Patternmaking

Related terms:

Customization, Design Process, Body Measurement, Body-Scanning, Detail Design, Patternmaker

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Garment construction: cutting and placing of materials

J. McCann, ... X. Dong, in Smart Clothes and Wearable Technology, 2009

12.4.2 Traditional flat pattern development

Patternmaking is one of the initial steps in the garment design development process. It is ‘a craft that has evolved over the centuries into a skilled technical process’ (Anderson, 2005). Ethnic and artisan clothing was originally constructed from hand-woven fabric with rectangular-shaped pieces of fabric, incorporating the selvedge, or edge of the weave, where possible, in order to leave the fabric intact and to minimize waste. Garments made up of geometric shapes include gathered skirts and saris, with decorative borders, the kimono, the Indian salwar (loose pyjama-like trousers), the Scottish kilt and workwear smocks (Tilke, 1982). In the fifteenth century, patternmaking evolved as carefully engineered pieces were cut to follow the contour of the body. ‘For evermore, fabric would take a back seat to fashion’ (As quoted by Anderson, 2005). Prior to the Industrial Revolution it was normal for the elite to have tailors working with their personal measurements to customize patterns. During the Industrial Revolution, standardized patterns were developed, initially resulting in poorly fitting garments. ‘After lengthy experimentation and standardized sizing, pattern-making made a triumphant transformation from customization to standardization’ (As quoted by Anderson, 2005). Mass-produced ready-to-wear fashion has increasingly been moved from factories in Europe to off-shore locations, although a ‘home coming’ and the customization of ‘value added’ products is now being considered for products with wearable technology.

Two-dimensional flat pattern drafting is widely used with patterns developed from size charts or personalized from an individual's body measurements. Standard basic blocks are developed, based on extensive research into the characteristics and measurements of the human bodies of various races in different countries, in order to address their various demands with particular regard to comfort and performance. Blocks are perfected constantly to meet a breadth of everyday design requirements, with appropriate amendments for fitted, semi-fitting or easy fit garments. The function of a standard block serves as a basis for garment designers to make adaptations in flat pattern cutting for the development of their garment designs in a relatively scientific, accurate and speedy process. Blocks are made for particular target customers and garment sectors from intimate apparel to outerwear. A basic block might consist of back and front body and sleeve pattern, with no seam allowances or style lines, providing the basis from which a variety of garment styles may be adapted. The designer/patternmaker develops a new design by adding style lines and garment details. The basic block is symmetric but adaptations can be asymmetric, with side seams and shoulder seams manipulated as basic shapes are converted to individual styles. Details such as facings, linings, pockets, protective panels and seam allowances may be added as demanded by the design and fabric selection.

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Fashion design using evolutionary algorithms and fuzzy set theory – a case to realize skirt design customizations

P.Y. Mok, ... Y.Y. Wu, in Information Systems for the Fashion and Apparel Industry, 2016

9.4.2 Patternmaking knowledge base

A patternmaking knowledge base is developed to automate the patternmaking process, in which pattern operations are generalized and coded as computer algorithms using the Teigha.NET development kit. The rationale behind this is that complex pattern design can be achieved by sequential geometrical operations/manipulation of the basic blocks. The knowledge base contains four types of patternmaking knowledge: sequential workflow, flat pattern techniques, garment construction rules, and seam information. The optimal workflow specifies the required sequence of generic pattern operations for each style element. Flat pattern techniques are detailed pattern manipulation techniques, such as pivoting, slash, and spread, adding fullness. Garment construction rules are for avoiding conflicts among different design elements, ensuring pattern accuracy and compatibility (ie, curve truing and right angles at joining points), and being ready for manufacturing and virtual simulation (Meng et al., 2010, 2012). Seam information guides the finalizing process, in which seam allowances, annotations, and other manufacturing instructions such as notches and holes are added to the pattern pieces.

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Pattern construction

K. Kennedy, in Garment Manufacturing Technology, 2015

8.2.3 Traditional and contemporary approaches

There are numerous traditional and contemporary masters in the craft of pattern-making such as Aldrich (2009), Bray (1966), Kunick (1967), Armstrong (2006), Muller and Sohn (1997), to name a few. Each has a particular approach, technical nuance and preferred set of technical instructions on how to best construct, draft or adapt patterns for apparels. A patternmakers preferred method, formula or process is similar to a favourite cooking recipe. It is a method that can be relied on to achieve a successful outcome. The ability to assess the variety of elements and components and combine a complex range of inputs to achieve a successful outcome is what determines an adept patternmaker.

Contemporary approaches using the pattern as the design source rather than the traditional sequential didactic pattern drafting approach offer a more experimental format. Describing Roberts (2014) Subtraction Cutting techniques, Lindqvist (2013) cites Roberts as ‘designing with patterns instead of creating a pattern for a design’ (p. 50). The zero waste philosophy of McQuillan (2014) and Rissanen (2014), Singo Sato's Transformational Reconstruction (2011) techniques, and Nakamichi's Pattern Magic (2012) pattern puzzles alter the function of patternmaking as a design translation to a creative technical design source. The relationship to form and fit is also fundamentally skewed from Erwin et al.'s (1979) classic fit benchmarks of grain, set, line, balance and ease. These contemporary practitioners playfully disregard the traditional rules around grain, set, line, and ease to experiment with volume, drape, and kinetic interactions. Off-grain effects, wrinkles and seams not perpendicular to the floor become design features rather than indicators of poor fit as defined by Erwin et al. (1979).

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Three-dimensional (3D) technologies for apparel and textile design

C.L. Istook, ... H. Lim, in Computer Technology for Textiles and Apparel, 2011

Image processing and measurement extraction

Capturing surface information is only the first step in creating a 3D image from 3D body scans. Since most body scanners capture multiple views of 3D data, the next step involves the registration and merging of these views into a point cloud (Buxton *et al.*, 2000). These point clouds must then be cleaned and refined to remove outliers or artifacts that often result when cameras pick up additional information from the environment during scanning. Nearest-neighbor analysis and evaluation of point intensity can be used to eliminate points beyond the body surface (Jones & Rioux, 1997; Buxton *et al.*, 2000).

Once the images have been cleaned and refined, body landmarks are then defined, enabling measurement extraction from 3D body models. This process is very important because landmarks and measurements are commonly used as feature points or lines to guide the surfacing of 3D models and contribute to their use in automated patternmaking systems.

The process of measurement extraction begins with the definition of body landmarks. In manual measurement, this is done by experts who touch the body to feel for specific bony protrusions under the skin or a joint that connects two bones. In 3D measurement, the process is more difficult because the landmarks can be very subtle, there is high variation in body shape for different people, and the landmarks may be hidden from view (Buxton *et al.*, 2000). Researchers have used various methods to locate landmarks, such as searching for the intersection of angles at points of extremities or vertical locations, or changes in curvature along body cross-sections or profiles (Dekker *et al.*, 1999; Kim & Kang, 2002) Researchers have also utilized belts or other markers during image capture to help predefine a body landmark that can be easily located by a computer after scanning (Buxton *et al.*, 2000; Dekker *et al.*, 1999; Pargas *et al.*, 1997; Wang *et al.*, 2007; Zhong & Xu, 2006). Some laser scanning systems can record color values, so that landmarks identified with color markers can be extracted after scanning (Paquette, 1996; Wang *et al.*, 2007). While virtual landmark location is difficult (and sometimes different in different scanning systems) (Bye *et al.*, 2006; Carrere *et al.*, 2001; Simmons & Istook, 2003), accurate identification is critical for measurement extraction in addition to 3D surfacing, animation, and body adjustment.

Once landmarks are located, measurements are then extracted. Rapid automatic measurement extraction is one of the primary advantages of 3D body scanning systems over manual measurement techniques (Pargas *et al.*, 1997; Simmons & Istook, 2003; Xu & Sreenivasan, 1999). Length, width, depth, and angle measurements not obtainable through manual measurement can be obtained through automatic 3D extraction. This has enormous possibilities for made-to-measure patternmaking, development of sizing strategies, and size prediction in 3D visualization systems (Bye *et al.*, 2006; Pargas *et al.*, 1997).

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Coke in the iron and steel industry

Alexander Babich, Dieter Senk, in New Trends in Coal Conversion, 2019

13.1.4 Foundry industry and the role of coke

Foundries are plants where castings are produced by melting metal, pouring liquid metal into a mold, then allowing it to solidify. They also form components for numerous applications. About 90% of all manufactured goods are based on metal castings (Reliance Foundry, 2017). The casting process involves the following general steps: patternmaking, molding, melting, pouring, ejection, cleaning, fettling, and inspection.

A majority of foundries specialize in a particular metal and have furnaces dedicated to these metals. There are ferrous (iron or steel) and nonferrous (aluminum, brass, bronze, copper, etc.) foundries. For ferrous materials, EAFs, cupola furnaces, and induction furnaces are commonly used. Reverberatory and crucible furnaces are typically used for production of aluminum, bronze, and brass castings.

The foundry industry is widespread around the world. The highest annual amount of cast metal is produced in China: over 44.5 Mio tons in 30,000 mostly small foundries, including 17,000 iron foundries in 2013. The United States produced nearly 12.3 Mio tons of cast metal in 2013 in 2000 foundries, including 640 iron foundries (Reliance Foundry, 2017).

Table 13.2 presents statistical data about the number of foundries and their production in 22 European countries, members of the European Foundry Association.

Table 13.2. Number of foundries and castings production in Europe[e] in 2016 (countries with iron and steel castings production over 100 1000 tons are shown)

Country	Nonferrous metal castings

	Iron, steel, and malleable iron castings			
	Production in 1000 t	Number of foundries	Production in 1000 t	Number of foundries
Austria	154.8	23	147.1	35
Czech Republic	270.8[a]	71	119,0[a]	37
France	1263.7	120	362.2	291
Germany	3919.0	242	1248.8	340
Italy	1152.4[b]	189[c]	934.0	878
Poland	696.0	216	348.8[d]	240
Portugal	131.5	31	48.7	57
Slovenia	202.6	11	52.1	46
Spain	1116.9	74	163.5	52
Sweden	230.3	39	61.5	59
Turkey	1471.0	544	427.5	383
United Kingdom	345.0	216	141.7	204
Total[e]	11,351.7[f]	1902	4210.2	2771

[a] estimated.

[b] without investment castings.

[c] including investment castings.

[d] without copper (only two foundries, no data collection).

[e] 22 European countries, members of the European Foundry Association.

[f] in 2014 production was 11.576 Mio tons.

After The European Foundry Association, 2017. http://www.caef.org/downloads/kategorie.asp?kat=9.

With respect to iron production, foundry coke is used primarily in a cupola furnace for the production of molten iron. It is a heat and carbon source for melting scrap and other additives to provide gray iron or ductile iron, as well as source providing the adequate permeability within the burden. The coke ratio lies between 9% and 15% of metallic charge or some 100–150 kg/t iron depending on scrap ratio and size, blast and tapping temperatures, coke quality, additives, and further technological parameters.

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Digital printing of textiles for improved apparel production

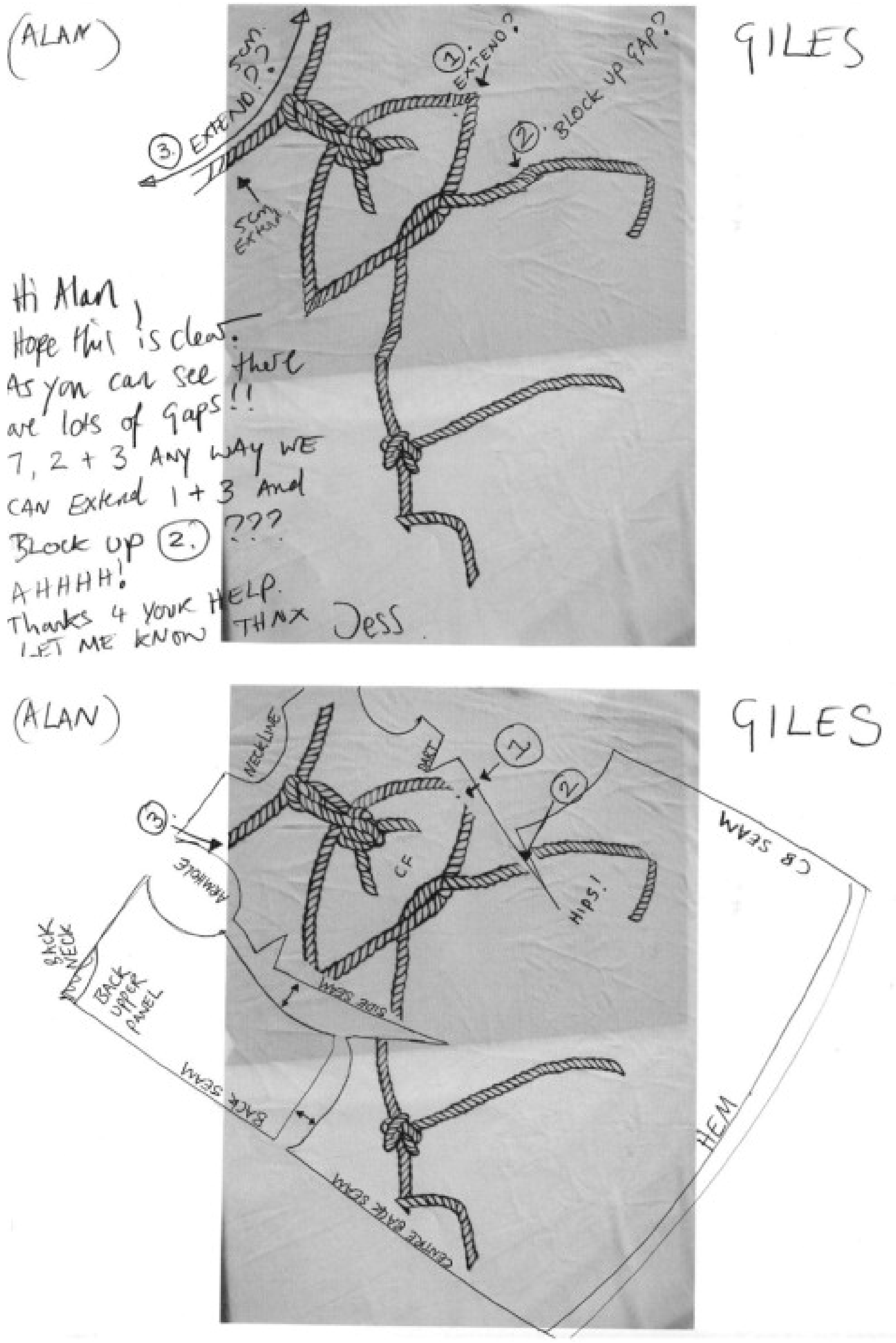
J.R. Campbell, in Advances in Apparel Production, 2008

11.5.2 Pioneering case studies in digital textile printing production

Rory Crichton and Giles Deacon

Rory Crichton has been leading innovations in digital textile design technology for many years, acting as collaborative textile designer with a number of high-profile fashion designers, including Giles Deacon. Giles' couture and ready-to-wear collections have included digitally printed fabrics, predominantly printed at the Centre for Advanced Textiles, for the past three years. The print designs generated by Rory have been used in garments that are now being digitally produced for short runs by Giles. Figure 11.4 shows an example of the type of engineered imagery that Crichton has created for Giles. Crichton believes that his design practice is not really changed greatly by employing digital textile printing technology, as he has always used the computer to generate his imagery, regardless of the printing process used in production, but he does acknowledge that DIJP effectively reduces the 'translation' of his imagery concepts as they are applied to cloth. In this sense, he thinks of DIJP output as being more 'true' to his design process. In collaborating with Giles, the patternmaking is done by hand, and so the imagery concepts that Rory creates, although placed within garment shapes, are not engineered directly into digital patternmaking files. As such, the production manager working for Giles communicates specific instructions to the digital printing service bureau about the placement and orientation of the images onto the length and width of the fabric. Figure 11.5 shows an example of working files that describe the garment shape and print placement to the digital print service bureau.

11.4. Chain imagery by Rory Crichton for engineered print garment by Giles Deacon, 2006.



Hi Alan,
Hope this is clear!
As you can see there are lots of gaps!!
1, 2 + 3 Any way we can Extend 1 + 3 And Block up ② ???
AHHHH!
Thanks 4 your HELP.
LET ME KNOW THNX Jess

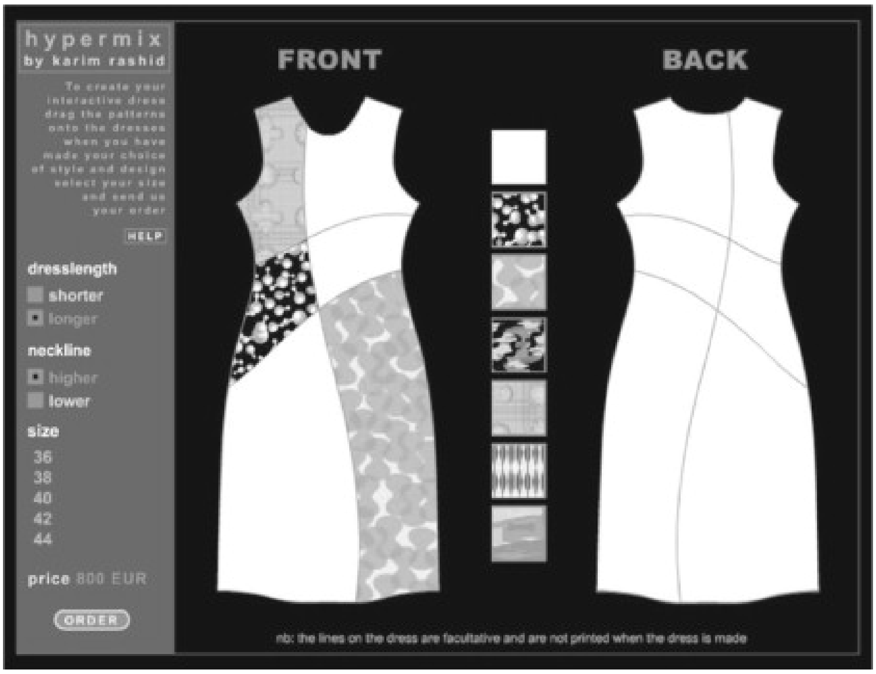
11.5. Production printing communication notes for collaborative design by Giles Deacon and Rory Crichton. Instructions are for image correction and placement on fabric by staff at the Centre for Advanced Textiles digital textile printing service bureau.

Pia Myrvold

Pia Myrvold is the founder of 'cybercouture.com', started in 1999 during fashion week in Paris with her 'clothes as publishing' concept called 'Dream Sequences'. Pia followed with the development of her cybercouture collections and an interactive online garment design studio concept dubbed the ‘interactive studio’. An extract from a description of her 2003 collection follows:

> Cybercouture Spring Summer 2003 is divided in three themes. Hypermix [shown in Fig. 11.6] and Cyberware are using innovative tools and technologies to produce highly complicated prints. Break-throughs in small-batch digital printing to fabric and innovative methods of customization permit cybercouture’s couturiers to assemble unique garments. This allows for a collection of highly individual prints, draped on the body, like a sculpture or art piece, which can be produced on a per-order basis. It offers a completely new level of quality to consumers: one-of-a-kind couture at ready-to-wear prices [Examples of a completed garment from the Hypermix collection are shown in Fig. 11.7]. (Myrvold, 2003)

The ‘interactive studio’ holds some of Myrvold’s most innovative concepts for digitally printed production garments. In the site, one of the conceptual products (it is not functioning as an actual business yet) is the ‘dubbeldam’ customized garment. In this interface, a simple knit-dress template is shown over an animated video file to demonstrate how the imagery might fall into the garment shape. The goal is to capture an instant of the moving image, allowing customers to order that specific instance as an engineered print in the garment. A screenshot of the interface is shown in Fig. 11.8.



To create your interactive dress drag the patterns onto the dresses when you have made your choice of style and design select your size and send us your order

dresslength
☐ shorter
▣ longer

neckline
▣ higher
☐ lower

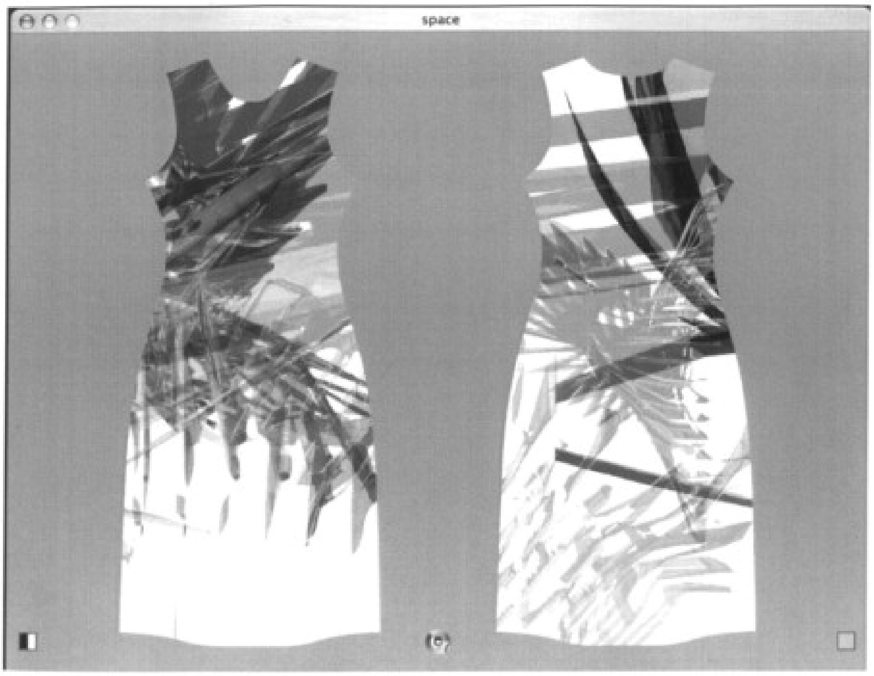
size
36
38
40
42
44

price 800 EUR

nb: the lines on the dress are facultative and are not printed when the dress is made

11.6. Online design interface of cybercouture by Pia Myrvold, Hypermix by Pia Myrvold and Karim Rashid.

11.7. Hypermix dress configuration. Pia Myrvold and Karim Rashid. Photo model from presentation at Fellisimo Design House, New York, 2002(Photo: Anne Senstad).



11.8. Dubbeldam freeze online design interface. Pia Myrvold.

Myrvold describes her motivations for working with DIJP:

The actual process of 'painting' each pattern piece with motifs is very exciting, it is much more like draping with colour, and it is hard to imagine now buying a print by the metre, when the distribution of the prints itself [creates] a new design experience. I used to do collections with forty garments... one digital dress design with an interactive interface takes about twenty times more effort in preproduction. But when the design is made, it stays forever. My vision with cybercouture, is a completely different game of production, distribution and customer service. It breaks all the rules of the fashion industry, but it creates a much higher design value for the customer, ...[it] is an intelligent solution to problems of environment, overproduction, slave factories and other ethical concerns that I have had.

Other innovative examples

Designers Sue Firestone and Mimi Wolfe have translated R. W. Firestone's digital 'expressionist paintings and photography' (http://www.tamsen.biz/home.html) into vibrant all-over digitally printed fashion collections. In late 2005, Topshop created a new line segment termed 'Topshop Unique', which they introduced in runway presentations during London Fashion Week. The 'Unique' collection is produced in small quantities, and as a result they have chosen to use digital printing for both their prototyping and production. Mulberry has also begun using DIJP for prototyping and producing garments from their collections.

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