-Naqirah), 25 degrees, 32 minutes N latitude; 41 degrees, 24 minutes E longitude
al-Ḥajjāj b. ʿIlāt al-Bahīzī al-Sulami, who had married into the Qurashi tribe, it is located approximately 170 miles northeast of Makkah and 155 miles southeast of al-Madīnāh, directly on the Darb Zubaydah road. Describing this route, al-Ḥamdānī and al-Ḥarbī assert that from al-Mislaḥ to Ṣafayʿiyah is 8 miles; and from it to the lava field (ḥarrāḥ) of the bānū Sulaym (“which consists of 23.5 sections”) is 26.5 miles, and from it to al-ʿUmaq is 22 miles. Al-Ḥarbī states that the mine itself was “26.5 miles from Ṣafayʿiyah . . . in the mountains to the right of the ascending road.” He also indicates that a large round well built by Queen Zubaydah was proximate to the mining site. Ibn Saʿd and Ibn al-Athīr provide evidence that the mine was in use in the reign of Caliph Abī Bakr al-Ṣiddīq (r. 11/632-13/634). It was still in operation in 128/746, when the Umayyads appointed Kūthayr b. ʿAbd Allāh as its overseer, and did not close down until well in the 3rd/9th century.39) (see “Site II,” Maps B and C, at 23 degrees, 55 minutes N latitude; 40 degrees, 50 minutes E longitude.)

Twenty two miles to the northeast of Mahd al-Dhahab, at al-Bīr fiUmaq, according to al-Samhādī, was another mine known as “maʿdin bānī al-Sharīd.” This mine, also actively worked in the classic Islamic period, was the property of yet another offshoot of the bānū Sulaym, through a linkage of ʿNakhr and Muʿāwiyah, sons of ʿAmrū b. al-Hārith b. al-Sharīd, and ʿUqayl b. Fudayl b. Amrū b. al-Sharīd, via bānū ʿAmrū b. Yaqūḍah b. ʿUṣayyāh b. Khufāf b. ʿAmrī al-Qays b. Buhthah b. Sulaym.40) (See “Site III,” Maps B and C, at 23 degrees, 58 minutes N latitude; 40 degrees, 59 minutes E longitude.)

Some 137 miles further to the northeast of Mahd al-Dhahab, moreover, lay yet another mine, known as “maʿdin Nuqraḥ” (al-Nuqrah), west of the Darb Zubaydah at the juncture where that route sub-divided, with branches diverging to Makkah and al-Madīnāh. Al-Ḥarbī and Ibn Khurrahādhbih indicate that the northern sector of this mine, located 26 miles northeast of al-Muqthāh, was also known as “maʿdin al-Qurashī.” Al-Bakrī states that it was located before Qarqār and that it was operated by the bānū ʿAbū Bakr.41) (See “Site IV,” Map C, at 25 degrees, 32 minutes N latitude; 41 degrees, 24 minutes, E Longitude.)

Because these sites were on the traditional Hijāzī-Iraqī pilgrimage route, they enjoyed a direct commercial tie to Makkah. References to still other medieval


mines with links to the Makkah commonwealth also abound in the Islamic sources. Al-Hamdâni describes a mine called “ma’dîn Mahajjat al-‘Irâq” (“mine of the Iraqi pilgrimage route”) that lay between Ufâyiyyah and al-‘Umaq, in the vicinity of Madh al-Dhabab (though this site may well be another banû Sulaym mining subsidiary, as he also suggests). He likewise speaks of two mountains near Makkah, al-‘Ayrah and al-‘Ayr, that contained operating mines. Zubayr b. Bakkâr and al-‘Azraqi indicate that al-‘Ayrah is the mountain to the right of the approach to the pilgrimage site of al-Mina, whereas al-‘Ayr is the peak directly across from it.42)

Al-Bakrî cites another mine known as “ma’dîn al-Nuṣub,” one of the Qabaliyah chain of mines, proximate to al-Madînah.43) Other sources indicate that the “Qabaliyah” mines were located between al-Madînah and Yanbu’, and that still others could be found in al-Juhaynah region.44) Al-Ya’qûbî asserts that there were also gold mines at al-‘Uwaynid on the coastal route from Aylah to Makkah.45) Al-Hamdâni also cites major medieval mining operations at al-‘Aqîq, between Sa’dah and Najrân; at Dankân, at the top of Wadî Dhahbân between the villages of al-Qaﬁmah and Halîn al-Suflâ, on the Suflâ -Makkah inland commercial route; as well as at Bishah. Al-Isfahâni, in turn, indicates that the prime occupation of the inhabitants of Wadî al-Qirâ was exploiting the prodigious gold, silver, and copper mines located in that region.46)

Other medieval mines were located in Central Arabia, outside of the Makkans’ direct sphere of influence. They included “Hillaydit” (al-Najâdi), which al-Bakrî and al-Samhûdi both call the most productive mine on earth;47) “al-Ahsan,” a gold and silver mine situated between al-Qasîm and al-Yamâmah, operated by the banû Kilâb;48) and “Abraq Khutrab,” a silver mine near al-Dariyyah pastoral reserve, east of Wadî Jarîr and south of Wadî al-Rumah.49) The sources

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45) Al-Ya’qûbî 1892, p. 341.


similarly attest to the prodigious output of al-Hufayr, al-Đubayb, Shamâm, and Thaniyat ibn 'Işâm mines in al-Yamâmah.50)

In addition to gold, silver, and copper, it appears that iron ore was also produced at several of these sites. Indeed, there are indications that at least eleven separate iron mines were in operation on the Arabian Peninsula at this time.51) In all, there are references to over two hundred gold, silver, copper, and iron mines in medieval Arabia cited in the sources consulted by this inquiry. Other gemstones and minerals were present in significant commercial quantities as well. The sources indicate, for instance, that emeralds, amethysts, quartz crystals, turquoise, borax, lead, the stone used in whetstones for sharpening swords and knives, and table salt also were mined in medieval Arabia and exported to surrounding regions.52)

Fortunately for research, unlike other vestiges of desert civilization, mining leaves a lasting imprint. Consequently, evidence of medieval mining operations—in the forms of trenches, pits, deep, tortuous tunnels, and ore residuals—today exists at more than a thousand separate sites in the lava escarpments that dominate the western half of Saudi Arabia. Often, pairs of tunnels, dug adjacent and parallel, extend inward into the escarpments to depths approaching seventy meters, and to as much as eighty five meters in the case of Mahd al-Dhahab.53)

The remnants of mining villages, stone quarries, and smelters—as well as lanterns, stone hammers, picks, shovels, millstones, grindstones, pestles, and other primitive mining instruments—also can often be found proximate to these sites. Some of these residuals are quite revealing. Tailings and slag at Mahd al-Dhahab, for example, suggest that as much as a million tons of ore may have been mined there in the early Middle Ages. Remains of wells dug adjacent to these locations to provide pure water for washing ore, as well as to meet the consumption needs of miners, likewise are in evidence. Al-Samhûdî and others explicitly refer to wells located at the sites mined by the banû Sulâyym and elsewhere. In several instances, their ruins still are evident.54)

51) Al-Azraqî 1858, pp. 158-160; al-İşîhânî 1968, pp. 30, 126; Plans currently are underway to commercially develop substantial iron ore deposits found at Wâdi al-Şâwâwin, as well as bauxite deposits at al-Zâbirâ."
The Chronological Perspective

Indeed, such ruins can be of significant value in determining the actual dates of mining operations. As the difficulty of dating past mining activities is often complicated by the nature of the industry itself. For in antiquity, as now, mining towns tended to be functional rather than cultural centers. Thus, the presence of such artifacts as exquisite pottery and other sophisticated accoutrement usually is quite rare, with only more utilitarian utensils present. Nonetheless, past smelter sites often do contain “tailings” as well as slag piles, analysis of which can be successfully employed in radiometric dating of historic workings and the evaluation of past mine production.

Among other data, such tailings—generally consisting of non-smelted waste materials with imbedded ore fragments—can provide detailed information on the composition of the ore and the nature of the mineralization. The slag, in turn, represents a geochemical amalgam consisting of compounds from ore, flux, furnace, and trace elements of the metal extracted. The chemical composition of the slag, therefore, can be of particular value to the metals geochemist, who can “fingerprint” an extracted sample through trace elements found in the original ore. It may also contain charcoal, which is the fuel medieval miners usually used in kilns for smelting the extracted ore. Such charcoal is commonly found as sealed fragments in residual fused glass and hence serves as a useful chronological dating material in Carbon-14 (C-14) dating methods.55)

Properly employed, radiometric dating thus can be a key physiochemical method for assaying mining residuum—dating its organic and biological components by measuring its C-14 radioactivity. This process is based upon the deterioration of natural carbon over time, and is predicated on the axiom that when a carbon-containing organism dies, or is otherwise destabilized by removal from its equilibrium cycle, its C-14 contents decay with a 5,570 year half-life. A precise measurement of the remaining C-14 content therefore allows the analyst to calculate the time lapse since the organism died.

A potential exogenous factor complicating the radiocarbon dating process, however, can involve the specificity of the sample itself. For among the reasons that chemically-derived age determination could yield dates later than the actual activity would be if samples were to be taken only from the top of the slag heap—which would represent the culmination of the mining activity. Another would be “bioplastic varnishing,” subsequent accruals of bacteria and other mold-like organisms, which could also affect the specificity of the sample. Such spurious factors, in fact, combined with the age of the charcoal feedstock itself


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when consigned to smelting, may explain why certain C-14 dating results could indicate late ‘Abbāsid 10th-13th century mining activities, whereas medieval documentary sources might suggest a 7th-10th century actual operations date. The key to effectively using radiocarbon dating, therefore, is first to understand its limitations.

Working within these caveats, it is insightful to note that radiocarbon datings of residual charcoal in slags from Mahd al-Dhahab suggest that in situ gold and silver mining and smelting activities were carried out approximately 3,000 years ago—in an era exactly corresponding to the reigns of biblical Kings David and Solomon (circa 1000 B.C. to 922 B.C.)—and again from A.D. 430 to A.D. 830. Such findings comport perfectly, of course, with al-Harbi’s aforesaid claims that such mining activities took place in ancient times (“al-ma‘din kāna bihi dhahab kathīr yustakhraj fī qadīm al-dahr”) and again in Islamic times, only to be halted in the 3rd/9th century because they were no longer cost-effective (“wa aladhi ḥamalahu ‘alā tarkihī anna al-ma‘ūnah akthār minā yukhraj minhā”). Testing at a placer gold deposit at Jabal Makhiyat (20 degrees, 12 minutes latitude, 43 degrees, 28 minutes longitude) suggests mining activities both in King Solomon’s era and again circa A.D. 626—precisely in the lifetime of Prophet Muḥammad. Testing at the al-Nuqrah gold and copper mine, in turn, indicates that mining activities took place in the A.D. 675-835 period.56)

Similar radiocarbon testing indicates that silver mining activities took place at al-Samrā‘ mine (at coordinates: 24 degrees, 22 minutes latitude; 44 degrees, 21 minutes longitude) in the A.D. 668-819 period; and at Jabal al-Shizm copper mine (at coordinates: 26 degrees, 27 minutes latitude; 37 degrees, 32 minutes longitude) in the A.D. 450-950 period. C-14 testing at al-Ma‘ṣā‘ini copper mine (at coordinates: 18 degrees, 08 minutes latitude, 43 degrees, 51 minutes longitude) has produced similar time frames for medieval mining operations.57)

Arabic inscriptions dating to the classic Islamic period at many of these sites can aid in the mining dating process. Kufic inscriptions found among tailings at Mahd al-Dhahab, for example, suggest that they may extend back to the A.D. 750-1150 ‘Abbāsid era and similar writings exist at (cited in geographic order from west to east across the western half of the Arabian Peninsula):

‘Aynūnā’, Ghurābah, Hillayt (al-Najādī), al-Muwazzar, al-Ḥamdah, al-Maṣānī’, al-‘Aqīq, and at numerous other excavated sites. At al-Ṣuwaqqiyah, as well as at Thanāyit ibn ‘Īsām al-Bāhili gold mine, thirty kilometers west of al-Qawāyīyah in the western Najd, such writings consist of personal names and prayers of repentance seeking Divine pardon and redemption as well as supplications invoking the blessings of Prophet Muḥammad. It is critical to note that inscriptions found at certain of the sites, including al-Qabalāyah, appear in unpointed Arabic script, suggesting that they may date to no later than the close of the first Islamic century.  

Glass, vessels, pottery, and shards present at the mining sites can also contribute to a more accurate dating process. Remnants of glass and glazed pottery at a variety of locations, among them (again cited in order from west to east): Ghurābah, Musaynā‘ah, al-‘Ablā‘ (al-‘Ablah), Mahd al-Dhahab, al-Nuqrah, Samīrā‘ (Samirah), al-Ṣumūṭ, al-Hujayrah, al-Saṃrā‘ (al-Samrah), and al-‘Aqīq mines have been dated to the A.D. 9th and 10th (A.H. 3rd and 4th) centuries. Numerous glass fragments found in al-Dawādīmī silver district likewise have been determined by the Corning Museum of Glass to date to the A.D. 800 to A.D. 1300 period. Since such fragile fragments have survived, it may be assumed that they represent the culmination of mining operations at the particular location, because subsequent production activity likely would have obscured their existence. Dated medieval Islamic currency has also been found at several of the medieval sites. Two ‘Abbāsid silver dirhams struck in the years 143/760 (at al-Kāfah) and 158/778 (at Baghdad), for instance, have been found at Samīrā‘, a medieval gold mine located northeast of Hillayt on the Darb Zubaydah.  

There are also remnants of mining villages at many of the sites that suggest medieval occupation. Among them, the mining site at al-‘Ablā‘ contains foundations of approximately 300 structures that possibly could have housed as many as 1,000 manual laborers; whereas the site at al-‘Aqīq contains at least 100 similar structures. At Mahd al-Dhahab, numerous stone dwelling ruins resembling barrack-like structures also suggest that a large work force was employed at the mine; and similar dwellings exist at Umm al-Qurayyāt, Ghurābah,
al-Birām, Muṣayna‘ah, Umm Al-Damār, Turabah, Māwān, al-Nuqrah (North and South), al-Šafra‘, al-Kawm (East and West), al-Shumta‘, al-Kawkabah (Ashqar al-Barāqah), al-Ḥujayrah, al-Samrā‘, al-‘Īsān, Umm al-Liddām, al-Ḫufayr, al-‘Awsajah (modern Abū al-Ruḥay), and Umm al-Dabā‘.  

Medieval Islamic sources also often may be employed to sustain the evidence suggested by physical artifacts. In addition to al-Ḥarbi’s aforesaid conformity with C-14 dating results at Mahd al-Dhahab, for instance, both Ibn Sa‘d and Ibn al-Athir provide corroboration that the Treasury of Prophet Muḥammad’s successor, Caliph Ābū Bakr, received substantial revenues from mining operations. Ibn Sa‘d states: 

Much money was brought to it from maḍīn al-Qabāliyah and maḍīn Juhaynah, and maḍīn bani Sulaym was opened in the caliphate of Ābū Bakr, and he received the “ṣadaqah” from it and deposited it in the Treasury, and Ābū Bakr distributed it to the masses . . . 

Al-Balādhurī, Mālik b. Anas, al-Bakri, al-Samhūdi, al-Ṭibrānī, and others, in turn, indicate that Prophet Muḥammad granted al-Qabaliyah mines and adjacent areas as concessions to Bīlāl bin al-Ḥarith al-Muẓani on the condition that the lands be agriculturally improved; whereas al-Ḥajjāj bin ‘Ilāt al-Bahizī, Ābū Ḥuṣayn al-Sulami, and others are reported by the medieval Islamic sources to have presented gold donations from their mines to Prophet Muḥammad. Ibn Ḥajar relates that when members of the bani Lihb brought gold ore to him from maḍīn ‘Aqīq Ghamid, near Turabah, Prophet Muḥammad ruled: “Whoever finds something, it is for him; and the twenty percent tax (khums) is to be levied on precious metals.” Al-Hamdānī similarly attributes to Prophet Muḥammad the assertion regarding maḍīn ‘Aqīq ‘Uqayl, in modern Wādī al-Dawāṣir: “the land of the ‘Uqayl has been showered with gold”—suggesting that this mine too was productive in his era. 

The medieval Islamic sources present evidence that mining activities took place on the Arabian Peninsula in pre-Islamic times as well. Al-Hamdānī indicates, for example, that amongst the gold mines of the Najd was “maḍīn Thaqīyat ibn Ḥisam b. Bāhil,” chamberlain of Ghassānid King Nu‘mān bin al-Mundhir (r. circa 580-602 A.D.); and asserts that thousands of Persians also
worked at the Shamām silver mine in al-Yamāmah—a practice that likely came to a halt with the Islamic conquest of the Sāsānīd empire in 16/637. He likewise indicates that “ma‘dīn al-Radrād,” which he states was better than the Shamām mine, was also operated by “Persians of the mine.”

Naṣr al-Iskandari, later cited by Yaḵt and al-Ḥāzimī, asserts that “Mindāh” was a pre-Islamic Hijāzī mine which had a huge pit in which water gathered. The Mindāh mine also is frequently mentioned in early Arab lyrics. Pre-Islamic poetry similarly reverberates with references to specific gold and silver fineware, rings, bracelets, other jewelry, and gold and silver embossed weaponry. Coincident with the rise of Islam, the Qurʾān too speaks of them as esteemed precious metals. Sūrat Āli-Imrān, for instance, asserts:

Fair in the eyes of men is the love of things they covet; women and sons; heaped up hoards of gold and silver . . .

Sūrat al-Kahf promises the Righteous:

For them will be Gardens of Eternity; beneath them, rivers will flow; they will be adorned therein with bracelets of gold . . .

a commitment that finds its affirmation in Sūrat al-Ḥajj:

Allāh will admit those who believe and work righteous deeds to gardens beneath which rivers flow; they shall be adorned therein with bracelets of gold and pearls . . .

to which Sūrat al-Insān adds:

And among them will be passed round vessels of silver and goblets of crystal—crystal clear, made of silver . . .

The composite of documentary and scientific evidence thus suggests that modern conventional portrayals that separate historic Arabian mining operations into two distinct chronologic periods of activity—late Bronze Age and medieval ‘Abbāsid—may well be imprecise. For many references are unquestionably pre-‘Abbāsid and may be traced back to the era of Prophet Muḥammad and before. In addition, as noted, practically every gold, silver, and copper deposit on the Arabian Peninsula shows some evidence of previous mining activity. Roman pottery shards, for example, have been found at an ancient mining site called Wādī ‘Arjah in northwest al-Ḥijāz. Several medieval mine site names—such as al-Maṣāni‘, al-Ma‘malah, Umm al-Marū, Umm al-Damār, and al-‘Amār likewise

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clearly suggest the existence of previous mining. Thus, it is not altogether illogical to conclude that just as modern geologists and prospectors now typically seek out historic mines as a means of finding new deposits, so did the miners of previous times, in so doing, obscuring the handiwork of their predecessors. 65)

It is not improbable either that what we now identify as ‘medieval’ Islamic mining actually is a sporadic continuation of early exploitation—particularly for large deposits such as al-Nuqrah—and that such mining probably took place from its inception perhaps in the third or second millenium B.C. until midway into the ‘Abbās id era. Thus, the geographic documentary sources and in situ physical evidence converge in a compelling way to suggest that significant precious metals extraction and smelting operations did take place at mining sites in Western Arabia at various times before, during, and after the proclamation of Prophet Muhammad’s mission—while peaking in the commercial surge that attended the first two Islamic centuries.

Not coincidentally, many of these mines lay on or near the historic incense, spice, and pilgrim routes of the Arabian Peninsula. Mahd al-Dhahab, for instance, is situated two kilometers north of the well-travelled Darb Zubaydah pilgrimage route that linked Makkah with al-Kūfah in Iraq, as well as with other key cities of Western Asia. In addition to Mahd al-Dhahab, the Nuqrah, Hillayit, Samirah, and Umm al-Damār sites were likewise located along this route. Similarly, such noted medieval mines as al-‘Aqiq and al-‘Ablā‘ were located on the Yemen-Makkah-Syrian spice route. Not only were these routes major arteries for commerce, therefore, they also afforded access to the currency base that made such commerce possible. 66)

The Operational Perspective

It appears that early medieval Arabian mining was financed with private capital. Al-Baladhuri quotes future caliph ‘Umar b. ‘Abd al-‘Azīz’s grudging assessment of a mining property that he had recently acquired: “look at what was extracted from it and what I spent on it.” Ibn Hajar, in turn, quotes members of the banū Lihb as asserting: “We brought the Prophet of God ore from al-‘Aqiq, and he wrote us a letter stating: ‘whoever finds something, it is his.’” Whereas al-Bakrī speaks of a dispute at Mahd al-Dhahab between original Sulamī investors and mine workers in the caliphal reign of ‘Umar ibn al-Khaṭṭāb. 67)

Nonetheless, despite operational difficulties, and however primitive the extraction techniques, it appears that even by modern standards, mining in ancient and medieval Arabia was “big business” for the age. The evidence suggests, for instance, that an estimated 1,500,000 ounces of gold were produced from the more than one million tons of ore mined at Mahd al-Dhabab in historic times. Based on residual tailings, evidence likewise indicates that more than 1,000,000 ounces of gold were produced at al-Ḥamdah in the early medieval era. These are economically significant findings. For they are production volumes of sufficient magnitude to have generated substantial local purchasing power throughout the medieval west Arabian Peninsula and east Mediterranean basin, stimulating regional economies to an appreciable degree.68)

The Arabic sources reveal that medieval mining operations were often labor-intensive, at times employing as many as 1,000-2,000 workers. Existing ruins, as noted, indicate that these miners were usually housed in stone structures, often arranged in orderly barrack-like fashion. Slaves, prisoners, and servants likely comprised the bulk of the mining labor force. But there are reports of others—Jews, Persians, and even Arabs—also actively engaged in mining activities on the Arabian Peninsula. Al-Ḥamdānī, for instance, states that there were 200 Jews at ma’din ‘Aqiq ‘Uqayl in Wādī al-Dawāsir. He also indicates that there were thousands of Zoroastrians employed at ma’din Shamām, and that they had even set up two places of worship (baytā nār) there.69)

Mining operations were supported by impressive public and private support infrastructure. As subsequent analysis will reveal, some mines were even deemed to be true towns (having a minbar). Many were at least full fledged mining villages with fortifications, and in some instances, had palaces. Certainly, commercial support infrastructure was present. Al-Ḥarbi writes that Mahd al-Dhabab contained quite substantial physical facilities to logistically support ongoing site operations—describing a palace and a mosque at the mine, as well as a circular well built by Queen Zubaydah, numerous other wells, old and new, and a square reservoir in the vicinity:70)

Ma’din banū Sulaym . . . is for the banū Sulaym bin Mansūr bin ‘Irīmah; and in it is a mosque and a palace; and from the mine to Ufayyiyah is sixteen and one half miles; and in it is a circular well of Zubaydah; and many wells, old and modern, having names. Two and one half miles from the well are building ruins said to be “Rayyān.”

where (Hārūn) al-Rashid stayed; and there were palaces
in it for his commanders and staff, and shop ruins,
and wells, and a square reservoir and a distillery,
at a mile from Rayyān.”

Indeed, there are reports that Hārūn al-Rashid, each time accompanied by more
than one hundred Islamic jurisprudents (fuqahā’), made at least seven official
visits to the Islamic holy cities of Makkah and al-Madīnah, and had palaces
built at many of the official major rest stops that were co-located with mines
along the Darb Zubaydah pilgrimage route to facilitate his mission.

Other sites were substantially built up as well. Speaking of “ma’din Mawān,”
al-Ḥarbi cites a palace, mosque, reservoir, and three wells within its confines—
and similar references proliferate throughout the medieval Arab geographies.
Al-Hamdānī asserts that “ma’din Thaniyat ibn ‘Īsām” contained a fortress, and
al-Ḥarbi states that it too was considered to be a true town (having a minbar).
Yaqūt writes that “ma’din ‘Aqīq ‘Uqayl” had a governate; whereas al-Ḥāzmī states
that “ma’din Khazabah” also had a governor: “wa bihā amīrān wa min-
baran.” Al-Īṣafahānī reveals that there was a market at “ma’din al- Ḑasrār”
and that there were merchants at “ma’din al-‘Isān” as well as at “ma’din al-
‘Awsajah.” He describes “ma’din al-‘Ahsān” as a village with a citadel and a
mine; and “ma’din ‘Arāqib” as a mine and a huge village. He likewise claims
that “ma’din Hillayūt” was both “a mine and a village.” Yaqūt, citing the
authority of Abū Miswar, describes a market at “ma’din al-Nuqrah.” Al-Ḥarbi
asserts that “ma’din al-Nuqrah” had a mosque and a palace, two reservoirs, and
wells. Thus, both the physical and spiritual needs of the mining community
were met with on-site services.\(^{71}\)

As for the mining itself, medieval Arabian gold was found in various forms.
Al-Hamdānī states that gold nuggets as large as six ounces were not uncom-
mon, and that pure grains of gold were often interlaced with the earthen ore
brought up from the mining pits. Al-Ḥarbi, in describing operations at the barū
Sulaym facilities, speaks of “the earth being mixed with gold.” Upon removing
stones from the ore mix, this “gold dust” (placer gold) was extracted by wash-
ing it in wooden troughs especially designed to separate out dirt and other resid-
uals. After this process, the resulting particulate mix could be refined further by
first manually sifting it in a dish; then immersing it in quicksilver to consume
residual pollutants; and finally boiling off the quicksilver, leaving the purified
gold intact.\(^{72}\)

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But often, the desired gold and silver existed in the form of microscopic particles compounded with other minerals such as copper, zinc, iron, and lead sulfides (gossans), which required more complex refining techniques. Al-Hamdání describes the requisite refining process in detail—indicating that medieval mining engineers operating on the Arabian Peninsula smelted the ore through a combustion process employing kilns (tanānīr) made of stone-reinforced baked clay. It is apparent from the remnants of those kilns that have been preserved that they were almond-shaped and approximately sixty centimeters both in height and base—and were vented to accommodate one or two sets of leather bellows. Separating the gold from the other minerals contained in the raw ore was accomplished by placing within the kilns measured portions of both wood and raw ore—pre-pulverized by hammers, millstones, and pestles—as well as clay and mineral salts that accelerated the refining operation. Charcoal, usually produced from mimosa, acacia, or juniper wood, was the primary feedstock used in the smelting process.  

The composite was then ignited, and the covered kilns fanned with the bellows for approximately one hour. Because silver, mineral sulfides, and other salts within the ore dissolved at temperatures well below the 1,063 degree centigrade melting point of gold, they would separate outward from the central mass, leaving the purified gold to settle into small pots placed in the base of the kiln. Once the smelting operation was complete, the pots would be removed with tongs and allowed to cool, after which, the pure ore was removed.

While the refining of silver was similar to that of gold, the method of smelting copper ore was technically somewhat different. It involved first pulverizing the mined ore into fragments through impact-crushing and grinding, followed by smelting to separate the copper from the ore. The latter process was carried out in a clay kiln, which was charged with a mixture of crushed ore, flux (usually sea shells, calcite, hematite, and quartz), and charcoal. As heat built up in the kiln, the firing was intensified by a blow pipe worked by bellows. The molten copper then sank to the bottom and the residual copper gangue at the surface flowed out through a hole punched near the base of the kiln into a small bowl.

1957, p. 45; 293-294; J. ‘Ali 1970, vol. 7, p. 512; the Kingdom has once again begun to process this “gold dust,” extracting a quite remarkable average of 72 grams of gold per metric ton of earthen ore.


placed further down. The kiln was then broken and the copper and slag extracted.\(^75\)

**Conclusions**

From the wealth of evidence presented in the medieval primary sources, it is clear that the role of precious minerals in stimulating the economy of the medieval Hijāz has been greatly underestimated in many modern analyses. Indeed, the synthesis of the documentary data with recent archaeological discoveries strongly indicates that ore production from the gold, silver, and copper mines of the Arabian Peninsula contributed greatly to the commercial expansion that characterized Islam’s dynamic first two centuries. So much so, in fact, that in response to Patricia Crone’s cogent inquiry regarding early medieval Makkah’s economic reason to exist; to wit:\(^76\)

> The Meccans cannot be said to have exported silver and gold at all... Meccan trade thus cannot be identified as a trade in gold, it may be asserted that, without question, it was gold and silver used as currency and the dynamic commerce that these twin precious metals underwrote.

The archaeological evidence depicting the economic impact of precious metals on the economy of medieval Arabia thus is persuasive—so persuasive, in fact, that it may now invoke the need to reexamine other conventional interpretations of early Near Eastern history based on the emerging data that ongoing exploration of the Arabian Peninsula has to offer. For the range of tools at the disposal of modern historians of the Peninsula has expanded greatly in the past decade, making possible greater economic understanding based on dramatic new evidence that the artifacts of the region are beginning to provide.\(^77\)

**Source Analysis**

Unlike many works of Islamic history, in setting its scenarios, the present analysis relies heavily upon medieval Arabic geographies which generally tend to be more empirical than other more traditional Islamic sources. Such sources not only include the well known, predominantly 3rd/9th and 4th/10th century geographers contained in the Bibliotheca Geographorum Arabicorum—Ibn Khurradadhbih, Ibn Rustah, al-Mas‘ūdi, al-Muqaddasi, Qudāmah Ibn Ja‘far,

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\(^{75}\) H. Sāhir 1991a, p. 16.

\(^{76}\) P. Crone 1987, pp. 87-95 passim, pp. 87 and 95 quoted.

\(^{77}\) Including satellite remote sensing infra-red photography techniques that have recently led to the rediscovery of ancient trading cities on the Peninsula.
al-Ya'qubi et al.—but also both earlier and later geographers/historians such as al-Baladhuri, Yaqut, al-Fayruzabadi, and the native Hijazi `Arram al-Sulami. It has also extensively explored the findings of geographers devoted primarily to capturing the topographical essence of the medieval Arabian Peninsula; in addition to still others, such as al-Hamdani and Nasr al-Iskandari, who are focused more narrowly on describing contemporary mining operations.

In the former category are the works of such chroniclers as the 3rd/9th century al-Harbi’s Kitab al-Manasik wa Amakin Turuq al-Hajj wa Ma’alim al-Jazirah;* the 3rd/9th century al-Isfahani’s Bilad al-‘Arab; the 4th/10th century al-Hamdani’s Shi’at Jazirat al-‘Arab; the 5th/11th century al-Bakri’s Mu’jam ma Usta’jam min A Sm’a al-Bilad wa al-Mawaddi; the 6th/10th century al-Hazimi’s Kitab al-Amakin and the 10th/16th century al-Samhudi’s Waq’ al-Waqi bi-Akhbar Dar al-Mustafa. Al-Hamdani likewise wrote a major treatise devoted exclusively to regional mining called Kitab al-Jawhara atayn al-Ma’atbatayn al-Nafr at’qatayn Mu’ajjil al-Jazirah; edited and published by Shaykh Hamad al-Jasir in 1987; whereas much of Nasr al-Iskandari’s commentary on mining appears in al-Jasir’s 1995 edition of al-Hazimi’s Kitab al-Amakin. The lexicons of al-Zabidi, Taj al-Farqis and Ibn Manzur, Lisn al-‘Arab, and al-Fayruzabadi’s Al-Muqhaim al-Mu’tabah fi Ma’alim Tabahe likewise have been useful in defining explicit mine sites.

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*) It must be noted that a certain controversy exists as to whether the true author of Kitab al-Manasik wa Amakin Turuq al-Hajj wa Ma’alim al-Jazirah is al-Harbi or a contemporary, Muhammad bin Khalaf bin Hayyan Wadi’, author of AKBAR al-Qudah, cited below.

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