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Identification of Bullets: human right and human responsibility?

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Introduction

Much is made of the implications of the arms trade and the spread of weapons, notably manufactured by the permanent members of the United Nations Security Council. This has become a fact of life and is accepted as such.

Curiously it is less evident whose weapons are used in the final killing of individuals in combat -- especially the weapons used "illegally" by insurgents. The following is a brief exploration of the possibility of identifying who supplied the bullet which finally entered the body of the person maimed or killed.

Does the person so wounded -- or the relatives of those killed -- have the right to know who produced the bullet? Is this a fundamental human right or a matter of human responsibility?

Whereas not many years ago it would have been considered ridiculous to sell fruit individually identified by marks enabling their precise origin to be determined -- even to the person who packed them -- such labelling is now commonplace. The argument is that in the event of a threat to health associated with the product, whether fruit or other consumer products, responsibility can be precisely established. Such labelling may be a requirement governing import of foreign products.

If precise labelling can be justified for sources of life-giving human nourishment, because of their potential threat to health, is there not a case for denitrifying those products intended as a means of incapacitating individuals, possibly terminally? Do relatives have a right to the bullet by which a loved one was killed?

More generally is it appropriate to be able to indicate, with as much details as possible, who was responsible for the manufacture of the bullet? Should the bullets used in insurgency operations be a matter of public knowledge?

Fruit identification as a precedent

The objective of foodstuff labelling is to guarantee that consumers have access to complete information on the content and composition of products, in order to protect their health and their interests. Other information may provide details on a particular aspect of the product, such as its origin or production method. Some foodstuffs, such as genetically modified organisms, allergenic foods, foods intended for infants or even various beverages, are also subject to specific regulations. (*Product labelling and packaging*, Europa Summaries of EU Legislation).

Regulation (EC) No 1935/2004 of the European Parliament and of the Council of 27 October 2004 on materials and articles intended to come into contact with food notably establishes the requirements which must be met regarding the traceability of food contact materials from production to sale. The traceability of food is currently assured by a Regulation dating from 2002. The concept of traceability "from farm to fork" was established in the *White Paper on Food Safety* (2000). The traceability of food, feed, food-producing animals and all substances incorporated into foodstuffs must be established at all stages of production, processing and distribution. To this end, business operators are required to apply appropriate systems and procedures.

Bullet identification

There is of course an extensive literature on the identification of bullets and the firearms that produced them (M. Bonfanti and J. De Kinder, *The Influence of Manufacturing Processes on the Identification of Bullets and Cartridge Cases: a review of the literature,* Science and Justice, 1999, 39, 1, pp. 3-10). The forensic techniques of ballistic fingerprinting rely on marks that firearms leave on bullets to match a bullet to the weapon by which it was fired.

However the focus is primarily on the challenge in relation to crimes within countries. A notable emphasis is placed on the traceability of firearms based on their rifling as evident from examination of a bullet as reviewed by Daniel L. Cork, et al. for the Committee to Assess the Feasibility, Accuracy and Technical Capability of a National Ballistics Database, and the National Research Council (*Ballistic Imaging*. National Academies Press, 2008). This assesses the state of computer-based imaging technology in forensic firearms identification. It offers an evaluation of current US law enforcement database of images of crime-related cartridge cases and bullets and

recommends ways to improve the usefulness of the technology for suggesting leads in criminal investigations. The book also suggests further research on an alternate method for generating an investigative lead to the location where a gun was first sold: "microstamping," the direct imprinting of unique identifiers on firearm parts or ammunition.

This last recommendation is more relevant to the credibility of the argument here, namely the addition of identification to the bullet itself as a product independent of the firearm. Arguably it is the bullet that kills, not the firearm. A patent issued in 1979 covers one such possibility (*Bullet identification means*, US Patent 4150624, 24 April 1979; Estimated Patent Expiration 26 May 1997). This is a method for identification of bullets is provided whereby a coded insert is fitted within a cartridge to accompany a bullet in its trajectory and provide source information when recovered.

Several proposals have been made for the mandatory marking of bullets to aid in ballistic fingerprinting. Some jurisdictions have passed legislation to that effect. California, for instance, passed a bill AB 1471 which requires all new models of handguns to be equipped with microstamping technology by 2010. Firearm microstamping engraves the make, model, and serial number on the cartridge and on the face of the firing pin, which stamps the primer as the firing pin impacts it.

Various computer-enhanced facilities exist to provide rapid identification of bullets in multiple gunshot wounds, such as the Lodox/Statscan. This provides rapid and whole-body scans. In multiple gunshot trauma, the conventional radiograph or computed tomography scan might be time consuming, and the resuscitation might be paused temporarily.

Use of new marking technologies: tracing tracers

Pollen/Metallic oxide coatings: It has been proposed that ammunition manufacturers coat their bullets with pollen, or with a pollen deposit coated with a metal oxide (Rob Crossley, *Nanotech can make every bullet a fingerprint*, *The Chemical Engineer*, 9 September 2009). The 'nanotags', each measuring 30 µm in diameter, are made from naturally-occurring pollen - a material known for its superior adhesive properties. Pollen grains are sticky enough and have a sufficiently hard outer case to survive being fired. They also attach themselves to the clothing and hands of people who handle the ammunition and the gun, providing an additional forensics clue (the pollen is extremely difficult to wash off completely, according to the researchers). If manufacturers used unique pollen varieties or unique mixtures of pollen and oxide coatings, the manufacturing database could be used to quickly identify a bullet found at a crime scene, assuming the investigating bodies equip themselves with the necessary pollen-identification equipment.

Microdots: A major stimulus for new marking technology has been the level of auto-theft in many countries. Whereas there have long been requirements that vehicle parts should be uniquely labelled by etching techniques, these can be effaced.

To prevent this loss of identification, one interesting development of potential relevance to both firearms and ammunition is the use of microdots or data dots. This is a text or an image substantially reduced in size onto a 1mm disc to prevent detection by unintended recipients. They can be made from various materials such as polyester. In the case of vehicles thousands of these may be sprinkled within the vehicle. They are also used to trace other property subject to theft. Various governments, companies, and manufacturers have begun using microdot identification to protect their assets.

Wider varieties of protection are applied using datadots, as distributed by DataDot Technology Limited (DDT), an Australian public company with worldwide distribution. Of potential relevance to the application of this nanotechnology to ammunition coding, in addition to firearms, is the company's DataDotDNA Metallic. This is currently applied via aerosol cans containing 25,000 Nickel Microdots each only 0.3 mm in diameter. These are resistant to temperatures up to 800°C. A 6 character PIN code is applied on a holographic background image. The PIN code is registered in the companies database. The temperature of a standard NATO rifle bullet has been estimated to be around 267°C (Austin Richards, *Measuring the Temperature of a Speeding Bullet*, ***R&D*** *Magazine*, June 2002).

Fingerprinting metals: Of possible relevance is the gold fingerprinting technique developed by the Anglo American Research Laboratories (B Grigorova, et al, *The AARL Gold Fingerprinting Technology*, *Gold Bulletin*, 1998). The technique provides gold profiles unique to a given source. The procedure adopts a qualitative approach based on the singular patterns produced by the minor and trace element impurities present in gold. The generation of a Gold Bullion Databank (GBD) has provided an effective means of ascertaining gold provenance in cases where the origin is unknown (cf. James Randerson, *Gold fingerprint to foil forgers*, *New Scientist*, 6 March 2004).

Molecular tracing: Molecular tracers have been developed that allow manufacturers to monitor flexible and rigid plastic packaging - at any stage in the supply chain - to help resolve security, counterfeiting, quality, liability and other issues (*Molecular tracer tags rigid, flexible packaging*, *FoodProductionDaily.com*, 28 July 2005).

Comment

Clearly health and safety legislation regarding food products "from farm to fork" have clarified the justification for traceability and have resulted in a high degree of implementation. Concerns with theft, notably in the case of automobiles, have encouraged development of ever more sophisticated identification technologies.

The logic of the drug war has notably focused on the responsibility of producers -- leading to the much publicized destruction of crops of poppies and of coca plantations.

The issue of gun control remains highly controversial, most notably in the USA -- one of the few countries where the right to bear arms is specifically enshrined in its Constitution (in the form of the *Second Amendment*). The argument above is not however concerned with arms control or the massive trade in small arms, frequently the subject of international debate. It accepts the primary argument of the US National Rifle Association that "guns don't kill people, people do". The right to bear arms may indeed be essential to the viability of a

particular understanding of democracy, as previously discussed (*Arming Civil Society Worldwide: getting democracy to work in the emergent American Empire?* 2003).

The argument here is that, consistent with that Second Amendment, everyone might indeed "bear arms". Arms in that sense are purely decorative -- without ammunition. It is only when the arms are loaded -- when the weapon itself is "armed" -- that there is an issue of risk and responsibility. The issue then, following the logic of fruit production and the responsibility attributed to coca and poppy cultivation, is to identify responsibility at the source of ammunition production. It is not, for example, the manufactuers of syringes for the delivery of drugs. who are held to have any responsibility in the matter. More interesting in fact is the potential responsibility of the holders of the patents for the ammunition and their right to understand how their final effects, as discussed previously (*From Patent Rights to Patent Responsibilities: obligations incumbent on owners and licensors of intellectual property*, 2007).

It is not a question of acting on that knowledge but rather of making transparent that responsibility -- irrespective of whether it is to be judged as responsible or irresponsible. Much is made and appreciated in historical drama of the right of an individual to know the name of the person by whom they may be killed -- if the death is to be understood as honourable. Civil servants dealing directly with the public and the fate of individuals are now specifically named at the counters where the interaction takes place -- in contrast to practice not so long ago.

To what extent is it then an honourable human right to know the name of the person from whom one's relative has received a fatal bullet? To what extent is it an honourable human responsibility to provide that name, as the crafter of that bullet? Or is such manufacture to be considered a matter of shame and dishonour? (cf *Honour Essential to Psycho-social Integrity: challenge to the nameless of dishonourable leadership*, 2005; *Varieties of Honour and Dishonour: distinguishing intrinsic honour from honourable externalities*, 2005).

The tragic twist is that such information might well reveal that the bullet resulting in the death of a soldier in a combat zone came from the soldier's own home town. It is obvious that the sale of arms by permanent members of the UN Security Council may lead to them being used in combat against one another. However the provenance of such ammunition is as yet less evident in media reports of such engagements -- notably when it gives rise to fatalities.

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