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Design del giunto “per forma”.
The design of the joint “by form”.

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The single-subject issue no. 66 of Diid offers an articulated reflection on the processes of "*subtraction and addition*" of values, meanings, signs, information, languages, functions, materials, technologies, skills, and visions. The various contributions offer design scenarios touching on the proposed theme, associating it with aspects of the contemporary in which tangible and intangible are reflected in the development of digital technologies on the one hand and the centrality of the disciplines of user experience and service on the other. Subtraction is valued as substitution with intangible practices, in which the digital element prevails. Addition is proposed as taking responsibility and expanding design's fields of interest. Many of the contributions investigate fertile scenarios and are addressed to those who study, are interested in, and work in the world of design, and represent an opening to and stimulus for new design possibilities.

Luca Bradini

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Index

The design of the joint "by form"

Zero connections for the paper *clip*, a masterpiece among anonymous objects, mono component and mono material and works with its elasticity and pressure. Three rigid connections by gravity, one for each leg of "*Eros*", a marble table designed by Mangiarotti in 1971. Three hundred connections by friction, obtained by the joint in a geodesic sphere that protects the collision-tolerant drone "*Elios*" by Flyability. Joints with forms that depend on the material and the forces generated, on techniques and on the context of use and epoch. This is the subject of an inductive research work of university design that has taken into consideration over 500 examples of joints "by form", to investigate their historical and cultural relationships, their linguistic and technical aspects and set up a taxonomic classification based on material, types of semi-processed object, number of planes involved by the connection and the forces exchanged between them. For better understanding of the phenomena, the research is accompanied by photographic representations and exploded axonometric drawings. This research is set out to make a contribution to the culture of design for manufacture, based on observation through a magnifying glass of the micro-culture of connectors, reference markers of the past and flight into the future: from the influence of wooden carpentry techniques in Japan on the work of the masters of architecture and design to the minimalist current; from revisiting pre-industrial artisan techniques and expressions to those of post-industrial making.

[design of the joint, material and structure,
theory of the form, parametric design]

Claudio Germak, Stefano Gabbatore

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Complexity is not in the things, but in the design

In the direction of "less is more", of simplification but with intelligence, as we are reminded by Bruno Munari (Finessi & Meneguzzo, 2008), the patient, determined search for synthesis between form, function, art and technique – which many of the masters of architecture and design have sought after and then demonstrated – lives out its tensions in designing "couplings", where present, that become intense in the concept of "joint by form".

For the structural engineer, the couplings between two or more elements are static or kinematics solutions that become brilliant objects of study when, in working on the combination between material, stresses, volumes and surfaces, they find a synthesis in the "joint by form", a coupling that rejects both fixed connections, such as welding, gluing, stitching or riveting, and reversible ones, such as screws and bolts.

For the designer, the "joints by form" are much more than just the brilliant solution of a coupling. They are one of the components that animate the artefact, or even the defining component of the artefact design. Even today, when this direction of research seemed to be on the wane, the subject of couplings comes back into vogue: they are a gym for the younger designers, who are riding the wave of the *making* culture, both analog and digital, and of parametric design and creating strongly interrelated research pathways; they are cult objects, as in the recent exhibition entitled "U-JOINT" in the Milan Fuorisalone; they inhabit different sectors from that of furniture and architectural technology, such as the techno one of biomedical prostheses and sports equipment.

Much more than an exercise in style, the "joints by form" are proof of ingenuity and capacity for expression, subtraction of matter and addition of design: simple things, fruit of a complex design (Trabucco, 2005).

The Design of the joint "by form": definition and genesis

Over time, technology and design have described couplings "by form" as: «An activity of ingenuity and creativity aimed at designing the joint between two or more elements, which, mainly by geometry and the stresses transmitted by contact, create a stable but reversible union».

This is an activity that is reached by starting from different initial study factors and combinations of them: material, structure and form. In an ideal design it is expected that the "weight" given to each of the parameters would be equal, while the history of constructing presents a much more articulated scenario, where it is only at the end of this alchemical design process that you are able to assess whether the coupling contributes to the expressiveness of the product or not. Therefore, when examining a coupling solution, rather than a balance in weighting between factors, it is more convenient to speak about privileged points of view, which acquire intensity in relation to the education and research path of the designer.

Mangiarotti, being aware of this, writes in the foreword to the book by Setsu Ito, his collaborator: «The difference between my generation and theirs is that I start from

the material, they (referring to Setsu and Shinobu Ito) start from the idea. They have chosen freedom of design».

The reason is that the design approach of Mangiarotti looks to the classical references and he is one of the strictest of contemporary masters, while that of the Japanese designer couple, Ito, is polyhedric, both on the level of approach and of language.

Connecting in construction is equivalent to sewing in tailoring. The stitching has functional requisites, it must be robust but harmless for the wearer. It must ensure and express meaning, just as a joint, for example, between a leg and the surface of a table. In both cases the joint may be more or less of a main subject in the lexicon of expressiveness, being more or less on display, integrated or distinct. Indeed, when the joint takes on a precise meaning in the product seen as an organism, it almost always appears as the result of a careful compositional study, where the joints between elements follow a precise plan: what Gottfried Semper, in his book "*Der Stil*", associates with tectonics, or the art of the carpenter.

Semper, who was a leader of the culture of constructing, associates the four categories of materials that recur in architecture (ductile, soft, reducible to bars, solid) with another four of techniques and art (weaving, ceramics, tectonics and masonry). Tectonics is the art of a craftsman/designer capable of "joining" elements in bars and assembling the various components obtained while following an order of stratification, therefore hierarchical, based on the knowledge of elementary geometry, of acting forces, of the nature and behaviour of the materials. In the exhibition "*Sempering*" at the 21st Triennale in Milan on the subject of "*21st Century. Design after Design*" the four technical categories of Semper are contemporary reinterpreted, through eight categories of action, in which that of "joining" is again associated with wooden and metal carpentry (Galateo, 2016).

The Art of tectonics (structure, joinery and coverings) is also referred to by masters of the 1900s, such as Mies van der Rohe, Gerrit Thomas Rietveld, Walter Gropius, Alvar Aalto; those who passed through the Hochschule für Gestaltung in Ulm, such as the Swiss, Werner Blaser, and the Italians, Angelo Mangiarotti, Enzo Mari, Gianfranco Frattini and even more.

Thus, Aalto wrote to a young Werner Blaser, who submitted coupling designs to him for furnishing products:

… the design principle for furniture is determined by the timeless problem of uniting (joining) vertical and horizontal parts. The way in which they are joined, for example the leg to the horizontal part of a seat, determines in turn what is called "style": the leg of the seat is, let's say, the little sister of the pillar in architecture. (Blaser & Gomm, 1992)

The joint enthusiasts: points of view

Werner Blaser, after his first journeys to Japan in the 1950s, studied with the masters he used as reference, debated on the conceptual principles of design and signed books and projects with them. He asked them about joints and asked for their opinion on his. In the exchange of ideas, he had with Mies van der Rohe, Blaser took inspiration for an initial taxonomy of constructing with a "tectonics" approach. This was programming activity of the order of constructing, which enabled the joint enthusiasts, over the years, to reflect on the significance and role of connection in the organism being designed: order that is difficult to govern and maintain, since it is always in a precarious state of balance between structural complexity (geometric/spatial) and constructive simplicity, between redundancy and minimalism of the expressive sign.

Blaser's reasoning on the connections, strongly influenced by the culture of Japanese joinery, are set out in the book "*Joint and connection. Ideas in furniture design and their background*". One of the various paradigms identified for the design of the connection, the one that forces it on the interest of the masters, is the first, called "cruciform table", which Blaser put forward as a clarifying example of the "Column, Beam and Surface", on the model of the "Skin and Bones" category, theorized by Mies. Created in 1952 and revisited several times on the level of reversibility, this joint, where the legs are made from small boards joined to the beams in a cross shape and which then in turn support the surface, became the manifestation of the connection by "fixed end joint". A joint which on the one hand "unites", by connecting the structural bars coming from three directions in memory of the bars cited by Semper, while on the other hand "separates" the structure (columns and beams) from the covering (the surface), also through the colour of the wood: dark oak for the cross-shaped leg, as compared to the light beech for the surface.

Thinking tectonics is also the working method of Mangiarotti: the "*Eros*" collection of marble tables from 1971 grew from construction types he had already used for prefabrication (beam, column and cover resting on top, without the use of any additional elements), as witnessed in the industrial premises in Lissone of 1964 (Mangiarotti, Paoletti & Horikawa, 2012). Here, the legs, in other words the pillars, with a truncated cone cross-section, are self-supporting and bear the weight of the surface, in other words the roof, which rests on its own weight and gives rise to a construction that is very stable and with stresses only through gravity. This was an archetypal solution, which Mangiarotti would then use not only with marble, a material with no apparent expansion, but also with wood.

In hindsight, it is imaginable that Blaser and Mangiarotti scrutinised each other and that they had a shared interest towards the culture of constructing in Japan and specifically towards the admirable solutions of wood joinery, where attention to detail takes on lyrical tones.

Not by chance, "The devil is in the details" was a proverbial way of saying how much design effort was required to face the dimension of the detail, which was echoed by the "God is in the details", with which Mies reinforced the concept. And again, a few years later: expressing something and/or expressing yourself through detail represents a fight to reduce marks and material, was the prophesy of Bruno Munari.

Not until many years after the experiences of Blaser did a publication appear in the

West written by Japanese researchers, technologists and structural engineers, on the subject of "art of the joint" (Sumiyoshi & Matsui, 1989).
In the introduction to the book, Yukihiro Kamiyama clarifies the aims of the work, set up as a census of joints "by form", organised in taxonomies and accompanied by didactic illustrations for assembling the elements, as well as mathematical models for verifying the tensions generated within the joint itself.

Towards a taxonomy

The taxonomic categories are very similar to those that were developed at the Polytechnic University of Turin, in the didactic workshop of Industrial Design, just as the aims, too: passing on to future generations layered knowledge of connections, starting from the tradition of working with wood, observing the capacity of the various species to offer balanced strength (pressure, cutting, twisting); to show how joints in wood for architecture (beams, pillars) can display performances of high stability without the aid of glues and, in most cases, also without additional components, leaving the material free to work, according to seasonal humidity. On the level of expression, the joint being apparent is not part of the Japanese tradition, but, again in the words of Kamiyama, «when you manage to show the main components on the outside, the masterpiece is created». What we today consider as decorative value of a connection designed also on the basis of the identity of the product (Sacchetti, 2010).
The approach to study of the connections "by form", therefore implies four areas of observation and analysis: material, stress, form, decoration.
The "materials" affect the design in relation to their physical, mechanical and workability characteristics: starting from the choice of materials, it therefore becomes more intuitive to study the stresses that a certain form will produce.
The "stresses", in other words the exchange of forces between the various planes, distinguish the categories which are very often found together in the organism: gravity joint; pressure joint, exercised by interlocks, wedges or external agents; friction joint, involving the nature of the surfaces, therefore of the materials; opposition joint, made from two or more parts that work against each other, generating a kind of action-reaction.
The "forms", in other words the geometry of the volumes and positioning of the masses, as a result of a compromise between characteristics and potential of a material and the hypothetical stresses in the concept stage.
The "decoration", namely the assessment of the contribution made by the connection to the identity of the whole organism.

The joint "by form", free research

Making a product easy to assemble and disassemble leads to the conception of removable solutions for joints, by means of interlocking, plugs and wedges; whether handmade or machine-made. Undoubtedly, but without rhetoric, the idea of a removable joint is accompanied by the need for disassemblability (first) and flexibility of composition (after).

"*Disassemblability*". This is one of the most ancient of requirements, an example of which is the furniture created and produced spontaneously by the Occitan migrant population, during the transhumance in the XVII and XVIII centuries. This is mountain furniture, of limited dimensions, which can be disassembled and transported on the back of a mule, where the joints were reversible and conceived as "Mi-bois", in other words joining two superimposed half sections, so as to achieve coplanar surfaces, held together by removable plugs. The junction between pillars and beams, meanwhile, was resolved with mortise and tenon joints, held together by a removable wedge (Germak, 2015).
Better known are the experiments in self-construction, the work of the masters of design, launched with the "*Do-it-yourself furniture*" collection designed by the carpenter/artist/designer Rietveld (1940), whose *Crate chair* was the best-known piece, thanks also to the re-edition of Cassina in 1977. Following the usual Blaser and Mangiarotti, there were then Enzo Mari and Bruno Munari.
Mari, in the mid-1960s, understood that innovation goes with the flexibility of the furniture item, easy to make and to use, conceived with several degrees of freedom for various uses and various users. The *Junior and Senior* series appear: furniture that can be dismantled, made from plywood and assembled with slots for interlocking one element with another. All of this while Mangiarotti extends the principle of flexibility to other materials, apart from wood: from the plastics moulded in ABS (*Cub8 system*, 1967) to coaxial extrusion plastics (*IN/OUT system*, 1968, produced by Knoll), down to lithic material (marble) possibly one of the most immobile materials, because of its weight.
The myth of constructive flexibility associated with reduced complexity and greater freedom of use will leave an indelible mark on the design to come. Sometimes they complete the identity of a product, sometimes they determine its identity.
The joints by form and gravity are added to by new experimentations, working on friction and contrast with the use of different materials: metal tubes coated with rubber and bent into spirals wind like snakes around the posts of the "*Hook System*" bookshelves, designed by Pagani e Perversi in 1987, to create supports that are freely adjustable for the bookshelves themselves. Aeronautical origins produced a contrast joint, a cylindrical plug, 10 centimetres long, inserted into two round half-hollows, which was obtained from two years of experimentation at the Experimental Institute for Light Metals in Novara by De Ferrari Architetti and was used to connect the six-metre-long extrusions for their "*Lestrusa*" seat, for which sliding coupling did not work, so that of rotation and locking by form was used. The same period saw the work of Makio Hasuike on new flexible, blow moulded plastics, such as polyethylene, where the tubular trunks of the "*Zoom*" drawing holders are coupled by positive and negative veins creating resistant opposition and friction connections, which are adjustable according to the dimensions of the drawing rolls.

Beyond the joint "by form"

The search for a joint by form is one of "passion" that is once again under discussion, thanks to two activities, which today complement each other: that of the "makers" and that of the "parametric design". In the FabLabs, laboratories of digitally aided manual work, techniques and technologies co-exist: some assured by instruments, either manual or digital, such as RP (rapid prototyping), cutting by CNC (computer numerical control) and Laser Cut; some connected to systems for serial combination of modules, which have been forever evolving, such as *Meccano* and *Lego*, the first born of constructing by playing. *Meccano* is by nature mechanics, with connections ensured by nuts and bolts, but *Lego*, for example, is a mono-material system with joints "by form", which has by now undergone several reinventions. There is also widespread application of joints seeing cardboard techniques as a reference point for shifting into other materials, flexible and foldable by their nature, in which holes, slots, creases and cuts can be made for inserting flaps. The iconic model of the flap, namely something that folds to be inserted into a seat, was reproduced in 2013 by the young Japanese designer, Hiroyuki Ikeuchi, in the construction of a bookcase that can be dismantled (Greppi, 2013); this is a subject that, after the seat, is to be considered as the most demanding of exercises for the designer, since (almost) everything has already been invented, designed and prototyped. Here, the surface for holding the books, made in cheap semi-processed material, such as plywood, is cut *ad hoc* to form two long flaps, which are then curved, through the elasticity of the panel, to be slotted into special seats formed in the four posts. This is a solution that re-focuses attention on the elastic properties of the materials, as already happened with the elegant clothes hangers of the "*Collezione Flex*" by Paolo Ulian.

On the one hand, therefore, we are seeing a return to, or perhaps rather a continuation of, the simplicity of construction that still stimulates the exploration of potential hidden in old and new materials.

On the other hand, we are accelerating towards the new technologies for contemporary craftsmanship, operating within the Fab Labs and in an open source environment, where parametric design and rapid prototyping are respectively the mind and the arm.

It is precisely the spread of these breakthrough technologies that gives rise to a new reflection. Take, for example, the "*Keystones*" system of joints, designed for a 3D fabrication by the Studio Minale-Maeda. At the base of the fabrication process in 3D, which also belongs to parametric design, it is necessary to break down the volume of the joint into "frames", small closed frames made of slender poles of polymeric material, which go together to make up a connection seat for other elements Is the end result a joint "by form"? It is not the plastic poles that interconnect, but it is the set of poles that creates a node capable of forming a seat for poles of different material, conceptually much the same as the *Mero* joints, which were designed to accommodate the poles of the space frame structures.

This change of paradigm, from connecting two or more elements by working on the elements themselves to connecting "n" elements through an accessory, is not a new concept, though. In actual fact, the taxonomic cataloguing already included connections ensured by third elements, very intuitive but also quite simple to construct. Connections formed by a seat and an implant, as in the case of the "*524*" table lamp by Sarfatti, where a ring (the seat) houses the arm of the lamp (the implant), or in the *Sciangai* clothes hangers, fitted with an invisible central node connected to the poles of the clothes hangers. And the question was asked: joints "by form" or joints suitable for housing "forms"?

Final consideration: the *Mero* joints were restricted by the type of processing, moulding, and their stated aim was the search for universality of combinations, while these, thanks to the "n" solutions made feasible by the variables of the algorithm governing the 3D moulding, resolve situations *ad hoc*. Is this creative freedom a limit? It seems paradoxical. Various authors are discussing it and a new stimulus is coming from them: shift the search for the ideal form through parametric design (form-finding) from the solution for the specific product to the search for a process, capable of generating extended families of products, "a phenotypic culture within a genotype" (Picerno Ceraso, 2017). The aim is not then the universality of the joint, as much as the creation of a family of joints, which set out constructive and expressive models.

Wachsmann, too, as master of the conceptualisation of the joint, would agree today: «The development of the details should not follow the conceptual designing of a specific construction: on the contrary, the conception and choice of such details ought to precede the conception of the design» (Zorgno,1992).

The introduction of these new models of manufacturing therefore induces widening of the reflection on the joints and opens up to the creation of new taxonomies that arise from the combination between material, stress, form and decoration.

References

> Blaser, W., & Gomm, A. (1992). *Joint and connection. Ideas in furniture design and their background*, (p. 10). Basel: Birkhäuser Verlag Basel.

> Finessi, B., & Meneguzzo, M. (2008). *Bruno Munari*. Cinisello Balsamo-MI: Silvana Editoriale.

> Galateo, S. (2016). Connecting. L'azione del carpentiere (pp. 94-113). In L. Collina & C. Zucchi, *Sempering. Process and pattern in architecture and design*. Cinisello Balsamo-MI: Silvana Editoriale.

> Germak, C. (2015). Perché artigianato e design. In F. Tosi, G. Lotti, S. Follesa, & A. Rinaldi, *Artigianato Design Innovazione* (pp.42-51). Firenze: DIDA-Dipartimento di Architettura.

> Greppi, D. (2013). Librerie smontabili. In *Inventario*, 08, (pp. 42-43).

> Picerno Ceraso, A. (2017). Enneper Pavilion. La fabbricazione digitale tra utopia progettuale e pragmatica artigianale. In *MD Journal*, 03, (p. 176).

> Mangiarotti, A., Paoletti, I., & Horikawa, K. (2012). *Architetti e designer giapponesi dello Studio Mangiarotti*, (p. 189). Santarcangelo di Romagna: Maggioli Editore.

> Sacchetti, V. (2010). *Il design in tasca*. Bologna: Compositori.

> Sumiyoshi, T., & Matsui, G. (1989). *Wood joints in classical japanese architecture*. Kashima: Kashima Institute Publishing.

> Trabucco, F. (2005). *Dire, fare...* Bologna: Esculapio.

> Zorgno, A.M. et al. (1992). *Holzhausbau / Konrad Wachsmann,*. Milano: Guerini Studio.

Make
gallery

Emptying and refilling

"Simplicity is about subtracting the obvious, and adding the meaningful": this is the tenth of the ten "laws of simplicity" written by John Maeda.
In the design brief, the term "simplicity" can often take on the meaning of "lightness", a characteristic that connotes the product in its physical/material expression and characterizes it on the emotional level with the *User Experience*.
In physics, the law that governs the lightness of a body is density, defined as the ratio between mass and volume. In contemporary design practices, a phenomenon emulating this law can be found, which reinterprets it through the relationship between empty and full, and exalts its dynamics of intersection, emptying, and balance. In light of this, one of the designer's challenges is to give added value to design through a series of detailed interventions that play to the relationship and intersection between the concepts of full and empty. The iconographic proposals in the Make section propose a set of design experiences and products, which look in the direction of a design that, through experimentation and additive production, valorizes new attributions of sense and meaning to the operations of emptying, balance, and intersection. An important reflection regards the theme of the joint; through the relationship between design and the new technologies of Rapid Manufacturing, we can imagine connection systems that, while light and dematerialized, are technical high-performance, and extremely characterizing for *Design for Reduction* products. The narrative structure that connects the reported product examples is certainly experimentation on materials and technologies, and in particular the new boundaries of *Additive Manufacturing* and the new applicative scenarios of generative modelling.

Daniele Galloppo

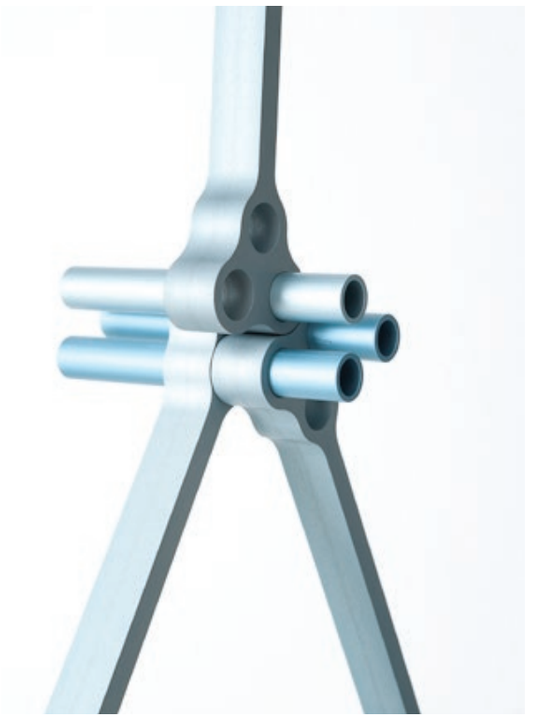
[simplicity, intersection, full-empty, joint]

Kinematic dress, Nervous System, 2014.

01

Intersection
as simplicity and lightness
>
Through *Boolean* operations, the concept of empty takes on an added value within the project, becoming significant in terms of experience and structural for the development of a "simple" and "light" connection system.

02



03

04

01 *Keystones, table,* Studio Minale Maeda, 2014.
02 *Vaso introverso*, Paolo Ulian, 2012.
03 *17 Screens*, Ronan & Erwan Bouroullec, 2015.
04 *Keystones, coat rack,* Studio Minale Maeda, 2014.

01

02

Games between full and empty
>
In the relationship between full and empty, the product's skin and geometry can become the interpreter of and instrument for narrating this duality, through lively alternations or by generating forms characterized by perfect balance.

03

01 *Antibodi, chaise longue*, Patricia Urquiola, Moroso, 2006.
02 *Antibodi*, poltrona, Patricia Urquiola, Moroso, 2006.
03 *Chair_One*, Konstantin Grcic, Magis, 2003.
04 *Achille Castiglioni,* Achille Castiglioni, 1962.

04

01

The emphasis of emptying

>

"Simplicity is about subtracting the obvious, and adding the meaningful". This reflection by John Maeda suggests a broader vision for the idea of reduction; it opens the possibility for designing around the concept of subtraction and emptying objects in such a way as to attribute new meanings and functions.

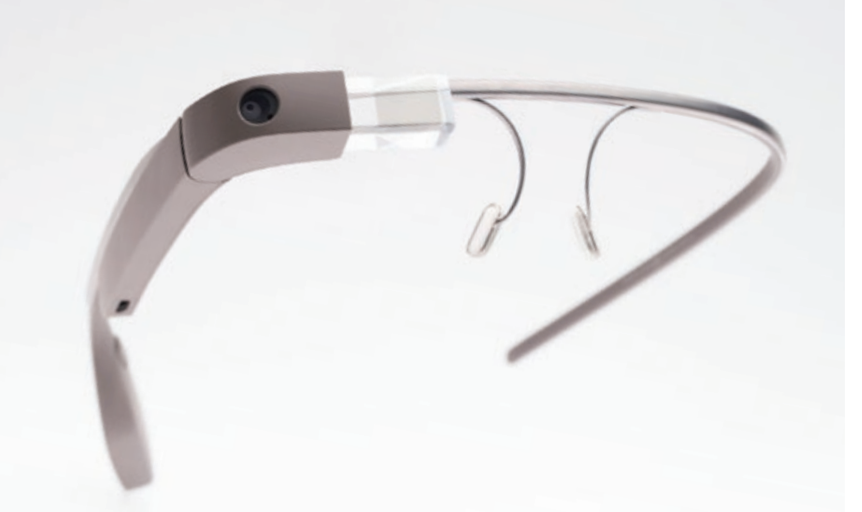
02

03

04

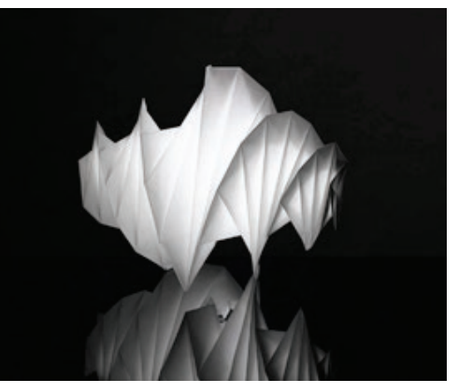
01 *Nikolatesla One,* Fabrizio Crisà, Elica, 2017.
02 *Rotola*, Adriano Design, 2004.
03 *iPhone XS*, Apple, 2018.
04 *Supersonic*, Dyson, 2016.

01



04

Baroque visions
>
In these product examples, the concept of simplicity is made clear through more articulated and Baroque forms. Although the redundancy of certain parts strongly characterizes the item, the balance between solids and voids restores the overall vision of a "simple" and "light" product.

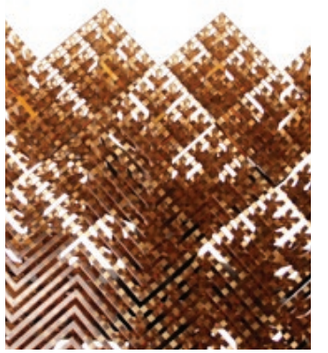


02

03

The laws of complexity
>
The new technological scenarios, in particular of Additive Manufacturing and of generative modelling, represent, on the contemporary design landscape, the effective tool for responding to the needs of a design permeable to the dynamics of complexity: the structure and organization of the product's parts are thus resolved through a calculation and elaboration process.

05



06

01 *Heatwave-Jaga*, Joris Laarman, 2003.
02 *Mendori*, Issey Myake.
03 *L'angelo barocco,* Roberto Capucci, 1987.
04 *Google Glass*, Google, 2017.
05 06 *Fractal.MGX*, WertelOberfell & Matthias Bär, Materialise.

Mirror Room (Pumpkin), Yayoi Kusama, 1991.

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