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Economy as instituted process: the case of hard rock mining in the United States

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Abstract. I examine the origin and development of institutions that assign and enforce rights to hard rock minerals located on federal lands in the United States. Hard rock mining gives a prime example of the 'artificial selection' of settled customs or working rules by jurists and legislators. The evolving structure of the industry, conditioned by technological and market factors, produced a parallel shift in the locus and control of *sovereignty*. In the early days sovereignty vested in the mining clubs. The enlarging scale and complexity of mining catalysed a change in both the uses and location of sovereignty. With the transition from prospecting to large-scale industrial mining, the 'right to use' mineral deposits obtained through patents became contingent on the cooperation of labour. At this stage, the capture of the state's monopoly on legitimate violence to protect the right to use became a crucial dimension of property. Mining companies have also enjoyed liberties with respect to the externalization of environmental costs. The emergent structure of rights, duties, capacities and exposures was instrumental in bringing forth a quantum increase in the mining of hard rock minerals necessary for industrial expansion. There is, however, an urgent need for reform of the mineral patent system.

1 Introduction

Taking into account its economic, environmental, political, and social impacts over the course of 146 years, the Hard Rock Mineral Law of 1872 is surely one of the more consequential pieces of legislation in US history. The law has enabled individuals and corporations to extract many billions of dollars in gold, silver, nickel, copper, uranium, and other metals from federal land without the payment of any fees or royalties to the government. The allocation of mineral rights under the 1872 law created a privileged class of mining interests that, to this day, wields appreciable economic and political power. The Hard Rock law is also implicated in the abandonment of roughly 161,000 hard rock mines in the twelve western states and Alaska. Of these, at least 33,000 are thought to cause serious environmental damage from soil erosion, acid water drainage or arsenic-contaminated tailings piles. The reclamation costs for these mines has been estimated to be upwards of $50 billion.[1]

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1 This is according to the Government Accounting Office (GAO).

My purpose here is to argue that the history of the Hard Rock law illustrates how economic, and in the present case, environmental outcomes are the (predictable) manifestation of politically sanctioned and state-enforced working rules that specify rights, liberties and their correlative duties and exposures. Hard rock mining gives a prime example of the 'artificial selection' of settled customs or working rules by jurists and legislators. The evolving structure of the industry, conditioned by technological and market factors, produced a parallel shift in the locus, uses, and control of *sovereignty* – meaning a social force capable of producing order and security of expectations and consisting of law-making authority, control of dispute resolution, and a state monopoly on violence. In the early days sovereignty vested in the mining clubs. The enlarging scale and complexity of mining catalysed a transfer in the location of sovereignty to the state and territorial governments. The struggle for the control of sovereignty was, by this time, chiefly a faceoff of elite mining interests and the mining workers' collectives. With the transition from prospecting to large-scale industrial mining, the 'right to use' mineral deposits obtained through patents became contingent on the cooperation of labour. At this stage, the capture of the state's monopoly on legitimate violence to protect the right to use becomes a crucial dimension of property.

The mining companies were modern business concerns, and their key officials understood very well that the *liberty to withhold* was vital to the preservation and expansion of the *exchange value* of mining assets. The facts reveal numerous instances in which state governments performed a correlative duty in enforcing the liberty to withhold by the deployment of their police powers.

Mining companies also have enjoyed liberties with respect to the externalization of environmental costs. The historical facts of hard rock mining also lends support to the view that the institution of property is determinative of class structure and the distribution of economic power among (antagonistic) social classes. With the transition from prospecting to large-scale industrial mining, the 'right to manage' mineral deposits obtained through patents became contingent on the cooperation of labour. The capture of the state's monopoly on legitimate violence to protect the right to manage became, at this point, a crucial dimension of property. The emergent structure of rights, duties, capacities and exposures was instrumental in bringing forth a quantum increase in the mining of hard rock minerals necessary for industrial expansion. I argue, however, that the principle that institutions tend to become obsolete with increasing knowledge and shifting social valuations finds empirical confirmation in the study of hard rock mining.

2 The Mining Law

The General Mining Act of 1872 is known as the miners' Magna Carta in that it codified the 'right to mine' for hard rock minerals on federal lands,

excepting those lands that were withdrawn by administrative action. The stated purpose of the Act was 'to promote mineral exploration and development in the Western United States'. As is discussed below, by 1872, many of the richest deposits located in the Western states had already been claimed, and the federal mining statute merely certified these claims. The mining law also ratified the informal claim and patent system that had been in effect in the mining districts for two decades. Commons' observation about the common law – that it 'comes *up* from economic and sociological conditions, not *down* from authority' (Gonce 1971, 86, original emphasis) – seems generalizable to statutory law in the present case. By enacting the 1872 statute, Congress artificially selected the 'customs of the dominant portion of the people at the time' (Commons 1934, 94).[2]

Under the hard rock law, the holder of a mineral patent on federal land holds fee simple title. A patented mining claim confers 'the exclusive possession and enjoyment of all the surfaces included within the lines of their location'. Gary Libecap (2007, 270) notes that the law 'established the precedent that individuals could own minerals and that government did not retain title to them, as was the practice in Europe and Spanish America'. The hard rock statute is also grounded in a distinctively American feature of property law – the doctrine of *ad coelom*. That is, the rights of landowners extend vertically both upwards and downwards.

The rights of mineral patent holders who, from the beginning of large-scale mining in the late 1850s, have been mainly corporations, fulfil all 11 of the 'incidents of ownership' delineated by the French property theorist A. M. Honoré.[3] In fact, these rights might be classified as 'super' property rights, in that the mining companies have enjoyed liberties with respect to the externalization of the harmful environmental costs of mining.

The Mining Law has had a profound and enduring impact on the distribution of wealth and political power in the Western US.[4] Population growth in the West has also meant greatly increased exposure to the spillover costs of mining. For these reasons, the Mining Law is among the most reviled and criticized of all federal statutes. Ending the patent system has proven to be a very difficult political proposition, perhaps illustrating Mancur Olson's principle that

2 R. A. Gonce (1998, 84, original emphasis) explains that, for Commons, 'social phenomena are largely the outcome of deliberate action, not self-interest; of artificial, not natural selection; of evolving human *conventions*, not *nature*'.

3 'Ownership comprises the right to possess, the right to use, the right to manage, the right to income of a thing, the right to the capital, the rights or incidents of transmissibility or absence of term, the prohibition of harmful use, liability to execution, and the incident of residuarity: this makes the 11 leading incidents' (Honoré 1971, 231).

4 In reference to Colorado, Howard Zinn (1999, 276) writes: 'State politics for nearly 50 years was affected by mining and the political and economic struggles between workers and their employers. During much of this time Republicans, aided by mining money, controlled state government.'

a 'privileged' small group with common, narrowly defined interests can prevail over larger groups.[5] The last serious attempt at reform came during the Carter Administration.

3 Sovereignty and withholding

Viewed as a test case for the comparative plausibility of the 'state theory' *versus* the 'bottom-up' or 'spontaneous order' (Hayek 1973) model of the origin of institutions, the historical facts of the Mining Law seem to provide more evidence for the latter view. At the time of the discovery of gold at Sutter's Mill in 1848, California was a sparsely populated, newly acquired US territory with no organized government.[6] As Mark Kanazawa (2015, 119) states:

> The vast majority of this [territory] was then designated part of the public domain, including virtually all the gold fields into which the miners swarmed. Legally then, the gold seekers were trespassers on public lands belonging to the federal government who went about busily expropriating gold that technically speaking was not theirs to take. The federal government, however, did nothing to uphold its claims to gold resources nor did it establish any regulations to manage the development of the gold fields. Consequently, the growth of the mining camps in the 1850s occurred in almost complete absence of effective institutional governance by the federal government.

The things economists classify as natural resources or 'free gifts of nature' do not support a flourishing life process without considerable human effort, knowledge, and skill. A standard argument in defence of property rights in land is that they serve to distribute economic rewards to those who apply the effort, knowledge, and skill required for the beneficent use of trees, topsoil, fisheries, mineral deposits, or other resources. In the early days of the Gold Rush, prospectors had no assurance that their claims would be respected, and therefore had weak incentives to mobilize the labour and capital required to exploit these claims.[7] Gold or 'placer' mining was not feasible without security of access to water resources and it entailed substantial capital costs, as Kanazawa (2015) has

5 All members of a 'privileged group' stand to benefit considerably from collective action, and thus group members have strong incentives to engage, directly or indirectly, in lobbying efforts to bring forth the desired collective action. To this effect, Olson (1965, 128) writes: 'The smaller [privileged] groups ... can often defeat large groups ... which are normally supposed to prevail in democracy [because] the former are generally active and organized while the latter are normally unorganized and inactive.' See also Cronin and Loevy (2012).

6 Mexico had ceded California under the terms of the Guadalupe Hildago Treaty of 1948, which ended the Mexican–American war.

7 Charles Wilkerson (1992, 39) writes: 'These miners, like all business people, need a reasonably defined structure – a set of accepted norms – to protect the hard labour and materials they had sunk in their operations.'

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described.[8] Claim jumping and disputes turned to violence were common in the years immediately following the Sutter's Mill strike.

The hard rock law originated in the codes of the California and Nevada mining districts, which were 'montages of Spanish rules transported north by Mexican miners, regulations from the Midwest, improvisation bred of common sense, and local custom' (Wilkerson 1992, 39). Cornish immigrants for whom mining was a hereditary occupation were among the early arrivals in the California mining district and, later, at the Comstock Lode of Nevada (discovered in 1859). Several writers have remarked on the Cornish influence.[9]

The mining camp codes established informal rights for claimants based on the ancient doctrine of *terra nullius*, or first possession as the basis of property. As Dean Lueck (2003, 215) explains:

> To get a patent to mineral land, the miner must find a valuable deposit, locate the claim, do assessment work, and apply for the patent. While prospecting and before the discovery, the miner's claim is legally protected. Mining law gives full transferable title to the mineral-bearing land to the first person who [sic] discovers the deposit.

First, possession theoretically applies only to 'lands owned by no person' (the literal meaning of *terra nullius*). It is noteworthy that, as a matter of public policy, federal mineral-bearing lands have been treated *as if* they were un-owned.[10] The adverse revenue and distributive consequences of these policies is a recurring

8 '[R]iver mining required the construction of a diversion dam in the river and a diversion ditch or flume, which ran parallel to the river' (Kanazawa 2015, 55). Kanazawa (2015, 105) observes that 'the earliest ditches were small affairs [and] financing could be accomplished by a team of miners.' The ditch companies emerged because 'as ditches became longer and ditch systems more elaborate, they came to require a great deal of capital and were beyond the limited means of many miners' (Kanazawa 2015, 106).

9 See Thomas Rikard (1932), for example.

10 Clay and Wright observe:

> Most national mining systems descend from the tradition that valuable minerals belong to the lord or ruler, who grants use rights as concessions in exchange for a share of the revenue. The US government was by no means immune to the attractions of mineral revenues. Continuing colonial-era practice, the Land Ordinance of 1785 reserved for the federal government 'one third part of all gold, silver, lead and copper mines, to be sold or otherwise disposed of, as Congress shall direct'. Although minerals were not mentioned in the land laws of 1796, 1800, and 1804, Congress did act in 1807 to reserve lead mines in the Indiana Territory. Between 1824 and 1846, the government maintained a leasing system in the Galena District of Illinois, Iowa, and Wisconsin: miners were given exclusive permits to work certain areas and in return were required to bring their ore to one of the officially licensed smelters, who were required to pay a 10 percent royalty. The plan worked reasonably well in the 1820s, when production and federal revenue both grew. It fell apart in the 1830s, however, when nonpayment and noncompliance became widespread. Authorities in Washington lacked enforcement power, even over their own agents, who abetted evasion by smelters and fraudulently sold valuable mineral lands at minimum farmland prices, almost surely with side payments for personal profit.

them in the literature.[11] The Mineral Grant Act of 1866, sponsored by Nevada senator and former mining camp attorney William M. Stewart, 'almost incredibly by today's standards ... zoned a billion acres – nearly all of the American West – for [mineral] mining' (Wilkerson 1992, 41). The patent system observed in the mining camps, and subsequently formalized into statutory law with the 1872 Act, has allowed the metal mining industry to take title to approximately 3.4 million acres of federal land – an area roughly the size of Connecticut – with minimal compensation to the taxpayers.

John Commons (1934, 695) defined sovereignty as 'an organized instrument of physical force which individuals endeavor to use to enforce their own wills on others, or to prevent others from using their will on the individuals'.[12] Our period of study is noteworthy for organic and enduring changes in the location, control and uses of sovereignty. These changes should be understood as purposive adaptations of sovereignty to evolving technical and business exigencies.

Prior to the 1872 statute, ownership claims were granted according to local mining district rules.[13] The territorial governments played no role in the enforcement of patent claims or in the adjudication of disputes over claims. These functions were performed by the mining districts, which established systems for recording claims, arbitration procedures, and *ad hoc* miners' courts.[14] It is fair to say that, at this point, the mining district constituted a sovereign or collective power that made state enforcement of the mining codes unnecessary.[15] This bottom-up structure of rules and practices did, moreover, prove quite effective in achieving an orderly and productive prospecting environment. The question therefore arises: what factors gave rise to the ratification of the district mining codes in federal statutes? Perhaps more importantly, what can explain the shift

11 Murtazashvili (2013, xiii), for example, writes: 'Far from an efficient response to poorly designed laws, claims clubs were perhaps the fundamental rent-seeking coalitions of the 19th century.'

12 Richard Dawson (1998, 49) describes Commons' conceptualization of sovereignty: 'He perceived the state as a process of negotiation over the control of physical force. For analytical and interpretive purposes Commons in effect proffered the following proposition: Sovereignty is available for the use of whomever can get into a position to control it.'

13 Libecap (1979, 365) notes: '[P]rospectors who followed gold rushes after 1848 were technically trespassing though there was little sustained effort by the federal government to enforce its claims.'

14 John Umbeck (1977, 1981) has analysed the importance of violence in the initial distribution of property rights during the California Gold Rush. Using a two-agent microeconomic model, Umbeck shows that the allocation of mineral claims will follow the comparative capacity and willingness of agents to use violence to exclude other agents – even if neither agent actually resorts to violence. For Umbeck, violence is something meted out by individuals in the pursuit of their own ends. Would his results differ if a collective entity such as a claims club exercised monopoly control over the administration of violence? Umbeck does not address the question.

15 Ilia Murtazashvili (2013, xi–xii) writes: '[t]heir informal associations, which were called claims clubs, typically had all the features of the state – executives, deliberative bodies, a system of administration, judges and juries – despite operating in the state's sometimes pale shadow.'

in enforcement responsibility from the mining districts to the federal government that came with the 1872 law?[16]

In explaining the insufficiency of custom or informal rules and the need for formal laws, Geoffrey Hodgson writes:

> The creation of the law and the state corresponded to a shift from relatively simple and moderately egalitarian tribal societies based on custom, to more complex, divided and highly stratified social systems where general rules could not be adequately sustained by widespread individual habits, and social and religious customs were subject to violation and dispute. (Hodgson 2009, 153)

With respect to the location of sovereignty, Ilia Murtazashvili (2013, 18, original emphasis) hypothesizes that '*claim clubs will be effective in in providing private property institutions when spontaneous order breaks down, yet the state is unwilling or unable to specify and enforce property rights*'.[17] In the case of hard rock mining, two factors appear to be of great importance. With the mass entry of prospectors into the Western states after 1848, easy-to-recover mineral deposits were quickly exploited. The prospector soon gave way to the mining company. Deep-vein mining brought forth an increase in both the number and complexity of mining disputes. A key source of conflict derived from the fact that 'extra-lateral rights' were a component of 'ledge' claims granted under rules applicable in the Nevada mining districts. Extra-lateral rights meant that, though claimants faced restrictions on the location and width of mines at the surface, below the surface the width of the mine was unconstrained. Claimants were at liberty to 'follow the vein', a crucial proviso in bringing forth the large-scale investment required in deep-vein mining when the subsurface location or direction of the mineral-bearing vein could not be known prior to digging. Given the geology of mining, and in particular the concentration of mineral deposits in veins stretching laterally beneath the ground, extra-lateral rights were bound to come in conflict. As Libecap (1979) reports, the miners' courts were quickly overwhelmed with cases involving conflicting extra-lateral claims.

16 In explaining the formalization of mining codes in statutory property rights, Daniel Bromley (1989, 742–3) comments:

> There were certainly norms and conventions of mining behavior, but as the potential economic gains from the new mining activity increased, the incentives to defect from such conventions became too much for many to resist. It soon became evident that a more structured institutional structure was required; there was an evolution into a structure of *entitlements* such that rights and duties of each participant were clearly spelled out. Institutions as entitlements (that is, property rights) rather than as conventions produced a solution to the problem of anarchy in the new mining area. The evolved institutional structure led to clear increases in the production of the mines, an outcome that must be regarded in the interests of economic efficiency.

17 Murtazashvili (2013, Table 1.3, 19) designates three 'levels of social control': (1) the state; (2) claims clubs; and (3) spontaneous order. He defines the latter is defined as '[i]nformal property institutions [that] are self-enforcing without conscious design, hierarchy, and, in some situations, without enforcement'.

In fact, Libecap (1979, 371) argues that 'the inadequacy of the miners' court and the development of large-scale, absentee-owner mines' provided the impetus for the creation of the Nevada Territorial government in 1861. The Territorial Justice System, however, proved unequal to the task of adjudicating mining disputes. A 300-case backlog had developed by 1864.[18] The new technological and organizational realities of hard rock mining clearly necessitated an increase in the level and quality of judicial services – something that, under prevailing circumstances, could only be provided by the federal government.

Honoré (1971) includes the 'right to use' among his 'incidents of ownership'. Institutional economists stress the 'right of non-use' or the right to withhold, as a crucial dimension of modern property. It is important to note that the giant US-based mining and smelting companies have never had much in the way of pricing power. US production of copper, for example, has rarely exceeded one-quarter of world output. Mine production has generally followed global metal prices, which have tended to fall sharply with contractions in industrial output. Mines could hardly be operated according to sound business principles without the right to withhold. But the shutdown of mines in reaction to weak prices deprives individuals of their livelihoods, and places mining companies at risk of retaliatory action. The right to withhold may therefore be barren if the state does not fulfil its correlative duty to protect this right.[19] The story of hard rock mining illustrates how the rights and liberties inhering in property co-evolve with new facts of economic organization.[20]

Property rights are a wellspring of class differentiation, and they give rise to antagonistic class interests. The profitability of a mine is, *ceteris paribus*, inversely related to the size of the wage bill. The inferior position of workers *vis-à-vis* the mining corporation in labour market transactions is explained by the corporation's right to withhold employment in combination with the workers' lack of suitable alternatives. The leverage possessed by patent-holding

18 The Territorial Justice System consisted of a single panel composed of three federal judges.

19 An illustration of this principle comes from the anthracite regions of Northeast Pennsylvania during the Depression, when the collapse of coal prices prompted massive layoffs by the 'big four' coal companies. Unemployed miners in Schuykill County first resorted to sabotage of mining facilities, and later to the digging of 'bootleg' mines. The police responded in 1934 by dynamiting bootleg mines and arresting miners. See Kozura (1996).

20 The idea that '[l]aw and economics have co-evolved and will co-evolve' (Atkinson and Paschal 2016, 17) is fundamental to institutional thought. Glen Atkinson and Stephen Paschall (2016, 17) also write:

> Co-evolution of law and economics is a dynamic process in which developments in each system are intended to achieve certain outcomes. The result may be the achievement of the intended outcomes but this process may also ignite endogenous forces that create conflicts and disputes that may alter legal authority and economic behavior. The outcomes of this co-evolution will not be transitions from one equilibrium to another nor be wealth-maximizing for the economy as a whole although, based upon resource allocation and power dynamics, the outcomes may be wealth-maximizing for some. The outcomes will form expectations about the future.

mining companies, which has its objectification in the terms of employment that mine workers are compelled to accept, derives substantially from the 'waiting power of property' (Commons 1924, 54).[21] Collectivization offers labour its only real option for checking the withholding power of property. Unionization efforts in Western hard rock mining began in earnest in 1863 at the Comstock Lode (see Wyman 1979). At this point the modern *political* economy of Western mining began to take shape. Mine owners and their representatives now devoted resources and energies to the capture of the sovereign power of the state as a means of enforcing the status quo. The election of friendly politicians and the appointment of jurists sympathetic to mining company interests became a top priority.

The capture of sovereignty by the mining interests was aimed at thwarting collectivization efforts and thereby preserving the withholding power of property. The capture of state power was revealed first of all in the forbearance of politicians and judges with respect to the *private* enforcement of 'rights' – meaning the hiring of private militias, Pinkerton detectives, or union infiltrators by the mining companies. Forbearance among key officials was equivalent to the (asymmetric) public sanctioning of private violence. The use of physical, as well as economic, coercion became a liberty conferred by ownership.

The historical record is, of course, replete with instances in which the police power of the state has been deployed at the behest of big mining. An early example is given by the Coeur d'Alene silver mine in Idaho, where '[t]he National Guard, brought in by the governor, was reinforced by federal troops: six hundred miners were rounded up and imprisoned in bullpens, scabs brought in, union leaders fired, the strike broken' (Zinn 1999, 276). More recently, Arizona Governor Bruce Babbitt deployed the National Guard to protect replacement workers during a strike at the Phelps Dodge copper mines in Arizona in the late summer of 1983 (see Ruth Bandzak 1991). The capture of sovereignty was also manifest in the issue of strike-breaking injunctions.[22] The capture of state power by the mining companies was not always assured, however. For example, the populist governor of Colorado, Davis Hanson Waite, called out the state militia in 1894 to protect the Western Federation of Miners during a five-month strike in the Cripple Creek gold mining district.[23] A 1916 report of the Congressional Committee on Industrial Relations concluded:

> [t]he greatest uncertainty exists regarding the legal status of almost every act which may be done in connection with an industrial dispute. In fact, it may be said that it depends almost entirely upon the personal opinion and social ideas

21 Commons (1924, 54, original emphasis) writes: 'This power of property in itself ... may be distinguished as *waiting power*, the power to hold back until the other party consents.'

22 The issue of strike-breaking injunctions was barred by the Norris–La Guardia Act of 1932.

23 See Eric Foner (1975) and Elizabeth Jameson (1998).

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of the court in whose jurisdiction the acts may occur. (Walsh and Manly 1916, 90)[24]

The value of a mine as a business asset is diminished if rights of withholding are not protected. As Carol Rose (1985) explains, the doctrine of first possession is informed by the Lockean normative analysis of property. The impression derived from common law decisions is that ownership according to first possession is, above all, a reward for useful labour. Ownership claims on land may, according to the common law, be terminated without continuing evidence of useful labour. It is noteworthy that, during the prospecting phase where the informal mining camp codes were in effect, there was *no* right of non-use. A mineral patent imposed a diligence requirement.[25] The informal codes in this sense showed fidelity to the common law understanding of property. The 1872 law imposed no such requirement.

Rights of withholding, particularly as they apply to mineral claims, are difficult to defend on social welfare criteria. In the case of tangible capital goods, the owners have at least made investments in the (man-made) productive assets that are the articles of withholding. Moreover, the ownership of capital goods entails significant carrying costs. If positions in capital goods have been financed with debt, the proclivity to withhold is checked by the need to use these assets to generate cash flows sufficient to service contractual debt obligations. By contrast, a mineral patent obtained under the 1872 law is pre-emptive in the sense of excluding other claimants. Such a claim may require minimal financing and involve zero or negligible carrying cost. As such, the patent holder controls a nearly costless option that can be exercised as global mineral prices warrant.[26]

24 The report goes on to say:

> The general effect of the decisions of American courts, however, has been to restrict the activities of labor organizations and deprive them of their most effective weapons, namely, the boycott and the power of picketing, while on the other hand the weapons of employers, namely, the power of arbitrary discharge, of blacklisting, and of bringing in strikebreakers, have been maintained and legislative attempts to restrict the employers' powers have generally been declared unconstitutional by the courts. Furthermore, an additional weapon has been placed in the hands of the employers by many courts in the form of sweeping injunctions, which render punishable acts which would otherwise be legal, and also result in effect in depriving the workers of the right to jury trial. (Walsh and Manley 1916, 90)

25 As explained by Wilkerson (1992, 39):

> Each mining claim had to be marked and worked according to local mining camp rules. For example, one district in 1852 required miners to work their claims at least one day out of three during the mining season, and another in 1853 specified that a miner was to dig a ditch on his claim 'one foot wide and one foot deep' within three days of locating a claim. Abandoned claims could be occupied by others.

26 I am indebted to an anonymous referee for pointing out the difference in withholding rights as applied to minerals and capital goods, respectively.

The structural changes in mining were, of course, coterminous with, and a part of, the emergence of the absentee-owned corporation as the dominant economic and political force in American life. A major theme of Commons' *Legal Foundations of Capitalism* is that these structural changes brought forth an adaptive transformation in the legal definition of property to include intangible property, expected earning power or exchange value. The state's responsibility with respect to property at this stage evolves into a duty to protect the owner's right to withhold as a means of preserving/increasing the exchange value of business assets. The political struggle between labour and capital is about the capture of sovereignty for the purpose of limiting or expanding the withholding power of property.

4 Liberty, exposure, and the environmental effects of hard rock mining

Liberty or capacity means the ability to take action subject to immunity, or without threat of legal liability. In Wesley Hohfeld's (1917) taxonomy, the juridical correlative to immunity, is disability or exposure. So, for example, natural gas fracking companies in Pennsylvania enjoy the liberty to discharge vast quantities of subsurface water (a 'fugitive' resource) to support their operations, whereas farmers or other rural residents may suffer exposure in the form of depleted wells. Charles Wilkerson (1992, 49) writes that '[t]he final distinctive quality of the General Mining Law is its utter lack of any provision for environmental protection'. Prior to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, mine operators enjoyed full immunity with respect to the externalization of the environmental spillover costs of mining. The cumulative impact of such immunity is manifest in a vast number of abandoned toxic mines that dot the Western landscape. As Ronald Coase observed (Coase 1960), the cost of internalizing externalities may exceed the economic value of benefits accruing to third parties as a result of such internalization. In the early decades of Western mining, when mines were located in remote areas far from population centres and when mining was a major source of employment in the West, Coase's observation probably applied. The level of exposure to pollutants from mining has risen with Western population growth. The exposure has been by no means limited to low-income, marginalized communities. Citizens of upscale Crested Butte, Colorado, filed a lawsuit against the Bureau of Land Management (BLM) to reverse the issue of a mineral patent to Phelps Dodge in 2004. The patent conferred rights to minerals (molybdenum ore) located beneath 24 mountaintops in proximity to the town. The case was dismissed. In a landmark 2005 decision, Federal Judge Marcia Kreiger ruled that, under the 1872 law, the Department of the Interior has 'sovereign immunity' from lawsuits that do not involve competing mineral claims.[27] The case illustrates that those

27 See *High Country Citizens' Alliance v. Clarke*, case number 1:04-cv-00749-MSK-PAC.

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suffering exposure to mine pollutants have very limited means of obtaining legal remedies under current statutes and their interpretation by the courts.

CERCLA requires those with BLM-issued mineral patents to reclaim their land when operations cease. The BLM issued regulations in 1981 that require mining operators to provide assurances that adequate funds would be available for clean-up. While this policy has been moderately successful in forcing *operating* mining companies to bear environmental clean-up costs, it has been ineffective in addressing the problem of mines abandoned prior to 1981, of which there are a vast number.[28] CLERCA also authorizes the Environmental Protection Agency (EPA) to place hard rock mines on the National Priorities List (NPL), which makes them eligible for clean-up using the EPA Superfund. The EPA may also compel the owners or 'potentially responsible parties' of NPL sites to make financial assurances. The Government Accountability Office (GAO) reported in 2008, however, that financial assurances made to date fall well short of the estimated clean-up costs for mines designated as NPL sites.[29] Moreover, big mining has been quite successful in scuttling the NPL-designation process with a flood of lawsuits filed against the EPA. As of 2013, the EPA has allocated $2.2 billion in Superfund money for the reclamation of hard rock mines.

5 Final remarks

The primary objective here has been to seek 'a comprehension of the facts [of hard mining] in terms of cumulative sequence' (Veblen [1919] 1932, 81). The present study of hard rock mining unearthed another key example of the principle that the cumulative or path-dependent quality of economic life is made real by the 'dead hand of the law'. There is little doubt that the institutions formalized in the 1872 Miners' Law were effective in promoting a national policy objective – the development of hard rock mineral resources in the Western US. The institutional structure described above should be understood as a key factor underpinning the explosive growth of industrial production in the post-1870 period. The well-rehearsed arguments in defence of property rights in land – specifically, that they eliminate the problem of wasteful racing observed in the case of 'common' resources, and that they give the security of expectations without which the

28 David Trimble, GAO Director of Natural Resources and Environment, in comments delivered to the House Subcommittee on Environment and the Economy on 22 May 2013:

> BLM issued regulations in 1981 requiring all operators of these mines to reclaim the land when their operations cease, but some did not and abandoned these mines. As a result, thousands of acres of federal land previously used for mining and related operations now pose serious environmental and physical safety hazards. These hazards include toxic or acidic water that contaminates soil and groundwater and physical safety hazards such as concealed shafts, unstable mine structures, or explosives.

29 GAO (2008).

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considerable long-term investment required to make these resources useful would not be forthcoming – are validated in the case of hard rock minerals. If we view the question of natural resources from the narrow perspective of maximizing private profits from their sale over a multi-period time horizon (which, assuming no market failures, accords with 'socially optimal' use), the controversy might be considered resolved.

The problem is that the Mining Law has delivered a set of cumulative consequences that few would consider good. It created a *de facto* lottery in natural resource wealth, and so was responsible for the creation of powerful and enduring mineral dynasties.[30] It deprived the US Treasury of many billions of dollars in royalties. It was a principal factor in shaping the sorrowful record of labour relations in the Western US. Finally, the structure of liberties contained in the law have virtually guaranteed that future generations will suffer exposure to environmental spillovers from hard rock mines long been abandoned.

The analysis performed here highlights the fact that popular notions about property – specifically, that it consists of a non-variegated 'bundle of rights' that societies either have or do not have – are seriously misguided. The historical record reveals that property is subject to purposive redesign by the body politic. Changing facts on the ground provide the primary motive force to this process of institutional change. There is nothing intrinsically bad about this phenomenon. To the contrary, the disruption or failure of this process of adjustment risks leaving society with an institutional structure that is obsolete – in the sense of delivering economic and social outcomes at variance with prevailing social values or ideas of 'the good'. Judged on these criteria, the Mining Law of 1872 is obsolete. The need for progressive reform of the mineral patent system in the United States is pressing.

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30 Former Interior Secretary Morris Udall famously described the Mining Law as 'a fire sale without the fire'.

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