

AN ERA OF SWEEPING CHANGE IN DIAMOND AND COLORED STONE PRODUCTION AND MARKETS

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The diamond, colored stone, and pearl businesses have witnessed unprecedented change since the turn of the 21st century. Not only have new markets for gems emerged around the world, but channels of distribution have also changed dramatically as a result of economic forces and political pressures. De Beers abandoned its single-channel seller role, which created—for the first time in over a century—a competitive rough diamond market. Political problems in Madagascar and a ban on gem exports from Myanmar disrupted supply channels for sapphire and ruby. And the proliferation of new sales avenues, through the Internet and TV, has given consumers much more information about gems and forever changed the way they buy them. The use of gems to subsidize bloody conflicts and repressive regimes has moved the trades to become more accountable, as concerns over terrorism and illicit trading have created a new legal environment. At the same time, a new class of consumers who value ethically, socially, and environmentally friendly products are making their demands known in the gemstone business.

The last decade was bookended by its two defining events: the September 11, 2001, terrorist attacks on the U.S and the world financial crisis that struck in September 2008. The 2001 attacks, which were followed by a terror attack on the Indian parliament in December, brought far-reaching international reviews of financial and security activities, while the crisis of 2008 placed much of the world's financial institutions in jeopardy. In between, however, the decade saw substantial increases in wealth, both in most developed nations and in some developing nations, particularly India and China.

For the diamond industry, this article will address the radical transformation it underwent on many levels during the last 10 years. The most significant event was the dissolution of the once tightly

controlled rough distribution channel into a more competitive market. In addition, producing nations, particularly in Africa, moved to derive greater economic benefits from their diamonds (figure 1). And social and political issues, from the Kimberley Process to anti-terrorist legislation, became a critical part of doing business, as the industry was subjected to close scrutiny from various government and law-enforcement agencies around the world.

The traditional art of diamond cutting also was revolutionized by technology, which brought new cuts and greater demand for precision cuts. In diamond retailing, the Internet became the fastest-growing sector in the U.S., while India and China became important consumer markets.

The colored gemstone industry also witnessed significant changes. It saw an evolution in the way gems are mined and the manner in which they are then distributed through the supply chain. The development of large-scale mining operations for colored gems has been in the news for the entire decade (Robertson, 2009). Nevertheless, it is believed

See end of article for About the Authors and Acknowledgments.
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Figure 1. Some of the most important developments of the decade were in the way rough diamonds were distributed and the efforts of producing countries to gain greater economic benefits from their deposits. These rough diamonds are all ~1 ct in weight. GIA Collection no. 24648; photo by R. Weldon.

that about 80% of the world's supply of colored gems still come from small-scale artisanal miners (Michelou, 2010; figure 2).

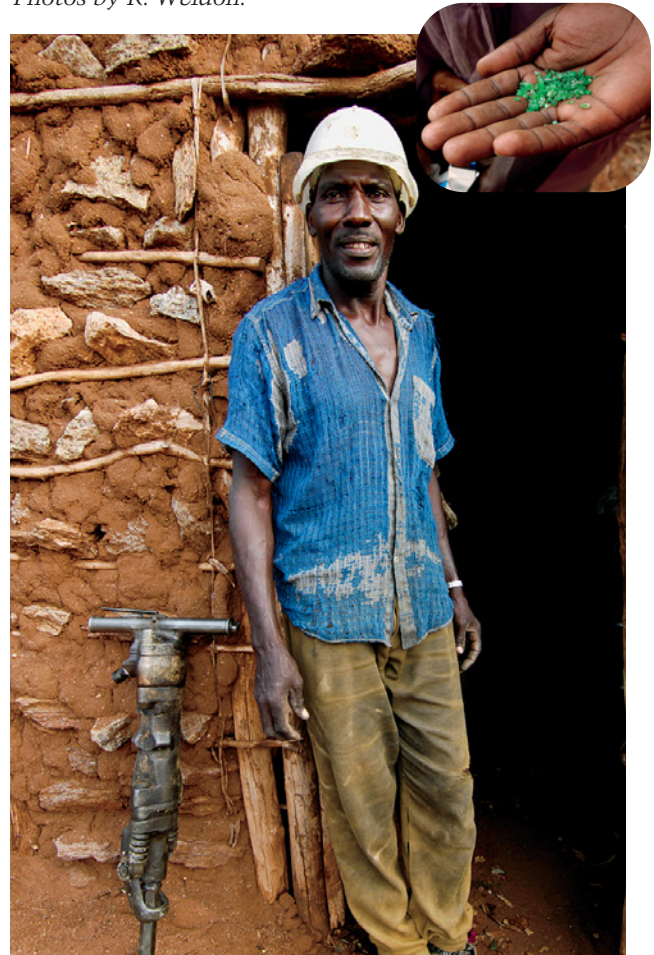
The financial crisis at the end of the decade forced major cutbacks in diamond mining and prompted industry banks to re-evaluate long-accepted credit practices, with the result that supplies and distribution began changing in ways that still have not fully played out. Colored stone mining and cultured pearl farming also experienced severe cutbacks, while prices and demand grew increasingly volatile.

PRODUCERS

Diamond—From Supplier of Choice to Multiple Suppliers. De Beers. In 2000, the De Beers Diamond Trading Company (DTC), which then controlled about 64% of the world's rough diamond output by value (Even-Zohar, 2007) and 50% by volume (Shor, 2005), announced an ambitious plan to revamp its 65-year-old sales structure. The initiative was called Supplier of Choice (SOC). The main components were designed to shift the burden of consumer advertising of diamond jewelry onto DTC clients; reset the client selection system to one based on a set of "objective criteria" determined through detailed company profiles; and implement "best practice" policies that required clients to source all of their rough from nonconflict producers, pay fair wages, ensure safe working conditions, and follow ethical trading practices (Shor, 2005; figure 3).

Coinciding with the launch of SOC, the DTC also announced that it would abandon its traditional

Figure 2. Small-scale artisanal miners, such as this tsavorite miner near Voi, in Kenya, are estimated to supply some 80% of the world's gems. Photos by R. Weldon.



role of stockpiling diamonds during periods when demand was reduced or when production from particular sources threatened to destabilize the market. This strategy had consumed considerable cash reserves and generated a great deal of controversy during the 1990s (Even-Zohar, 2007). When the DTC announced Supplier of Choice in 2000, it controlled an enormous rough stockpile, held by corporate parent De Beers, that was valued at more than \$4.8 billion and drawn from all producers in its network (Even-Zohar, 2007). The DTC's overall aim, in addition to freeing itself of the burden of stocking rough diamonds, was to comply with the European Union's regulations regarding anti-competitive activity (Shor, 2005; Even-Zohar, 2007) and more tightly focus marketing and sales efforts on its own production.

While Supplier of Choice was the most significant shift in De Beers's operations, it also embarked on several major changes that affected the rough and, ultimately, polished diamond market. In 2001, De Beers converted from a publicly traded corporation to a privately held company. The main shareholders were Anglo-American Group, 45%; Central Holdings, the Oppenheimer family trust, 45%; and Debswana, the De Beers-Botswana government partnership that operates the country's diamond mines, holding the remaining 10% (Shor, 2005). The deal cost \$18.7 billion, financed mainly through sale of Anglo-American stock. However, the company also borrowed \$3.35 billion from a consortium of banks, which transformed it from one with ready cash reserves to one carrying a significant debt. To pay down this debt, De Beers significantly reduced its workforce and sold the bulk of its diamond stockpile in an orderly fashion during the following two years.

At the same time, De Beers sought (and in late 2002 received) legal approval of its SOC initiatives from the European Commission (EC), which oversees competitive issues in the EU. However, its June 2003 announcement that it would drop one-third of its existing shareholders touched off several lawsuits in the U.S. and Europe from clients claiming they were unfairly removed (Shor, 2005).

De Beers ran into other legal problems in the U.S. A number of class-action suits were filed during the early 2000s, alleging that the company had, over the years, violated anti-trust, unfair competition, and consumer protection laws in order to fix and raise diamond prices. The suits were combined under the jurisdiction of the U.S. District Court of New Jersey



Figure 3. Gareth Penny, outgoing managing director of De Beers Group, was the principal architect of the Supplier of Choice program. Photo by R. Weldon.

(Diamond Class Action Settlement, 2010). De Beers initially declined to appear, leading to default judgments against it. After launching SOC, and with an aim of returning to the U.S., De Beers eventually negotiated a combined settlement that was approved in April 2008—though it admitted no wrongdoing. Of the total settlement, \$22.5 million would go to “direct” purchasers (DTC clients) between 1997 and 2006, while \$272.5 million would be split by an “indirect purchaser” class, which included diamond wholesalers and retailers—who would divide half that amount—and consumers, who would share the second half. Although the court approved the settlement in August 2008, a number of claimants filed appeals contesting it (Diamond Class Action Settlement, 2010). In July 2010, the U.S. Second Circuit Court of Appeals overturned the settlement, holding that the indirect purchaser class had been improperly certified. Then, in August, a panel of judges from that same court vacated that ruling, primarily on the grounds that both sides had agreed to the settlement, and referred the case to review by the full 15-judge panel of the court. At this writing, the case remains in limbo.

De Beers faced legal challenges from another front: EU approval of Supplier of Choice. Various parties claimed that the company's relationship with Russia's Alrosa, the world's second largest diamond producer, was anti-competitive. Again, De Beers did not contest the challenge; and in 2004 it agreed to gradually scale down its rough diamond purchases from approximately \$1.2 billion yearly, to \$700 million in 2005, and by \$75 million increments thereafter until 2009, with the maximum set at \$275 million (De Beers/ALROSA Trade Agreement, 2004).

By 2008, the last "normal" year before the economic crisis forced major changes in mining operations, the DTC's share of the rough market was down to 42% by value and 29% by volume (Rio Tinto Diamonds, 2008). It had unloaded its diamond stocks and a number of its South African mines, and was making plans to shift the bulk of its operations to Botswana, which had acquired a significant share of the company (Even-Zohar, 2007). Because of the mine closures, De Beers's market share by volume fell to just under 20% in 2009 (24 million carats against a world total of 125 million). The company expected to produce 31 million carats in 2010 and revive to 40 million carats in 2011, compared to 48 million carats in 2007 (Penny, 2010). De Beers announced it would cap production at 40 million carats yearly after 2011 in order to extend the lives of its existing mines.

Beneficiation. The 2000s also saw diamond-producing countries begin to assert more control over the disposition of their resources. The "beneficiation" movement, creating added-value activities such as rough sorting and cutting in producer countries, also forced De Beers and the DTC to greatly restructure operations away from their traditional headquarters on London's Charterhouse Street (Even-Zohar, 2007). Botswana, which produces two-thirds of De Beers's output (De Beers, 2009), used that leverage to create a separate DTC Botswana in 2006. By the following year, it had issued diamond manufacturing licenses to 16 companies—mostly Indian and Israeli—that agreed to establish cutting operations supplied from local production. The government also mandated that much of the sorting from its mines be done locally instead of in London. Both of these actions represented a drastic break from the long-standing DTC policy of integrating production from all of its sources and sorting it at its London headquarters (Even-Zohar, 2007). Still, the DTC for-

malized the process when it appointed these 16 companies sightholders.

Beneficiation efforts have also led to 11 DTC-sightholder manufacturing facilities in Namibia. However, these are supplied from all DTC sources, not just local Namibian production.

South Africa launched similarly ambitious efforts, beginning with amendments to the Diamond Act in November 2005. It also embarked on a plan to promote black businesses under a series of Black Economic Empowerment (BEE) initiatives. The BEE laws required all diamond mining companies, including De Beers, to have a minimum of 26% black equity within five years. The diamond portion of BEE also required that local diamond polishing operations would be offered first refusal for all diamonds mined in the country. The process was supervised by a government-appointed State Diamond Trader, which was mandated to buy up to 10% of the nation's output for resale to cutting operations (Hill, 2008).

The State Diamond Trader's office opened in June 2007 with the professed goal of buying \$140 million worth of rough. While the policy did result in an increase in the number of diamond manufacturing operations in the country (e.g., figure 4), including 19 newly appointed DTC sightholders, the office was never sufficiently funded to purchase more than a tiny fraction of South Africa's rough

Figure 4. A renewed desire for black empowerment and beneficiation took root in the southern African diamond business at the beginning of this century, with the establishment of cutting factories throughout South Africa, Namibia, and Botswana, such as this facility in South Africa. Photo by R. Weldon.





Figure 5. These two pink diamonds (0.51 and 0.55 ct) from the Argyle mine in Australia were part of the 2007 Argyle pink diamonds tender. Photo by R. Weldon.

production. At this writing, it has made little impact on the nation's diamond industry (Creamer, 2009; "South Africa's state diamond trader. . .," 2010).

De Beers also commissioned two new mines in Canada: Snap Lake and Victor. Snap Lake was initially projected to yield 1.4 million carats yearly of primarily smaller diamonds; Victor's production, estimated to be about half of that, was somewhat higher quality. The company appointed three Ontario sight-holders to polish 10% of its locally mined production (Golan, 2010). However, just as the mines became fully operational in the fall of 2008, the market went into a severe decline (Hill, 2009).

Alrosa. After it was required—not without some objections—to scale back its rough sales to the DTC, Russia's Alrosa developed its own client base, which included a number of major DTC sight-holders. Alrosa had acquired a 32.8% interest in Angola's Catoca mine in the early 1990s. Commissioned in 1997, Catoca was producing just over 3 million carats yearly by 2003 (Even-Zohar, 2007) and 6 million carats by 2009, representing about 70% of the country's diamond output (Nyaungwa, 2010). During the economic crisis of 2009, Alrosa began changing its rough sales policy from a DTC-like system of supplying several dozen firms, toward one that allotted much greater quantities to comparatively few major buyers. In 2010, the company announced it would earmark a minimum of \$500 million worth of rough to four Indian companies over the following three years, contracting an additional \$300 million to a consortium of Israeli manufacturers and \$1.4 billion to Russian cutting operations over the same period (Kravitz, 2010; Goldstein, 2010).

Rio Tinto. In 2003, London-based mining giant Rio Tinto opened Canada's second diamond mine, Diavik, with 60% ownership. Rio Tinto had established its own rough diamond sales channel in 1996, when its Argyle operation in Australia ended its sales agreement with the DTC (Shor, 2005). Diavik produced 3.8 million carats in its first year of operation and more than 8 million carats over the following several years (Rio Tinto Diamonds, 2006). Rio Tinto marketed its share and its Argyle production through a sight system similar to the DTC's, though it claimed its pricing would be more flexible than its rival's (Even-Zohar, 2007). The company also adopted a series of sustainable mining initiatives for its own operations and, like De Beers, developed a code of best business practice requirements for its clients. It also helped develop Canada-branded diamond programs in cooperation with local diamond cutting operations (Rio Tinto Diamonds, 2004–05).

Argyle, at its peak, was the world's largest diamond producer by volume, yielding over 40 million carats yearly of predominantly near-gem diamonds during the 1990s. The majority of its cuttable output went to feed the discount diamond jewelry markets (Shor, 2005). As the millennium opened, however, Rio Tinto faced a decision over whether to convert Argyle to an underground mine. The project was estimated to cost \$1 billion, and Rio Tinto studied it for five years before making the decision to go ahead in 2005 (Rio Tinto Diamonds, 2006; Bosshart, 2010). The construction underground and reduction in the open-pit operations cut Argyle's yearly production to some 29 million carats in 2006, 20.5 million in 2007, and 15 million in 2008 (Janse, 2007, 2008, 2009).

Because Argyle produces a significant amount of yellowish brown and brown diamonds (which it calls "Champagne" and "Cognac"), Rio Tinto was a charter member of the Natural Color Diamond Association, through which it promoted the \$150 million worth of those stones it mined each year. Argyle also produces several hundred carats of pink diamonds each year, which it markets at special tender auctions in Geneva, Switzerland (e.g., Rio Tinto Diamonds, 2008; figure 5).

BHP Billiton. Canada's first diamond mine, Ekati, was developed by BHP Billiton during the late 1990s. The company set aside 10% of its production by value, in specific qualities, for local polishing operations (BHP Billiton, 2010). Unlike the DTC or Rio Tinto, BHP markets most of its production, current-

ly \$40–\$50 million monthly, by tender auctions through an Antwerp sales office. While this system has resulted in fluctuating prices, the BHP rough is so competitive that these are regarded by some observers as closest to true market prices (Even-Zohar, 2009).

Other Producers. In the meantime, a number of junior producers developed smaller mines that large firms such as De Beers or Rio Tinto had withdrawn from or declined to exploit. The most significant was the Letšeng-la-Terae mine in the small nation of Lesotho. Originally operated by De Beers in the 1970s, Letšeng closed in 1982 during a major industry slump and remained inactive for almost two decades. In 1999, two South African investment groups, JCI and Matodzi, acquired the property, restarting operations in 2004. In 2006, they sold a controlling interest to Gem Diamonds of South Africa (Gem Diamonds, 2010a).

Soon after, the company unearthed the 603 ct “Lesotho Promise,” the 15th largest diamond ever found. A year later, it came up with the 493 ct Letšeng Legacy (figure 6), which Laurence Graff purchased for \$10 million, as well as several other diamonds weighing over 100 ct. The stream of huge stones continued: In 2008, Letšeng yielded a 478 ct stone that also went to Graff, and in 2010, it

announced a 196 ct diamond that drew estimates of over \$11 million (Gem Diamonds, 2010b). While Letšeng’s production was relatively small—less than 100,000 carats yearly—its average price per carat was nearly \$1,900, compared to an industry average of \$71 (Brough, 2007; Letšeng Diamonds, 2010).

In 2007, Gem Diamonds acquired Australia’s Ellendale mine, the source of about half the fancy yellow diamonds entering the market; and by the end of 2009, it had completed a deal with Tiffany & Co. to supply a collection of fancy yellow diamond jewelry (Allen, 2009; Gem Diamonds, 2010c).

As De Beers sold off some of its older operations in the middle of the decade, Petra Diamonds of South Africa acquired its Cullinan (formerly Premier) and Koffiefontein mines, both in South Africa, and its interest in the Williamson mine of Tanzania. Soon after the Cullinan deal went through (July 2008), Petra recovered a 26 ct stone that was cut to a 7.03 ct Fancy Vivid blue diamond that sold for \$9.4 million (\$1.35 million per carat). In 2009, Petra recovered a 507 ct diamond, which it named the Cullinan Heritage and sold to Hong Kong diamond trader Chow Tai Fook for \$35.3 million, the highest known price ever paid for a rough diamond (Petra Diamonds, 2010).

By the end of 2007, diamond production had climbed to an estimated 168.1 million carats (Kimberley Process, 2008), while prices for top-quality and large stones soared, both on the prospect that an increasingly affluent world would generate greater demand (Shor, 2008b). Events were in the offing, however, that would soon upend these assumptions.

Colored Stones. In 2007, worldwide demand for all colored stones was about \$10 billion, 7% of the total jewelry market according to a 2009 survey (BUZ Consulting, 2009). Broken down further, ruby and sapphire accounted for 30% (\$3 billion) and emerald 12% (\$1.2 billion), with all other gemstones constituting the remainder. The study, completed before the 2008 economic crisis, predicted a 5.2% average annual growth rate in worldwide demand for colored gems through 2020, largely from emerging markets such as India and China that have cultural affinities for gemstones.

New Deposits and New Operations. *Madagascar.* Much of the global gem business for well over three years in the middle of the decade was dominated by Madagascar. This was due in part to the Malagasy

Figure 6. The 493 Letšeng Legacy is one of several 100-ct-plus diamonds recovered from the Letšeng-la-Terae mine in the last few years. Photo courtesy of the Antwerp World Diamond Centre.





Figure 7. Madagascar produces rubies and sapphires of many colors, and production of these and other gems drove the global gemstone market for much of this decade. The orange-pink sapphire in the ring weighs 3.15 ct; the loose stones are 2.11–4.13 ct. Courtesy of Omi Gems, Los Angeles; photo by R. Weldon.

government's decision to liberalize its mining sector (beginning in 2005) and in part to a historic financing scheme sponsored by the World Bank to help develop mining, gemology, and other value-added initiatives in the island nation. Most of the production was in

tourmalines, sapphires (e.g., figure 7), and rubies, but a new gem mineral—pezzottaite—was also introduced. At its peak in 2007, the sector employed close to 100,000 people (Shor and Weldon, 2009).

However, Madagascar's gemstone production suffered a serious setback in 2008, when the country's then-president, Marc Ravalomanana, reversed some of his own liberalization policies by placing a ban on rough gemstone exports. His decision to clamp down followed the export of the 536 kg emerald-in-matrix specimen "Heaven's Gift Emerald," which Ravalomanana claimed had been illegally taken from the country (Yager, 2008). Even though the ban on exports ended in July of 2009, the mining sector in Madagascar failed to get jump-started as a result of the global economic slump.

Myanmar. Production at various Burmese corundum mines slowed considerably in the latter part of the decade, as trade sanctions deterred exports of rough material. The sanctions enacted by the U.S. and EU—among the world's largest consumer markets for gems—cut supplies of Myanmar's ruby and jade in Western markets to virtually nothing. This was particularly true after the U.S. Tom Lantos Block Burmese JADE Act, banning the importation of all ruby and jadeite mined in Myanmar, was signed into law in July 2008. The previous ban, enacted in 2003, did not cover Burmese gems that were cut in a third country. The cumulative sanctions caused Burmese ruby production to drop by an estimated 50% (Shor and Weldon, 2009).

Figure 8. Affluent Chinese consumers are avid collectors of Burmese jadeite, and much of the production of jadeite in Myanmar is exported to China. This upscale jadeite shop in Guangzhou caters to jadeite connoisseurs. Photo by R. Weldon.



Because Myanmar produced an estimated 90% of fine- and commercial-quality ruby, while Madagascar embargoed exports as noted above, supplies of ruby and sapphire slowed greatly. This not only created worldwide shortages of gem corundum, but it also proved devastating to Thailand's gemstone cutting industry (Shor and Weldon, 2009).

One new source of corundum, Winza in Tanzania, began yielding some fine-quality ruby in 2007 (Schwarz et al., 2008), but the quantities produced could not begin to compensate for the loss of Myanmar and Madagascar goods. As supplies of fine and commercial qualities dwindled after 2008, a flood of nongem material entered world markets, especially the U.S., to fill the void. In its natural state, much of this material was infused with a lead-based glass to render it stable and attractive enough for jewelry use. This treated material, which traded for extremely low prices in gem markets, touched off two major controversies: (1) whether it was actually "ruby" (because some material was more filler than ruby, or was assembled from multiple pieces of corundum); and (2) how to describe it, with terms such as *composite*, *filled*, *stabilized*, and *treated* being used (Robertson, 2010). Lack of proper disclosure at retail also created controversy and brought on a number of press reports warning consumers about such stones (Wouters, 2010).

Jadeite jade, an important gem in Chinese culture, continued to be heavily mined in Myanmar. Between June 2009 and June 2010, more than 22,600 metric tons of jade were produced ("Over 10,000 jade lots. . .," 2010), with much of that destined for China (Palagems, 2010; figure 8). Most was sold at official government Myanmar Gems Enterprise gem auctions, though much was also distributed by other means, mainly through illicit smuggling into Thailand.

Other Producers. Colombia remained the major producer of emeralds; about 60% by quantity and 80% by value (Kuri and Ramirez, 2008), but problems in the form of market decline, guerilla activities, and ongoing conflicts with drug cartels led to a precipitous drop in official exports, from a peak of \$452.4 million in 1995 to a reported \$75 million by 2005 (Kuri and Ramirez, 2008). A major new source of fine emeralds called La Pita, located in Colombia's Boyacá Department, was developed in the late 1990s (Fritsch et al., 2002). By mid-decade, La Pita had produced hundreds of thousands of carats—some 40% of the

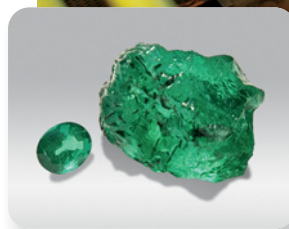


Figure 9. Near Nova Era in Minas Gerais, Brazil, the Belmont mine operates using sophisticated optical sorters and other machinery to ensure an efficient and steady

supply of rough (photo by Eric Welch). In the inset are two emeralds (17.4 g crystal and ~5 ct faceted stone) from the Belmont mine (photo by R. Weldon).

output of Colombian emeralds—as production from other mines in the area slowed (Weldon, 2006).

Brazil witnessed a sustained slump in overall gemstone production, in part due to the enforcement of minimum wage and environmental protection laws. However, its production of emeralds has reportedly increased with the opening of a new mine in the Nova Era region and technological developments at established mines such as the Belmont (ICA, 2006; figure 9). Toward the end of the decade, Pakistan's emeralds became embroiled in controversy over allegations that members of the militant Taliban were forcing residents of the Swat Valley, which had been closed for nearly a decade, to mine the material. It was reported that the proceeds were being used to finance terrorist activities ("Emeralds from Swat Valley. . .," 2009).

The decade also saw the rise in popularity of garnets such as spessartine (e.g., Laurs, 2002b), demantoid (Laurs 2002a; Eddins 2010), and tsavorite (Mayerson and Laurs, 2004), as well as cuprian tourmaline (from Africa), thanks to the discovery of new sources (see, e.g., Laurs et al., 2008).

And as fine ruby gained in price and grew ever scarcer in world markets, red spinel and pink-to-red tourmaline became sought-after alternatives. In



Figure 10. TanzaniteOne, formerly Afgem, is licensed to mine tanzanite at Block C in Merelani, Tanzania. This high-security screen enclosure (designed to prevent theft) guides miners to different shafts at the mine. Photo by R. Weldon.

addition to the traditional spinel sources of Sri Lanka, Pakistan, and Myanmar (spinel, if polished elsewhere, is not included in the sanctions against the country), a new deposit was located in Tanzania in 2005 (Laurs, 2006), while Nigeria developed into an important source for pink tourmaline (Laurs, 2009) following a 1999 discovery in the western part of that country.

Large-Scale Mining Operations. Despite the recent economic downturn, global demand for gems grew over most of the decade. As a result, several corporations have begun large-scale colored stone mining projects in the last 10 years. (By “large-scale,” we mean here that such a company is publicly traded, uses geophysical techniques to identify and analyze suitable deposits, and employs heavy machinery such as backhoes, bulldozers, pneumatic drills or jackhammers, explosives, and trucks to move large quantities of overburden to extract and presort gem materials.) In recent years, large-scale miners have also launched corporate social and environmental responsibility programs.

We review some of the most notable companies here.

Afgem and TanzaniteOne. Merelani, Tanzania, is the world’s sole commercial source for tanzanite. In 2001, South Africa-based Afgem obtained government licensing to mine tanzanite and commenced

operations at Block C in Merelani, which contains several other blocks that are primarily worked by small-scale miners. Afgem soon modeled their production and marketing strategy after De Beers’s historical approach to the diamond business (Weldon, 2001a). It did so by attempting to control output of the rare blue-to-violet gem through their mining operations (figure 10) and by purchasing tanzanite from local producers. Distribution was handled through a series of “sightholders,” or preferred dealers. Its primary aim was to stabilize what had been a highly volatile pricing structure for tanzanite since its discovery in 1967. TanzaniteOne Mining Ltd. acquired Afgem’s business and assets in 2004. Other colors of zoisite, including green (e.g., figure 11) and pink, have been mined in the Merelani area, though production remains sufficiently rare for them to be deemed collector’s stones.

At the height of tanzanite’s popularity, in 2000, it was named a birthstone for the month of December, ascension to a status that ranked it among the world’s most popular gems (Federman, 2006). However, according to *The Guide*, which has monitored the value of tanzanite for several decades, prices dipped during the early-to-mid 2000s. In an extensive report on tanzanite values, Robertson (2006) attributed the dip to a combination of factors, including market saturation in the U.S. He and others also reported on a decline in price for blue sapphires, which provided the buying public with far greater choices when selecting blue stones (Weldon, 2001b). TanzaniteOne has sought to diversify its portfolio of gem offerings, and in 2009 it announced the acquisition of the “Tsavorite Project” from Green Hill Mining Ltd. and

Figure 11. This 8.72 ct green zoisite and 11.30 ct tanzanite are from Merelani, Tanzania. Faceted by Meg Berry, Fallbrook, California; photo by R. Weldon.



Kirkwood Resources Ltd., a license covering a 100 km² area not far from Merelani.

Gemfields. A gemstone exploration and mining company based in London, Gemfields began exploration and small-scale mining of emeralds in Zambia in 2000. In 2008, it was invited to start operations at the Kagem mine in the Kafubu District, historically Zambia's largest source of emeralds, which reportedly produces about 20% of the world's supply (Zwaan et al., 2007; "Acquisition of the Kagem mine," 2008). At the time, heavy financing for emerald promotion came from Pallinghurst Resources, which with other parties became a major shareholder in Gemfields.

Gemfields also holds exploration licenses for emerald, ruby, and sapphire in Madagascar; owns the Kariba amethyst mine in Zambia; and has cutting facilities in Jaipur, India, where it auctions its production. With a view toward furthering its mine-to-market strategy, Pallinghurst has negotiated a 15-year license to use the Fabergé name in its brand-building efforts (Kurian, 2008).

True North Gems. Canada-based True North Gems has been actively exploring and mining for emeralds, rubies (e.g., figure 12), and sapphires for about a decade. Its biggest investment is the Fiskenaasset Ruby Project in Greenland. While the company remains in the exploration phase of its ruby operation in Greenland, it says it has identified some 30 occurrences there. However, none of the material True North has sampled so far has reached the market (Shor and Weldon, 2009).

Cultured Pearl Production. By 2000, pearl producers in Australia, Indonesia, French Polynesia (Tahiti), and China were in the process of breaking the century-long domination of pearl culturing by the Japanese pearl industry (figure 13). The result brought a much more diverse array of products and prices to the pearl market in the first decade of the new century, with Australian South Sea cultured goods at the high end for white pearls and Chinese freshwater cultured pearls, many of which resembled more expensive Japanese akoyas, in very low price points (Shor, 2007). The decade also saw the acceptance into fashion of fancy-colored cultured pearls: "goldens" from the Philippines, and greens and browns from French Polynesia. This broad array of goods was well promoted by large producers such as Paspaley in

Australia, Jewelmex in the Philippines, and Perles de Tahiti, the marketing consortium funded by the Polynesian government and local producers (Shor, 2007).

Even so, from 1999 to 2009 the combined estimated value of the three major groups of saltwater cultured pearls—akoya, South Sea, and Tahitian—decreased from \$489 million to \$367 million. The reasons for this shift were greatly increased production of South Sea (some say overproduction) and Tahitian goods, while akoyas declined (Müller, 2009). An estimated 25 metric tons of white South Sea and black Tahitian cultured pearls were produced in 2009, compared to 8.7 metric tons for both in 1999, at a lower per-pearl value as a result of the global economic downturn at the end of the decade.

Production of Chinese freshwater cultured pearls stabilized at about 1,500–1,600 tons in 2006 (Shor, 2007), but it declined sharply in 2009 to an estimated 1,200 tons as many farms cut back (A. Müller, pers. comm., 2010). While China's cultured pearl production is 20 to 30 times greater than other producers in volume, the percentage of high-quality goods is extremely low, with the result that by mid-decade the total value was only about 20% of the saltwater pearl market (Shepherd, 2007).

Figure 12. True North Gems has performed gem exploration and feasibility studies on various localities in the northern hemisphere. This pink sapphire and ruby sample comes from their Fiskenaasset Ruby Project along the southwest coast of Greenland. Courtesy of True North Gems; photo by R. Weldon.





Figure 13. These two South Sea necklaces typify fine quality in multi-color (inside, 12–15 mm) and white (outside, 11–16 mm) cultured pearls, which were fashionable throughout the decade. Courtesy of Armand Asher Pearls, New York. Photo by R. Weldon.

MARKETING AND DISTRIBUTION

Globalization has affected the gemstone business by making the world “smaller” through enhanced and easier communication by telephone, the Internet, and digital photography—but it has also made it far more complex. New selling channels have emerged. New gem sources have appeared, in some cases confusing established supplies and nomenclature. New treatments, some sophisticated, some deceptively simple, have been introduced. As the market has become global, an increased need for vigilance regarding the sourcing of gems has become required.

New Channels Provide Strong Competition.

Diamonds. The 1990s brought the Internet business boom, which saw the rise of the “e-tailer,” including jewelry sellers. The bust in late 2000 ended many of these ventures, but Internet retailing regrouped during the 2000s to become a solidly growing force, while the number of brick-and-mortar jewelers declined from 26,200 at the start of the decade to 22,100 by June 2010 (Jewelers Board of Trade, 2010a). The growth in Internet sales can be gleaned from the sales

results of the largest online diamond seller, Blue Nile. In 2000, its first full year of operation, the company reported sales of \$44 million. By 2003, sales had almost tripled to \$128.9 million, and they reached \$319.3 million by 2007. The 2008 economic crisis caused a dip, but sales rebounded in 2009 to \$302.1 million, and by the second quarter of 2010, Blue Nile had posted an industry-leading 9.7% year-over-year sales increase (Blue Nile, 2010).

Many traditional jewelers added online sales channels as well, so that by 2004 an estimated 2% of all diamond sales in the U.S. were made online (Shor, 2005). By 2009, that share had more than doubled to 4.6%, or \$2.7 billion, 70% of which were diamond-set pieces (Blue Nile, 2009b; Gassman, 2010).

Demand for diamond grading reports soared during the decade, with every major gemological lab reporting strong intake gains. The reasons were rooted in the proliferation of older treatments such as fracture filling, and development of new gem treatments such as HPHT color enhancement, combined with the rise of electronic diamond trading, which facilitated the sale of diamonds sight unseen (Bates, 1998; Reiff and Rapaport, 1998; Halevi, 2004). As consumers grew more educated about diamonds, demand for grading reports increased yet again (Dobrian, 2006). One industry expert noted that GIA’s lab business increased 20% yearly between 2001 and 2005 (Even-Zohar, 2005).

Quality issues—especially those related to cut—also changed how diamonds were sold during the decade. By 2000, engineers and laser experts had devised equipment that could model and cut rough diamonds much more precisely than human labor, and consumers in Japan, a key diamond market, were demanding stones cut to very exacting standards. The facet arrangements of such diamonds often formed what was called a “hearts and arrows” pattern (Shor, 2005; figure 14). In the U.S., a number of diamond manufacturers created successful brands by promoting round brilliants precision-cut for both proportions and facet placement.

Yet cut grading had been the subject of considerable controversy during the 1990s, when some (mostly opponents of online diamond trading) argued that such a grade would fully commoditize diamonds, while others argued that it would prevent vendors from misrepresenting poorly cut stones with high color and clarity grades as top quality (Shor, 1997). The American Gem Society (AGS) grading lab, which opened in 1996, began issuing reports

with cut grades based on the system AGS had developed in 1966 that, in turn, was based on proportions devised by Marcel Tolkowsky in 1919. The AGS was the first lab to adopt a detailed cut grade system. The lab revised the system in 2005 to include light performance (how well a diamond refracts light from the crown and table) and add a grade for princess-cut diamonds (P. Yantzer, pers. comm., 2010).

In 2004, GIA completed a 15-year study of diamond cut, which found that an excellent balance of fire and brilliance could be achieved by a number of proportion combinations beyond the traditional Tolkowsky “ideal” that had formed the basis for most diamond cut grades (Moses et al., 2004). The following year, those findings were incorporated into a cut grading system subsequently used on all GIA round-brilliant-diamond grading reports (Luke, 2006). Other labs, including Hoge Raad vor Diamant (HRD) and the International Gemological Institute (IGI), also began adding more cut information

Advances in cutting technology also gave diamond manufacturers greater opportunities to design new, proprietary cuts that would offer differentiation at retail—important for branding initiatives—and, it was hoped, garner premium prices in a market where traditional cuts were commoditized in price lists. While some cuts never gained a foothold in the market, others, such as the Signet Corp. (Kay Jewelers)

66-facet Leo Cut, became an integral part of the retailer’s marketing efforts (Kay Jewelers, 2010). At the same time, a new take on an older cut—the Asscher cut—entered the market as an alternative to traditional shapes (Shor, 2005). By greatly speeding up and expanding the diamond cutting process, technology also put many more diamonds into the marketplace, creating larger inventories and more price competition. This favored volume buyers like the large retail chains and mass merchandisers and, in turn, led to an increase in memo deals and extended payment terms.

Colored Stones. The U.S. market accounts for 35% of global sales of colored stones at retail, a position of dominance it has held for several decades. Worldwide in 2007, sales of colored gemstones were estimated to be about \$12 billion at retail, or 7% of total jewelry sales (BUZ Consulting, 2009). The U.S. also crossed the important billion-dollar benchmark in imports of unmounted colored stones, growing in size from almost \$875 million in 2004 to \$1.15 billion by 2008, according to the U.S. Geological Survey (Olson, 2009). Globalization has also made colored stones more accessible to newly affluent consumers in places like the United Arab Emirates, Russia, Brazil, India, and China—locations that would not have been considered significant markets for gemstones during the 20th century (“India’s 9.6 billion...,” 2008).

Television shopping and Internet sites have increased the market for previously little-known gems, such as iolite, sunstone, and others. One such stone, sold almost exclusively through TV shopping channels, was red andesine feldspar, which caused a considerable controversy when undisclosed treatment came to light (Roskin, 2008; see below).

The online auction site eBay grew into a major sales outlet for vendors who wanted to reach the public directly. A recent (September 2010) search of the site found nearly 285,000 individual colored stones of all types, ranging from a 69 ct sapphire with a reserve of \$1 million, to bead material at an initial offering price of one cent. The site’s ease of access for vendors also brought controversy over alleged fakes. In 2004, Tiffany & Co. sued the company over alleged counterfeit merchandise sold via eBay auctions and the misuse of its trademark. The case, which took four years to litigate, was ultimately decided in eBay’s favor when the U.S. District Court of New York determined that the burden of protecting the brand

Figure 14. In efforts to differentiate themselves, and because of increasing demand for precision in cutting, many manufacturers fashioned diamonds to exacting standards throughout the decade. Note the precise arrow pattern in this 1.54 ct diamond, courtesy of Crossworks Manufacturing, member of the HRA Group, Vancouver, British Columbia. Photo by R. Weldon.

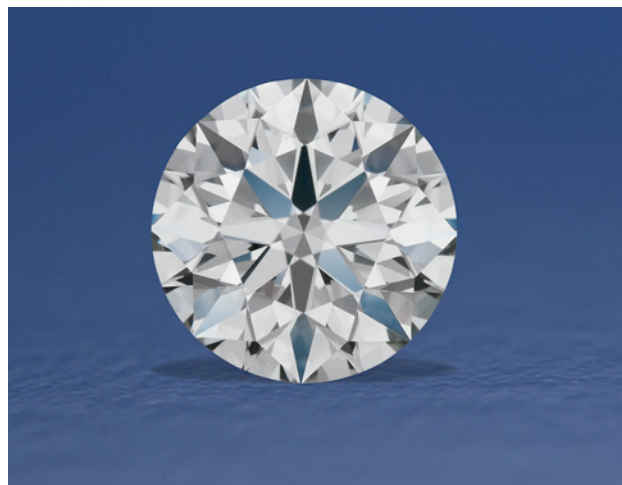




Figure 15. The historic Wittelsbach Blue diamond was sold for a record-breaking \$24.3 million to London jeweler Laurence Graff at Christie's in December 2008. It was subsequently recut to 31.06 ct, as shown here, and renamed the Wittelsbach-Graff. Photo by R. Weldon.

fell on Tiffany, not the online auction seller. The court noted that eBay did make considerable effort to police its site for counterfeit goods (Clark, 2008).

Nomenclature Issues. Differences of opinion about gemstone nomenclature have had an effect on the gem business in the last decade—particularly felt at the collector and dealer level. One of the most contentious examples involved violet-to-blue-to-green copper-bearing (cuprian) tourmalines, which were first discovered in Paraíba and Rio Grande do Norte states in Brazil in 1989 (Fritsch et al., 1990) and became known as *Paraíba tourmaline* in the trade. Their vibrant “electric” colors were distinctive and had not been observed in tourmaline from other localities. In a few years, as production tapered to a trickle, prices for this material soared wildly.

Around 2001, a new deposit of cuprian tourmaline was discovered near Edeko, Nigeria, though this material did not have quite the same color saturation as the original Brazilian stones (Smith et al., 2001). In 2005, another deposit was discovered in Mozambique (Laurs et al., 2008), and some of this new material approached the appearance of the best Brazilian tourmaline. Many dealers used *Paraíba* (or *Paraíba-type*, or *Paraíba-like*) as a general descriptor for cuprian tourmaline. In the absence of a recognized naming committee for gemstones, the Laboratory Manual Harmonisation Committee (LMHC; a panel com-

posed of representatives from major gem labs in Europe, the U.S., and Asia) issued a statement supporting the use of the term *paraíba* to refer to blue (electric blue, neon blue, or violet blue), bluish green, greenish blue, or green colors (of medium-to-high saturation and tone) of elbaite tourmaline, whatever its geographic origin (LMHC, 2010).

Auctions. The last decade brought the first \$1 million-per-carat fancy-colored diamond, the \$100,000-per-carat colorless diamond, and extraordinary prices for top colored gems. These steep increases began in 2005, when precious materials began inflating quickly in price, fueled by a decline in the U.S. dollar (in which gold and diamonds have been historically traded) and a rise in the numbers of very wealthy people around the world. Some of this action was played out in public, primarily at auctions conducted by Christie's and Sotheby's. The colored stone world was stunned in February 2006 when an 8.62 ct Burmese ruby sold at Christie's Geneva for \$3.64 million, or \$422,000 per carat—a record per-carat price for any colored stone. In October 2007, a 6.04 ct Fancy Vivid blue diamond sold for \$7.98 million at a Sotheby's auction in Hong Kong, the first gemstone to ever break the \$1 million-per-carat mark, at \$1.32 million. The buyer was London jeweler Alisa Moussaieff (Hines, 2007).

A year later, another blue diamond shattered the record for the most expensive gemstone ever sold at auction, when the historic 35.56 ct Wittelsbach Blue, graded Fancy Deep grayish blue, sold to jeweler Laurence Graff for \$24.3 million at a Christie's auction in London (Christie's, 2008). Graff had the stone recut in a shape similar to the original (figure 15), losing 4.5 ct but shifting the color grade to Fancy Deep blue (Gaillou et al., 2010).

While auction offerings and sales were restrained during the spring of 2009, sales of million-dollar-plus-per-carat blue diamonds and \$100,000-plus per-carat D-flawless stones resumed a year later. At Sotheby's April 7, 2010, Hong Kong sale, the De Beers Millennium blue diamond—a 5.16 ct Fancy Vivid blue IF—sold for \$6.4 million to Moussaieff of London. The \$1.24 million per-carat price was some 20% over estimate. A month later in Geneva, a Swiss retailer paid \$162,000 per carat for a D-flawless round brilliant of 16.92 ct. Also in April, Sotheby's New York sold an 8.66 ct Burmese ruby for \$2.1 million and a Kashmir sapphire bracelet for \$2.85 million (“Magnificent Jewels . . .,” 2010). At the Hong Kong

sale that same month, an unidentified bidder paid \$5.54 million for a jade necklace.

Treatments. Methods of enhancing the appearance of natural gemstones have been practiced for centuries, but the decade saw a number of new techniques and the inevitable controversy over nondisclosure.

The 1999 announcement of a new, difficult-to-detect process of improving the color of type IIa diamonds by high-pressure, high-temperature annealing rocked the industry and threatened to undermine confidence in those stones until a reliable means of detection was discovered shortly thereafter (see, e.g., Smith et al., 2000).

In 2002, the sapphire market received a jolt of its own from a previously unknown treatment that added traces of beryllium to the heating process and thereby altered the color of plentiful light pink sapphire to a more marketable pinkish orange (“padparadscha”). Later the treatment was applied to create other sapphire colors (see, e.g., Emmett et al., 2003). The result caused confidence and prices to drop, in some cases to extremely low levels, and led to press reports warning consumers about the process (Mazurkiewich, 2003).

An old treatment of a popular gemstone received a new hearing in 2007 when the U.S. Nuclear Regulatory Commission (NRC) contacted retailers and wholesalers to determine whether their stocks

of irradiated “London Blue” topaz had come from NRC-licensed suppliers. Because there *were* no licensed distributors in the U.S. at the time, many retailers and wholesalers temporarily removed the gems from their inventory. The NRC continues to require proper licensing, though it has since been determined that the material on the market is safe to wear (Weldon, 2007).

Nondisclosure of treatment led to a class action lawsuit against a major TV retailer who allegedly sold andesine feldspar that was altered to look like Oregon sunstone. The case created a major controversy within the gem industry (see, e.g., Graff, 2008). Likewise the proliferation of lead glass-filled rubies led to a number of televised exposés that publicized incidents of nondisclosure at retail.

As education about gemstones has expanded, there has also been a resurgence of appreciation for less traditional gems that are more likely to be untreated (Robertson, 2009). For example, as more information became available about lead glass-filled rubies, buyers chose alternatives such as red spinel. As lawsuits concerning emerald treatments were disclosed in the press, demand grew for alternative green stones such as tsavorite or demantoid garnets (figure 16).

In 2008, a controversial new treatment of tanzanite surfaced, affecting its perceived value and undoubtedly hampering the gemstone’s recovery in value (McClure and Shen, 2008). While the market has largely understood and accepted that most tanzanite must be heat treated to achieve the colors associated with the gem, it does not readily accept impermanent surface coatings.

Figure 16. Gems that are traditionally not treated, such as this 3.47 ct tsavorite from Kenya, were in high demand throughout the decade. Courtesy of RareSource, Chattanooga, Tennessee; photo by R. Weldon.



India and China. Two powerhouses, India and China, became the world’s fastest-growing consumer markets for diamond jewelry during the decade. India grew rapidly in the 1980s and 1990s as a diamond manufacturing center, but it also saw an exponential rise in affluence within the country as a whole. The result was a growing middle class that began buying diamond jewelry. One study reported that from 2000 to 2005, consumer demand for diamonds in India increased at an annual rate of 43.5%, to \$1.5 billion, about 2% of world diamond consumption. By 2009, India’s market share was about \$5.5 billion, about 8% of the world market. Diamond sales in China, excluding Hong Kong, grew at 9.15% yearly between 2000 and 2005, to about \$1.32 billion, slightly lower than India. By 2009, diamond sales had reached \$6

billion, about 9% of the world total. One study predicted that by 2015, India and China together would account for a world market share equal to that of the U.S. (KPMG, 2006).

THE ECONOMIC CRISIS OF 2008–2009

Retail. As the U.S. economy began slowing in late 2007 and 2008, a number of large retail jewelry chains found themselves in difficulty and, ultimately, liquidation. These included Friedman's Jewelers, a 388-store chain (Graff, 2009); Fortunoff, a 20-store chain; and the 375-store Whitehall Jewellers (figure 17). Several other jewelry chains also filed bankruptcy during this period, the 23-store Shane & Co. and the 15-store Christian Bernard stores.

A key reason behind the liquidations of such large firms was that diamond suppliers, who had millions of dollars in outstanding invoices, feared that the equity capital firms that held large shares in these companies would get their money out through Chapter 11 reorganizations at the expense of the trade (White, 2008). The Whitehall bankruptcy and liquidation also presented a crucial legal test of memo (consignment) agreements, commonly used by most large diamond companies to supply major accounts. In July 2008, a U.S. bankruptcy court judge ruled that Whitehall could not sell \$63 million worth of properly identified consigned merchandise because it had no legal title to it (Memorandum opinion, 2008; White, 2008).

In late September 2008, the collapse of investment banker Lehmann Brothers set off a chain reaction that rippled through the global economy, as once-solid financial houses now seemed vulnerable. The holiday season of 2008 was a retailing disaster, even for strong firms. Signet, parent company of Kay Jewelers, reported that its fourth quarter same-store worldwide sales fell by 14.9% compared to the previous year; Zale Corp. charted a decline of 22%; Tiffany & Co. noted a same-store fall-off of 23% worldwide; and Finlay Enterprises, which owned Carlyle & Co., Congress Jewelers, and Bailey Banks & Biddle, as well as operating a number of leased jewelry departments, reported that its same-store sales for the last quarter of 2008 fell 20% (Shor, 2009a; Tiffany & Co., 2009; Signet Jewelers, 2009).

Even the Internet was not spared. Blue Nile reported that its holiday season/fourth quarter sales fell to \$85.8 million from \$111.9 million a year earlier (Blue Nile, 2009a), after five years of double-digit growth.

The second half of 2009 brought a slow recovery, with mixed U.S. holiday sales results that generally exceeded economists' forecasts. Several large chains fared well—Signet and Tiffany reported same-store sales gains of 6.8% and 11%, respectively. However, others battled strong competitive pressures, such as Zale Corp., which suffered a decline of 15%. The big winner in diamond sales was the Internet, with Blue Nile, for example, reporting a 23% sales gain.

By the second quarter of 2010, the number of stores operated by the top 10 U.S. retailers had dropped to 4,518, down from 5,978 at the beginning of 2008 (Jewelers Board of Trade, 2010b).

Diamond Production. As the global crisis took hold, diamond manufacturers asked the DTC and other producers to cut back rough sales (Shor, 2008c). At the September 2008 DTC sight, held a week after the Lehman Brothers news, clients declined to buy some \$60 million worth of rough—about 10% of the value of that month's allocation.

As 2009 opened, diamond trading was nearly paralyzed at the wholesale level. The DTC allocated its smallest sight in many years, an estimated \$108 million, and instituted a series of unprecedented non-prescheduled rough sales. Alrosa announced it would divert all its rough sales to the state stockpile Gokhran (Golan, 2009c; "Alrosa: \$35 million. . .," 2009). The value of worldwide mining output plummeted from \$14.3 billion in 2008 to \$8.4 billion in 2009. By weight, total production (including industrial qualities) dropped from 165 million to 124 million carats (Even-Zohar, 2010).

The crisis created havoc in India, particularly Gujarat State, where an estimated 200,000 diamond workers—25% of the country's diamond workforce—were furloughed ("Rough" times ahead. . .," 2009). The central and state governments, fearing that such a large number of unemployed workers created potential for unrest in an already volatile region of the country, formulated a stimulus package (Golan, 2009a). In June, the central government offered India's 53 industry banks more than \$4 billion in credit guarantees to enable diamond manufacturers to resume operations (Kazi, 2009). Within one month, as many as half of the idled workers were rehired (Polished Prices, 2009).

In other diamond centers, banks were keeping a close watch on credit, but supported almost one-third of major diamond companies that, otherwise, might have collapsed (Segal, 2009). This prevented a



Figure 17. Whitehall Jewellers was one of the many large chains that was forced to liquidate during the economic recession of 2008–2009. Photo © Najlah Feanny/Corbis.

run of bankruptcies and inventories coming into the market.

By early summer, the rough market had stabilized, with inventories at very low levels because of the cutbacks in mining and producer sales (Shor, 2009b). Demand for rough now rose sharply as diamond manufacturers were getting back to work and needed goods. The DTC sold nearly \$550 million at its June 2009 sight. Alrosa slowly resumed sales into the market in July, allocating about \$150 million worth of rough to long-term clients (Golan, 2009b). In August, the operation's new president, Fyodor Andreyev, announced a much more aggressive sales policy ("Alrosa: \$35 million. . .," 2009), which eventually saw some \$900 million worth of rough going to the market during the second half of 2009.

By October, banks and some diamond analysts were warning that the rising rough prices—which had recouped all of the early-year declines—were not warranted by still-sluggish demand for polished goods ("ABN Amro sees no recovery yet," 2009). As a result of the precipitous rise in rough prices, the DTC stepped up rough sales during the first quarter of 2010, dealing a total of about \$1.5 billion worth. During the same period, Alrosa sold \$925 million in diamond rough while suspending all sales to the government stockpile. Polished prices, however, recovered much more slowly, even as diamond centers reported encouraging pre-holiday orders from retailers in the U.S. and other markets (Polished Prices, 2010).

Colored Stones. The economic crisis exacerbated problems in the colored stone market that had adversely affected it for several years. The skyrocketing cost of gasoline and diesel fuel in the late 2000s had already curtailed mining activities in many countries by making them too expensive to be economic. As noted earlier, mid-2008 brought a U.S. and European Union ban on all ruby and jadeite from Myanmar, while Madagascar suddenly imposed a ban on rough gem exports.

As the economic crisis took hold and sales plummeted, mining operations in key centers such as Brazil and Zambia curtailed or ceased production, though reports were anecdotal and offered no specifics (ICA Mining Report, 2006). Exploration also halted in many locales (Robertson, 2009). The depth of the problem was evident in the weak retail sales reported above for the 2008 holiday season. As a result, at the February 2009 gem shows in Tucson, reports estimated that buying was down 30%–50% from 2008, and attendance at the American Gem Trade Association show was down 19% (Weldon, 2009).

Thailand, which accounts for 70% of the world's polished sapphire exports and 90% of polished ruby exports, was hard hit. By the time the global economy plunged into crisis in September 2008, numerous cutting firms had already closed or suspended operations (Shor, 2008a). In 2009, exports of "precious" stones dropped 29.9% to \$178.74 million compared to 2008. Exports of "semi-precious" stones (the term used by Thai customs for all colored stones other



Figure 18. Swala Gem Traders, based in Arusha, Tanzania, works a tsavorite mine in the rural region of Lemshuko. To serve the needs of the miners' children, the company constructed a schoolhouse and hired a schoolmaster. This is an effort to provide learning opportunities for people in the area. Photo by R. Weldon.

than ruby, sapphire, and emerald) fell 17.5% to \$201.5 million (Gem and Jewelry Institute of Thailand, 2010).

By late 2009, colored stone dealers were noting a mild recovery, though supplies of many types of stones had become scarce because of reduced production and the Myanmar trade bans (Robertson, 2010), in spite of the fact Madagascar had lifted its export ban in July. Thai exports of colored stones increased 6.28% to \$137.9 million during the first quarter of 2010. However, the political unrest that paralyzed Bangkok and several other cities in Thailand that spring kept buyers away from the country for part of the second quarter.

Pearl production was also greatly affected by the economic crisis. Nearly half (300 of 650) of the farms in French Polynesia ceased operations in 2008 and 2009. In addition, Perles de Tahiti ended its \$1–\$2 million yearly promotions early in 2008, and the government abolished the export duty that had funded them (Müller, 2009). According to N. Paspaley (pers. comm., 2010), about 700,000 shell operations are expected in Australia in both 2010 and 2011—a considerable decrease from peak operations in 2007–2008. To deal with the downturn in the market in 2009, most Australian pearl producers reduced

production or closed operations. Akoya production continued its decline, falling from 25 metric tons in 2007 to an estimated 15 metric tons in 2009 (Müller, 2009). Chinese freshwater pearl production plunged 25%–30% from the high at mid-decade.

SOCIAL ISSUES, A NEW INDUSTRY FORCE

As the decade opened, brutal civil wars in Africa and terrorist attacks against targets in the U.S., India, and Europe created demand for greater accountability in the diamond and gem trades, while growing concerns over corporate governance issues in the wake of major business scandals such as Enron and WorldCom generated public calls for increased transparency and ethics. These developments led to greater consumer attention to how and where gems were sourced and manufactured. In many cases, the buying public began asking if the gems they purchased were products of fair trade; that is, if they provided a living wage throughout the supply chain (including at the source), fostered gender equality and opportunity, and were mined in a socially and environmentally friendly manner (e.g., figure 18). Increasingly, consumers expected independent verification of the claims—a dealer or retailer saying it was so was no longer enough (Weldon, 2008).

The Kimberley Process. The issue of conflict, or “blood,” diamonds reached critical mass in 2000, while civil wars—funded primarily by diamonds—raged in Sierra Leone and Angola. As images of atrocities from these conflicts began appearing in the media, pressure built on the industry to stop the trade in conflict stones and thus help stem the violence. An estimated 3% of world diamond production came from these sources that year, though some non-governmental organizations (NGOs), wanting to draw attention to the larger issue of illicitly traded diamonds, reported estimates as high as 25% (Smillie, 2010). In July 2000, representatives of various industry organizations convened in Antwerp to propose a system of monitoring and certifying legitimate rough diamond exports, which would help the United Nations and governments end the illicit trade.

In December of that year, representatives from diamond producing and processing countries met in Kimberley, South Africa, to put together the formal policies and procedures of that system, known afterward as the Kimberley Process.

Two years later, 53 nations ratified the Kimberley Process Certification Scheme (KPCS), which took

effect January 1, 2003 (Shor, 2005). The KPCS required that all rough diamond imports carry certificates indicating they were exported through legitimate, official channels. By the end of 2003, Angola and Sierra Leone had regained sufficient control over their diamond production to be admitted as KPCS members, allowing their diamonds to be sold on world markets. The following year, the KPCS reported that it covered 99.8% of world diamond production. By that time, the conflicts responsible for the KPCS's creation had ended and the body now took a role in ensuring diamonds remained in legitimate channels, preventing their use to fund wars or criminal activity. While KPCS was generally regarded as successful in greatly reducing the flow of illicit diamonds into the trade, a number of NGOs criticized it for being too dependent on voluntary compliance, the lack of independent monitoring, and a lack of resolve in dealing with alleged violators.

By 2008, the KPCS had 75 member nations, but a new issue thrust it once again back into the news: Zimbabwe's Marange diamond fields, also known as Chiadzwa, near the Mozambique border. Since KPCS regulators determined that the government controlling the diamond area was also responsible for killing more than 180 miners during a 2008 eviction action, the Kimberley Process was unable to take decisive action. This paralysis drew renewed criticism from both NGOs and the diamond indus-

try (Dugger, 2009; "Zimbabwe's diamond controversy. . .," 2010). In July 2010, the Kimberley Process, after conducting an investigation into Marange diamond production, agreed to permit exports from two of the mining sites ("World Diamond Council concludes. . .," 2010). In August, the government sold 900,000 carats from the concessions, and an additional 500,000 carats in September.

The decade also saw the rise of several initiatives designed to improve working conditions and returns for miners of alluvial deposits in West Africa (see, e.g., figure 19). One, the Diamond Development Initiative, founded in 2005, was an outgrowth of a collaboration involving several NGOs, De Beers, the Rapaport Group, and the World Bank. The DDI has conducted several studies tracking how alluvial diamonds get to market, and the prices paid at each step of the pipeline in Sierra Leone and Democratic Republic of Congo (DRC), as well as ways of ending child labor in DRC diamond deposits.

The studies will be used to develop sustainable, repeatable programs to help improve the lives of alluvial miners and their families (Diamond Development Initiative, 2010). Another organization, the Diamond Empowerment Fund, was established in 2007 by the diamond and jewelry industry to improve educational opportunities and living conditions in diamond-producing African nations (Diamond Empowerment Fund, 2010).

Figure 19. Most of the diamonds in Sierra Leone are found in alluvial deposits by independent miners. These men are panning for diamonds in one of Sierra Leone's many rivers and streams. Photo taken in 2006 by Ric Taylor.



Terrorism and PATRIOT Act Restrictions. Illicitly mined and exported diamonds also became the focus of attention following the September 11 terrorist attacks. Allegations that terrorists had used diamonds, tanzanite, and other gems to raise and launder funds for al Qaeda and other terrorist groups prompted the U.S. government to examine industry dealings more closely.

As a result, a provision was added to the PATRIOT Act, passed five weeks after the attacks, to designate all dealers of diamonds, gems, and jewelry as “financial institutions” and subject them to much more detailed financial reporting requirements. These included reporting all large cash transactions, obtaining valid identifications and addresses for both suppliers and clients, maintaining transaction records, and briefing staff on PATRIOT Act procedures. The European Union and other countries adopted similar measures in tandem with the U.S.

Then, in November 2001, the *Wall Street Journal* reported that an al Qaeda operative named Wadih el Hage—who had been linked to the 1998 U.S. Embassy bombings in Kenya and Tanzania—had sold tanzanite to fund terrorism in East Africa (Block and Pearl, 2001). A notebook found among his possessions when he was captured mentioned his attempts to sell a parcel of tanzanite. Print, radio, and television media soon broadcast similar stories, and the repercussions for tanzanite were immediate and devastating (Drucker, 2002). Tiffany & Co., Zales, Walmart, and QVC all pulled tanzanite from their inventories, and they and other manufacturers canceled outstanding orders. Sales of the gem plummeted to virtually nothing overnight (M. Avram, pers comm., 2001).

However, the details in el Hage’s notebook sketched a different story. El Hage had tried to sell a parcel of tanzanite, but his notes also showed how little he knew about tanzanite or the gem market—such as where to sell it, or for how much. He chronicled his unsuccessful attempts to sell the material in London and San Francisco, and at trial it was revealed he actually had to borrow money from a friend to complete his fruitless trip (Weldon, 2002). No actual sale of tanzanite by him or any other operative was ever confirmed. In February 2002, the U.S. State Department declared that it did not consider tanzanite to have been used to raise funds for al Qaeda (Gomelsky, 2002).

The diamond industry also came under suspicion in the aftermath of the September 11 attacks. In

November of that year, *Washington Post* reporter Douglas Farah reported that diamond dealers, working through alleged al Qaeda operatives, had purchased diamonds from Sierra Leone rebels at below-market prices. The report also alleged that the diamond trade helped al Qaeda avoid a freeze of its bank assets (Farah, 2001). A staff report to the National Commission on Terrorist Attacks upon the United States (the “9/11 Commission”) later concluded that there was insufficient evidence to tie al Qaeda to the diamond trade (Roth et al., 2004), though some NGOs objected to its conclusions (Global Witness, 2004).

Responsible Jewelry. During the early part of the decade, a number of industry organizations independently drafted standards for responsible business practices. To establish sets of commonly agreed-upon standards, 14 of the industry’s largest players—including diamond miners (De Beers, Rio Tinto, BHP Billiton), several diamond manufacturers, ABN Amro Bank, and major retailers such as Tiffany & Co. and Signet Group—formed the Council for Responsible Jewellery Practices (now called the Responsible Jewellery Council) in 2005 to create minimum standards regarding fair labor practices, environmental sustainability, ethical trading, and transparent business dealings (Responsible Jewellery Council, 2010). By the following year, membership had reached 33 after the council adopted a formal structure, was chartered in London, and promulgated a detailed set of standards in business, environmental, and social areas (Council for Responsible Jewellery Practices, 2006).

In December 2008, with codes of practice in place, the council moved into a new phase certifying members’ compliance to its best practice standards.

CONCLUSION

The first decade of the 2000s witnessed the fragmentation of the rough diamond market, greater financial scrutiny of colored stone and diamond dealers, and the rise of social concerns. Today, consumers are much more aware of these issues as well as treatments, quality, and pricing, thanks in great part to widespread information on the Internet, a situation that will certainly improve as new ways of delivering information proliferate.

For diamonds, the fragmenting of the rough diamond market will probably continue, as De Beers

recently announced it would keep mining at a reduced rate (about 40 million carats yearly, compared to 48 million before the economic crisis) while newer producers pursue independent sales channels. New estimates about Zimbabwe peg its diamond production at 40 million carats yearly, making it potentially the world's largest by volume, yet not under the control of any single marketing channel (Thomas, 2010). The country's uncertain political situation may lead to more changes in the near future.

Politics in producing and processing nations will continue to affect the colored gemstone market. Ongoing sanctions against Myanmar by the U.S. and EU will keep a large percentage of ruby and jade from reaching those markets, while difficulties in

other producing countries will create spot shortages of gem-quality material. We do not know what new treatments are on the horizon, only that they are inevitable. In pearls, the majority of the industry is still working through the double challenge of over-production and diminished demand.

The world economic crash of 2008 also brought changes in the ways the diamond and colored stone industries conduct business, particularly in financing and retail consolidation in the U.S., though the long-term effects are still far from being understood. However, the industries appear to have regained solid footing in recovery, aided greatly by two powerful emerging consumer markets in India and China—which promise to be even more important in the decade to come.

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ERRATUM

While every effort is expended to ensure the accuracy of the information printed in *Gem & Gemology*, on page 156 of the Summer 2010 issue an error occurred in, and was not corrected during, the editing process. In the report titled “‘Nanogems’ – A new lab-grown gem material,” the part of the title reading “A new lab-grown gem material” should have read “A new

glass-ceramic material,” and this correction should also be reflected throughout the rest of text. We recognize we improperly used the terms lab-grown and gem material when referring to what is essentially a glass. We have corrected the online version of the issue, and ask that you make a note correcting this in your copy.