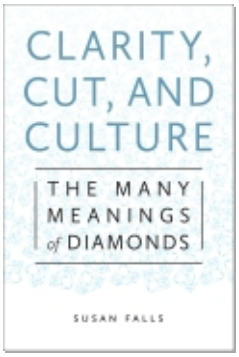
1. From Rock to Gem



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1

FROM ROCK TO GEM

Anthropology and Value

Once they are cut and polished, diamonds are quite valuable—especially considering how small they are. But how do we get from "just a rock" to "such a gem"? Where does a diamond's value come from? How is its value defined, produced, and recognized? What is "value" anyway?

Moving beyond economic models of value that hinge upon exchange, anthropological theories of value consider a broad array of variables such as labor, use, sentimentality, morality, semiotics, and more. The anthropological lens is multivalent, even kaleidoscopic. As Paul Eiss and David Pederson (2008, 283) point out, "from Smith and Ricardo to Marx and Mauss, and by way of Simmel and Saussure, the category has been used in varied ways to illuminate ethical, economic, aesthetic, logical, linguistic, and political dimensions of human life. . . . The value of value may lie in its ability to elucidate and move across boundaries of many kinds." Value is, thus, a foundational category, and deserving of exploration across all domains of activity and experience.

Many anthropological theories start with Marx and develop "value" in ways that attend to some aspect of labor, use, or exchange with regard to contemporary capitalism. David Graeber, in *Toward an Anthropological Theory of Value: The False Coin of Our Own Dreams* (2001), for example, combines theoretical innovations by Marcel

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Mauss and Roy Bhaskar to argue for value as a form of creative action. Contributors to Fred Meyers's (2002) edited volume, *Empire of Things: Regimes of Value and Material Culture*, challenge the implications of Annette Weiner's (1992) theory of inalienability within a capitalist context, utilizing Arjun Appadurai's demonstration that objects take on different meanings as they move through different cultural contexts (Appadurai 1986). These texts show us that value can be used as a theoretical lens to transcend the restrictions of binary categories (like production vs. consumption, or gift vs. commodity), and that value can provide an analytic device to address how groups of people might be linked by their interaction with a set of goods even when separated by time or space. Using value in this way usually requires, however, a sustained consideration of historical context.

And just as different notions of value appear in theory, there are many iterations of "value" in the vernacular of the everyday. It is a term whose meaning at once expands and dissolves upon closer inspection; even as a concept, value is never inert. Its force is felt across every domain of social life—from the political and economic to the aesthetic, the religious, the scientific, the semantic, the moral, and the personal. Insofar as subjective value, or meaning, takes place in a cultural context in which many forms of value and valuation are operative, any study of value must consider a range of questions concerning the forms, sociality, and production of value. What are the relationships among various forms of value, and how might one form of value be translated into the terms of another? How does the notion of intrinsic value operate? Are there forms of value that are epiphenomenal to others—and if so, what is the nature of these secondary forms? How might value serve as a source of social action? Are there hegemonic forms of value in different social activities, and how are they produced and maintained? If there are gatekeepers of value, who are they and how are they established? How might cultural agents seek to shape or wield the standards of value to their own purposes? How do historical and discursive constructs restrict or enable alternative semioses? And finally, how do conceptions of value within anthropology

itself reflect larger disciplinary issues, as well as direct research? I will return to these questions at the conclusion of our adventure into the value of diamonds, a journey that begins now with the story of how these rocks became gems. This is a good place to start because besides being impressively serendipitous, it helps explain how the industry choreographs diamonds' value and provides a backdrop against which consumption takes place.

Romance, Status, and Glamour

The association of diamonds with romance, status and glamour is, actually, relatively recent. And you might be surprised to learn that diamonds were not always for women. It was only in mid-fifteenth-century France that King Charles VII, defying sumptuary laws prohibiting women from wearing them, gave a diamond pendant to his mistress, Agnes Sorel. As soon as she started wearing it, she was emulated by her peers, starting a new trend in the court.

If we go further back, the particulars of diamond wear become somewhat murky. Indian Dravidians knew of diamonds by the seventh or eighth century BCE, but even as late as 4 BCE, Buddhist texts referring to diamond as a precious stone contained few clues about where it was found, how it was used, or what it meant. The Bible also seems to reference diamond, though it is possible that authors were referring to magnetite, corundum, or rock crystal quartz, using terms that were subsequently mistranslated as "diamond." Pliny's *Natural History* (77 CE) is one of the earliest texts that appears to portray diamonds as a cultural artifact, but the text has also been subject to questions regarding translation issues.

Greek, Indian, and Chinese legends all allude to diamonds' magical qualities, describing their use as poisoning or healing agents, or as cutting and bead-drilling tools. Through a kind of contagious magic, diamonds were thought to bring virility to men on the battlefield and in the bedroom. The fantastical story of Alexander the Great rescuing a stockpile of diamonds from a snake-guarded pit, and a similar tale

celebrating Sinbad the Sailor's escape from Diamond Valley, are universally related in books on diamond lore. Other legends, like the naming of the Koh-i-Noor ("Mountain of Light"), a huge 108.93-carat Indian diamond, or the discovery of diamonds in South Africa by Erasmus Jacobs, contribute to a history generally construed as a sequence of wondrous incidents.

Our ongoing fascination with carbon gravel is demonstrated by the success of trade publications that court the industry at large, lionize individual diamondeers (often hagiographically),[1] and even spotlight single stones. Early on, merchants and visitors to Brazil and South Africa wrote stories of arduous travel to rowdy fields that abounded with scoundrels and scandals, authoring books with exciting titles such as *History of the War in South Africa, Containing a Thrilling Account of the Great Struggle between the British and the Boers; Including the Causes of the Conflict; Vivid Descriptions of the Fierce Battles; Superb Heroism and Daring Deeds; Narratives of Personal Adventures; Life in Camp, Field and Hospital, Etc., Etc.; Together with the Wonderful Story of the Transvaal, the Orange Free State; Natal and Cape Colony; the Kaffirs and Zulus; Richest Gold and Diamond Mines in the World, Etc., Etc*. (Birch and Northrop 1899).[2]

Half a century later, readers continued to be captivated by diamond stories, as ex–security agents penned accounts of guarding booty; *Diamonds Are Forever* (1956) and *The Diamond Smugglers* (1957) were best-selling, nonfictional accounts of the De Beers Security Service, written by former security agent Ian Fleming—most famous for creating the character of James Bond. And British MI5 agent Sir Percy Sillitoe, star of Fleming's *Smugglers*, wrote *Cloak without Dagger* (1955) describing his experience masterminding the De Beers International Diamond Security Organization, which was tasked with halting African illicit diamond buying (IDB).[3] Industry insiders now write about their struggles to control new Canadian fields,[4] while journalists and scholars track diamonds from outsider perspectives.[5] These texts are fascinating in and of themselves, and, taken as a collection, help to explain the larger

contemporary industry. Insular, sprawling, and powerful, the diamond business generates huge profits for individuals, corporations, and states across the world, and the gems are implicated in identity formation, social organization, and political violence in diamond-rich areas.

William Crane's (1965) work on Congolese *évolués*, or "evolved ones," locates the emergence of a class that imitated European lifestyles within the context of burgeoning luxury industries such as the Kasai diamond fields. Filip De Boeck's (1998) more recent work connects diamond traffic to commodities, money, and identity in southwestern Congo-Zaire. Also focusing on the emergence of new social groups, De Boeck described the widespread phenomenon of the *bana Lunda*' (the children of Lunda'), the young Congolese urbanites traveling through civil war from southwestern Zaire to the Angolan province of Lunda, in order to dig or dive for diamonds in UNITA-controlled territory. These articles, spanning thirty-five years, demonstrate how Western demand has continued to influence local activities, social formations, and economies in areas where diamonds are mined. To extend consideration of these transnational relationships, I focus on tensions between production and the subjective realm of demand. So how are these gems produced?

The Rise of Diamonds

Diamond mining takes place in a technologically dynamic landscape. Today, most gem-quality diamonds are extracted from highly mechanized mines in Africa, Russia, Australia, and Canada. Some of these mines are new, operational only since 2000. Hundreds of years ago, diamonds were found only occasionally in Borneo, before they were discovered in Goa, India, around the seventh or eighth century BCE (Spencer et al. 1998). These were alluvial diamonds spread around a large area by the forces of erosion; their poor quality and dispersion meant that mining in India never became a high priority. Even during peak production in the late 1600s, India only produced between fifty and one hundred thousand carats per year, only a small percentage of which were gem quality. The

rest were used as abrasives in bead drills or just discarded. Indian diamond collecting was eclipsed when diamonds were discovered in Brazil.

Around 1730, just as Indian production was petering out, gold *garimpieros* (miners) in Minas Gerais (southeast Brazil) recognized that the small, greasy-looking stones discarded by panners were not worthless bits of quartz, but diamonds. Brazil was then under Portuguese control, and the Crown tried to manage the diamond-rich riverbeds by taxing miners and their slaves, creating a system in which only a few designated companies could operate. A decade later, Portugal canceled these contracts and got into production itself, tasking royal cashiers with the counting and grading of diamonds shipped to Lisbon to be sorted for distribution (Bernstein 1986). Far more calculating than Indian policy, Portuguese management focused on both production and distribution in order to maximize the prices they could charge their English, French, and Dutch buyers.

As production became more efficient, other Brazilian sites were discovered, but more diamonds invited more pilfering. The small size, liquidity, and high value of diamonds meant that they were easily stolen and smuggled. In much the same manner as occurs today, "leaks" in the legal supply system led to a vigorous contraband market operating outside of the Portuguese trade. There is no way to know how many diamonds moved through black-market channels, but the official market was so lucrative and the effort required to stop the black market was so great that the hemorrhage was more or less tolerated. This same cost-benefit arithmetic was applied in modern times to mines in places like Sierra Leone, until a PR nightmare—generated by the NGO-led "Blood Diamonds" campaign—pushed the industry to take serious steps to halt the black-market exchange of diamonds for weapons. (The industry's efforts have been at least partly successful.)

Portugal's attempt to control mining, distribution, polishing, and sales was eventually replicated by other entrepreneurs. It is interesting to compare how the Portuguese strategy—slowly integrating the product chain first backwards and then forwards—was later mimicked, and

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extended, by De Beers. The current De Beers branding strategy and Flagship Stores move toward even greater integrated management of production, distribution, and sales.[6]

The flow of Brazilian diamonds into Europe had two important consequences. Indian diamonds, few and highly prized, had been treasures for the elite. Now, not only were they more available because of increased supply, but they were less expensive, to boot. As a result, they were swept into commodity capitalism and, as European royalty became increasingly unable or unwilling to absorb them, the emerging industrial bourgeoisie started to buy diamonds as status goods. Meanwhile, Brazil attained independence and fostered increased production by easing regulations. By 1850, new laws encouraging free enterprise had caused the untaxed contraband trade to ebb, but, at the same time, Brazil's ability to fix prices, set leases, and regulate site fees were weakened. So, even as bourgeois demand continued to rise, looser laws combined with increasing scarcity meant dramatically less production (Bernstein 1986). The diamonds were running out!

As production slowed, supply to Europe and the United States was severely curtailed. Major cutting and polishing outfits in Antwerp, Amsterdam, and France experienced worrisome shortages. How would the cutters survive? Where would retailers find stock? Miraculously—just as the Brazilian supply emerged to replace the dying industry in India—diamonds were discovered in South Africa, just as Brazilian production petered out. According to legend, a game hunter was handed a large, conspicuously glittery stone by the Boer farmer Schalk van Niekerk in 1867. The stone had been found among the pebbles in the Orange River, near the settlement of Hopetown, by his young neighbor, Erasmus Jacobs. Variations of this tale appear in dozens of publications, but what seems certain is that the 21.25-carat diamond, now known as the "Eureka," was displayed at the Paris World Exposition that year.

One might have expected a massive diamond rush to ensue. But rumors that the stone had been planted—a fraud technique known as

"salting" that makes barren land seem diamondiferous—kept people in doubt and away. When another diamond was identified nearby, it too was virtually ignored. As it turns out, these were both alluvial finds. No one knew then that water had eroded primary deposits, ferrying the stones far away from their ground source.[7]

As soon as the first primary deposit, known as a kimberlite pipe (after its ore and shape), was discovered between the Vaal and Modder Rivers in 1870, the rush was on! This area became the famous Kimberley Mine. Another pipe, found on the estate of brothers D. A. and J. N. De Beer, became the De Beers Mine. The discovery of more pipes soon followed, and thousands of men from Great Britain and elsewhere came, hoping to strike it rich. Digger committees created rules they hoped would prevent centralized control, while local governments tried to develop and enforce their own laws. In 1871, the British declared Griqualand West a colony of the British Crown, but instead of following in the footsteps of the Portuguese, they legitimized digger committees and their rules for limiting claim size and prohibiting corporate alliances. These rules worked fairly well for alluvial collecting, on the surface and over a large area. But once it became clear that diamonds were not just on the surface but also underground, the men had to work much harder to manage their claims, and limitations on size and collaboration fell into disuse.

The huge Kimberley Mine became increasingly unmanageable as workers excavated at uneven rates. The thin dirt walls separating the claims collapsed, and debris from one level fell or were pushed into the next. Rain and ground water had to be removed. A network of ropes was installed to haul buckets of earth and water in and out. As the entire area became crisscrossed with tangled webs of rigging and heavy machinery, it became more difficult to move men, tools, and water safely and efficiently. By the 1880s, finding a solution to the water problem represented a lucrative business opportunity (see Epstein 1982b, Lenzen 1970). The era of De Beers was about to begin.

"My dear, De Beers IS the diamond industry."

John Cecil Rhodes, a British national there to make his fortune, tackled the water problem by investing in and renting out steam pumps. Combining the profits he made excavating the De Beers Mine with those from his pumping business, he was able to purchase even more claims. He then began building the company that would later become De Beers Consolidated Mines, Ltd. His competitors, meanwhile, were also consolidating claims at other sites. Eventually there were only two major shareholding corporations at the nearby Kimberley Mine: the Kimberley Central, which was a miners' conglomerate, and the Compagnie Française des Mines de Diamante du Cap, known as "The French Company," which controlled the larger portion of the mine.

By 1888, Rhodes had gained control of the De Beers Mine, aiming to adapt the supply of rough diamonds to the market-dependent world demand by centralizing the control of production. Simply put, supply would be adjusted as demand fluctuated. Through price fixing at a level maximally above production costs, effected through collective monopolization, Rhodes also created a stabilizing fund that would cover costs in the event of economic recession and any resultant drop in demand (Bernstein 1986). This strategy has defined the De Beers model to this day.

But his aims extended well beyond mere profit seeking; Rhodes hoped to use revenue to recolonize Africa—and beyond—for Great Britain. In support of these goals, the South African Colonial Office granted him a special charter empowering him not only to build mines but to develop railroads, lay telegraph wires, annex territories, raise armies, and even install governments. And while Rhodes the historic figure is often lauded as a hard-working, nationalistic visionary, Rhodes the man was frequently denigrated as misogynistic, stiff, and calculating. Depictions deriding his behavior and high, squeaky voice stand in stark contrast to those of his rival, Barney Barnato. Practically every account of Barnato, born Barnett Isaacs to a London rabbi, paints the image of a charmed,

likeable "bad boy" whose charismatic personality simultaneously elicited suspicion and friendship.

Having followed his brother Harry to South Africa to make his fortune in 1873, Barnato's first swindle involved peddling defective cigars. Ever the entrepreneur, he arranged (and fought in) boxing matches, performed in a cabaret, sold liquor, and invested in imaginative schemes. Like almost everyone else living around the South African fields, Barnato eventually learned to deal diamonds, buying a claim in the Kimberley pit, which almost immediately began to produce. He invested in more claims, taking chances on places that others had abandoned. His strategy paid off: he and his brother soon amassed enough capital to take over the miners' conglomerate, Kimberley Central Company.

There was no love lost between Rhodes and Barnato. Rhodes seems too have regarded Barnato as a talented hoodlum. Barnato thought Rhodes a snobbish prig. In 1888, this antagonism came to a head. Rhodes, with monopoly in mind, cast his eye upon control over the Kimberley Mine. Well connected in the British banking world, he secured enough backing to bring about a takeover of The French Company. Barnato mounted a counteroffer. In ensuing negotiations, Rhodes convinced Barnato that competitive bidding would only benefit The French Company, and he persuaded Barnato to agree to a deal that would allow Rhodes to buy out The French Company's section of Kimberley for the lower bid of £1.4 million, which he would then sell to Barnato in exchange for £300,000 plus 20 percent of the Barnato Brothers' Kimberley holdings. Barnato believed himself the victor. But Rhodes, with the help of financiers in London and a plan to dump diamonds from the De Beers field onto the market to lower prices, started buying up shares of Barnato's company, eventually positioning himself to take over the entire Kimberley Mine. When Barnato realized he had been bested, a consolation deal gave him a lifetime appointment in the newly formed De Beers Consolidated Mines; his tenure ended after less than ten years when he either fell or jumped off a ship headed for home in 1897.

Rhodes easily acquired the rest of the mine. By 1889, De Beers controlled at least 90 percent of world output, but Rhodes took the lessons of history a step further. Although production had been managed successfully through centralized authority in both India and Brazil, Rhodes pushed for central control not just of production but also of marketing and sales. This he would accomplish in several steps, the first of which was to establish the Diamond Pool Committee consisting of about ten firms of dealers in London, three of which were major shareholders in De Beers Consolidated Mining. The group put together packaged boxes of assorted-quality unpolished goods ("rough") to be sold at fixed prices. There are remarkable similarities between the operations of the Diamond Pool Committee and those of the contemporary Diamond Trading Company; the latter now holds London "sights" where about 60 percent of the available global rough is packaged and then distributed to a special group of invited clients, called "sightholders," who process the rough at set prices.

De Beers survived Rhodes's death in 1920. Through a series of property acquisitions and cross-holding arrangements, a major interest was acquired by Sir Ernest Oppenheimer's Anglo-American Corporation. By 1929, Oppenheimer was made chairman of De Beers. The next year, in extending Rhodes's strategy of forward integration, Oppenheimer hired the N. W. Ayer Company to develop a marketing campaign in the United States.

Sir Ernest, who died in 1957, was succeeded by his son, Harry Oppenheimer. Harry served as chairman of Anglo-American Corporation and of De Beers Consolidated Mines until he retired from those positions in 1982 and 1984, respectively. Harry's son, Nicky Oppenheimer, became deputy chairman of Anglo-American in 1983 and chairman of De Beers in 1998. And Harry's grandson Jonathan held various other executive positions until the family sold its stake in De Beers in 2011 (Antwerp Facets Online 2011).[8] Such family dynasties are not unusual in the diamond industry. The nepotism seen within the Oppenheimer family in the management of De Beers is reiterated at every

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level of the industry, around the globe. As a form of "kinship capitalism," families and close friends employ one another in this business because trust is an absolute necessity (Shield 2002).

Loyalties and common goals have kept the network, sometimes referred to pejoratively as a "syndicate," together for over a century, though changes in production, the global economy, and the efforts of a few individuals outside of De Beers are testing the resilience of the long-standing industry architecture. The growth of a significant polishing industry in India, the discovery of diamonds in Australia and Canada, loss of control over Russian goods, threat of damage to demand by public relations campaigns against blood diamonds, in addition to minor threats to the industry levied by the Clean Diamonds Act and even the PATRIOT Act, have together pushed De Beers to develop strategies such as privatization, "supplier of choice" sight protocols, brand-name marketing, and a partnership with LVMH (an investment group founded as a result of the 1987 merger of Louis Vuitton and Moët Hennessy, which seeks world leadership in branded luxury goods). Still, when I asked a Forty-seventh Street retailer to describe the relationship of De Beers to the overall industry in light of these changes, he just laughed: "My dear, De Beers IS the diamond industry."

Pure Carbon

> Diamonds are some kind of crystallized mineral, something that is black. Which is weird, because they are clear!
> —Dana, diamond consumer

People sometimes incorporate what they know about production into their attitudes about commodities. But what are the basic steps in diamond production? Where do they come from? What are they, even? Comprised of pure carbon, diamond's chemical formula is simply "C." But graphite, also pure carbon, is the stuff of soft, gray pencil lead. Graphite atoms share only one valence electron (rather than four); they

share that one valence electron with only three of their closest neighbors (rather than four), and in sheets (rather than in all directions). The single electron skips from one neighbor to the next to the next in cycles, in essence time sharing with each of its neighbors. Though each sheet is very strong, there are no strong attachments between sheets. When one is writing with a pencil, the sheets slide off one by one as pressure is applied. Since extreme heat and pressure can change electron bonds, graphite can be transformed into diamond (and vice versa).

A third version of pure carbon, lonsdaleite, is a rare configuration associated with meteor impacts. What makes diamond unlike its pure-carbon cognates in both appearance and behavior is its molecular configuration.

The atomic number for carbon in the periodic table is 6, meaning that each atom has six protons and six electrons. Protons in the nucleus have a charge that keeps electrons in orbit and allows them to interact with other atoms. Four of carbon's six electrons follow an orbit in which they are chemically interactive ("valence electrons"), while the remaining two are inactive; there is "space" for an additional four electrons from neighboring atoms in the orbit. So, carbon has four "valence electrons" (electrons in a position to interact with other atoms). The shell of the carbon atom's orbit is ideally balanced with ten electrons, so each atom has "space" for four additional electrons in addition to the six already there. In diamond, the nucleus is surrounded by a full complement of ten electrons: two inactive and eight valence electrons (four of its own, plus four shared from neighboring atoms). Diamond is exceptionally durable because of its "covalent bond" or "shared-electron" bond, meaning that electrons are shared between adjacent atoms—the strongest possible form of attachment.

A few people I interviewed were not only familiar with diamond's atomic structure but used this knowledge to interpret them. Ian, a well-educated writer in his thirties, did this when he explained his policy on engagement rings. The problem, he said, is that individualized creativity and spontaneity are essential ingredients in personal expressions of

emotion, such as love or caring, which is inconsistent with the unbending regularity of carbon atoms. Ian said,

> Diamonds are impersonal. They are about as impersonal as you can get! I mean you go and give some Hasidic Jew guy up on Forty-seventh Street like thousands of dollars to justify an idea of emotional permanence. But seriously, what can be more impersonal than carbon atoms lined up just exactly so and totally standardized like stiff little soldiers? And it's all so cold and rational. I value poems and personal creativity much more. Like having people over to play music or sing or just entertaining yourself based on your own merit and imagination. This is more personal. That's what I mean by personal I guess, and I think it's a lot more gratifying.

It is not only diamond's atomic arrangement that is striking. Carbon is a fundamental building block of life, and its role in making and sustaining life can mirror kinship when diamonds are handed down through generations. Margalit, a married woman in her thirties who wears a family diamond, explained,

> Diamonds are made from carbon, I know that, and carbon is everywhere, so the carbon is recycled . . . just like life is recycled, and so it's like when my husband gave me his grandmother's ring . . . we had it reset, but still it's like a continuation in the family. I mean I am not really that into diamonds, but I am into my husband and I love being a part of his family so this is like making a chain. You know, it's all ashes to ashes.

This "ashes to ashes" concept is salient to a broad audience; Life Gem, a company that manufactures diamonds out of carbon-rich cremation remains (pets and people), has been in business for over a decade.

While taking atomic chemistry into consideration is somewhat unusual, interpretation based on diamonds' more apparent features is not. Everyone knows they are hard and transparent, but sometimes other qualities—durability, color, refraction, luminescence, and

conductivity—figure into creative readings. Durability might, for example, be read as "stability."

Extraordinary Features

Diamond mineral has some extraordinary features. It is extremely hard, measuring a ten—the highest—on the Mohs Scale of Hardness, a scientific scale of mineral hardness. A good gemstone is hard for practical reasons. Hardness makes it durable, resisting chipping under knocks and pressures, but one thing to keep in mind is that hardness is not necessarily a good indication of durability because minerals can fracture along cleavage planes. Diamonds are cleavable in four directions, and while cutters preparing gemstones can take advantage of these planes, this quality also makes them brittle.

Some minerals, like opal, are durable but not very hard; using opal for dinner jewelry, where it is less likely to get rough use, is consistent with its vulnerable status. The covalently bonded diamond, however, is perfect for everyday wear, as are other hard and durable minerals like ruby, sapphire, and emerald.

Stephanie, a 37-year-old massage therapist and Iyengar yoga teacher, interprets diamonds' pure carbon and hardness as representing simplicity and marital stability:

> A diamond is like the essence of something and this essence is reflected in the context. . . . Simplicity is part of the whole transaction of meaning because a diamond is pithy essence; it is beautiful and long lasting. It endures anything. Like marriage is supposed to. Of course I know that diamonds can become chipped or crack, but they are so hard, and they basically endure. They can scratch glass, and this hardness is communicated in the stone and it means essence. It means endurance.

And this meaning of "endurance" is key to representing a relationship with her husband, Charles.

Diamonds reflect light, "twinkling" and "shimmering"—what scientists call "refraction." The "refractive index" measures the extent to which light is slowed and bent when it enters and passes through something. Transparent, dense structures, like diamond, have high refractive indices. Cut diamonds twinkle and shimmer because light bounces around inside the stone before flickering out the top. As with its purity, high durability, and density, the refractive index of diamond is exceptional. The degree of refraction, which is correlated to the wavelength of light used to measure it, is different at the extreme poles of the visible light spectrum (red and violet). When well-cut diamonds are placed under a halogen light, as in most jewelry stores, light is highly refracted, separating into a prism. That wavelength of light creates a high "coefficient of dispersion," causing the diamond not only to sparkle but to emit tiny colorful rainbows, an effect known as "fire."

While I did not hear consumers using scientific jargon, they routinely referred to "sparkle" and "fire." Renee, a 34-year-old former stockbroker turned housewife, argued that "diamonds are the best out of all the gems, of all the precious stones, because they are the most sparkly. None of the other gems catch the light the way that diamonds do. I think that I like the pizzazz, the 'Hey, look at me!' factor, because they really draw the eye. Diamonds cry out!"

Imitation or "simulated" diamonds made out of glass, Moissanite, and cubic zirconia can have even higher coefficients of dispersion than diamond, making them look fake; the fire in simulated diamonds crackles neon, with lime greens, lavenders, and pinks rather than shamrock greens, violets, and reds.[9] Synthetic lab-made diamond, although it tends to have coloring and atomic regularity not present in a random sampling of natural stone, is chemical diamond and will behave just like the natural version (and the use of synthetics for industrial purposes reflects this).

Even though Renee and others find diamonds beautiful, and judge beauty by the degree of sparkle and glitter, their aesthetic appeal is far from universal. Glitter can be seen positively, as "festive," "flirty,"

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"attractive," "pretty," and "exciting," or negatively, as "calling too much attention to itself," "teasing," or being "too showy."

Daphne, a visiting nurse in her late forties, detests "sparkling," as she explained in her story about a large, fiery stone she inherited from her mother:

> Diamonds tease—they twinkle at you, they call you, they seduce you, but then there is nothing there. To me that is one of the fascinating things about diamonds. You know, my mother gave me this stone—it's almost three carats—I don't know what the quality is or anything but I would never wear something like this. It's gaudy . . . and diamonds are just not me. I don't like the way that they wink and twink and call you, and then they are empty. I mean you look in there and it's like a well that could suck you in, and you would never come back. . . . That teasing seductive quality is what comes to my mind. I ask people about them sometimes—you know I am a nurse and so I handle people's hands and stuff. Man, they never take them off! And so it's a way to relax them and pass the time. I'll say, "Oh that's a real pretty ring" or "That's a real nice necklace," and they usually talk about who gave it to them or when they got it or something. Some people get more technical I guess, but the main thing I notice is that people are really into these things. . . . Not me, though, like I said, they remind me of a black hole. Diamonds are all talk.

Daphne's views are balanced by Laura's: "Diamonds are just so beautiful, with their clean lines. So bright. So glittery. I just look at them, and I am like, 'Wow! I want that!'" And the clear ones sparkle best, but they are the exception. Although most commercial stones look clear, they come in every hue—most natural stones are somewhere between yellow and brown, but they can be red, orange, pink, green, blue, yellow, gray, and even black or white. Covalences are imperfect, and "purity" is statistical—coloration is caused by impurities or structural irregularity. Impurities are elements captured within the crystal as it forms, most commonly nitrogen, although other substances such as boron are occasionally

present. Impurities absorb certain wavelengths of light, giving the stone a shade. Nitrogen, for example, provokes the absorption of violet, blue, and green wavelengths, causing a diamond to look yellow. Boron results in green, yellow, orange, and red absorption, producing a blue tint. The mechanics of diamond coloration for white, red, pink, orange, and some shades of green remain poorly understood.

But impurity or irregularity can have other effects as well. Once in a while, you might see diamonds flashing across the room in a nightclub lit with black lights; this is no optical illusion. They "luminesce," emitting light in response to energetic excitation. Objects that stop emitting light once the light source is removed are called "fluorescent." About a third of diamonds fluoresce under ultraviolet light, flickering across the room, but some "phosphoresce," continuing to glow even after the light source is removed, like "glow-in-the-dark" stars. Luminescence does not change basic color, but it can affect appearance by brightening a yellowish gem or causing a clear stone to look greasy.

Glowing or not, diamonds are excellent thermal conductors and poor electrical conductors, making them good candidates for high-tech computer and spacecraft applications. Diamond's conductivity, in addition to its durability and hardness, make it an industrial tool unequaled by any other. Conductivity causes diamond to feel cold when touched to the lips. Could this sensation, in addition to its resemblance to a tiny chunk of frozen water, explain why it is known as "ice"?

Squished Dinosaurs

The term "diamond" has its roots in the Greek word "*adamas*," meaning "invincible" or "unbreakable," which might explain how it came to be used as a warrior's talisman. But, like love, diamond can chip, break, or crack into thousands of tiny splinters. It can also burn, and at 4,289 degrees Celsius, it evaporates, leaving nothing behind but a puff of gas. Deep underground and during their treacherous voyage to the surface, diamonds can be damaged, melted, or transformed into graphite by

volcanic processes. Seen in this light, the miracle of any single stone making it to the surface is an event worth celebrating.

The general knowledge that carbon, heat, and pressure are involved in diamond formation is reflected in statements such as, "Diamonds are made from carbon that has been subjected to extreme heat under great pressure over long periods of time"; some people believe them to be "thousands" or "millions" of years old. Brooke, a real estate broker, explained, "Well, I know that diamonds are formed in faults and it's some kind of process having to do with layers of the earth in South America. I know that there are not many diamonds here, but my perception is that they come from South America in vitamin-rich soil." Rosetta told me, "Well, this is probably wrong, but I think it is compressed carbon that has been under weight for a long time. I don't know if it needs heat or not but I know it's way down there, and I, well, I think somehow it gets really hot or something. Um, something about crystals? I have no idea!"

Apart from having just a little familiarity with the way they are formed, mined, or produced, most people feel little need to learn more. In my research, when people were knowledgeable about diamonds, they at times considered that information. Stephanie discussed diamond formation in a way that shows that her knowledge of the physical process enhances the significance of her diamond for her:

> The intense forces that formed it—all that heat and pressure and energy and the live things of the earth like the trees are compressed by nature miles and miles under the ground—into this one beautiful sparkling diamond. So I mean it's all about me and Charles being a part of the whole natural process, part of the whole intense, amazing, cosmic cycle of existence.

When I asked Renee what she knew about diamond formation she just laughed, "Well, I know that they are made of squished dinosaurs. . . ." And while science puts most diamond at about three billion years old,

much older than even the oldest of dinosaurs, they are indeed made of the same omnipresent material that constitutes life: carbon.

The eruptions that brought diamonds to the surface took place millions of years ago, but when the kimberlitic lava cooled, it formed bluish, carrot-shaped rock deposits that sometimes contain diamonds. These pipes are deep, but narrow. The surface area of the Orapa pipe in South Africa, one of the largest in the world, covers only 262 acres.

Kimberlite deposits are rare, and few are diamondiferous. Kimberlitic eruptions occur only on very old, deep continental plates called "archons."[10] Sometimes the lava brings diamonds to the surface, along with other rocks and minerals. Magma conditions underneath archons contribute to diamond formation, so prospecting begins by locating diamond-friendly archonic or protonic plates in areas such as southern Africa, Russia, and Canada. Protons, dated at 1.6–2.5 billion years, are unlikely to contain kimberlite pipes, but may have diamondiferous lamproite pipes, as in the Australian Argyle pipe. Tectons, dated at eight hundred million to 1.6 billion years, are unlikely to contain kimberlite or lamproite pipes.

Diamond formation requires very specific mantle temperature and pressure. The range of temperature and pressure within which diamond is formed and sustained is known as the "diamond stability field." Below a certain threshold, carbon forms graphite; above it, diamonds melt. Ideal conditions are a depth of two hundred kilometers and one thousand degrees Celsius, with a pressure of fifty kilobars. There are various types of mantle rock, and some, such as harzburgite and ecologite, are potentially diamond forming. Finding "indicator minerals" such as chromium-rich garnets, associated with those types of mantle rock, is one way to locate pipes.[11] When a pipe reaches the surface, the material explodes outward. Erosion pushes materials back towards the top of the pipe, or away from it, spreading them over a very large area. Erosion can even carry the diamonds out to sea, creating high-quality offshore marine deposits.

While diamonds are produced in about twenty countries, people have varying degrees of knowledge about where they come from. Rosetta, an educated thirty-something, guessed, "Diamonds are from Africa, but I don't know which countries, maybe like Congo or South Africa, or maybe just in South Africa where the market is, and maybe some other places, but I have no idea." Sandy, although extremely well informed about polished gems, knew little about the origins of rough: "Diamonds come from the earth, I mean they are rocks, right? I think they come from Africa and India, but mainly Africa and California."

Marketing that promotes an ideology of scarcity has been successful. People routinely insist that diamonds are "very rare," sometimes to justify price, but how scarce are they? Acquiring accurate statistics on production is difficult due to a combination of industry secrecy, inconsistent reporting techniques, and underreporting of black-market trade. Some underreporting results from a desire to avoid taxation, while overly optimistic numbers encourage investment by creating an impression of mine viability. Nevertheless, the idea that diamonds are scarce is troubled by the fact that global production from antiquity through 2005 is estimated at 4.5 billion carats, valued in the neighborhood of $300 billion, with an average per-carat value of just $67 (Hart 2001). In 2011, miners produced more than 120 million carats of rough diamonds, valued at $15 billion; once out of the ground, the rough moved through the pipeline with a resulting retail value of $71 billion (Bain & Co. 2012a).

On the other hand, it is tricky and expensive to mine and process diamonds. The diamond-to-overburden ("overburden" refers to all the ground-extracted stone) ratio in profitable mines is less than six carats of rough per ton (Janse 2007). Mine viability is contingent upon quality: a site producing few but good-quality diamonds may be more viable than one regularly producing lots of tiny, poor-quality stones. Most rough, upwards of about 80 percent, is "bort," which sells for as little as a few dollars per carat. The monetary worth of diamonds from jewelry and

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investment-grade stones far exceeds that of bort, which makes mining diamonds economically feasible.

Top diamond-producing countries include Botswana, Russia, Canada, South Africa, Angola, Namibia, Congo, Australia, Lesotho, China, Guinea, and Sierra Leone, with Botswana being the world's largest producer by far. There is no commercial diamond mine in the United States, although the Crater of Diamonds State Park in Arkansas might produce a few hundred carats in a good a year, which means that almost all of the diamond consumed in the United States is imported. Botswana, through Debswana, a joint venture with De Beers, is an exceptionally important producer, contributing around a fifth of total global production.[12] According to estimates, Botswana produces around twenty million carats per year; diamond has fueled Botswana's economic expansion and currently accounts for about 70 percent of export earnings.

Diamonds are Botswana's greatest mineral asset and represent its biggest revenue stream, so market fluctuations can be threatening.

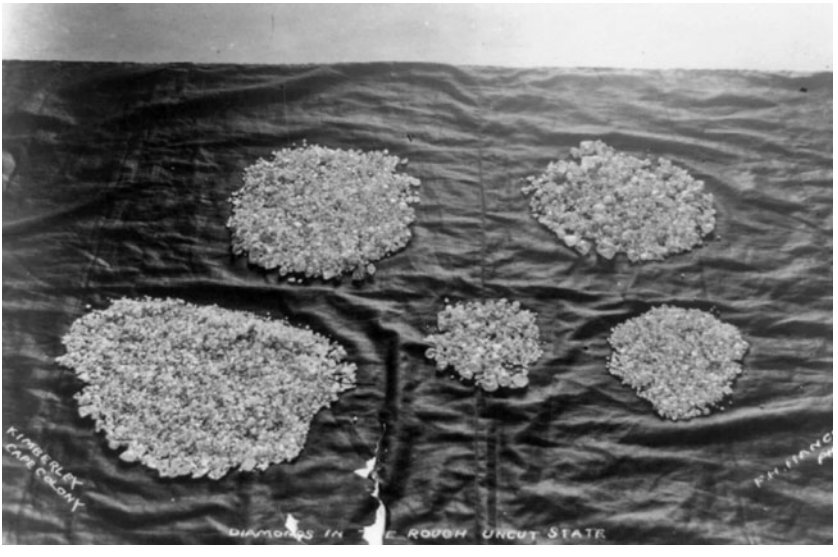

Figure 1.1. Uncut diamonds gathered by five different mines in two days, Kimberley, South Africa. (Photo by F. H. Hancox between ca. 1900 and 1923. Public Domain image Courtesy of the Library of Congress.)

The next two highest-producing states, Russia and Canada, are less dependent than Botswana on diamonds for crucial revenue, and rely less on De Beers for knowledge and market access. Their governments are less imbricated in the De Beers empire and consequently can leverage products outside of the De Beers pipeline. And other viable outside markets are emerging: Robert Wake-Walker, a former employee willing to speak out publicly against De Beers, started his own company, WWW International Diamond Consultants, which trades Russian and Canadian rough (Hart 2002). Another figure in sales outside of De Beers is former De Beers sightholder Lev Leviev, whose strong political connections and business partnerships in Russia, the Middle East, and Africa allow him to trade successfully. Leviev, like other moguls, is rich, connected, and depicted in mainstream press as unusual, charismatic, and mysterious.

Low-quality/high-quantity quantities of rough ("packages") can move without help from De Beers. For example, although occasionally producing valuable pink gems, Rio Tinto's Argyle mine in Australia sells many small brownish stones directly to polishers and dealers in India and Antwerp. Argyle can be profitable partly because of the growth of the Indian cutting industry, in which low-paid workers, who are sometimes very young with good eyes, take small, near-gem rough that would once be considered industrial grade and transform it into gemstone.

Extraction

I asked Henry, a film critic in his early forties, if he knew how diamonds are mined. He replied (in terms befitting a film buff),

> Diamond is a lot like other rocks, granite or cobalt or even chalk and limestone, so you mine it. I can picture it, like gold or coal miners, like those photographs of Sebastião Salgado—he has these photographs of miners in Africa or wherever, and it's heavy chiaroscuro, all black and

> white, massive pits filled with workers, so many workers that it is like an abstract painting, very odd . . . and they take place in various African nations. Diamond mining, it's like that.

Others also described coal-mining-type scenarios, but there are actually several types of diamond mining: open-pit and block mining, alluvial and river digging, and marine extraction (both from the sea floor as well as from on-shore terraces or beachfront). Although the early South African rush was characterized by thousands of workers hauling diamond, ground, water, and each other out of the pits, miners in today's heavily automated mines almost never come into direct contact with ore. And, besides, miners are now mostly wage laborers, rarely stakeholders in the claim.

Open-pit mines are on the surface where the kimberlite ore is dynamited into chunks, then chewed by machinery into smaller, more manageable pieces from which diamonds are extracted. Jwaneng, in Botswana, is the world's most valuable open-pit mine, with a recovery ratio of 1.25 carats per ton of ore. Block mining, similar to coal mining in that it is underground, is used when open-pit mines become too deep or unwieldy. But unlike coal veins, diamonds are scattered throughout the ore, and the "tunnels" are huge theaters where trucks remove overburden by the ton. When open pits become too deep to profitably manage, some companies resort to block cutting, where long shafts are sunk parallel to the mine and then horizontal shafts dug under the exposed pipe. Workers dynamite the roof and let the debris fall, collecting it and ferrying it to the surface for crushing. Enormous amounts of ground, or "overburden," need to be processed just to recover a few grams of diamond.

The same exploitative working conditions that plague coal industries, however, characterize many, but not all, diamond mines.[13] In marine mining, giant tankers literally suck and sift diamond-studded sands from the ocean floor. Since sea diamonds have passed the tests of erosion, they tend to be of very high quality. Here, as with other types of

corporate mining, workers almost never come into direct contact with diamondiferous materials.

Ideas about the working conditions of diamond production shape people's opinions of the industry and the politics of consumption. Tom, in his early thirties, works in publishing. When discussing whether men should wear diamonds, he went so far as to suggest, somewhat provocatively, "Well, the only men, or people, that should wear diamonds are black South Africans. They work to get them out of the ground, so they deserve to wear them. I mean they might get one for their birthday or maybe never. I don't know if they ever keep a few or not—but they should." Luke, a computer technician, also worries about working conditions in his critique of rappers wearing "ice." Political messages in rap are, he said,

> very inconsistent, in terms of race, in terms of violence, in terms of the objectification of women and things like that, they are all over the place, and, I mean, how can you talk about progressive politics and then wear those obscene diamonds and still have the gall to be confronted with the realities of the South African diamond trade? It just doesn't make any sense.

Luke and Tom, who spoke explicitly in favor of purchasing diamonds for women, say that we all have a responsibility to be aware of the realities of production. However, in keeping with the basic inconsistency of human behavior in relation to stated norms, knowledge, and values, an awareness of poor working conditions in diamond mines does not necessarily translate into a change in desire. This same dynamic has been demonstrated for many goods.

Sights

After rough is extracted, acid-cleaned, and sorted into categories based on color, size, quality, and cutability, De Beers sells them in Diamond

Trading Company (DTC) "sights." Prior to each event, "sightholders" advise the DTC, through their brokers, about what kinds of goods they want. DTC then prepares and prices client boxes. When clients arrive, they, along with their broker, are escorted into a room to examine the contents. This is an all-or-nothing affair: boxes can be accepted or rejected, but if rejected, the client risks losing his future sight invites.

The problem here is that clients want good-quality stones that will not lose volume in the cutting process, but since De Beers must sell off all its rough, not just the desirable pieces, boxes can contain a mix of goods. Edward Epstein (1982b, 1982c) explains how clients have historically been rewarded for good behavior with the inclusion of specials, large diamonds at a discount, while others might receive junk, small, poorer-quality rock that is hard to polish or will lose significant weight in cutting, if they fail to meet De Beers's expectations.

Because the global rough trade is now open to more participants, De Beers has altered the sight system, now called "Supplier of Choice," as part of its broader management strategy. The *Rapaport Report*, which provides information about pricing and industry news, explained that the new Supplier of Choice system has used the tactic of branding to reduce the number of sightholders who must participate in "adding value" (Rapaport 2004). According to De Beers, sights are allotted on the basis of financial standing, market position, distribution abilities, marketing strength, technical and manufacturing ability, and compliance with the DTC's Best Practice Principles (maintaining, through proper disclosure, consumer and trade confidence against the increasing threat of synthetics and treatments). These new protocols have the effect of both increasing the net promotion of diamonds and passing off marketing costs to retailers.

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Processing Rough

Diamonds are cut with strong machines. I know they are really hard so I guess they are cut with steel machines or something.
—Dana, diamond consumer

The early use of diamond in men's fashion in India and Greece was accompanied by an unexplained taboo against polishing. But when diamonds were introduced to Europe, the taboo fell away and by the fourteenth century, a lively cutting center had been established in Antwerp. Diamonds were scarce then, under sumptuary law, and used only to complement other gems and semiprecious stones. Technology was to change all of this. Cutters found that shearing off a facet, using a technique called "cleaving," opened the diamond to light. Cleavers rubbed one stone against another to make a narrow channel called a "kerf." To cleave the stone, a flat-edged knife was inserted into the kerf, then

Figure 1.2. Diamond cutting on lathes in Jewish factories in Palestine on Plain of Sharon and along the coast to Haifa. (Tel Aviv. Diamond works, March 1939. Public Domain image Courtesy of the Library of Congress.)

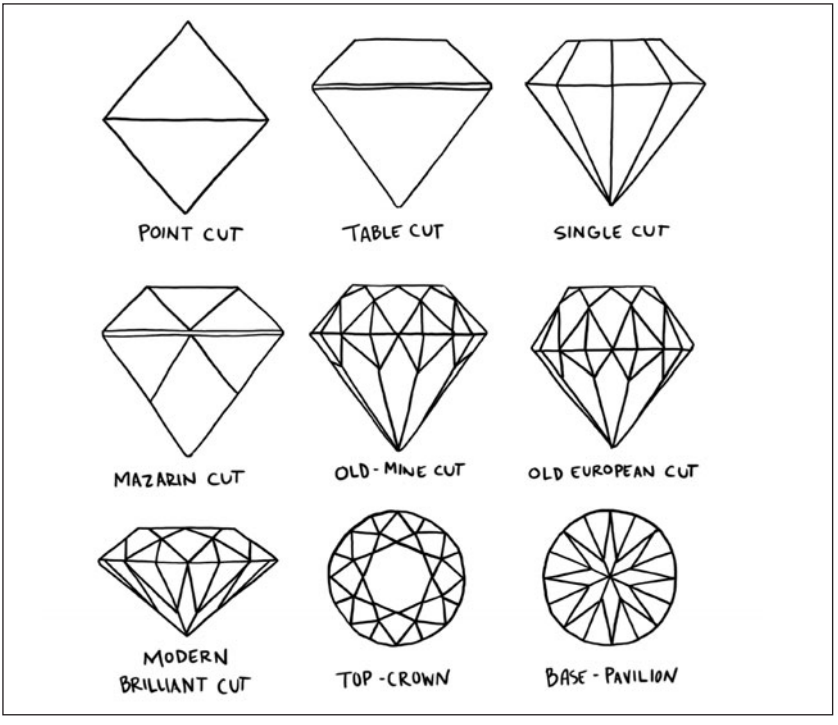

Figure 1.3. Early cuts. Early forms of diamond cutting started with the point, which emulates the point of a natural octahedron, and then developed through the table, rose, and early brilliant cuts. The light reflected by a cut diamond depends upon the number, angle, and placement of facets. (Illustration by Kay Wolfersperger, used by permission.)

carefully tapped. If all went well, the diamond split cleanly. Because they can easily shatter, cleaving diamonds that contain a "gletz" (or fracture), "knot" (a small diamond within a diamond), or "cloud" (area with tiny bubble-like inclusions) is also risky. Cleaving requires tremendous skill and patience, and it remains an expedient way to open up a diamond. As an art, though, the practice of cleaving was threatened by the invention of the saw.

Lodewyk van Berken invented the faceting "scaif" in the late fifteenth century. The scaif, a predecessor to the saw, is a polishing wheel impregnated with a mixture of oil and diamond dust. Stones, cemented in a little cup-like dop, are held against a spinning wheel until the desired

area is ground away. The result was that facets reflected light in new ways, and cutters competed to learn scaifing, enhancing Antwerp's status as the preeminent cutting center. And diamonds began to appear more frequently in European regalia during this era; Charles the Bold, Duke of Normandy, became the patron of Van Berken and commissioned him to cut a 137-carat diamond, which became known as the Florentine (Epstein 1982c:102).

It was not until the twentieth century, however, that the saw, a circular blade coated with diamond dust and oil, freed cutters from having to shape along naturally occurring cleavage lines. Sawing is more expensive than cleaving (about one-tenth of a carat of dust is required to saw through a carat of diamond) and more time consuming (it can take days to saw through a moderately sized stone) but is easier to master and allows cutters to lop off bulges or salvage misshapen or twisted stones that cannot be cleaved, or perhaps only cleaved with great talent. In the early 1960s, a De Beers subsidiary introduced the Pieromatic diamond-cutting machine in Antwerp, and, although it still required trained workers, the Pieromatic greatly reduced the need for master craftsmen or even long apprenticeships since, according to the literature accompanying the Pieromatic machine, men could be trained to operate it in a matter of months (Epstein 1982c:104).

As with the decline of skilled artisanship in other fields (Sennet 2008), the small cutting trade in New York is getting even smaller. Jake, a skilled old-school cutter, lamented that "cutting is a dying art in New York. It takes years and years of apprenticing and these kids today don't want to do that, so I don't know what's gonna happen. You can get a setting that looks OK but the real craftsmanship is dying out. We're a dying breed!" By contrast, the mechanized Indian industry, employing hundreds of thousands of people, specializes in producing small, cheap goods. These usually brownish, tiny stones can at times only carry a few facets, although amazingly, through the use of new technology, even the "larger" Indian goods of one point are polished with the full fifty-eight facets. As the Indian industry gains momentum, factories vie for rough. The

expansion of small-goods production means that mines producing low-quality rough can now be run economically. Though the cuts are inferior and the stones are junky, making millions of these every year generates enormous profits, and the Indian diamond business is booming.

New mining and cutting technologies, changing geographies of labor, modern taxation schedules, war, the end of apartheid, entrepreneurship by outsiders like Leviev, and the discovery of diamonds in Australia, Russia, and Canada have all impacted the transformation of rock into gem, otherwise understood as the production of value. With these seismic changes taking place, producers must redouble efforts to secure demand by managing the cultural construction of the diamond. This is achieved by deploying a grading system and powerful marketing narratives, both explored in the following chapters.