

WOMEN, AN OBJECT OF INNOVATION

Specialists of innovation usually talk about computers, automobiles, aeronautics, medicine or biotechnology. There was no book on innovations in techniques related to women and their bodies(1). Teresa Riordan, a science journalist specialized in the study of patents (for *The New York Times* in particular), has taken up the challenge of writing the missing book(2). The result is a gripping surprise with an original, offbeat view of innovation, its nature and processes.

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WHILE READING

INNOVATIONS FOR WOMEN

From 1850 to 1950, the period covered by Riordan's book, 1% of patents filed in the United States were connected with women's bodies. Feminists would like to interpret this figure as the effect of an all too familiar masculine domination. However things are apparently more complicated – or subtle? Women filed the majority of these patents, and even two-thirds of the patents for providing support to the bosom.

The catalog of inventions for women is unbelievable: devices resembling mechanical stencils for putting on lipstick without smearing (Figure 1); the dogged quest to produce crinoline with metal joints for keeping a dress belled out while allowing the wearer to sit (Figure 2); the trial-and-error advances leading to the development of the lipstick tube with a screw-on top (Figure 4); suction discs for enlarging and shaping the breasts; the cor-



Figure 1 : Device for putting on lipstick without smearing

set, which, advertised as “electric” (in fact, magnetic), was sold with a magnetized needle; etc. All sorts of techniques were put to use, in particular electricity and radioactivity, which, recently discovered and industrialized but not yet recognized as dangerous, was used for hair removal. Why all this activity?

The female body has been the object of many an innovation, we might say “part by part”: eyes, breasts, hips, skin, fingernails and so forth. This is the outline used by Riordan who unswervingly pursues the topic of patents, techniques and inventions. She formulates, as though in passing, a single hypothesis: might women have been trying to respond to men's predilection for novelty by looking for ways to continually reinvent themselves? Whatever the answer, the market for innovations connected with women has been a goldmine. Cosmetics were one of the few categories of products with increasing sales during the Great Depression. An estimated fifteen

(1) Historians usually approach feminine beauty, and its changing canons, from the angle of the history of mentalities. See Georges VIGARELLO, *Histoire de la beauté. Le corps et l'art d'embellir de la Renaissance à nos jours*, Paris, Éditions du Seuil, 2004.

(2) Teresa RIORDAN, *Inventing beauty*, New York, Broadway Books, 308p., 2004. We thank the author for permission to publish the illustrations from US patent records or advertisements with the French version of this article.

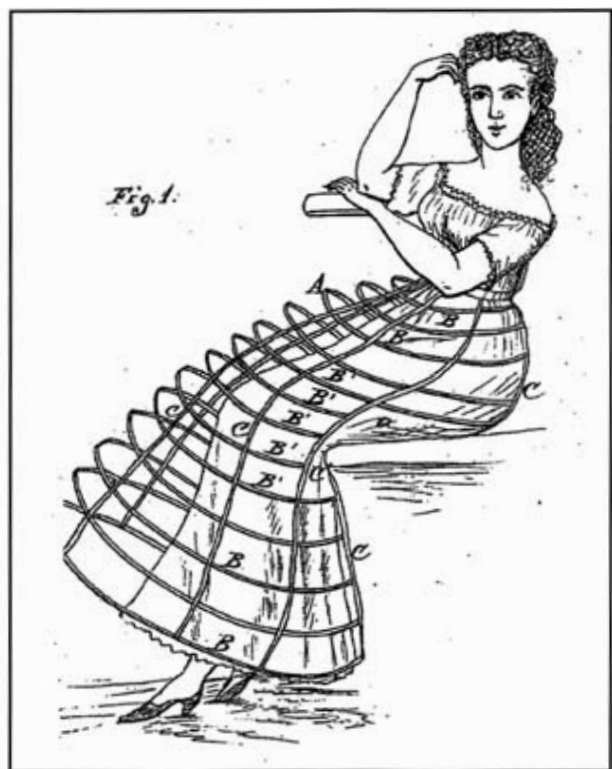


Figure 2 : Patent for crinoline that makes it easy to sit down.

thousand sorts of nail polish are now circulating. It is easy to understand why L'Oréal and its owners have become rich. Two out of the many innovations listed in Riordan's book will be retained herein: cosmetics (specifically mascara) and the epoch-marking switch from the corset to the bra.

MASCARA

Mascara was used in ancient times, especially by Egyptians. This product has to be liquid enough for easy application, but has to dry without hardening and be relatively waterproof (from tears or rain). Petroleum byproducts satisfying these tricky technical requirements were not invented till the 1950s and 1960s. Esso, with an eye on the growing cosmetics market, filed several patents related to mascara. In this field as in others however, technology is but one aspect of innovation.

Besides the purely chemical properties of the products used, other factors – the ease of applying and carrying mascara – played a key role in developing this product. Packaging was decisive. The small bottle of nail polish with a brush can be traced directly back to the way glue was packaged during the 19th century (Figure 5). In contrast, the small pen-shaped bottle for mascara with what Americans call a “wand” in the cap comes from the shoe varnish bottle through a process of trial-and-error (Figure 3). Some manufac-

turers had, unsuccessfully, tried to replace the wand with a tiny sponge.

Another technical problem cropped up. Women needed a mirror to put on makeup. Till the late 19th century, mirrors were scarce. They were kept at home, hung above fireplaces or on bedroom closets. During the 1890s, big American companies (notably Coca Cola) distributed small pocket mirrors marked with their advertisements to women for free. Women were now able to make up their faces at any time and in any place. An innovation also has social aspects. The 19th-century associated makeup with women of loose morals. It took time to change this. The major phases were: the spread of photography (with its strong contrasts); the Diaghilev Ballet's staging of *Sheherazade* in London in 1909, which sparked an explosion in mascara sales to high society; Paul Poiret, the couturier who made this

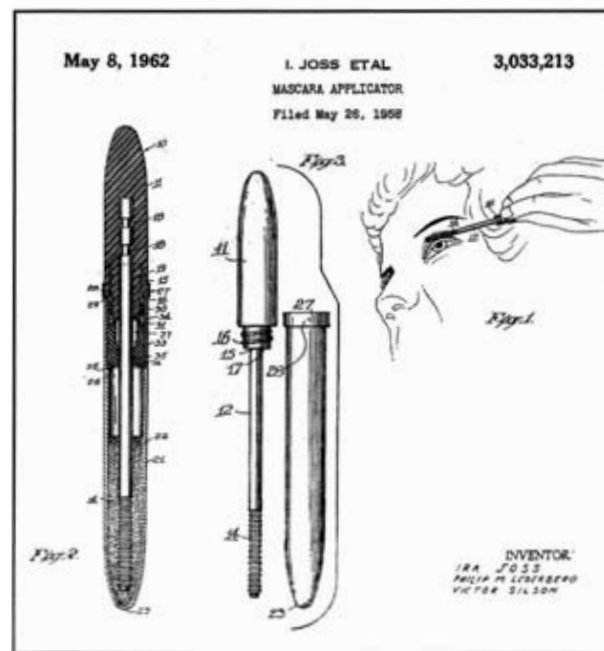


Figure 3 : The mascara wand derived from the shoe varnish bottle

product fashionable in Parisian society; and, finally, Greta Garbo who popularized mascara. According to a 1936 survey of American male students in *Vogue*, 100% of them disapproved of wearing makeup. The magazine concluded: they want to be tricked by beauty but do not want to be aware of the trickery. This conclusion was right: the same year, *Woman's home companion*, carrying out the same survey but with American women, found that 62% of them regularly used mascara (their favorite brand: Maybelline). The history of mascara does not stop at this point.

On the morning of 17 May 1933 – in the depths of the Great Depression – Mrs. Brown (Her real name has never been disclosed) went to the beauty parlor. After a permanent, she had her eyelids and brows

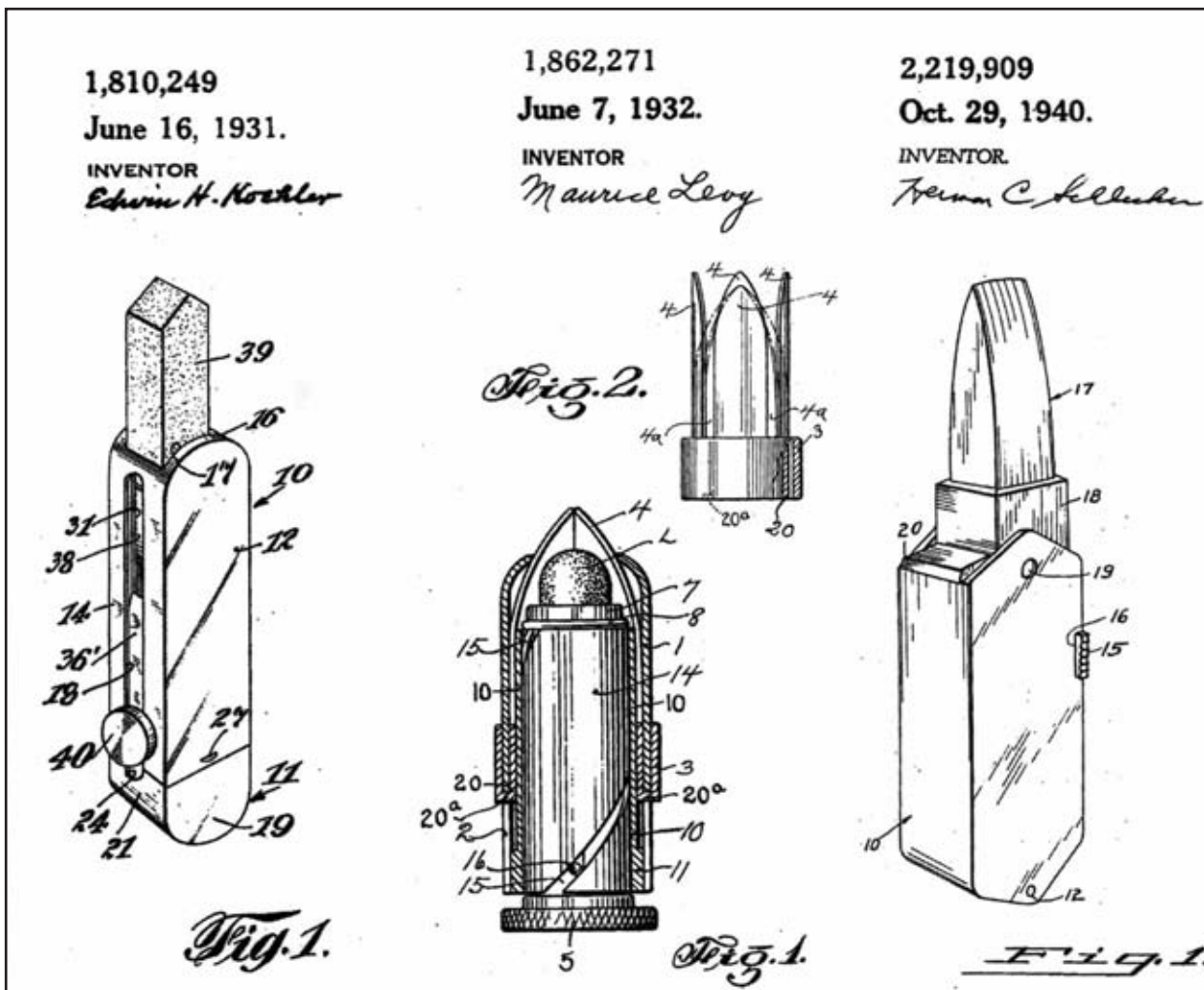
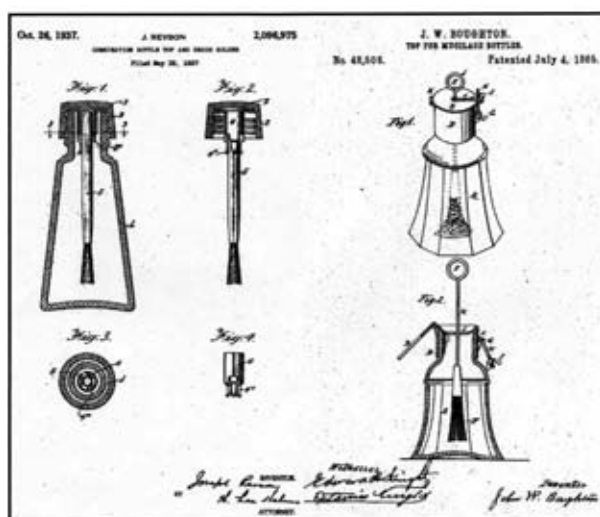


Figure 4 : Trial-and-error advances leading to the lipstick tube.

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done up with mascara. That evening, she had to give a lecture to the PTA in her small Midwest town. During the lecture, she felt the first symptoms and, by the next morning, had lost the use of both eyes. The mascara made by Lash Lure (a pharmaceutical laboratory in Los Angeles) was a product mainly used to dye hair. Its danger as a dye would not be discovered till much later; but bringing it in contact with the eyes had a tragic, immediate effect. It took Congress five years before deciding in 1938 to adapt regulations about drugs to cosmetics. Newspapers had previously reported cases of blindness caused by Lash Lure mascara. What is amazing is that American women continued using the product for so long and that imitators of Lash Lure went on selling their own mascara despite increasingly confirmed suspicions.

The history of mascara draws our attention to several points: the pace of scientific and technical innovations, the importance of packaging, the social aspects of an innovation related, in particular, to the force of images (photography, movies) and regulations. The switch from the corset to the bra is even more complicated.



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Figure 5 : The packaging for glue was used for fingernail polish.

WHILE READING

Corset anatomique et scientifique de l'Académie de Paris

Breveté S. G. D. G.

Exécuté par M^{lle} E. AGIER, 22, Avenue de l'Opéra, PARIS

MEDAILLE D'OR à l'Exposition Franco-Anglaise de Londres 1908 (Première Exposition où ait figuré le "CORSET ANATOMIQUE")



Le plus grand désir de M^{lle} E. Agier est que chaque femme montre son corset à son docteur, à la disposition duquel elle se tiendra pour toutes explications et démonstrations qu'il pourrait désirer.

M^{lle} E. Agier est heureuse de signaler à sa nombreuse et fidèle clientèle sa dernière innovation, le merveilleux "Corset Gant", sans baleines ni coutures, ne se distendant jamais.

M^{lle} E. Agier s'engage à annuler la commande de tout corset, essayé au magasin, qui ne réunirait pas les conditions et les avantages ci-dessus décrits.



Ce corset, non seulement transforme le corps de la femme par sa forme extra-esthétique et élégante, mais il lui donne une grâce incomparable en même temps qu'une souplesse et une légèreté du corps jointe au plus grand confort. Il est construit de telle façon qu'il ne presse sur aucun organe, mais bien au contraire, la femme peut se serrer indéfiniment, sans jamais se faire du mal. La compression s'opère sur les os du bassin, au bas de l'abdomen et au bas des reins qu'il maintient en bonne position, ainsi que tout l'organisme de la femme, qui fonctionne avec aisance.

Toutes les maladies occasionnées par le port de mauvais corsets peuvent être combattues avec succès par le Corset anatomique.

Démonstration des avantages du Corset anatomique

Corps normal et naturel

- 1° Côtes.
- 2° Fausses côtes.
- 3° Sternum.
- 4° Estomac.
- 5° Foie.
- 6° Intestin.
- 7° Os iliaque.
- 8° Fémur.

Corps déformé par le corset ordinaire

- 1° Côtes.
- 2° Fausses côtes resserrées.
- 3° Sternum.
- 4° Estomac déplacé.
- 5° Foie allongé.
- 6° Intestin également déplacé.
- 7° Os iliaque.
- 8° Fémur.

Corps retressé par le corset anatomique

- 1° Côtes.
- 2° Fausses côtes.
- 3° Sternum.
- 4° Estomac.
- 5° Foie.
- 6° Intestin.
- 7° Os iliaque.
- 8° Fémur.

Face du corset anatomique

A B C D E F

AP, CD, EF Mesures à donner pour les commandes par correspondance.

Figure 6 : The search to improve the corset.

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Figure 7 : The slow invention of bras: the first brassieres with straps covered both breasts instead of each separately.

FROM THE CORSET TO THE BRA

The 19th century was the age of the corset, an object with two technical functions. The one was related to a physical constant, perhaps the most important and most stable in human history: 0,70. Whether contemplating Marilyn Monroe or the Venus de Milo, a beautiful woman's waistline should equal 70% of the width of her hips. As an exhaustive study shows, corsets were intended to reach this constant: the average was precisely 0,72. Secondly, corsets served to lift the breasts from the bottom upwards. This allowed for low-cut dresses that bared the shoulders and top of the breasts, an appreciated quality in 19th-century gowns. The teenage hero in Balzac's *Lys dans la vallée* felt dizzy from looking at Madame de Mortsauf's shoulders. Technical improvements were made in the corset throughout the 19th century. The

(3) Robert LYND & Helen MERREL LYND, *Middletown, a study in contemporary American culture*, New York: Harcourt & Brace, 1929.

(4) In French, brassière originally referred to the part of a suit of armor in contact with the arms (*bras*). This sense of the word was already antiquated by the 15th century, the referent having shifted to clothing, specifically a sort of woman's blouse with sleeves (1341). This meaning was widespread in the 17th century, until the word came to refer a small upper garment with sleeves worn by nurslings (1843). The plural, brassières, used to refer to leather or cloth straps passed around the arms for carrying a load (1838). English adopted a similar meaning to refer to what is called a *soutien-gorge* in French. Alain REY, *Dictionnaire historique de la langue française*, Paris: Le Robert, vol. I, p. 283, 1994.

very expensive whalebone was gradually replaced with flexible metallic bones. Rubber was increasingly used to make corsets less rigid, and this opened the way toward the *corset gant*, which, it was claimed, fit the body better. Of special importance were the metallic eyelets for tightening the laces in order to reach the dreamed-of constant, even for bodies quite far from it. More than a thousand improvements in the corset were patented in the United States from 1870 to 1900 (Figure 6).

Everything changed in women's lives around 1900. Sports came into vogue: bicycles, in particular, but also swimming, tennis and golf among the well-to-do. A dancing fad swept over America between 1910 and 1920, and dance steps became freer. Masses of women were going to work. The generalization of the automobile signaled sexual liberation. In Middletown, a famous sociological study conducted in a small American town, nineteen out of the thirty girls appearing in juvenile court for sexual misconduct had been caught in the act in a car.(3) At the time, the United States counted fifteen and a half million motor vehicles. While courting Nora (the source of the character Molly Bloom), James Joyce begged her not to wear a corset. In an ardent letter, he wrote that he did not like the feeling of embracing a mailbox.

A technical problem metaphorically corseted the relation between hips, torso and breasts: how to hold up a woman's breasts without impeding her movements? Girls and young women wanted to take up sports or dance. Since this trend started in a peripheral market segment, the corset industry reacted belatedly. Nonetheless approximately fifty corset-makers in the United States were proposing products designed for dancing and other sports by 1920.

The race toward innovation was on. A rival product emerged: the brassiere (Figure 7)(4), a word used in *Vogue* in 1904(5). The product's technical definition was vague. The new elastic fibers used for bandages were put to a new use: providing support for the breasts while making it easier to move more freely. Many brassieres did not have shoulder straps. Most supported the breasts by applying pressure on them and flattening them.

Who caused what? It is hard to say. In any case, the trend of young women wearing brassieres in the 1920s coincided exactly with the tomboy fad with its emphasis on a

(5) In French too, the word for referring to a bra, *soutien-gorge*, appeared in 1904. But its etymology is quite different's from *brassière's*. The plural *soutiens* referred to a piece of female lingerie for supporting (*soutenir*) parts of the body. The compound word *soutien-gorge* was used in 1904 to refer to the undergarment that lent support to a woman's breasts and could give them a deceitful appearance, whence popular phrases such as *menteur comme un soutien-gorge* (a liar like a bra) used by Céline in 1936. Alain REY, *Dictionnaire historique de la langue française*, Paris, Le Robert, vol. II, p. 1999. The history of this product parted ways in France and the United States; but in both lands, the word came into being before the product had been fully developed.

flat profile. This fad soon passed, but the technical problem remained: how to lift the breasts while making it easier to move now that the aesthetic canon had changed from an emphasis on flattening the profile to enhancing it?

The race toward innovation was relaunched. Between 1918 and 1929, two hundred patents were filed in the United States, 21 of them by a single company, Kops Brothers. Most of these were fake innovations. But we do notice among them the brassiere with cups for setting off the breasts and the brassiere with straps. Finding the technical solution took about thirty years. Having devoted a million dollars in R&D, Warner

filed the decisive patent in 1950 (Figure 8). The object could, at that point, be defined in precise technical terms: two separate cups – a break with the corset – supported by elastic, adjustable shoulder straps with an adjustable band with a hook in the back for fastening (Corset-like underwires were optional).

Two other factors were essential in attaining this apparently simple but quite sophisticated result. The first was the chemical industry's development of latex, a light-weight, washable, resilient substance with another interesting property: it would wear out. Cheaper to buy than a corset, the brassiere was a growth market since a woman would, during her lifetime, buy four times more brassieres than she would have corsets. The brassiere was modern since the act of purchasing was to be repeated. The second factor was the standardization of sizes. Camp Company in Jackson, Michigan, which advertized its scientific approach to women's lingerie, invented the A, B, C and D sizes, which make men swoon. Competitors proposed other classifications that, in its infinite wisdom, history did not retain.

The corset was gradually abandoned during the 1920s and 1930s, in particular by the young. In 1934, teen-



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Figure 8 : Warner filed the decisive patent in 1950: two separate cups – a break with the corset – supported by elastic, adjustable shoulder straps with an adjustable band with a hook in the back for fastening.

more of these precious raw materials to make a corset. The War Production Board set the maximal quantity of elastic for the straps at 2,5 square inches, and the quantity for the cups at 6-8.

After the war, companies innovated in the padding. Pads, at first separate for placing inside the cups, were gradually incorporated in the brassiere itself (Figure 9). “Falsies” shaped the breasts like live shells, a well-known form from the war. They were used till the early 1960s, when the chemical industry progressed to the point of offering silicon implants.

In the meantime, the traditional corset industry was trying to take a fresh breath thanks to girdles, a new phase in the evolution of the corset.

ON INNOVATION

The study of the patents filed in relation to the female body places our perceptions of innovation in perspective. Is innovation more intense today than during the period from 1850 to 1950? Is it more scientific? The comparison of these two periods sug-

agers shortened “brassiere” to “bra”. Warner was the first to orient its advertisements for brassieres toward the adolescent market. Brassieres came to be widely worn during WW II for two reasons. For one thing, women were working. Lockheed, for example, required that brassieres be worn in its plants for decency's sake... and to reduce fatigue and the risk of accidents. Given the shortage of (male) manpower, wearing a bra contributed to the war effort by speeding up the pace of work. For another, there were shortages. Since the arms industry consumed huge quantities of iron and rubber, wearing a bra was to be favored since it took much

In my action-free SPENCER
I feel rested . . . and
fit for work or play!

Having survived for centuries, the corset didn't go gently into that good night. Instead, it evolved . . . into the girdle.

On the go all day long? Then enjoy the freedom-plus-support of an action-free Spencer! It will be light, flexible, easy to slip on and off—and, if you choose, can be made of an airy, easy-to-launder mesh!

Your Spencer Body and Breast Supports will be created just for you to solve your figure problems—and the health problems that come from imperfect posture. No more ugly bulges, tired back, weary feeling! You have trim new figure lines and radiant vitality. For keeps, too—because your Spencers will be guaranteed never to lose their shape.

Write or Phone for FREE Information. MAIL coupon below for fascinating booklet showing how a Spencer will help you! Or PHONE nearest dealer in Spencer Supports (look in yellow pages under "Corsets"—or in white pages under "Spencer Corsetiere" and "Spencer Support Shop".) No obligation!

CASUAL CLOTHES SHOW UP YOUR FIGURE! Ordinary supports do nothing for "square tits", sagging abdomens, back bulge. No vertical lift! Right: see how tired and sloppy she used to look!

CLOTHES LOOK SMARTER OVER YOUR SPENCER! Wear easy classics, dainty slacks, even slacks—and look as well as you feel! For slight, some women, some dress, but wearing her Spencer!

DOCTORS KNOW! Doctors prescribe Spencer Supports to improve general health by improving posture, to aid women with back discomfort—arthritis and other chronic diseases—displaced abdominal organs—breast problems—menstrual—post-operative and other conditions.



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Figure 9 : Pads, at first separate for placing inside the cups, were gradually incorporated in the brassiere itself. "Falsies" shaped the breasts like live shells, a well-known form from the war.

gests, paradoxically, that innovations, today like yesteryear, rely on an odd mixture of science, technology and trial-and-error. Is the dialog between innovators and their public or market more elaborate today than it was back then? We are told that the teenage market is a very recent discovery. Once again, perceptions must be set in perspective. The invention of the bra was a technical and commercial response to the changing needs of teenagers at the turn of the 20th century.

By standing back to take a historical view, we come to see how diverse, heterogenous and multidimensional innovation is: the importance of pictures in techniques (photography, cinema) and in people's imaginations; the advances made in science and marketing; changing mentalities; the complex interactions between social strata (After the Diaghilev Ballet, makeup signaled belonging to high society instead of the demi-monde); regulations; standardization... it all interacts.

An anecdote will serve as a last example. Everyone is familiar with Ford's statement that customers "can have any color they want so long as it's black". Unlike what we might suppose, this statement was not a symptom of autism with regard to consumers. Instead, it referred to a technical problem. At the time, black lacquer dried much faster than other colors, whence a faster pace on assembly lines, which was Ford's objective. In 1923, Dupont developed a fast-drying colored paint in response to a request from General Motors, which immediately used it for its cars and won a decisive competitive advantage over Ford. Prospecting for other markets, Dupont found pianos, golf and pool balls, and a more promising one: nail polish. Before it would be widely used, nail polish had to await another technical and social innovation, namely the electric hair-dryer. While women were spending time under a dryer at the hairdresser's, their hands were idle; and hairdressers could propose a manicure... and nail polish became popular. ■