

Ethical Gold: Why Manufacturing Methods Matter

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Introduction

This paper focuses on intersections between gold manufacturing technologies and the rise of new social aspirations and expectations around buying, selling and owning gold. It will present a brief history of the development and current use of ‘ethical gold’ and subsidiary terms (i.e. fair trade gold, Fairtrade gold, Fairmined gold, responsible gold, non-conflict gold and mercury-free gold) now being employed to imbue a moral register to specific types of provenance. It will then consider how these expectations and demands impact on gold manufacturing practices, such as refining, alloying, stock production and jewellery and watch manufacturing. The paper concludes by considering how a meaningful dialogue between the gold industries and NGOs is currently hampered by the use of incommensurate language as well as divergent notions of what constitutes ethical practice.

A note on research methodology

This paper primarily draws on social science research methods, principally ethnographic fieldwork and discourse analysis. In terms of academic disciplines, it relates most directly to material culture as a sub-discipline of anthropology and to science and technology studies, though it is also informed by business and management studies approaches.

It can claim to be a longitudinal study in that the data was collected over a decade, starting with the author’s attendance at industry engagement meetings arranged by the Fairtrade Foundation in 2009 to support the Fairtrade and Fairmined Gold (FT/FM Gold) initiative. The author followed the development, launch and ultimate decline of the Fairtrade-ARM partnership that managed FT/FM Gold, as well as the trajectories of two subsequent certification schemes run by the former partners. He also tracked the development of the certification schemes managed by the RJC and the impact of the US Dodd-Frank Act and Minamata Convention, as well as the publication and promotion of NGO advocacy reports focusing on ASM and corporate mining, the jewellery and watch industry, and leading companies operating in that sector.

The author has engaged in regular periods of participant-observation during this decade. These have not followed the naïve approach found in classical anthropological fieldwork or the role of change initiator typical in applied anthropological projects. Instead, the author principally adopted an informed observer position, acting either as a maven or unaffiliated commentator. This approach enabled the author to draw on his expertise as a qualified analytical chemist (augmented by precious metal assay training at the Birmingham Assay Office in 2009). The author also referenced his extensive personal experience of bench and industrial jewellery manufacturing techniques and knowledge of large- and small-scale ore beneficiation and refining technologies.

Maintaining a neutral position regarding the validity of any proposed criteria for ethical gold whilst remaining sympathetic to the need to debate the issues it raises has been fundamental to this research. This has facilitated sustained contact with diverse groups of respondents from all branches of the gold industries and beyond, including campaigners working in the gold jewellery trade and its supply chains, ardent sceptics, and professional activists antagonistic to the gold industries as they currently operate.

The structure of the paper

The remainder of the paper consists of three main sections. The first takes a broadly historic approach, identifying key moments in the rise of ethical gold, from the creation of the first ethical certification scheme up to the present day. This lays the groundwork for the second

section, which identifies how these events and their consequences directly or indirectly interact or interfere with gold manufacturing practice. The author then reflects on differences in underlying perspectives and how these result in the use of incommensurate language by the gold industries and NGOs, resulting in inconclusive contestations, where the two groups often talk past each other, rather than engaging in meaningful dialogue.

History: new gold adjectives for the twenty-first century

Enter Ethical Gold

The adjective ‘ethical’ to gold is a relatively recent phenomenon that can be traced back to the first decade of the twenty-first century. This was the inevitable, though unintended, consequence of a new type of protest campaign intended to inflict damage on mining corporations’ activities by targeting their downstream markets (Bloomfield 2017). This strategy was adopted due to its previous success with other luxury commodities, most notably fur and diamonds, and disillusionment with the minimal effects of broadcasting situations at specific mining sites in the hope of instigating fundamental changes in attitudes and behaviour¹. The first gold campaign of this type - *No Dirty Gold* - was launched in the US in 2004 by Earthworks and Oxfam America. *No Dirty Gold* promoted a simplistic moralistic narrative intended to influence consumer attitudes towards the material itself, rather than any specific corporate mining operations. Gold mining, trading and retailing were all referred to, but only in a very generalised sense. The campaign also promoted a set of wide-ranging criteria for good practice, loosely based on human rights laws and sustainable development goals, which it dubbed *The Golden Rules* (Earthworks 2019).

Having presented the claim that current mainstream practice was unable to meet these ethically based criteria, it was short step to describe gold that apparently did so as ‘ethical gold’. This new material bifurcation reinforced moral claims being made by both the campaigning NGOs and the certifiers of the ‘alternatively’ sourced gold, adding a new social dimension to a substance with an already complicated cultural identity (Oakley 2015). Due to the all-encompassing but unspecific nature of the assessment criteria, the term ethical gold has proved to be extremely unstable. There has been lack of willingness to engage with dilemmas where participants cannot simultaneously meet all the criteria (which in practice includes almost all real-world situations). This has led to the appearance of programmes that primarily focus on one criterion at the expense of others, but still use the term ethical gold to promote their activities. Consequently, the term has been successfully appropriated by many disparate groups and formal associations and applied indiscriminately to widely differing contexts.

The Industrial Response: from the CRJP to the RJC

In May 2005, a group of leading companies involved in the diamond and gold supply chains formed a new industry body to change attitudes and practices, the Council for Responsible Jewellery Practices (CRJP). The CRJP gave itself the remit of promoting responsible ethical, social and environmental practices throughout the diamond and gold jewellery supply chains. In doing so it aligned with the requirements of the Golden Rules. However, it was decided this overall aim would be best achieved through the creation of a code of practices adopted by members, though the scope of this undertaking required a long gestation period (CRJP 2007). In 2008 the CRJP launched its member’s certification programme and at the same time announced their association was being renamed the Responsible Jewellery Council (RJC). Existing members were required to undertake RJC certification by 2010, with any new members given two years grace after joining. As the mining supplement was slated for completion a year later, miners had until 2011 to become certified.

Due to the time it was taking to set up the RJC certification programme, many of the NGOs initially involved became increasingly antagonistic to the initiative. This was compounded by the lack of formal influence the NGOs felt they had over the direction and details of the scheme (CRJP 2007). The situation was complicated by the appearance of an alternative ethical certification programme that appeared to conform more closely to these NGOs' ideals.

ASGM and Fair Trade Gold

The term ethical gold was first used to describe gold extracted by subsistence mining communities. This was part of a re-identification of what subsistence mining was, and could be, by national and international policy-makers and NGOs. During the late twentieth century, subsistence mining in the developing world was not high on the international agenda. When it did surface, subsistence miners were treated as either as an unruly infestation, or as entrepreneurs-in-waiting, who would, with assistance, inevitably develop into industrialised operations that could be integrated into formal economies (Barry 1996; Hilson 2008; United Nations 1996).

The stubborn persistence of informal subsistence mining communities in the face of a sequence of international development initiatives led to a revised understanding that subsistence mining was an endemic condition that needed to be addressed on its own terms. This process was enmeshed with, and facilitated by, the coining of a new phrase *artisanal and small-scale mining* (ASM). This new classification covered low-technology mining in the developing world, mostly for high-value, low-volume, easily traded minerals, such as gold and diamonds. Interest in ASM grew once it became apparent it was not only persisting but growing fast. Due to its informality, ASM numbers have always been hard to verify, but current consensus is that global ASM has consistently risen over the past three decades, from about six million people in 1993, to over forty million in 2017 (Barreto et al 2018). The ubiquity and distinctiveness of subsistence gold mining and its specific issues (including the use of gold dust as a *de facto* local currency and processing using mercury) has led to the more recent appearance of a subsidiary acronym: ASGM – standing for *artisanal and small-scale gold mining* - in development literature (e.g. Seccatore *et al* 2014).

Though national policymakers were treating ASGM as a social problem, the certification campaigners claimed the issue was unfettered market forces, leading to irresponsible extraction driven by greed or desperation, combined with gold trading practices that amounted to institutionalised extortion. They claimed certifying responsible ASGM would positively influence miners' behaviour by offering a fair price for the gold (this would be underwritten by licensed gold manufacturers and a more nebulous but apparently reliable commitment of support from the end consumers). Certification would tame ASGM, making it a driver of economic benefit, community cohesion and environmental protection, rather than a cause of social and ecological degradation.

ASGM Certification Programmes

The first ASGM ethical certification programme - *Fairtrade and Fairmined Gold* (FT/FM Gold) - came about through a partnership between the Alliance for Responsible Mining (ARM), a Latin American grass roots organisation, and the Fairtrade organisation (Echevarria 2010). This association initially appeared to be the ideal solution. ARM members were able to contribute practical experience of gold mining and an initial gold production base, whilst Fairtrade had the expertise to construct, police and promote a viable certification programme to potential licensees and end consumers.

FT/FM Gold was launched on 9th February 2011. Fairtrade's established promotional strategy centred on an emotional appeal to consumers to support deserving poor commodity producers (defined by and mediated through the Fairtrade organisation) rather than rely on the 'invisible

hand' of impersonal neo-liberal market forces (Lamb 2008). The FT/FM Gold campaign followed the same format. The press pack contrasted the ethical superiority of FT/FM certified gold with the immoral gold available through the open market, emphasising that as the latter was possibly contaminated by contact with one or more social ills all uncertified gold was unethical by potential association. The promotional literature also emphasised the positive character of the miners and the injustices they suffered. Representatives of Latin American communities affiliated to ARM were presented to the audience and provided a media-friendly spectacle by holding the first ingot of FT/FM gold. Mainstream and trade media coverage of the UK launch was substantial and positive (e.g. BBC Radio 5 2011; Taylor 2011). An equally media-focused format was evident in later FT/FM Gold launches held in other countries (see Luning and de Theije 2014).

Unfortunately, the FT/FM Gold licensee jewellers were unable to take advantage of this publicity. Reliable physical supplies of FT/FM gold failed to materialise in the run-up to Christmas 2011 or in early 2012. It did start to become available later in 2012, but this was too late for the crucial pre-Christmas trading period and by then the media interest generated by the launch campaign had evaporated. This FT/FM certified gold had to be sold through the open market.

From this point tensions developed in the Fairtrade-ARM partnership that eventually proved impossible to resolve. In November 2011 ARM and the RJC signed an MOU on working towards better ASM practices (RJC 2011). The following September, the RJC announced that FT/FM certified gold would be acceptable for the RJC's new Chain of Custody standard, allowing FT/FM gold to enter RJC members' supply chains (RJC 2012). The decision increased sales opportunities for FT/FM certified miners but put additional pressure on licensee jewellers' supplies of FT/FM gold at times of peak demand.

The situation further deteriorated in the run up to the first revision of the FT/FM gold certification standard. Fairtrade's close auditing of each batch of commodity moving along its supply chains was its *raison d'être*. This system had been developed through the certification of bulk agricultural products, such as coffee and bananas, amenable to such *track and trace* oversight (Luetchford 2008). Fairtrade had assumed gold would be similar (Fairtrade Foundation 2012). This assumption ignored the fact that gold is an atypical and expensive commodity. One manifestation of this is that gold refining, assaying, and alloying processes all require a surplus of gold and this necessity is ameliorated through an accounting practice called *mass balancing*, which relies on an acceptance that all gold is equivalent. As long as the amounts of gold entering and existing a system are equal, the system is considered effective, whilst gold 'trapped' in the system is accounted as a non-depreciating material asset. Despite the ubiquity of mass balancing in gold manufacturing, proposals to include its use in appropriate contexts within the FT/FM standard met with strong resistance. In a pre-emptive move, in September 2012 a group of leading FT/FM jeweller licensees broadcast an open letter condemning its inclusion in the revised standard, claiming this was a betrayal of Fairtrade principles. The Fairtrade-ARM association only lasted another seven months. On the 15th April 2013 the two organisations announced their partnership was being dissolved and that they would in future both be running independent certification programmes.

Relaunched in 2013, the Fairtrade Gold standard has been subjected to repeated but not noticeably successful attempts at revitalisation in the UK. The number of licensees and the overall sales of Fairtrade gold have risen over the intervening five years, but the share of market penetration has fallen far short of the levels predicted in 2011. Fairtrade has also attempted to extend its ASGM supplier base through interventions in Africa, funded through Comic Relief charity grants (Fairtrade foundation 2017). Fairtrade's most notable success, was having the retail chain Argos join its stable of retail Fairtrade Gold jewellery suppliers in 2016, though

this was not enthusiastically supported by all its licensees, due to its impact on brand perceptions,.

Fairmined gold has taken a different route. This has been possible due to ARM's less antagonistic relationship with the refinery sector and a long-standing relationship with the jeweller and watchmaker Chopard, one of the luxury sector's leaders. In 2013 Chopard presented their Green Carpet Haute Joaillerie Collection, crafted in Fairmined gold, as their contribution to the Green Carpet Challenge at Cannes. The following year events took a more commercial turn at Baselworld, the leading international watch trade show. Chopard launched the L.U.C. Tourbillon QF Fairmined, billed as the world's first Fairmined gold watch, with a \$144,570 price tag (Van Halem 2014). The success of the QF Fairmined led to Chopard releasing a less expensive successor, the L.U.C. XPS Fairmined, alongside a Fairmined jewellery collection called Palme Verte in 2015 (Liu, 2015). In 2018 Chopard again used Baselworld as a platform to announce all its gold products would be made using gold certified as responsibly sourced, though this news was overshadowed by the concurrent release of a Human Rights Watch report that claimed leading luxury jewellery companies, including Chopard, were making dubious ethical sourcing claims (Becker and Kippenberg 2018).

The OECD, the RJC and the C-o-C

At the same time as the FT/FM Gold certification scheme was gathering momentum, the foundations for a later shift in the 'centre of gravity' of ethical gold were being laid. Following a UN experts' report on the situation in the Congo basin, the OECD published a guidance document on the sourcing of minerals from conflict areas (OECD 2010). The Congo had been blighted by a long-running civil war, extended in part by commercial sales of minerals, principally tungsten, tantalum, tin and gold, which were sold into the international market by the warring factions controlling different parts of the country. The OECD publication coincided with a period of enthusiasm for trading reform in the US, precipitated by distrust in the financial sector following the 2008 US banking crisis. Consequently, the core principles of the OECD guidance became incorporated into the 2010 Dodd-Frank Act (House of Congress 2010), a piece of reform legislation designed to limit unethical trading. Implementing Dodd-Frank, in August 2012, the Securities and Exchange Commission (SEC) issued its Conflict Minerals Rule that companies should report on the source of the 'conflict minerals' in question, in order to demonstrate they were not supporting armed conflict in the Congo.

The potentially extensive and pervasive reach of the Conflict Minerals Rule, which not only extends to all US companies and subsidiaries, but indirectly to all overseas manufacturers supplying them with goods, led to the coining of a new term: *non-conflict gold*. The ongoing monitoring of the trade of Congolese minerals (see IPIS 2015) and threat of prosecution through the Dodd-Frank Act had a galvanising effect on US jewellery companies. As the RJC was the only industry body with an effective response to the new demands in the form of its certification standards, it was able to dramatically extend its membership. The requirements of Dodd-Frank facilitated the widespread use of a second, more ambitious RJC certification: Chain-of-Custody (C-o-C). which covered not only a company's in-house operations, but also its suppliers.

The Better Gold Initiative

The RJC is an international association, but there have also been nationally based projects whose aims overlap with the RJC's focus. Since 2013, the not-for-profit Swiss Better Gold Association (SBGA), through a public-private partnership with the Swiss government (SECO), has supported a programme called the Better Gold Initiative (BGI). The BGI supports the production of '*responsible gold*' by acting as a guaranteed buyer of all ethically certified gold, including Fairtrade Gold, Fairmined Gold and RJC certified gold. The programme currently

operates across Bolivia, Columbia and Peru, through association with those countries' government mining agencies, though through its retained consultants Projekt Consult, the BGI also acts as a global advocate for change to responsible practices (BGI 2019).

The actions of the SBGA could be perceived as purely a defensive response to mounting criticism of obviously unethical activity and encroaching legislation from other countries, or accused of being a cynical attempt to retain the country's grip on the international physical gold market (Ruysschaert 2015). The BGI is only adding institutional support to schemes already in existence, rather than initiating anything new. By supporting all the schemes, it is also able to avoid having to make any judgements regarding their comparative merits. However, the BGI makes one exceptional contribution: by underwriting all the initiatives that currently exist through guaranteeing purchases of ethically certified gold it is financially stabilising these schemes, resolving one of the most difficult issues they previously faced.

The Minamata Convention and the GEF GOLD programme

International politics are now beginning to impact on another aspect of ASGM. In 2003, the United Nations Environment Programme (UNEP) initiated the development of a convention to eliminate mercury emissions. Following a decision to create a legally binding instrument in 2009, the final text of this document, named the Minamata Convention on Mercury, was adopted in 2013 (United Nations Environment Programme 2017). The Convention came into force in 2017, binding the 127 states that had signed the accord to reduce emissions in their territories. For many countries across the developing world, ASGM use of mercury to initially process gold is their biggest source of mercury pollution and a formidable problem (Clifford 2014; Hilson et al 2018).

To support the Minamata Convention, in March 2019 the OECD's Global Environment Facility (GEF) launched the *Global Opportunities for Long-term Development of ASGM Sector* programme (GOLD), focusing on reducing or eliminating the use of mercury by ASGM miners across eight countries. The GEF GOLD programme also promulgates a new ethical phrase: *mercury-free gold*.

However, numerous commentators have noticed that many of the national initiatives being supported under the banner of the Minamata Convention rely heavily on the supposed panacea of formalizing the ASGM sector (Hilson et al 2018; Persaud et al 2017; speiegel et al 2015; UNITAR and UN Environment 2018). Twentieth century notions of how to 'deal with' ASM are apparently being re-conscripted under the guise of ecological concordats. The unintended and perverse consequences of previous similar international top-down programmes focusing on ASM activities, such as the Kimberly Process, indicate the obstacles this one may soon face (see Global Witness 2013; Smillie 2014).

Consequences: the impact on manufacturing

The Contradictions of Ethical Gold

Ethical gold is promoted by campaigners as a simple answer to the complications and opacity of the dominant interlocking system of international trading, refining and manufacturing. They challenge commercial gold-using businesses to improve their practices by submitting to the campaign's demands and attempt to leverage this through threats to broadcast the targeted company's perceived failings and so negatively affect consumer sentiment. That the criteria being used for these assessments are selected by self-appointed arbiters according to personal agendas and that the published judgements have been made on the basis of sketchy research is elided in the pursuit of attention-grabbing headlines that will generate impact.

The rise of the consumer-facing approach was born out of frustration at the supposed recalcitrance of large companies at the start or centre of the gold supply chain, combined with these companies' apparent invulnerability to established tactics. By changing their focus on the supposedly weakest link – the public retailers – activists were attempting to foment disharmony between companies operating at different stages in the chain to achieve their ends. But the setting up of ethical certification schemes exposed previously unacknowledged truths: the gold supply chain was far more complex in terms of its inflows and end markets and more dependent on specialist technologies of material processing than was commonly understood. Gold's longevity and capacity for recirculation further complicates the sector, as does the existence of an international trading system designed to respond to gold's peculiarities as a commodity (Green 1965, 1985; O'Callaghan 1993). But the campaigners lacked knowledge of how the most influence over the system was concentrated at points remote from the campaigners' attentions and were ignorant regarding the practical purpose of elements of the system they saw as simply problematic.

These factors all feature in the story of FT/FM Gold's rise and fall. The project team lacked an understanding of advanced refining technologies or the demands of gold manufacturing at scale. This can be explained, at least in part, by Fairtrade's complicated attitude towards corporations and 'big business' in general. Fairtrade, under the influence of the Fairtrade Foundation's CEO, Harriett Lamb, had recently adopted a strategy of mainstreaming Fairtrade commodities through partnerships with industrial manufacturers and retail chains. But this new approach was layered over the Fairtrade organisation's core identity as an alternative to impersonal free market forces and industrial corporations. Fairtrade employees were largely inimical to the practices of the large refining companies or the industry's trading body, the London Bullion Market Association (LBMA). Industry engagement meetings took place in an unhealthily confrontational atmosphere. Even Lamb herself chose to adopt a dismissive tone when describing the structure of the gold market at the FT/FM launch.

Seeking the Elusive Fair Price

The notion of ethical gold rests on another: the fair price. One of campaigners' narratives is the exploitation of subsistence gold miners by poorly defined middlemen, who do little or no work whilst taking all the profit.

Small-scale miners are also exploited by traders because of their poverty, and the absence of regulation and legal protections. They rarely receive a fair price for their product, even when the world gold price rises, as they are usually offered below the market price.

Gold Miners - Fairtrade Foundation Website 2019

This claim is an example of the typical conflation of the trading price in localised gold markets and the international gold price. Campaigners treat a disparity between the price paid for gold in local mining districts and the international spot price for gold as irrefutable evidence of exploitation.

Depending upon your opinion of international banking, the twice daily fixed gold market price (or 'fix') agreed and broadcast by the LBMA and used as the benchmark for international gold trading is either a secretive, opaque process or an exemplary demonstration of market forces determining price. In the current discussion, there are three interacting aspects of the LBMA system that are of interest: the price-setting mechanism itself, how it responds to the commodity in question, and difference between the intended and actual reach of the fix.

The fixed price is the result of a series of bids between representatives of five leading bullion banks who either want to buy and sell gold. On a twice-daily basis these banks aggregate their demand or surplus, resulting in amounts far larger than most gold trades. Membership of the panel is closed, though it has changed over time as institutions have left and new ones taken their place (Capano 2008; Green 1968, 1985; O’Callaghan 1993). Perceptions of the fix were damaged by a one-off price manipulation fraud by one of Barclay’s employees in 2012 (Levine 2014) but despite this, it has survived as the key gold price-setting mechanism.

A second aspect of the gold fix is the nature of the gold being traded. Panel trades can only be honoured by Good Delivery Bars produced by an accredited LBMA refiner (LBMA 2019). The costs associated with this hidden but technically demanding activity are factored into the trades.

The third aspect is the wider impact of the fix. Due to the comparatively enormous volumes of gold being traded at each of the LBMA meetings, the fix is taken by many traders in other commodities markets as the bellwether for the global demand for gold. Consequently, trades in physical gold, gold futures, and to some extent, gold mining company stocks, are all revised in response to the fix.

That the impact of the fix is an indirect consequence of its importance, rather than a conscious intention on the part of the LBMA, is lost on many commentators and campaigners. Equally, the actual nature of the gold objects being traded – Good Delivery Bars – is little understood. Due to this, campaigners describe the discrepancy between the price per gram being offered for a palmful of untested impure gold dust and tonnes of refined bullion as a scandal. This leads to accusations that refiners and LBMA traders are amongst the dishonest middlemen who exploit subsistence miners. This critical narrative has reached the point of becoming an orthodoxy amongst many NGO workers and supporters.

Who’s Afraid of Mass Balancing?

Considered through the lens of campaigners’ attitudes towards the existing gold trading system, ‘track and trace’ appears more as an ideology than an approach to policing certification requirements. Campaigners assume applying track and trace principles to previously *laissez-faire* gold supply chains means the egregious middlemen will be squeezed out, leaving the virtuous miners and their supporting licensees to thrive. From this perspective, the attempted reintroduction of mass balancing was a recidivist move that would enable the return of obfuscation. They were unable to countenance the idea that mass balancing was possibly a justifiable and practical response to the specific nature of gold as an exceptional commodity and the demands of gold processing technologies.

Gold processing, including refining, alloying, and stock production all benefit from economies of scale. Some of these are due to the material requirements of the technologies, but others are a consequence of the economics of working with a very expensive material.

The hydrolytic and pyrolytic processes deployed to refine gold are equipment and reagent intensive. The initial processing of impure gold doré bars requires either purification by remelting and adding fluxes to the melt to react with and separate out impurities, or dissolution of the doré in *aqua regia*, followed by precipitation and filtering. To refine gold to 99.5% purity (the minimum standard for the LBMA) it is also necessary to employ the Miller Process, where chlorine gas is blown over and bubbled through the molten gold. To refine gold to 99.99% purity (the typical LBMA standard) entails the electrolytic Wohlwill Process, which requires baths of chloroauric acid (Pletcher and Walsh 1990). To meet staff health and environmental concerns, as well as legislative requirements, operations must also shoulder the indirect costs of installing and maintaining robust fume scrubbing systems.

The requirements of the Wohlwill process are a good example of the existence of how gold becomes ‘trapped’ in refining processes. To supply the necessary gold ions, the electrolytic

solution is charged with chloroauric acid (HAuCl₄). Gold ions always remain in the electrolyte after the process. During the procedure contaminants increasingly impair the functioning of the electrolyte, which eventually has to be replaced. At this point the ionic gold can be recovered from exhausted electrolytes by precipitation, but it then has to be recovered through reprocessing.

Refining also entails repeated percentage losses from a batch whenever samples are removed for assaying. When molten pure gold or gold alloy is being tested, it is necessary to draw a sample using a vacuum tube. As the sample has to be processed and held securely whilst this occurs (and possibly retained much longer for possible reconfirmation) a noticeable percentage is removed from the melt that cannot be returned to that batch. A similar size sample needs to be withdrawn each time no matter what the size of the melt to ensure the material being tested is representative. Added to the direct cost of gold removal is the cost of the equipment, materials and assayer required to undertake the assay. The cost of each assay has to be assigned across the batch; the smaller the batch, the higher the percentage cost of each assay for each gram of gold being refined or alloyed.

Producing stock materials has related issues. Perhaps the most extreme of these occurs in chain production. Chain making machines are impressive pieces of mechanical engineering that can produce kilometres of gold chain in a day. The issue chain manufacturers face is that chain machines need to operate continuously, so chain manufacturers need large volumes of gold alloy wire to feed into the running machine, as well as a skilled operator who can manage and quickly resolve issues before the machine malfunctions. Chain making has developed an extreme path dependency to volume production (Green 1968).

ASGM and Mercury

The use of mercury to process gold bearing ores is a very ancient technology. It was still ubiquitous during the new world gold rushes during the nineteenth century, and used in the giant industrial gold dredges that worked alluvial gold deposits in the first half of the twentieth. Attitudes towards mercury use across the developed world shifted when the extreme effects of environmental mercury poisoning came to international prominence in the 1950s. The inhabitants of the fishing community of Minamata, dependent on a food source contaminated by very high levels of mercury discharged by a nearby factory, began to suffer extreme effects of mercury poisoning.

Despite increasingly stringent controls on mercury use in the developed world, ASGM has become increasingly dependent on using mercury to capture and initially process gold. Attempts to limit the worst excesses of contamination – exposure to mercury vapour from heating mercury-gold amalgam in and around dwellings – through the design and distribution of small-scale retorts to ASGM communities, proved an expensive failure. More modest programmes, focusing on promoting the use of marginally safer *ad hoc* equipment to driving mercury out of gold amalgam, have had mixed results (Spiegel *et al* 2015; Steckling *et al* 2017; Telmer and Stapper 2012).

The organisations attempting to enforce the Minamata Convention, including the GEF GOLD teams, face a definite uphill struggle (Fritz *et al* 2016; Porcella, *et al* 1997). Key to this is the combination of mercury's compatibility with low-tech gold extraction and the insidious cumulative nature of mercury toxicity. The lag between exposure and impact makes it difficult to convince users that exposure is dangerous. Attempts to eliminate mercury use simply through legislation have led to perverse effects, such as miners heating mercury amalgam secretly inside dwellings, rather than openly in more ventilated courtyards.

Reflections: Reaching across the divide.

Ethical Gold as an ideal

As a term ethical gold has undergone significant revisions in meaning over a single decade. As a phrase created to describe idealised practice in the gold industries, but not owned by the professional groups that constitute the sector, it exists as an inherently problematic phrase for those groups. Its foundational structure, the Golden Rules, was assembled from a diverse list of social aspirations that have themselves proved just as self-contradictory and difficult to implement effectively in their entirety.

The ethical gold sourcing certification programmes that came into being have had to prioritise some of the rules at the expense of others. The FT/FM gold programme focused on rules 1 and 3 that supported members of existing mining communities, but admitted miners working in national parks in one of the worlds biodiversity hotspots and in the middle of longest running civil war on the planet, contravening rules 6 and 4. Later schemes marching under the ethical gold banner have given up any claim to be all-encompassing, instead focusing entirely on very specific requirements. Conflict gold, according to the quasi-legal framework that initially underpinned the term, was restricted to the gold sold into the international market to finance specific armed conflicts in equatorial Africa. Though non-conflict gold implies an encompassing idea, its strict definition is simply a reciprocal of the former. This process of simplification takes a new turn with mercury-free gold. In this case the framing is around environmental protection and human health, yet less altruistic motives behind interest in signing up for the GEF GOLD programme are already becoming evident. Implimentation could even end up focusing predominantly on controlling ASM communities in the name of 'mercury-free gold' than working with them or for their future benefit.

Whilst ethical gold and its subsidiary terms do not demonstrate coherence in the face of rational scrutiny, this does not repudiate their currency and impact. As markers of idealised practice, they are exceptionally effective, condensing a nebulous idea into an apparently concrete reality that can exert real social force. This makes them ideal tools for supporting the type of emotive presentations and hagiographic texts that campaigners are keen to deliver (e.g. Lamb 2008; Valerio 2013).

Manufacturing in a Time of Ethical Gold

Over the past decade professionals involved in the physical processing of gold have increasingly had their practices and perceptions challenged by individuals with no obvious authority. That many directors, managers and staff have found this both disconcerting and irritating is something of an understatement. Watching numerous uncordial, confrontative and, on occasion, even vindictive exchanges between industry representatives and NGO activists it was obvious that a pattern frequently emerged. Campaigners were very willing to expound at length on reasons why particular changes needed to be made, whilst industry representatives took the position the status quo was unassailable but offered no justification for taking this approach.

I believe there are two reasons for this. The first is that industry insiders are not practised in explaining the complexities of the gold industries to outsiders, a situation that is reinforced by a general reticence across the industry to discuss technical matters that in some cases come close to being trade secrets. This reluctance to engage can, unfortunately, easily be read as arrogance by someone who is familiar with behaviour in the gold industry community.

The second is that gold industry professionals see themselves as members of a community who undertake divergent tasks, but all work towards a single overarching aim: to support the creation and flows of gold objects that perpetuate these industries. What campaigners saw as complacency was experienced by the practitioners themselves as loyalty to a common cause.

Mind your Language

Perhaps the answer lies in understanding the consequences of the very specific ways that members of the gold industry talk to each other. The language of the gold trade is, in many ways, the antithesis of that used by staff in the NGOs. Gold professionals focus on the practicalities of situations, adopting a dispassionate viewpoint and attempting to frame their activities in terms of technical and financial imperatives rather than abstract and idealist criteria. Faced with the fundamental but unquestioned inconsistencies of idealist ethical terms and unaccustomed to their emotional strength, gold professionals find it hard to respond in an effective manner. The situation has worsened as campaigners have moved from threatening to spotlight companies to try and elicit compliance, to actually doing so as a pre-emptive tactic. Whilst I am not advocating complete linguistic capitulation by the industry, I do feel the current lack of open communication between these two spheres of social influence is proving damaging. A clear example comes in the form of Chopard's mauling at the hands of Human Rights Watch. Whilst the report identified more extreme examples of detachment from ethical principles e.g. Rolex (see Becker and Kippenberg 2018), in order to achieve maximum media exposure the authors chose to downplay these findings, instead they pilloried Chopard for perceiving failings in terms of the extent of their overall support and the veracity of the certification schemes they chose to work with. HRW's press release was timed to coincide with, and so compromise Chopard's announcement it was entirely moving to sourcing from certified sources. That Chopard was shouldering more risk than its competitors to financially support those in more need than the safer options taken by the list's leaders was not taken into account. This attempt to hijack industry events is not unique: campaign launches, including No Dirty Gold, FT/FM gold, and Fairtrade's 'I Do' have all taken place immediately before Valentines Day, in the hope of generating publicity on the back of a controversial story. That this divisive tactic is likely to antagonise jewellery professionals and so make them less likely to engage, rather than 'bring them to heel', does not appear to occur to the campaign managers. However, in an increasingly crowded field of competing ethical advocacy organisations, the use of such confrontational tactics to generate exposure are likely to become more typical rather than die out.

There is, therefore, a pressing need for the gold industry to become more loquacious in explaining its activities to the wider public and for its membership to become more prepared to justify the value of existing practices. If consumers understand why manufacturing matters in ethical practice, they will be more prepared to recognise industry members' contributions to the debate as it develops. This needs to be done not only in terms of on technical or financial registers. Industry protagonists also need stake out and seriously occupy some of the emotional ground currently held by campaigners.

Notes.

1. Though some other campaign groups soon followed the same strategy e.g. WWF (see Bendell and Kleantous 2007), the targeting of gold jewellery consumers was not universally adopted. For example, Human Rights Watch persisted in publishing reports on specific mines (e.g. Albin-Lackey 2010) and national ASM (e.g. Kippenberg 2015) for a decade, primarily accusing mining corporations and governments of responsibility for the issues they raised. HRW only changed their focus in 2018 in the report *The hidden Costs of Jewellery*, which claimed to review the sourcing activities of leading jewellery and watch manufacturers (Becker and Kippenberg 2018).

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