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Gendered Drugs and Medicine

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Chapter 1

Oestrogens and Butter Yellow: Gendered Policies of Contamination in Germany, 1930–1970

Heiko Stoff

Since the 1930s, biochemists and pharmacologists have defined cancer as a disease which can be experimentally produced through the use of radium, x-rays, ultraviolet light, and coal tar and its derivatives, notably azo dyes and aromatic hydrocarbons. A minor modification of the molecular structure of these compounds could influence their activity enormously. In the 1940s, two distinct substances, oestrogens as a biologically active drug and butter yellow as a food colourant, came under scientific scrutiny due to their presumed carcinogenic nature. While in Germany oestrogens, some of the most profitable biologics and of major importance for the new physiology of the gendered human body, were acquitted of the charge of having a cancer-causing steroidal structure, butter yellow, representative of the ills of industrial food production, was identified as a carcinogenic molecule. The history of oncologic theories of carcinogenic substances in the early twentieth century alone would be a worthwhile undertaking, but the history of oestrogens and butter yellow sheds new light on the holistic bias of the German women's movement. The German women's movement was, from the 1920s to well into the 1960s, in many regards a consumer movement concerned with defending the individual, the family and the collective body from contamination. The main question this essay seeks to answer is why German housewife organisations played such a crucial role in the prohibition of butter yellow in the 1940s but, at the same time, remained silent about oestrogens. Indeed, it was another thirty years before feminists engaged with the dangers of supposedly cancer-causing steroids in regard to hormonal therapy and the contraceptive pill. The history of chemically and biologically active agents cannot be written without consideration of the processes of their socialisation: discourses and narratives, modes of production, standardisation and regulation of procedures, problematisations and activations (Stoff 2013; Stoff 2012a, 7–24). In an important twist, the history of the German women's movement in the twentieth century must also take these precarious substances into account.

In the following pages I will not only retell the history of oestrogens and butter yellow during crucial stages in the 1930s/1940s and 1950s/1960s, but will also highlight the different reactions of women's organisations towards suspicious

molecules. While this corresponded with a new theory of carcinogenesis, one which highlighted the cancer-causing effects of certain chemicals, it also newly defined *healthy naturalness* and *dangerous artificiality*. In Germany, new biochemical knowledge strengthened a discourse on the poisoning of the people by modern civilisation, which from the 1930s to the 1950s, fuelled the continuing protest over the use of food colourants. Oestrogens could have been declared to be as precarious as azo dyes, but played a far too important role in the state's population policy, in the endocrine innovations within gynaecology, in the profit rates of pharmaceutical companies and in the careers of biochemists and pharmacologists, to be so easily condemned.

Oestrogens (1929–1940)

Ovarian extracts had been used for organotherapeutic supplementation and substitution since the 1890s, the female body having been defined as a precarious reproductive unit, always lacking something, always in danger of developing deficiencies. Organotherapy, with ovarian substances or by transplantation, was used for menstrual regulation and climacteric problems, but also produced new knowledge about a female reproductive system functioning through internal secretion, not nervous action. Both the new physiology and the new therapy relied on the concept of a notoriously deficient female body, one which could be regulated through the activation of efficient chemical messengers produced in the ovaries, 'speeding from cell to cell along the blood stream' (Starling 1905, 340; Sengoopta 2000, 441–55). In the 1910s, ovarian therapy was indicated for infantilism, sterility, asiderosis, anaemia, dysmenorrhea, amenorrhea, menorrhagia, genital neurasthenia, epilepsy and Graves' disease. The most critical deficiency symptom in turn of the century population policy was sterility. At this time 1900, the field of gynaecology changed dramatically; endocrine events transformed not only the representation and materiality of the female body, but also practices within the doctor's surgery, in the clinic, the labour ward and postpartum rooms (Sengoopta 2006, 39–45; Gaudillière 2004a, 527). In the 1920s, it appeared that 'the ovary produces an internal secretion which governs the phenomena of estrus' (Doisy, Rolls, Allen and Johnston 1924, 711). The concepts of internal secretion and endocrine regulation generated a version of femininity as delicate, precarious and never resilient; but this new female body, in contrast to the nineteenth century's enigmatic nervousness, was amenable to direct therapy and prophylaxis. The assemblage of the pharmaceutical industry, gynaecology, biochemistry, and governmental population policy produced a female *reproductive body*, always endangered by sterility, the deficient functioning of which was characterised by menstrual and climacteric disorders. The bio-political agenda was informed by the idea of a female *deficient body* caringly arranged by male gynaecologists.

The quality of ovarian extracts, however, was rather dubious; indeed, little advance had been made in ovarian therapy since the 1890s. Still missing in the 1920s was knowledge surrounding the chemical and physical character of the biologically-active substance. In the year 1923 anatomist Edgar Allen and biochemist Edward A. Doisy at the Washington University Medical School in St Louis, developed an assay enabling the isolation and industrial production of oestrogen-active substances. Injections of ovarian extracts into spayed animals produced 'typical estrual hyperemia, growth, and hypersecretion in the genital tract and growth in the mammary glands'. These changes included a characteristic cornification in the vaginal walls. This observation constituted a test easily monitored in a living animal. The active agent of these alterations in rats and mice, a follicle hormone, appeared to be an efficient substitute for the endocrine function of the ovaries of a non-pregnant animal, which was, according to Allen and Doisy, 'sufficient to explain the mechanism of estrual phenomena in the genital tract in the absence of pregnancy' (Allen and Doisy 1923, 821). The bio-assay not only facilitated the isolation of hormones but also their dosage and representation in mice or rat units (Oudshoorn 1994, 42–8). Animal experiments to assess the optimal dosages of a functioning female body led to the molecularisation of menstruation and menopause (Gaudillière 2006, 151).

The isolation of sex hormones in 1929, achieved almost simultaneously by two groups, one centred around Doisy, the other with the German biochemist Adolf Butenandt, relied on an enormous amount of raw material, such as follicles or placenta, which could only be organised with the help of clinics and the pharmaceutical industry. In 1928, Selmar Aschheim and Bernhard Zondek simplified this problem significantly, demonstrating that chemically-treated urine from pregnant women and animals passed the Allen-Doisy test, and two years later, Zondek identified mare urine as a rich source of follicular hormone (Zondek 1928; Oudshoorn 1994, 73–9; Ratmoko 2010, 90–97). Oestrogens could then be produced in large amounts by pharmaceutical companies such as Organon in the Netherlands (*Menformon*), Schering in Germany (*Progynon*), or Ciba in Switzerland (*Ovocyclin*) (Ratmoko 2010; Gaudillière 2004a; Oudshoorn 1994). Sex hormones were both druglike and communicative substances; they could be industrially produced while also defining and explaining the modern body (Hawhee 2009, 80). In the 1930s, oestrogens were efficient agents able to cause cornification of the epithelial cells in ovariectomised rats; in contrast to other substances passing the Allen-Doisy test, they had a steroidal chemical structure. Oestrogens were regulators of female functions, could be industrially produced and activated for both clinical and bio-political treatment of sterility and supposed menstrual or menopausal disorders. Oestrogens were conceptualised as highly effective molecular substances, thereby creating a new ontology of the female body and producing a tool for the regulation and optimisation of female functions or even 'femininity' itself. Since then femininity has mostly been seen as an alterable state of estrogenic activity (Ratmoko 2010; Roberts 2007; Sengoopta 2006; Stoff 2004a, 435–69; Oudshoorn 1994).

In the 1930s, although testosterone and progesterone could already be synthesised, biochemists had not yet achieved the synthesis of oestrogens. According to Butenandt, the reason for this lay in the lack of methods for a partial dehydrogenation of the steran skeleton (Butenandt 1942, 11–12). In the years 1937 and 1938, Hans Herloff Inhoffen and Walter Hohlweg, both chemists with Schering, synthesised ethinylestradiol from oestradiol. But this oestrogen-active substance had severe side effects, making it useless for marketing and clinical activation. It took another 10 years until a lower-dosed ethinylestradiol could be sold as a drug for menopausal symptoms (Hohlweg and Inhoffen 1939, 78). The only alternative to oestrogens isolated from pregnant mare urine was the stilbene derivative diethylstilbestrol (DES), which Charles Dodds produced as an oestrogen-active compound in 1938. According to Viennese chemist Fritz von Wessely, DES resembled natural oestrogens in quality, but was even more effective when administered in equivalent quantities. Dodd's research had been funded by the British Medical Research Council; since it had not been patented, IG Farben was able to produce a rather cheap DES-remedy under the name *Cyren* in the summer of 1938. *Cyren* and *Progynon* were competing in a lucrative market for biologically-active substances in the late 1930s; the production of sex hormones was behind the prosperity of pharmaceutical companies like Schering, Organon or Ciba (Dodds, Goldberg, Lawson and Robinson 1938; Wessely 1940, 198–201; Gaudillière 2008). But a dark cloud overshadowed this commercial, therapeutic and epistemological success story of the cooperation of pharmaceutical industry, the medical clinic and biochemistry. The effectiveness of oestrogens to induce growth in an organism made them also suspect of generating toxic or even carcinogenic effects. While this concerned nearly all biologically-active substances, oestrogens posed a particular threat.

In 1915, the Japanese pathologists Katsusaburo Yamagiwa and Koichi Ichikawa induced skin cancer in rabbits by painting their ears with coal tar. A group working with Ernest L. Kennaway and James W. Cook blamed benzpyrene, a pure chemical compound present in coal tar, for the cancer-causing effects. Therefore, aromatic hydrocarbons in general were regarded as potentially carcinogenic substances in the 1920s. One of these aromatic hydrocarbons, methylcholanthrene, was related to steroids. It was even possible, as the leading chemists Heinrich Otto Wieland and Adolf Windaus demonstrated, independently of each other, to convert cholesterol and bile acid into methylcholanthrene. This finding raised the possibility that under certain circumstances steroids could also become carcinogenic. Because oestrogens were characterised by a partially aromatised hydrocarbon framework, these useful reproductive agents were suddenly the critical and non-therapeutic focus of cancer research (Butenandt 1940, 348; Deichmann 2001, 344). The assumption, that oestrogens were evidently dangerous because of their chemical structure, was a serious threat to biochemists, gynaecologists and pharmaceutical companies. In the late 1930s, these bio-political agents, tools for the optimisation of female reproductive functions, became precarious substances. The very moment they were standardised through bio-assay and chemical procedures, they were also

established as autonomous agents of an individual structure, which acquired the ability to induce growth independent of the experimenter's will (Wahrig, Stoff, Schwerin and Balz 2008, 5, 10).

Adolf Butenandt, Germany's leading biochemist during the 1930s and director of the Kaiser-Wilhelm-Institute for Biochemistry in Berlin-Dahlem, who in close cooperation with Schering had isolated oestrone in 1929, was indeed shocked that Kennaway and Cook's thesis had gained the status of facticity in some scientific writings. At stake was an achievement of major importance for Butenandt's own career, gynaecological practice, the bio-political interests of the national socialist state, and finally and most of all, for Schering. In the summer of 1937, Butenandt, spurred to action by Schering, financed by the German Research Foundation and in cooperation with the gynaecologist Carl Kaufmann from the Charité in Berlin, organised a working group to address this suspicion. The story of this research project, which combined the interests of laboratory science, clinic and industry, has been written at length by the French historian of science Jean-Paul Gaudillière (Gaudillière 2006 and 2004b). Expectations were that oestrogens would be given the benefit of the doubt, but Butenandt, even though his success as a biochemist was based on cooperation with the pharmaceutical industry, saw himself as a respectable and autonomous scientist, who would never have produced unjustly favourable results. What Kaufmann and Butenandt did, was concentrate their research not on the chemical structure of oestrogens, but on the disposition of laboratory animals. Kaufmann, who in the 1930s had tested Schering's hormone products for optimal dosages and broader indications (he was an expert on the treatment of amenorrhoea, the lack of menstrual periods), administered oestrogens to three thousand mice. He concluded that even continuous administration would not increase the rate of tumours. Butenandt again referred back to experimental work carried out by Antoine Lacassagne, who in 1936 had injected male mice with follicle hormones, thereby inducing breast cancer. Sex steroids, Butenandt stated, affect genetic conditions which only exist in such mice breeds already demonstrating a high susceptibility to breast tumours (Butenandt 1940, 349). Oestrogens are therefore only the catalyst, not the cause of cancer; in the case of oestrogens the genetic precondition or intrinsic factor is the essential condition for cancer-causing hormonal effects. When Butenandt presented the results of the working group in June 1940, he summarised that oestrogens and DES could indeed induce breast cancer in genetically preconditioned mice, but that this had nothing to do with the specific chemical structure alone. Even if this report cleared oestrogens, Schering were not very pleased, as the statement gave *Cyren* the same innocent status as *Progynon*. Soon after this, however, both companies agreed that IG Farben would stop comparing its cheaper product to *Progynon*, while Schering would be quiet about the toxicity of *Cyren*. What remained from Butenandt and Kaufmann's animal experiments was the statement that oestrogen-active substances themselves – as steroids or as stilbene-derivatives – were not carcinogenic substances (Butenandt 1940, 349; Gaudillière 2008, 117).

Despite the fact that Kennaway and Cook's findings, as well as the results of Butenandt and Kaufmann's biological trials, were published in leading professional journals, there was no public debate. The actors involved in this story were merely male scientists like Butenandt, Kennaway and Cook, clinicians like Kaufmann and pharmaceutical companies like Schering and IG Farben. In the late 1930s, there was an ongoing discussion on the subject in professional journals, but as yet, no public debate (Druckrey 1940). The only physician to take up the accusation against oestrogens was Paul Gerhardt Seeger, who aroused the interest of Adolf Hitler himself, by claiming a cancer-causing stereoisomeric reversal of follicle hormones was provoked by the *wrong* femininity, pathology and mongrelisation (Seeger 1940; Proctor 1999, 317). But where were the persons concerned, where were the women? Why was there no outrage over this suspicion? While there were restrictions on dissent in Nazi Germany, as I will show in the next section, this was not the case for a campaign on butter yellow, another supposedly cancer-causing substance, which was mobilised by German housewives' organisations at the same time. Whereas oestrogens were bio-political agents controlled by male experts, the case of butter yellow was about food and therefore concerned female consumer interests. Even though there was a short period of medical consumerism in the 1920s in relation to oestrogens, women were patients dependent on expert opinions and bearing bio-political responsibility. The fast reaction of Germany's leading biochemist, Butenandt, had smothered any doubt over hormonal therapy in the cradle. But the silence of women and women's organisations can also be explained by the simple fact that the reproductive and bio-political issue was itself part of feminist discourse in the first decades of the twentieth century. While oestrogens, in a rather disburdening way, defined biological femininity, hormonal therapy held the promise of relieving women's physical and social pains. There was simply no interest in criticising this biomedical practice because sex hormones defined women as both sexual and reproductive beings, thereby connecting physiology with the prospect of liberation in a 'motherhood-eugenics consensus' (Grossmann 1995, 15). In the case of butter yellow, not only the same biochemical experts but also the women's organisations, reacted strongly against the azo dye, on the one hand because it was a neglectable substance and on the other because it concerned the holistic bias of life-reformist discourse.

Butter Yellow (1937–1941)

Critiques of modern food production had been common in all western nations since the last third of the nineteenth century. But while this criticism was largely focused on food fraud, in Germany, the highly influential interplay of diet reform and a new dietetics emphasised the need for a healthy diet based on nutritional value. This political discourse turned life reform into science and nutrition research into life reform (Melzer 2003, 101–42; Merta 2003, 119–28). A nutrition-political and civilisation-critical discourse distinguishing between

natural purity and artificial contamination merged toxicology, pharmacology and cancer research. In 1931, Curt Lenzner published a book entitled *Gift in der Nahrung*, which can be literally translated as 'Poisoned Food'. According to Lenzner, diseases of civilisation, notably cancer, were based on plasmatic damnifications caused by a lack of vital substances and an overflow of chemicals hostile to life. The latter he identified with food additives such as bleaching agents, colourants and preservatives (Lenzner 1933, XI, 191, 193). One year later, Erwin Liek, the notorious enemy of the social and health security system of the Weimar Republic, proclaimed a connection between civilisation and cancer, actualised in chemicalised and technicalised food (Liek 1932; Kater 1990). Diet-reform advocates like Werner Kollath, the German guru of wholefood nutrition, denounced industrially-produced food as denaturalised and a danger to the fitness and vitality of the people. If denaturalisation caused cancer, the sole hope for the German people lay in a natural diet (Proctor 1999, 120–72; Fritzen 2006, 201–4; Heyll 2006, 201–28). This strong positioning of purity and a natural lifestyle gained even more strength with the empowerment of the National Socialists; the narrative of a holistic body threatened by foreign matter fitted well into Nazi ideology of a 'Volksgemeinschaft' endangered by elements foreign to the German race (Harrington 1999, 185–8). While there were inner contradictions and an open dispute between propagandists of pure food and advocates of strategically important 'ideal preservatives' during the war, Kollath's distinction between near-natural and non-natural, therefore 'dead', food was widely accepted (Kollath 1942, 14; Stoff 2013; Stoff 2012a, 253–79; Sperling 2011).

In this historical setting the case of butter yellow, an azo compound used to give butter an attractive yellow colour, caused tremendous public interest. Butter yellow had been synthesised by Peter Griess at the Royal College of Chemistry in London in the 1860s and had been used as a colourant in Germany since the 1870s. In the early 1930s, Tomizo Yoshida published experimental findings, suggesting that rats fed with scarlet red (o-Aminoazotoluol) developed bladder cancer and hepatic tumours. O-Aminoazotoluol was closely related to p-Dimethylaminoazobenzol, the chemical compound better known as butter yellow. Between 1932 and 1937, Japanese pathologist Riojun Kinosita proved that several azo dyes were carcinogenic. The German pharmacologist Hermann Druckrey confirmed these results (Kinosita 1940, 287–92; Brock, Druckrey and Hamperl 1940). In 1943, Richard Kuhn and Helmut Beinert stated that butter yellow was the most important representative amongst carcinogenic azo dyes. And one year later, Eugene L. Opie summarised that '(a)dministration of butter yellow produces multiple foci of focal hyperplasia, cystic ducts, and cholangiofibrosis, and corresponding with these lesions, which are precursors of tumour growth, multiple tumours are formed' (Kuhn and Beinert 1943, 904; Opie 1944, 244). As early as June 1939, the International Congress for Cancer Research had recommended the banning of butter yellow for colouring food. A few months later, Hans Reiter, president of the German Reich Health Office, had suggested a new German Colour Law. Robert Proctor, in his book on the history of cancer research

in Nazi Germany, has outlined the complicated situation Reiter was in, as a sudden removal of colours during the war might have been interpreted as the application of inferior foodstuffs. On the other hand, however, there were already rumours circulating that coloured food was poisoning consumers. It was at this point that the women's organisations of Nazi Germany intervened, applying pressure to Reiter, and finally succeeded. As Proctor tells this story, in 1941 a member of Göttingen's 'NS-Frauenwerk' asked her superiors why cancer-causing substances were still allowed in butter and margarine. The regional women's leader informed Reiter that 'while women were certainly willing to sacrifice for the war, accepting the presence of cancer-causing agents in food was something else'. And indeed Reiter, who appreciated the housewives' organisation as allies in his efforts for wartime food security, rather successfully negotiated with the different groups producing and marketing coal tar dyes to reduce their use. Finally, even the almighty IG Farben ceased production of butter yellow (Proctor 1999, 165–70).

To sum this story up, it was a coalition of scientists, politicians and women's organisations who succeeded in bringing about the prohibition of butter yellow. Women's organisations, as has been shown in several studies, were deeply involved in Nazi Germany's health and nutrition policies; they were the core of the rising consumer movement and experts in their own right, as consumers and in their role as 'guardians of nature'. Housewives, far from being marginalised, were able to determine health policy decisions (Davis 1996). Papers on the pharmacology of cancer in the 1940s referred to two classes of carcinogenic compounds: azo dyes and aromatic hydrocarbons (Butenandt 1940). But until the late 1960s only the case of butter yellow generated legislative and scientific political action.

Butter Yellow (1948–1958)

In the 1950s and 1960s these two stories of silent and worried, of strengthened and endangered, of dependent and autonomous, of apolitical and political women convened. And it was again these two differing substances, a sex hormone and a food colourant, which catalysed the establishment of German feminism as a consumer movement. In the year 1948, Butenandt, the defender of oestrogens, did not hesitate before frightening the public by proclaiming that butter yellow, a proven carcinogenic substance, was still in use (Hartmann 1949, 247–8). Although this accusation was immediately denied by nutrition experts and representatives of the pharmaceutical industry, a debate was begun, which shaped food additive policies in Germany throughout the 1950s. Magazines and newspapers took up the story and just a few years after the end of the Nazi reign, dramatically asked if the Germans were now poisoned (Anonymous 1954). This narrative expressed itself in a new oncological theory introduced by the well-respected physician Karl-Heinrich Bauer, which downplayed the role of genetics while emphasising the significance of exogenous agents, such as rays or chemical compounds. Bauer based his assumption on the case of azo dyes, thereby reiterating the idea of a

strong connection between civilisation and an apparent rise in cancer (Bauer 1950). According to Bauer's 'pharmacology of cancer causing substances' the rise in cancer was the result of a progressing chemicalisation and technicalisation of the environment and the development of external toxins, or 'Noxen' as Bauer called them (Bauer 1950, 33–4). These mere speculations gained scientific facticity through the collaboration of Druckrey, again, with the mathematician Karl Küpfmüller in 1948. Druckrey, a convinced Nazi who had to be whitewashed by Butenandt, himself a profiteer of Nazi science policy, after 1945, conducted animal tests with butter yellow; these experiments demonstrated that the production of tumours required a certain total dose, regardless of how this was distributed over 35 to 365 days. The latency period, Druckrey stated, was inversely related to the daily dose. If experiments were extended over the life span of the animals, a smaller dose was necessary to produce an effect: with increasing age, there was an increasing disposition to tumour development. Druckrey concluded that the carcinogenic effect of butter yellow was therefore, even at the smallest doses, irreversible from the beginning of the experiment during the entire life span of the animals, and was additive with further exposure without any modification, until, after a critical total dose has been exceeded, tumours would develop. Because of this latency period – the dose-effect and dose-time relation – it was practically impossible to decide whether a certain substance was carcinogenic or not. From this time on, it was chemical substances in everyday use that demonstrated the most risk (Druckrey and Küpfmüller 1948; Wunderlich 2005; Stoff 2012b).

Bauer, Druckrey and Butenandt were comrades in arms in the ongoing war against cancer. The field for this battle was the senate commission for food colourants of the German Research Foundation, in which, under the guidance of Butenandt and Druckrey, representatives of the pharmaceutical and foodstuff-producing industry, together with politicians negotiated the use of food additives (Stoff 2009). During the early 1950s, German scientists even tried to establish this new theory of carcinogenesis as a European norm and install a preventive risk policy for food additives in the institutions EUROTOX and the Joint FAO/WHO Expert Committee on Food Additives (JECFA). In the late 1950s, however, the influence of Druckrey and Butenandt faded; the radical and life-reformist informed concept of risk prevention was replaced by a mere risk management, expressed in the concept of 'acceptable daily intake' (Jas 2013; Stoff 2012b).

While the commission worked behind closed doors, a public discourse about the 'toxic condition' of modern life and the negative role of the pharmaceutical and chemical industry gained strength. The catchphrase of a 'toxic total situation' ('toxische Gesamsituation') coined by Fritz Eichholtz, director of the Pharmacological Institute at the University of Heidelberg, inspired a far-reaching debate on the boundaries of risk assessment and the dangers of chemical substances (Eichholtz 1956). At the same time, organised as well as independently acting women intervened, writing hundreds of letters to the ministries in charge. A certain Anneliese Conrad from Schöppenstedt in Lower Saxony, for example, demanded the Ministry of Food immediately ban food colouring. Cancer, she wrote, had

so dramatically increased that it was the dictate of the moment to search for the reason for this German disease ('deutsche Volkskrankheit').[1] Marie Seeger, who identified herself as a housewife from Augsburg on a postcard she sent to the health committee in Bonn, pleaded with the committee to bring uncoloured and raw foodstuff to the consumer. It was an unscrupulous act without comparison to supply the population with poisoned food even in the smallest doses, she wrote. In the future, food should be identified as pure or impure. Whoever wanted coloured food should be able to obtain it, but she and her family did not want any of it.[2] There was also an open critique in which consumers were not represented, however, by the commissions for food additives established by the German Research Foundation during the 1950s. In Germany at this time no official consumers' association existed. It was up to the housewives' and women's organisations to resume their battle against poisoned food and the poisoning of the people. In February 1950, the German Women's Association ('Deutscher Frauenring') demanded measures be taken against the colouring of food. In a concerted action, Catholic and Protestant women's and housewives' organisations demanded that the ministries of health and of the interior prohibit food colouring with azo dyes. The Women's Information Service ('Informationsdienst für Frauenfragen'), which united 80 women's organisations and groups, applied to all relevant political representatives, requesting the passage of a new food law based on a white list of experimentally proven dangerous substances.[3] On 24 February 1956, members of parliament, Hedwig Jochmus (CDU), Käte Strobel (SPD), Marie-Elisabeth Lüders (FDP) and 43 other female delegates of the German Bundestag, presented an application that the Bundestag should request the Federal Government to produce a draft of a new food law. This proceeding was well prepared by Jochmus, Strobel and Werner Gabel, undersecretary in the Ministry of the Interior. The issue produced much laughter from male members of parliament, but the 'united front of female delegates' ('Einheitsfront der weiblichen Abgeordneten') provoked a strong response from the public and the media.[4] Indeed, the women's organisations succeeded in releasing a new and much stricter food law. An as yet unwritten history of German consumer organisations would have to address the role of women in the debate on 'poisoned food', while also explaining the masculinisation of the consumer movement in the 1960s. The politics of precarious substances, which

1 Conrad, A. (1952), Letter to Federal Department for Nutrition, 2 December, B 116/420. Koblenz: Bundesarchiv.

2 Seeger, M. (1958), Letter to Health Committee, Bonn, 24 April, B 142/1530. Koblenz: Bundesarchiv.

3 Deutscher Frauenring, Committee for National and Domestic Economy (1950), Letter to Federal Ministry of the Interior, Health Department, 14 February, B 116/419. Koblenz: Bundesarchiv.

4 German Bundestag (1956), 149th Meeting, Bonn, 8 June, B 142/15282, p. 7901. Koblenz: Bundesarchiv.

united women across party lines, emerged as a major topic in the feminist agenda during the second half of the twentieth century.

Oestrogens (1950–1970)

In the 1950s, Western European cancer research was concentrated on azo dyes. In the case of West Germany this meant an absolution for oestrogens. In 1940, when supporting the results of Butenandt and Kaufmann's experiments, Druckrey had officially proclaimed that follicle hormones were not 'real carcinogenic substances' like derivatives of benzanthracene (Druckrey 1940). This contrasted sharply with the debate in England happening at the same time. In 1950, Alexander Lipschütz, a veteran of hormone research, published a monograph under the title *Steroid Hormones and Tumors*. He emphasised the connection between organs controlled by hormones, such as the breast, uterus and prostate, which could be governed by hormonal therapy, and a vulnerability to tumours. Eric Stephen Horning from the London Royal Cancer Hospital took up this idea. Together with Hadley Kirkman from the Stanford University School of Medicine, he was able to experimentally produce renal tumour in hamsters through the use of oestrogens (Lipschütz 1950; Horning 1951; Kirkman 1957). During the 1940s and 1950s, there was a widespread belief, at least in the USA, that the intake of oestrogen-active substances such as DES could prevent miscarriages, therefore this was a highly controversial finding (Langston 2010, 48–60). Kirkman produced a long list of questions relating to the relationship between hormones and cancer:

> Which hormones are tumorigenic, which carcinogenic? Do these hormones act directly or indirectly in producing neoplastic change? Do carcinogenic or tumorigenic hormones act only on normal physiological target tissues? Do the neoplastic changes occur in normal or in injured cells? Most hormonally induced tumors are dependent, but upon serial transfer some of them become autonomous. What is the nature of this transition from dependency to autonomy, and does the transition occur abruptly as a single step or is it a gradual process involving several or many steps? (Kirkman 1957, 757)

In West Germany the outcomes of these new experiments were mostly rejected. A remarkable exception was Walter Büngeler, director of the institute for pathology at the University of Munich, who attempted to re-examine Kirkman's and Horning's findings, but encountered harsh reactions from his colleagues. In 1959, Herwig Hamperl even tried to prevent the funding of Büngeler's research by the German Research Foundation.[5]

5 Büngeler, W. (1959), Application. Experimentelle Untersuchungen über die Bedeutung hormoneller Faktoren bei der Geschwulstentstehung (Leberveränderungen), 2nd September, Bü 1/17. Bonn: Archive of the German Research Foundation (DFG).

In the mid 1960s, however, the debate surrounding potentially carcinogenic hormones also flared up in West Germany. It was the translation of the bestseller *Feminine Forever*, written by the gynaecologist Robert A. Wilson, which raised tempers in the German public and amongst German physicians. Wilson recommended hormonal replacement therapy with oestrogens for the treatment of menopausal symptoms (Roberts 2007, 120–28; Houck 2003; Watkins 2001; Wilson 1966). The main discussion point was whether menopause was a natural condition to which women should adapt, or a deficiency symptom to be taken care of by gynaecologists. 'Wilson wants to abolish menopause with oestrogens', read one of the many headlines in the German press. Menopause, lectured the gynaecologist, Josef Zander, when interrogated by Germany's leading news magazine, *Der Spiegel*, is a deficiency disease based on a lack of oestrogens. The only question for Zander was whether acute or prophylactic measures should be taken. He opted for long-term treatment with oestrogens because, according to him, these highly potent substances had exceptional medicinal benefits (Müller and Petermann 1966, 149). The gynaecologist, Gerhard F. Winter, distanced himself from those he called conservative physicians, who regarded menopause as a simple physiological state and therefore not requiring any kind of therapy. Instead, he associated himself with a group of modern American physicians, 'who demand hormonal substitution in every situation and maintain this substitution until old age' (Winter 1967). But Wilson's book also caused a heated debate on the dangers of hormone replacement therapy. *Der Spiegel* even referred to a 'hormone-war' ('Hormon-Krieg'). In the weekly *Die Zeit*, Georg Schreiber listed a whole compendium of dangerous side effects associated with hormone replacement therapy (Schreiber 1966). The drug commission of the German Medical Association also published a joint statement (Anonymous 1966). Even though some physicians warned that, quite apart from heavy side-effects, such a use of oestrogens could induce uterine and breast cancer, barely any experts mentioned the experiments conducted in the 1930s. The gynaecologists, Gisela Dallenbach-Hellweg and Frederick D. Dallenbach, were the exception, reminding their colleagues that 60 years earlier, oestrogens had already been accused of causing tumours in mice (Dallenbach-Hellweg and Dallenbach 1971). By contrast, Butenandt's verdict that a genetic proclivity was necessary for hormonally induced breast cancer was alive and well in the 1960s. Zander was, after all, a disciple of Butenandt.

Due to the authoritative statements made by German gynaecologists, the 1966 hormone-war had been long forgotten when, during the Whitsun holidays in 1969, another gigantic headline in the tabloid *Bild* frightened the West-German public: 'Shock for women! Lump in the breast due to birth control pill!' ('Schock für Frauen! Knoten in der Brust durch Anti-Baby-Pillen') (Köhler 1969). Animal testing had shown that a new oral contraceptive called *Neonovum* could induce breast cancer. Until this unexpected scandal the dangers of the contraceptive pill had mostly been discussed in relation to thrombosis (Marks 2001, 138–57). But there had already been warning voices in the early 1960s. In 1964, Hamburg gynaecologist Oskar Guhr had reported that the pill might induce uterine cancer.

Given his statement had been based on only 80 cases, Gregory Pincus examined a thousand women who took the pill and, according to his enthusiastic statement, appeared to be completely healthy. The journalist, Thomas von Randow, reminded *Die Zeit* readers of the sad case of Thalidomide some years previously: 'Even the fact that the pill is taken by millions of women cannot comfort us until Guhr's outrageous suspicion is refuted' (Randow 1964). Generally throughout the 1960s, the contraceptive pill had appeared to be much more of an ethical than a health problem (Ignaciuk, Ortiz-Gómez & Rodríguez-Ocaña, this volume; Thoms, this volume). But in 1969, an immediate and intensive debate began on the methods of steroid toxicology and the interpretation of experiments. This focused on the selection of laboratory animals, as research on Neonovum had been based on experiments with Beagles prone to breast cancer (Anonymous 1970, 198). In accordance with the Druckrey-Küpfmüller equation, the latency period between exposure and clinical manifestation called for long-term studies with a huge amount of investigations. But even such long term studies were barely convincing. In 1973 the statistician, Karl Überla, realised that an increase in the risk of breast carcinoma following oestrogen treatment could not be claimed with sufficient certainty. With resignation, however, he added that this did not sufficiently invalidate the suspicion (Plotz et. al. 1973, 371). The controversy on carcinogenic substances was not settled by knowledge, facts, or nature itself (Latour 1987, 96–100).

The story of the contraceptive pill, which has been written in great detail, is complicated because there were – in dramatic contrast to the 1940s debate on oestrogens – so many actors: self-proclaimed progressive scientists such as Carl Djerassi; neo-malthusianists and population politicians; conservative, pro-natalist and bio-political physicians; a new media hunting for headlines and fanning the fear of breast cancer; the famous papal encyclical; and last but not least, a far from homogenous women's movement (Marks 2001; Silies 2010). It was probably astonishing for actors like Djerassi that the women's movement, which had been associated with sexual reform and sexual emancipation since the 1920s, turned into a consumer movement during the 1960s, valuing bodily integrity higher than sexual fulfilment (Duden 2008, 595–6; Marks 2001). On one hand, sexual reform was consumerist itself, sexuality being a 'consumer choice' (Birken 1988). On the other, the German consumer movement was deeply influenced by the life-reform discourse of a holistic body endangered by poisons, as expressed in the fight against butter yellow and for a new food law in the 1950s. The 1970s West German debate on potentially cancer-causing oestrogens followed this argument against poisoned food and was led by the trope of a toxic total situation, which led the German environmental movement.

In the late 1970s, the modern utopia of liberated sexuality was questioned in various ways. This new feminist topic, claiming that the alleged sex wave only benefited men, while women had to bear the risk of a chemicalised body, echoed Michel Foucault's famous dictum that 'the irony of this deployment (of sexuality, H.S.) is in having us believe that our "liberation" is in the balance' (Foucault 1976, 159). For those advocating sexual consumerism, suspicion of

cancer was the argument of a conservative-feminist conspiracy. In 1973, two projects studied the role of the 'subjective side-effects' of oral contraceptives, as social psychological factors and religious moral values (Frick, Kessler and Pferdmenges 1973; Blättler, Blättler and Hauser 1973). These factors seemed to explain the critical position towards the contraceptive pill so many women adopted in the early 1970s. For supporters and beneficiaries of sexual liberation, like *Der Spiegel*, the papal encyclical of 1968 was the same type of propaganda against the contraceptive pill as exaggerated medical objections (Anonymous 1968, 85). Contemporary journalists, like social scientists, were unable to trace the new feminist position towards oestrogens back to the case of butter yellow, the identity of women's and consumer movements, and the trope of poisoning.

Thirty years after the silent acceptance of expert opinion on oestrogens, these precarious substances became a political issue. In 1970, female members of parliament, Hedda Heuser (FDP) and Käte Strobel (SPD), who had already played a major role in the amendment of German food law, again organised a non-party inquiry regarding the dangers of the contraceptive pill. Feminists, overcoming the former, hierarchical separation of experts and patients, not only utilised the expertise of those scientists who proved the dangers of oestrogen-active substances, they also referred to the experiences of women, their unease and discontent with the pill. As part of a consumer movement, the feminist critique of the pill was raised against elitist negotiations of risks, which neglected or redefined women's interests. The controversy surrounding the pill, as Barbara Duden has summarised, accelerated the transformation of women from immature patients to self-determined consumers. The gendered promise of autonomy, youth, beauty and health merged with an optimised life designed by experts, self-care and steroids (Duden 2008; Stoff 2004b, 238). While today the quarrel about oestrogens as potentially cancer-causing substances remains unresolved, the female body is both a contested side of consumerism, activated for consumption and defended in the name of consumer rights, and a residuum of purity and holism. In Germany, the narrative of the poisoning of the female body started around 1940 with butter yellow, influenced the German consumer movement in the 1950s, and finally affected the feminist movement in the 1970s.

The German women's movement as a consumer movement inherited the life-reform discourse and critique of civilisation from the 1940s. It gained its political strength through the battle against butter yellow and its short lived victory in the instalment of a new food law in 1958 (which in the following years was diluted by much laxer resolutions). Feminists in the 1970s took up the holistic discourse and rhetoric of the women's movement while also questioning sexual liberalism and male expert definitions of the female body. The history of the German feminist movement does not have to be rewritten, but following the actions of and quarrels about molecules can help reveal motives and discourses which would otherwise remain invisible.

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