

## Identifying and Exploiting Opportunities for ‘Clean, Green and Ethical’ Animal Production

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### Summary

Market demand for ‘clean, green and ethical’ animal production is growing. In order to identify and exploit market opportunities for ‘clean, green and ethical’ products in the animal industries, we need an approach to agricultural innovation that effectively connects consumers with producers, scientists and other industry stakeholders. Using the case of mulesing in the Australian wool industry, we highlight the constraints of the traditional ‘transfer of technology’ approach to innovation processes aimed at developing technologies and products that seek to meet the demands of ‘ethical’ consumers. In examining the case of mulesing in the Australian wool industry and consumers response to ‘clean, green and ethical’ wool apparel, we are able to articulate an alternative approach to innovation that supports the early and ongoing engagement of consumers, producers and other influential stakeholders in the innovation and product design process. Ultimately, this flexible and collaborative approach to innovation, known as ‘fourth generation research and development’, may help animal industries to identify and exploit of new market opportunities for ‘clean, green and ethical’ products.

**Key words:** Clean, green, ethical, 4<sup>th</sup> generation R&D, wool, ethical consumers

### Resumen

## Identificando y Explotando Oportunidades para Producción Animal ‘Limpia, Verde y Ética’

La demanda del mercado para producción animal ‘limpia, verde y ética’ está creciendo. Para identificar y explotar oportunidades de mercado para productos ‘limpias, verdes y éticas’ en las industrias animales necesitamos una aproximación a la innovación agrícola que conecte efectivamente los consumidores con los productores, científicos y otros interesados industriales. Usando el caso de ‘mulesing’ en la industria Australiana de la lana, destacamos las restricciones de la aproximación tradicional de ‘transferencia de tecnología’ a los procesos de innovación apuntados al desarrollo de tecnologías y productos que buscan cumplir con las demandas de consumidores ‘éticos’. Al examinar el caso de ‘mulesing’ en la industria Australiana de la lana y la respuesta de consumidores a prendas ‘limpias, verdes y éticas’, podemos articular una aproximación alternativa a la innovación que apoya el involucramiento temprano y sostenido de consumidores, productores y otros interesados influyentes en la innovación y en el proceso de diseño de productos. Finalmente, esta aproximación flexible y de colaboración a la innovación, conocida como ‘investigación y desarrollo de cuarta generación’, puede ayudar las industrias animales a identificar y explotar nuevas oportunidades de mercado para productos ‘limpios, verdes, y éticos’.

**Palabras clave:** Limpio, verde, ético, I&D de 4<sup>ta</sup> generación, lana, consumidores éticos

## Introduction

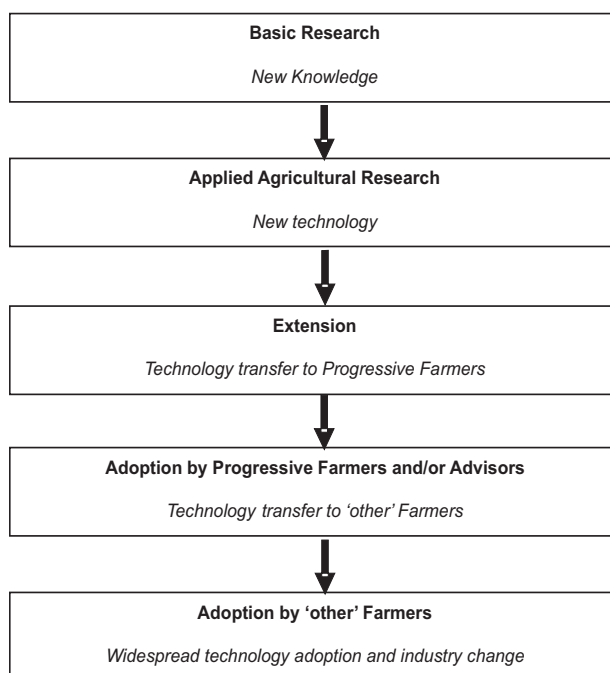
The agricultural sector is experiencing a growth in consumer demand for ‘clean, green and ethical’ products. In order for the agricultural sector to identify and exploit market opportunities for ‘clean, green and ethical’ products it is argued that there is a need for agricultural industries to adopt more flexible and collaborative approaches to innovation that reduce technology and product failure risk by effectively connecting producers, consumers and other industry stakeholders in the innovation process. In the following sections of this paper traditional approaches to agricultural innovation and emerging flexible and collaborative innovation models are briefly examined and compared. The case of mulesing in the Australian wool industry is then described to highlight the constraints of the traditional ‘transfer of technology’ approach to innovation in the development of technologies and products that seek to address the ethical preferences and concerns of consumers. Finally, the role of emerging flexible and collaborative innovation models in the identification and exploitation of new market opportunities for ‘clean, green and ethical’ animal production is discussed.

## Creating a market focus for ‘clean, green and ethical’ animal production

A strong market focus in the development of agricultural innovation, products and policy has been somewhat lacking in traditional approaches to agricultural innovation. Agricultural innovation has traditionally been seen as a simple, ‘top-down’, linear, staged process of the development, transfer and adoption of new technologies. Figure 1 shows a ‘top-down’ conceptualisation of agricultural innovation, referred to in the agricultural innovation literature as the Transfer of Technology (ToT) or Central Model (Lionberger and Gwin, 1991). New knowledge is seen to flow through a conceptual innovation pipeline that has basic research activities at one end and useful technologies that are adopted by farmers at the other (Biggs, 1989; Chambers and Jiggins, 1986; Clark, 1995; Horton and Prain, 1989), thus resulting in the development of products that will be accepted by the market.

In the traditional Transfer of Technology (ToT) model it is assumed basic research is undertaken in universities and research organisations to extend the frontiers of knowledge (Lionberger and Gwin, 1991). The outcomes of basic research are transferred to organisations, such

as Government funded departments of agriculture, that undertake applied research to translate basic research outcomes into farming technologies (Lionberger and Gwin, 1991). The technologies developed through applied research activities are translated into extension programs that are delivered to the farming community to bring about change (Biggs, 1989; Clark, 1995). It is further assumed that the changes that are implemented on-farm will result in the production of agricultural goods that will be valued by consumers. The ‘top-down’ technology transfer model is strictly a *technology push* or *technology opportunity* approach to innovation, which ignores market (both producer and consumer) demand for the development and dissemination of innovation and new products.



**Figure 1.** Transfer of Technology (ToT) model (adapted from: Lionberger and Gwin, 1991).

The successful transfer of technologies from researcher to end user using this ‘top-down’ approach is problematic (Black, 2000; Howden *et al.*, 1998; Roling, 1988). The use of the ToT approach in the agricultural sector has been blamed for the failure and over-adoption of new technologies and has been seen as contributing to uneven rural development and environmental degradation (Vanclay, 1994). A major constraint on the successful transfer of new technologies

through the ToT model is a lack of feedback either up or down the innovation pipeline and a lack of customer or consumer input. Researchers engaged in basic or fundamental research have little or no direct contact with producers, and the customers and consumers of agricultural products during technology development, adoption and implementation (Horton and Prain, 1989). Without direct contact or useful feedback from producers, customers and consumers, the scientific community may fail to understand the context in which new technologies are adopted and implemented (Biggs, 1989; Chambers and Jiggins, 1986; Crouch, 1981) and the needs of the market for whom agricultural production outputs are intended. Although the limitations of the ToT approach to agricultural innovation have been discussed by researchers and practitioners since the late 1980s (e.g. Hildebrand, 1993; Roling, 1988; Vanclay, 1994) there is evidence that ToT approach to innovation continues to be used in the publicly funded agricultural research and development R&D sector (Sneddon, 2008).

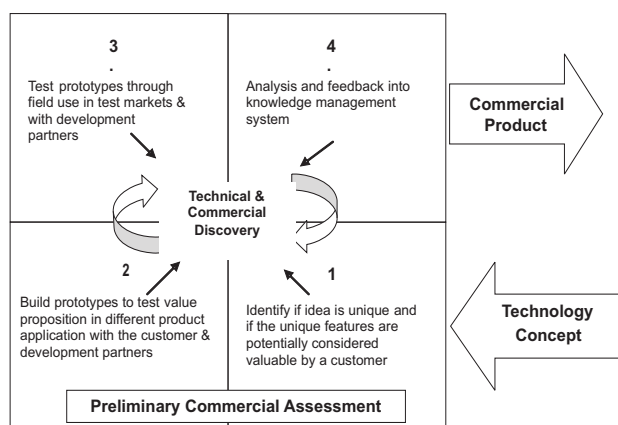
In contrast to ‘top-down’ approaches to innovation frequently used in publicly funded agricultural R&D there has been a shift towards more flexible and collaborative models in commercial R&D policy and practice (Niosi, 1999). Organisations that have successfully used fourth generation R&D approaches in innovation management and new product development include NASA, Nike, Hewlett-Packard and Intel (Miller and Morris, 1998). These flexible and collaborative innovation models have been referred to as the ‘fourth generation’ of R&D management approaches (Miller and Morris, 1998). Fourth generation R&D approaches emerged in the corporate research sphere in the 1980s and incorporate systematic links between researchers in the public and private sectors and alliances between producers, end users and other industry and market stakeholders. Such approaches to innovation management seek to incorporate the knowledge of researchers, users, suppliers, producers and competitors in an expanded and boundary-spanning innovation network (Miller and Morris, 1998; Niosi, 1999).

In fourth generation R&D management approaches, it is acknowledged that innovation occurs within a network of relationships where the outcomes of innovation initiatives depend to a great extent on the performance of other actors involved both directly and indirectly in the innovation process (Miller and Morris, 1998). These flexible and collaborate innovation models emphasise direct collaboration between producers and consumers and the rapid evaluation of the performance of innovations *in situ* (Miller and Morris, 1998; Niosi,

1999). Whereas traditional ‘top-down’ models of innovation management emphasised the need to avoid disruption or change during the innovation process, more flexible and collaborative models of innovation management seek to embrace change by continuing to develop the innovation or product concept as the needs of the target customer emerge (Miller and Morris, 1998). Participants in the innovation process actively manage changes in direction without a clear definition of the end-product. They focus instead on rapid response to market feedback and make effective feedback loops between the development, adoption and implementation of an innovation or new product a reality.

In flexible models of innovation management, technology development, adoption and implementation are linked and the project team addresses challenges associated with these phases iteratively as they cycle between development and use and incorporate feedback into further development (Miller and Morris, 1998). This cycle of ‘design-build-test’, illustrated in Figure 2, is repeated until the development and implementation of the technology no longer overlap. Such an iterative, dynamic and collaborative approach to innovation makes it possible for rapid response to changes in technological, environmental or societal events. Niosi (1999) argued that the use of effective fourth generation R&D innovation management practices can result in a reduction in R&D costs, reduced risk and uncertainty, the acceleration of innovation, less duplication, improved collaboration and greater access to target markets.

In the agricultural innovation context, the ‘design-build-test’ cycle, illustrated in Figure 2, begins with a technology concept and the identification of a target



**Figure 2.** Fourth generation approach to innovation (Source: Miller and Morris, 1998).

customer for whom this technology concept is unique and is considered valuable. The target customer for agricultural innovation is usually producers with specific enterprise types. However, the fourth generation approach to innovation requires the identification of all of the stakeholders in the innovation process, including the potential consumers of the product that will be produced with the use of the proposed technology, along with other key stakeholders who will have some influence over the use of the technology and product outcomes. The early identification and involvement of key stakeholders in the innovation process is critical in the development of technologies aimed at exploiting opportunities for 'clean, green and ethical' agricultural production because of the central role of consumers and consumer-based organisations in this market space.

### **The role of consumers in 'clean, green and ethical' animal production**

The role of consumers in the 'clean, green and ethical' agricultural production debate has become increasingly important. Since the 1990s, a group of principled 'ethical' consumers has emerged who are concerned about social, environmental and ethical issues and are demanding 'clean, green and ethical' sources of production (e.g. Matthews, 1994). The potential impact of ethical consumers on governments, enterprises and industries has generated ongoing interest among producers, marketers and managers (Caruana, 2007; Korthals, 2001). Consumers acting on their ethical preferences and concerns can force changes in production and marketing activities through their purchase decisions (De Pelsmacker *et al.*, 2005; Karpatkin, 1998) and boycotts of products and markets (Friedman, 1995; Rudell, 2006). Thus, ignoring the ethical preferences and concerns of consumers may result in the development of unmarketable products and production practices that are considered inappropriate or 'unethical' (Auger *et al.*, 2007), making consumers a key constituent in the development and implementation of agricultural innovation and production.

A recent example of the central role of consumers in the development and implementation of agricultural innovation and production is 'People for the Ethical Treatment of Animals' (PETA) campaign against mulesing in the Australian wool industry. PETA's anti-mulesing campaign threatened to lock Australian Merino wool out of lucrative apparel markets (Evans, 2005)<sup>1</sup>. PETA claim that mulesing subjects sheep to unnecessary pain and suffering (Akin, 2004) and have campaigned against the use of Australian wool by international clothing retailers such as Abercrombie and Fitch and Benetton since 2004 (Munro, 2008). A number of apparel retailers, including AB Lindex, Kukdong, Perry Ellis, Matalan, Hennes & Mauritz, Adidas and Hugo Boss have stopped using wool from mulesed sheep in their products (People for the Ethical Treatment of Animals, 2008), suggesting that PETA's campaign has damaged the market for Australian wool.

The success of PETA's anti-mulesing campaign suggests that agricultural industry participants need to better understand such issues as ethical preferences from a consumer perspective if they are to develop and adopt new technologies that will enable them to exploit market demand for 'clean, green and ethical' products. In light of PETA's campaign targeting the Australian wool industry there has been a growing recognition among woolgrowers and other industry participants for the need for a more proactive, market focused approach to 'clean, green and ethical' issues (The Woolmark Company, 2006), however, this is not evident in the industry's attempts to develop alternatives to surgical mulesing.

In November 2004, the Australian wool industry committed to phasing out mulesing in 2010 (McLachlan and Pietsch, 2005). In order to develop suitable and effective alternatives to surgical mulesing by 2010, the Australian wool industry has invested in an extensive research and development program (Australian Wool Innovation Limited, 2007). Alternative strategies for the prevention of fly-strike that are anticipated to be available to farmers from 2010 include clips<sup>2</sup>, needleless intradermal injections<sup>3</sup> and blowfly biocontrol<sup>4</sup> (Australian Wool Innovation Limited, 2007). The

<sup>1</sup>In 2004 PETA called for an immediate ban on the live export of sheep from Australia and mulesing of Australian Merino lambs. Mulesing is a surgical procedure to remove skin from the breech of the lamb to prevent flystrike, it has traditionally been performed without anaesthetic or analgesic.

<sup>2</sup>Clips are attached to the flaps of skin around the breech of the sheep that would be removed during mulesing. The clip places pressure on the flap of skin that prevents blood flow to it and causes the skin flap to fall off within a couple of weeks.

<sup>3</sup>A needleless applicator delivers a measured dose of formulation one millimeter into the skin which causes necrosis in the treated area.

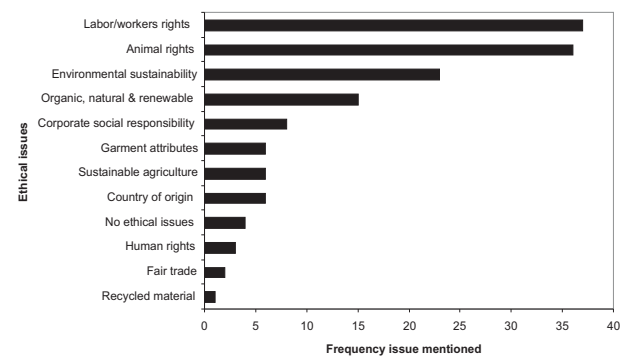
<sup>4</sup>The development of highly targeted vaccines or insecticides and methods such as the mass release of sterile male flies to control blowflies.

industry is also working towards a genetic alternative to surgical mulesing through the breeding and selection of flystrike resistant sheep<sup>5</sup> (James, 2006; Scobie *et al.*, 2005a; Scobie *et al.*, 2005b). However, recent research on woolgrowers intentions to prevent and treat fly strike when mulesing is phased out in 2010 found that farmers are concerned that this deadline will not be achieved because they believe that effective alternatives to mulesing are not in place (Wells *et al.*, 2009; see also Cuming and Gray, 2008). The likely outcome in this situation is that, although Australian woolgrowers are willing to support the phase-out of mulesing, they may not cease mulesing by the agreed deadline and PETA will continue to campaign against the use of Australian wool.

The lack of support among of woolgrowers for the proposed alternatives to surgical mulesing suggests that these new technologies have been developed using a ToT approach and that the beliefs, attitudes and intentions of woolgrowers have not been incorporated into the innovation process. Moreover, that PETA and some clothing retailers have questioned the animal welfare outcomes of clips as an alternative to surgical mulesing suggests that animal welfare groups, retailers and consumers have not been involved in the development of alternative technologies. The lack of buy-in of producers, retailers, animal welfare groups and consumers to the proposed alternatives to surgical mulesing highlight the problems associated with addressing ethical issues using a ‘top-down’ approach to innovation as opposed to more flexible and inclusive processes such as the fourth generation approach to innovation discussed in the previous section.

In an attempt to add the consumers’ voice to the mulesing debate we undertook an exploratory study of consumers’ perceptions of ethical issues in the wool industry. This exploratory research was undertaken with female clothing consumers in the USA<sup>6</sup> to identify the ethical, social and environmental issues they considered when purchasing wool apparel. The ethical issues considered and the frequencies with which they were mentioned are shown in Figure 3. Labour/workers rights were most frequently mentioned (25% of the ethical issues raised). Labour/workers rights issues were specific, but not exclusive to the purchase of wool

apparel as they included labour rights (e.g., ‘My husband and I are concerned about buying apparel that is not produced in sweatshops, this applies equally to wool and all other materials’), fair compensation for workers (e.g., ‘who makes them - fair , living wage?’), sweatshops (e.g., ‘I care about how it is produced, i.e. ‘I try not to purchase any material that is a result of unfair labour practices’) and forced labour (e.g., ‘no slave labour’).



**Figure 3.** Frequency of ethical issues mentioned by participants.

Thirty-six (24%) animal welfare issues were mentioned, including general concerns about how animals (sheep) are treated (e.g., ‘are sheep treated like animals or wool machines?’), living conditions (e.g., ‘conditions for sheep whose wool is taken’), farming methods (e.g., ‘factory farms – or whatever – safety of animals’), animal health and husbandry (e.g., ‘I would hope that the wool that is shaved of the sheep is not too close to the skin so that the sheep does not get hurt. If the sheep gets nicked, I hope the sheep is cared for. The season for shearing, I hope, is not too cold for the sheep to bear the outside elements. After the sheep is sheared I hope there are sheltered areas for the animal to go’), and welfare and humane treatment (e.g., ‘I really do not have a problem with purchasing or production part of the wool as long as sheep are treated humanely, meaning that they are not suffering’). None of participants mentioned specific animal welfare issues and none mentioned mulesing.

<sup>5</sup>The breeding and selection of sheep with a genetic make-up that are wool free in the crutch and inner hind legs and do not need to be crutched or mulesed.

<sup>6</sup>Forty seven females who identified themselves as ethical consumers, who select and purchase their own apparel, shop regularly for their own apparel, do not purchase apparel solely on the basis of price and would purchase an individual garment priced at over US\$200, participated in the study.

Twenty-three (16%) environmental sustainability issues were mentioned, including the use of chemicals in the treatment of wool, dyeing and dry-cleaning (e.g., 'dry cleaning isn't earth friendly', 'environmental impacts of chemicals') and the negative impact of the transportation of wool products (e.g., 'environmental: distance it travels'). Fifteen (10%) positive ethical issues were mentioned when purchasing wool apparel, including describing wool apparel as 'organic', 'regenerative', 'ethical non-intrusive to animal welfare' and 'a friendly, renewable resource'. These cited positive attributes of wool production in terms of wool being a renewable and natural resource (e.g., 'wool is a natural fibre') and have no negative implications for sheep (e.g., 'sustainable to produce the wool the sheep is sheered and the animal is not hurt').

## Conclusions

Apparel consumers play a central role in ensuring the 'clean, green and ethical' production of clothing and textiles through their product choices. The results of the consumer research described in this paper make it clear that the ethical issues that are of concern to consumers when they purchase wool apparel are numerous and complex and that animal welfare is a relatively important concern for wool apparel consumers.

These findings suggest animal welfare may be only emerging as an ethical issue in the apparel industry as, despite animal welfare issues being second most frequently mentioned by participants, a lack of understanding of the specifics of the welfare and treatment of sheep in wool production was evident. This is not surprising as there has been a marked shift in societal attitudes towards animal welfare in recent times from a narrow anti-cruelty focus toward an animal rights focus (Rollin, 2004). This shift in societal attitudes towards animal welfare can be seen in the creation of laws covering sources of animal suffering that were not traditionally legislated against, regardless of whether they are done as acts of deliberate cruelty or in the quest for profit. Rollin (1995) relates this shift in the social ethic for animal welfare to changing demographics and changes in the paradigm for animals, questioning of accepted human traditions, changes in the nature of animal use and changes in agricultural production practices. The changing social ethic for the treatment of animals has been articulated in a number of ways, including tighter restrictions on the use of animals in research and consumer activism such as

product boycotts (Frewer and Salter, 2002; Harper and Makatouni, 2002; Morris, 2000; Southwell *et al.*, 2006). Animal rights activist groups, such as PETA and Animal Liberation, have undertaken campaigns targeting primary producers, retailers and regulators which have resulted in consumer boycotts of products, such as those tested on animals (Auger *et al.*, 2007).

Although participants in the ethical consumer study discussed in this paper did not cite mulesing or other specific animal welfare concerns, it is clear animal welfare in the wool industry is a major ethical concern for consumers and cannot be ignored by researchers, extensionists, producers, manufacturers, marketers or industry policy makers seeking to develop new technologies and products aimed at developing markets for 'clean, green and ethical' animal production.

The study suggests the ethical consumer segment may be a promising market opportunity for the development of 'clean, green and ethical' wool apparel products. Although the present findings may not be seen to support wool industry research, which focuses on the positive environmental image of wool (i.e. wool as a natural, renewable, biodegradable resource) (The Woolmark Company, 2006), it is a logical extension because people are not simply purchasing an agricultural product when they buy wool apparel; they are purchasing a garment made from farmed animal fibres that is manufactured in a complex global supply chain. The positive environmental image of wool apparel may be necessary to attract ethical consumers, but may not be enough to influence this segment's purchase behaviour as ethical issues, such as labour rights and animal welfare, need to be addressed.

If the wool industry targets the ethical consumer market it could communicate the ethical attributes of wool apparel through appropriate certification and labelling as these attributes are unobservable to consumers (The Woolmark Company, 2006). The present findings suggest that more than one ethical issue needs to be included in the certification and labelling of wool apparel. This provides an opportunity for the wool industry to work with the global apparel industry to create standards that reflect a broad range of people's ethical concerns and create confidence in the authenticity of the apparel product and production standards. The current research indicates that apparel standards should address the humane treatment of animals, labour rights, fair trade and environmental, economic and social sustainability.

Depending on the results of such future research, efforts might be aimed at increasing consumers' awareness of wool apparel and consumer's interest in the ethical attributes of wool apparel by providing useful and credible information about the production process on which consumers can base their purchase decisions. A better understanding of consumers' preferences for ethical wool apparel attributes should be of interest to marketers, advocates, educators and policy makers. Empowering consumers with the information will allow them to make purchase decisions based on their ethical concerns and preferences that are likely to generate satisfaction and ongoing loyalty towards wool as a garment fibre and will provide a solid foundation for the development of new agricultural technologies and products.

These findings, along with the discussion of farmers intentions to continue to mules in 2010, support the need for consumer engagement early in the innovation and product design process in order to ensure that appropriate technologies and products are developed that meet the needs and preferences of producers and consumers. The lack of producer and consumer engagement in the development of replacement technologies for surgical mulesing and apparel products signifying positive animal welfare outcomes in the Australian wool industry is likely to cause significant damage to the industry and the market for Australian wool. The development of new technologies and products reflecting 'clean, green and ethical' agricultural production requires the early and ongoing involvement of consumers, producers and stakeholders who influence consumer behaviour, such as retailers, manufacturers and special interest groups. The incorporation of such a diverse and sometimes opposing set of beliefs and expectations reflects the complexity of developing 'clean, green and ethical' agricultural technologies and products and supports the need for the use of flexible and collaborative innovation models in place of traditional ToT approaches to R&D when developing new technologies and products aimed at promoting the 'clean, green and ethical' aspects of agricultural production.

### Acknowledgements

Research reported in this paper was supported in part by The University of Western Australia and the Department of Agriculture and Food, Western Australia.

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