

From Urine in India to Ampoules in Europe: The Relational Infrastructure of Human Chorionic Gonadotropin

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Abstract. From urine in India to ampoules in Europe describes the commodity chain of the hormone *human chorionic gonadotropin* (hCG) between the 1960s and 1990s. The transfiguration of hCG from an impotent waste product in India to a prized pharmaceutical in Europe was made possible by promises of productivity. These promises mobilized a gendered, classed, and racialized relational infrastructure that made the fertility of the urban poor in Kolkata available and valuable for reproductive medicine in the global North. Traces of these relations, however, were obscured by framing transactions as donations, providing return gifts, and declaring urine as raw material. In this article, I make hCG's relational infrastructure legible. Showing how the pharmaceutical has come into being through manifold relations, allows me to analyze processes of valuation that go beyond biological extraction and chemical metamorphosis.

[pharmaceuticals, hormones, urine, relational infrastructure, valuation, commodity chains, reproductive medicine, India]

Hormonal Alchemy

“Are you going to be a mother?” (*āpni ki mā hate calechen?*) This question was inscribed on a signboard captured in a slightly blurred photograph that Mr. Velden¹ was showing me in his living room in a small town in the Netherlands. It was part of a photo album depicting his visits to India. As a representative of a biochemical company, Mr. Velden had formerly organized a urine collection program in Kolkata (formerly Calcutta), the capital of the East Indian state of West Bengal. The signboard in the photograph had been erected close to the entrance of the company grounds in the outskirts of the city. Its inscription invited pregnant women to help their infertile contemporaries by donating urine, which contains *human chorionic gonadotropin* (hCG). The semi-processed urine would then be transported by air to Oss, an industrial town in the Netherlands, where Mr. Velden's company purified it to manufacture a pharmaceutical that was sold internationally for infertility management. Up until the 1990s, most In

1 All names of individuals in this article are pseudonyms.

Vitro Fertilization (IVF) hospitals would prescribe “urinary hCG” for medical procedures. Today, many hospitals in low-income countries still use urinary hCG instead of newer and costlier recombinant pharmaceuticals. However, the substantial relations between pregnant and infertile women in different parts of the world, as congealed in this pharmaceutical, are neither detectable in the final product nor communicated in the hospital.

Pharmaceuticals are “complex preparations” (Gaudillière 2005:605) that are “made and remade in relation to shifting contexts” (Hardon and Sanabria 2017:117). In this article, I dissect a hormonal pharmaceutical—urinary hCG, and show how it comes into being *through relations*. Tracing its “commodity chain” (Hopkins and Wallerstein 1986) between the 1960s and 1990s, I explore the alchemy² of hCG from an impotent waste product to a productive pharmaceutical commodity. Or as Bruno Lunenfeld, a scientist who was instrumental in this field (see below), put it: hCG’s transfiguration from “urine into gold” (Livneh 2002). I demonstrate how this transfiguration relied on manifold relations: between pregnant women in India, the pharmaceutical industry in Europe, and patients of infertility clinics all over the world, specifically; and between science, the market, the state, and everyday lives, more generally. I argue that reproductive medicine sources and thrives on sometimes surprising and often unequal relations that are later obscured or forgotten. Making hormonal pharmaceuticals legible in terms of these relations highlights minute processes of valuation that go beyond biological extraction and chemical metamorphosis.

Research for this article was conducted in and around Kolkata, India as well as Oss, Netherlands between 2016 and 2017. The article relies on long-term engagement with former managers and employees of the pharmaceutical company, organizers of the urine collection program, urine donors, public officials, IVF doctors, and medical representatives through informal conversations, semi-structured interviews, and a site visit to a former factory³. Some interlocutors also provided me with grey literature in the form of company in-house publications, leaflets, and photographs. The article is further based on material from the National Archives of India and corroborated by archival work in the Netherlands. The conjunction of ethnographic and archival work allows for a fine-grained and historically grounded understanding of “everyday practices and struggles over value” (Bair and Werner 2011:990) as they become apparent in the commodity chain of hCG.

2 Interestingly, urine has long been used as a transformative material, for instance for turning wool into garments, producing gunpowder, or tanning. But it was also a substance frequently employed in alchemy (Novick 2018).

3 Interviews were conducted in English or Bengali (the latter with the help of a research assistant). Consent was granted orally and interviews were recorded in writing. Some of the direct quotations used in the following derive from notes typed out after interviews.

hCG: from Urine to Ampoules

The concept of a hormonal body or an “endocrine style of thought” (Gaudillière 2004:525) in the life sciences and biomedicine is a relatively recent phenomenon. After the term “hormone” was coined in 1905 (Laveaga 2005:744), most hormones as they are known today were scientifically described in the first half of the twentieth century. hCG is a hormone or, to be more exact, one of three gonadotropins which control gamete and sex hormone production. hCG specifically is secreted by the placenta during pregnancy. hCG is also an essential pharmaceutical for infertility management. When administered medically, it promotes follicular maturation and induces ovulation in female patients. Furthermore, hCG can be employed to advance fertility in male and animal bodies. In its off-label uses, hCG has been applied quite creatively, for example for weight loss.

Until the 1990s, the production of hCG as a pharmaceutical required the biochemical extraction of the active ingredient from pregnant women’s urine. It therefore relied heavily on human raw material that was sourced in various parts of the world. Kolkata was one of these places. The fact that India specifically, or the global South more generally, has long served as a source for bodily extraction is well-known (e.g., Cohen 2005 for organs). What is noteworthy, however, are the alchemical moments built into the commodity chain of hCG. In this article, I analyze hCG’s transfiguration: from somatic source as urine to packaged product as ampoules. Apart from biochemical mutations—the changes in the form of the substance itself—the transfiguration of hCG was achieved through processes of valuation. Encompassing valorization as well as evaluation (Vatin 2013), processes of valuation, I argue, rely on specific local and global relational constellations.

In the first part of this article, I depict some of the constellations that enabled this hormonal alchemy. Among them are alliances between academy and industry in Europe; cooperation between India and the Netherlands; and connections between pregnant and infertile women. This allows me to make visible the gendered, classed, and racialized ‘relational infrastructure’⁴ that underlay the commodity chain of hCG but was no longer detectable in the final pharmaceutical product. Or, to put it in Donna Haraway’s (2012:307) words, it allows me to show that hCG was “about yoking molecules and species [as well as pregnant and infertile bodies] to each other in consequential ways.” Thus, similar to other capitalist commodities, hCG as a pharmaceutical product came “into value by using—and obviating—non-capitalist social relations” (Tsing 2013:21; cf. Sunder Rajan 2006:41).

In the second part of the article, I argue that the commodity chain of hCG was not only “animated by multiple, layered and complex interactions between material

⁴ Infrastructure has been described as a “fundamentally relational concept” (Star 2002:116). My focus in this article lies on the relational constellations that contribute to the making of hCG as a pharmaceutical.

objects and structural relations of production” but also by “abstractions” (Sunder Rajan 2006:20) or conjurations of promissory futures (ibid.:119). In the case of hCG, visions of a productive future in the form of somatic fertility and economic development helped to enroll the urban poor, medical doctors in Kolkata, and the Indian state into the urine collection program. Most importantly, they enabled extractive mechanisms at a time when India’s political economy was characterized by protectionism and policies of self-sufficiency. In this sense, hCG not only yoked pregnant and infertile bodies but also postcolonial landscapes in the global South and thriving bioeconomies in the global North. Promises of somatic and economic fertility proved to be powerful and productive, although most were never realized. Rather, the commodity chain of hCG reinforced global inequalities—processes that Jennifer Bair and Marion Werner (2011) describe as “disarticulations”—as the third part of the article shows.

Fertile Relations

The first section of the article details the multi-layered relational infrastructure on which the commodity chain of hCG was based in three steps: hCG’s industrial production was made possible through the entanglement of academy and industry during the first half of the twentieth century, which consolidated European pharmaceutical companies as we know them today. The internationalization of one of these companies in the 1960s contributed to the establishment of relations between India and the Netherlands through the externalization of supply chains. It is in this context that Kolkata became a site where pregnant women donated urine for infertile contemporaries all over the world.

Between academy and industry

During the first half of the twentieth century, researchers tried to turn hCG and other gonadotropins into clinically applicable products. In order to do so, scientists had to cooperate with pharmaceutical companies, as only they were able to initiate large-scale collection programs for raw material, industrialize the extraction procedure, manufacture products, and conduct clinical trials (Bettendorf 1995:360). However, there used to be practical concerns regarding the collaboration between academy and industry⁵. Bruno Lunenfeld⁶, who was a central figure in gonadotropin research and part of the

5 See Nordlund (2015) for the moral economy of academy-industry collaborations.

6 Born in Vienna, Bruno Lunenfeld fled to England and Palestine during the Second World War. After studying medicine at Geneva, he became interested in infertility for Zionist reasons (Livneh 2002; cf. Novick 2018). Sometimes referred to as the “hormone pope,” he has practiced, researched, and taught in various institutions, mainly in Israel.

so-called “G-Club”—a club that had been founded in the name of gonadotropins in 1953—remembered his meeting with the board of directors of Serono in 1958. He tried to convince Serono, an Italian pharmaceutical company at that time, to enter the field of hMG (*human menopausal gonadotropin*) production, a hormonal preparation extracted from the urine of postmenopausal women⁷.

“So I presented our data to the board of directors of Serono, they applauded me, but claimed they were not a ‘pissaire’, and that seemed the end of my dreams. However, as we left, a member of the board approached me, and Dr Donini [Pietro Donini, a senior scientist at Serono at that time] introduced him as Prince Pacelli. He invited me to stay in Rome and we met every day for a week, when he called the board back and gave them a similar lecture to mine, but ending with: ‘My uncle, the Pope, has made arrangements for the collection of urine in the old age homes of nuns and will donate this urine.’ It turned out that the bank Banco di Santo Spirito of the Vatican owned Serono shares, which is why Prince Pacelli was on the Serono board” (Lunenfeld 2009:37; cf. Lunenfeld 2013:14).

In the end, Prince Giulio Pacelli, an Italian aristocrat, initiated Serono’s industrial production of hMG with the help of Pope Pius XII and about 300 Italian nuns—a quite surprising, if not to say unholy, alliance in the field of reproductive medicine⁸.

In the following, I demonstrate how collaboration between academy and industry unfolded in terms of *hCG* production in one of the other prominent “hormone companies” in Europe: Organon. Organon was founded in the Netherlands in 1923 through another unlikely alliance: between Saal van Zwanenberg, the owner of a slaughterhouse; Ernst Laqueur, a professor of pharmacology at the University of Amsterdam; and Jacques van Oss, a chemist and consultant for van Zwanenberg. While van Zwanenberg was looking for a profitable way to get rid of his slaughterhouse’s waste products, Laqueur required glands for research on gonadal hormones (Oudshoorn 1994:69). The collaboration between slaughterhouse and laboratory effectively joined the provision of raw material and scientific expertise, although it remained largely invisible to consumers who “would not be able to identify the link between Zwan’s smoked sausage and Organon’s contraceptive pill” (Verhoog 1998:14). The connection continued to work favorably for both parties even after the source for many hormones shifted to urine as raw material (Oudshoorn 1994:71).

After Organon had started its urine collection program for hCG production in the Netherlands in 1931, men in black suits, called “pismannekes” (small piss men in Dutch), used to retrieve the substance from pregnant women’s homes, stopping their

7 Even though hMG is a different kind of gonadotropin, the processes and challenges involved in its industrial production are remarkably similar.

8 Unholy, because the Catholic Church later explicitly stated its opposition to many of the medical procedures, which hMG made possible. After Italy, the collection was extended to Argentina, Brazil, and Israel (Vertommen 2017).

horse carriages at houses with a newspaper placed on the windowsill (Moeders voor Moeders 2018). Since 1966, the program has been running under a new name: *Moeders voor Moeders*⁹ (Mothers for Mothers in Dutch; Tausk 1984:31). Volunteers have not been paid for their contributions but an early information brochure of *Mothers for Mothers* states that “each participant will receive a contribution and some appropriate amenities for the effort made” (Moeders voor Moeders n.d.).

Organon’s history is just one account of how scientific research and industrial production were conjoined in pharmaceutical companies in Europe during the first half of the twentieth century. Jean-Paul Gaudillière (2005:641) calls this move an “internalization of biology”: “During the years 1930–1950, the major pharmaceutical companies took decisive steps in the direction of developing their own, in-house biological research infrastructure.” When the demand for gonadotropins increased considerably, particularly after their clinical application in the 1960s and their regular use in reproductive medicine since the 1980s (American Society for Reproductive Medicine 2008:S13), this internalization of biology was complemented by the *externalization of supply chains*, a strategy that was linked to Organon’s increasingly global operations. After a McKinsey report in 1963 advised “internationalization,” Organon opened subsidiaries all over the world to sell its products (Verhoog 1998:9, 68). Further, it also extended the search for raw material abroad. It was this quest for new markets and resources that brought the company to Kolkata.

Between Europe and India

A leaflet produced for the fortieth anniversary of Organon in India announced that the company had “reached the Indian shores in 1961.” After a brief alliance with Martin & Harris, a British pharmaceutical company, Organon (India) Limited was formed and registered on August 30, 1967¹⁰. The fact that Organon only distributed imported pharmaceuticals at that time reflected the state of India’s pharmaceutical sector in the 1960s and early 1970s where MNCs (multinational companies) controlled large shares of the market but operated mainly through import. “The Indian pharmaceutical market remained import-dependent through the 1960s until the government initiated policies stressing self-reliance through local production” (Mazumdar 2013:19). These policies included the elimination of product patents through the Patents Act 1970, changes to the Foreign Exchange Regulation Act 1973 (FERA), and the introduction of the New Drug Policy in 1978 (Chaudhuri 2005:37). In more general terms, centra-

9 Moeders voor Moeders, today part of the pharmaceutical company Aspen Oss B.V., still collects urine.

10 The equity shares of Organon in Kolkata were divided between Organon (49%), the Mehta Group (49%), and a trust managed by nominees of Organon (2%), which effectively led to a constellation, where “Holland was in control,” as a former managing director said in an interview. This article focuses on Organon since, to my knowledge, there was no other pharmaceutical company conducting similar urine collection programs in India at the time.

lized economic planning, protectionism, and policies promoting self-sufficiency and self-reliance shaped the political-economic landscape in India at that time.

Apart from restrictions on imports of ready-made products, the Indian government required MNCs to locally produce bulk drugs (i.e. active pharmaceutical ingredients) in order to promote industrial development and reduce import-dependency (Chaudhuri 2005). According to former employees, these regulations forced Organon to open manufacturing facilities in India¹¹. In the early 1970s, Organon thus inaugurated two production sites in Kolkata: one for pharmaceutical items and another for bulk drugs. In 1974, the company applied for a license with the Indian government to manufacture steroids and export hCG. In the following, I examine the local operations that the hormone hCG, true to its etymological significance, set in motion in Kolkata.

Between the fertile and the infertile

Organon India was asked to produce hCG in the early 1970s, at a time when demand increased worldwide. According to my interlocutors in the Netherlands, the company was afraid that the supply of pregnant women's urine from the Netherlands would cease to be sufficient¹². In its license application to the Government of India in 1974, Organon therefore specified its need for urine as raw material. Referring to the large population and high birth rates in India, it was rather confident about its ability to collect the needed amount. "The raw material required for the purpose is at the moment a total waste in the country. Further availability of the raw material is plenty, for which large scale manufacturing of this product and its different preparations are possible without any difficulty." While the size and growth rate of India's population had usually been conceptualized as hindering factors to economic development during these decades, it was precisely these two elements that were now turned into an abundant resource to be harvested by a multinational company.

11 The policy changes in India coincided with the re-organization of Organon's holding company, Akzo, in 1971. Organon was subdivided, and the manufacture and sale of bulk products outsourced to Diosynth, an independent "sister" (Tausk 1984:172). Diosynth operated under the legal name of Organon in India until 1983 when it was "indianized" after the permissible foreign equity share of MNCs had been limited to 40% under the FERA Act. Organon (India) thus changed its name to Infar (India). According to my interlocutors in India, Infar used its independence to initiate their own projects that were not necessarily related to international Organon strategies. Many employees identified with the company and its unique work culture, the "Infar culture," a sentiment that is also reflected in the chorus of the "Infar Anthem": "Tera hai, Mera hai / Hum sab ka hai / Infar" (Inscape 2007:37). For reasons of legibility, I nevertheless refer to the company in India as Organon, instead of Diosynth or Infar, in the remainder of the article.

12 According to Mr. Velden, one reason for this anxiety was that a newspaper in the Netherlands had published a report about the Dutch queen and her sisters using hCG for weight loss, even though Organon had not advertised this particular use. Concerned that Dutch women might boycott the project, the company decided to expand its operations to India.

But urine collection did not run as smoothly as imagined. Dr. Chatterjee, a former manager of Organon India, who was entrusted with a pilot project to examine the feasibility of hCG production, recounted how he was overwhelmed with this unusual task: “They wanted me to do something about hCG. hCG comes from first trimester pregnant urine. (...) I am a Brahmin, working with urine was not my job. I am a synthetic drug man. (...) That was my line. Steroids, that was my line. My line was not handling urine.” While he was familiar with the production of synthetic hormones, he felt repulsed and unequipped to extract hormones from raw material, and even more so from urine, a smelly and polluting substance¹³. Dr. Chatterjee’s concerns were mainly tied to his status as a high-caste and extremely educated employee¹⁴. However, his friend Dr. Subhas Mukherjee, a clinician and researcher (cf. Bärnreuther 2016), who also acted as a consultant to Organon, encouraged him to engage with the project and helped him organize the collection.

In the beginning, Dr. Chatterjee and Dr. Mukherjee tried to enroll residents of middle class areas: “The first suggestion was to request friends from Ballygunge [an upper-middle class neighborhood] to donate, because they are the ones who get to know that they are pregnant early [at a time when pregnancy tests were rare],” Dr. Chatterjee explained. “But in the end, they would not donate, because people would ask why does this car come every day and collect bottles? So, this failed.” After middle class propriety and social surveillance had thwart their plans, both agreed that Dr. Chatterjee, who was a former general secretary of Jadavpur University’s student union and considered a “people’s man,” should go to Kolkata North, “to poor people’s villages” and ask for assistance there. And indeed, they slowly began to succeed in convincing women in these areas to participate in the collection program.

Apart from logistical challenges to collect urine, a racialized and classed understanding of biology created apprehensions about the potency of urine among the urban poor. As Dr. Chatterjee detailed: “We did not know whether we will get hCG. Some funny idea was there whether poor Indian women would have hCG. (...) Initially we were afraid whether we will get it at all.” Yet, in the end, both concerns proved to be unfounded: the company managed to collect urine in large quantities and was able to extract hCG from it. Dr. Chatterjee gave an impression of how the collection program started

13 Bodily excrements are often considered to be polluting substances in India, particularly excrements originating from socially inferiors (e.g. Barrett 2008). Yet, interestingly, urine also counts as a powerful substance that “promotes strength, energy, fitness, and longevity” (Alter 2004:185). Joseph Alter notes that in the context of auto-urine therapy “it is useful to think of one’s own urine—as quite distinct from someone else’s—as comparable to soma, as soma is understood in the medical literature to produce immortality by “killing off” the body prone to aging, disease, and death and replacing it with flawless reproduction” (ibid.:192).

14 This concern was shared by lower-level workers employed for urine collection, such as collection boys or supervisors of collection centers. Mr. Roy, who was involved in the collection program as a worker, explained that he and his colleagues were also troubled about handling urine. However, they got used to the substance after working with it on a daily basis.

off under his direction: “With permission from the company we organized monthly meetings in every center and the mothers were given small presents. (...) We collected 100 to 200 liters per day. Later maybe more, but I only stayed for five and a half years”. And indeed, in 1980 the collection had already reached around 800 liters per day (The Statesman 1980). It may have gone up to 3000 or 4000 liters per day, according to an estimate by Mr. Banerjee, the acquisition manager of hCG who was responsible for the program after Dr. Chatterjee had left the company. Mr. Banerjee expanded the collection area by incorporating wider regions in the district. He described donors as mostly labor class, many of them migrants, and more than half of them Muslims. According to Mr. Banerjee the fact that families tended to be large (and hence, the opportunity was given to recruit women during several pregnancies), turned these areas into “fertile grounds for collection.”

After the program had been popularized, women who had missed their menstrual period knew that they would have to call a so-called ladyworker responsible for their neighborhood. In case of a positive test, women would be notified about their pregnancy. The collection regime would start immediately lasting until week sixteen of the pregnancy. Each morning, collection boys¹⁵ would bring a plastic bottle containing a preservative while picking up the filled bottle they had left the day before. The boys would transport the urine by bicycle to one of the collection centers, from where a company cart would bring the bottles to the factory. Once the collection was over, urine donors received a small present.

The gift handed over after the collection was described by Dr. Chatterjee as “something useful” and “not very costly because the benefit ratio has to be kept.” Initially this used to be Horlick powder, a powdered milk drink produced by another MNC, which was advertised at that time to an upper middleclass audience in India with the slogan “the great nourisher.” Providing Horlick powder seems quite fitting: future mothers, who care for their infertile sisters by giving a substance, receive another substance to care for their own children. It can be read as a symbol for the nourishing relationship that the slogan “mothers for mothers” promises. Yet, at second glance, it completely negates the inequalities involved in this exchange. Former employees reported that many donors sold their Horlick powder to buy rice instead, which they evidently deemed more nourishing for their families. After complaints from regular Horlick retailers that the powder was being sold under market value, the company changed its presents to household appliances, such as buckets, steel plates, or jugs.

After illustrating the complex relational infrastructure that underlay hCG’s commodity chain, I now demonstrate how promises of nourishment, or promises revolving around the semantic field of productivity, mobilized these relations. Visions of a productive future in the form of somatic fertility and economic development helped to

15 All low-level workers, such as ladyworkers and collection boys were not formally employed by Organon. They received monthly salaries as well as incentives for their work in cash.

enroll the urban poor, medical doctors in Kolkata, and the Indian state into the urine collection program.

Promises of Productivity

Corporeal generosity through the promise of somatic fertility

How did Organon convince pregnant women to donate urine? Apart from handing out small presents, no payments were provided to participants because Organon was afraid that “men would also contribute,” as had apparently happened in other countries before¹⁶. Instead, the company relied on women’s corporeal generosity¹⁷, as Dr. Chatterjee explained: “We never talked about money. It was only an appeal. You know, Indian women are very kind in heart. (...) No money was provided. It was not money exchange, it was only people helping.” But women may not only have been willing to donate out of altruism—particularly since urine collection raised concerns, as an official interviewed by the Statesman, a leading English-language newspaper, explained: “Referring to the constraint in implementing the project, the official says many families do not like to be associated with the project. There are elderly people in some families who harbor the erroneous belief that donation of urine may harm the child.” (The Statesman 1980). Mrs. Roy, a former ladyworker, detailed in a conversation that women or their families would also decline to participate in the program because they considered the procedure harmful (*kṣatikāarak*) or shameful (*lajjār*). However, they might not have been able to refuse when asked by a doctor or ladyworker employed by the company, considering the hierarchical relations that characterize healthcare in India. Further, giving urine had the advantage that they could ascertain whether they were pregnant or not at an early stage. Mrs. Roy, for instance, described how some older women would take advantage of the free test to get to know whether their periods had stopped due to menopause or another pregnancy. And last but not least, women were promised a small present (*upahār*).

For Mrs. Lakshman, who used to be a urine donor and today works in a factory producing packaging material, several motivations converged: when she and her husband moved into a new flat not far from her husband’s small blacksmith shop in the 1980s, her landlord introduced her to the program during her first pregnancy. Even though she never ended up receiving a present, she donated her urine again a few years later. Being a good-hearted (*bhālo man*) person—as she described herself and Bengalis

16 Bruno Lunenfeld similarly notes that menopausal women in Israel were not paid for donations because “they may add water to increase the volume” (cited in Vertommen 2017).

17 I thank David Arnold for suggesting this term in a discussion of an earlier version of this article during the workshop “Fringe Science and Threadbare Knowledge,” held in Zürich in June 2017.

in general—she agreed to donate a substance that is usually “thrown away” to help others. Mrs. Lakshman thus reiterated the company’s discourse of generous women and worthless substances. In her case, corporeal generosity mainly rested upon the promise of fertility that future mothers could pass on to infertile contemporaries via the company.

In order to emphasize the directionality of the gift towards infertile women, Organon transferred the slogan “mothers for mothers” into Bengali (*māyer jany mā*) and explained: “if you give urine for a lady who is infertile, she may have a child.” This proved to be a persuasive promise that tapped into cultural valuations of motherhood as well as family planning ideologies in which two children were propagated as a norm. Geared towards mutuality and solidarity, it resembled the leitmotif that adorns the Dutch *Mothers for Mothers* website today: “you can share happiness” (*geluk kun je delen* in the Dutch original). The power of this promise became obvious when Dutch donors threatened to boycott the collection program in the Netherlands after it was made public that hCG can also be used for other purposes, such as weight loss or livestock breeding (Trommelen 2013). Hence, it was the (imagined) bond between pregnant and infertile women that remained central to the collection of urine and maintained supplies. According to my interlocutors in India, the slogan “mothers for mothers” was further corroborated by audiovisual material shown to possible donors that vividly represented the fertile trajectory of their urine: from the jar in their home, to the factory, and finally the doctor’s office where an infertile woman is prescribed an ampoule of *Pregnyl*, the end product. Ladyworkers also made this connection explicit when they motivated women to donate. Mrs. Roy, recounted how she would tell potential donors that urine can be transformed from something useless (*akājer*) in the toilet to something beneficial (*phāyḍā*) in the company’s bottle.

While this bond proved to be fertile during the collection period, it had to be cut later in order to avoid future relations and potential economic demands. Framing transactions as generous donations, providing return gifts, and labeling urine as an unproductive substance were important steps in the valorization process of hCG. Discourses of donation, for instance, obscured the bodily work of donors (cf. Cooper and Waldby 2014) and allowed Organon to evade possible expectations for compensation. The present provided by the company as a return gift further prevented future claims by completing the transaction. Finally, designating bodily substances as useless “free[d] them up for innovative and profitable forms of circulation and transformation” (Waldby and Mitchell 2006:28). The rhetoric of waste or *raw* material obfuscated that urine was not only fertile in somatic but also in economic terms. It would eventually turn into corporate wealth, a fact that was not publicized among donors in India. Thus, hCG in its pharmaceutical form reached consumers as an abstract product without any traces of the urine donors who were instrumental for its production (cf. Marx 1990 [1867]).

Public generosity through the promise of economic development

In addition to donors, many of my other interlocutors harbored the hope that Organon would become a “great nourisher” for the pharmaceutical sector specifically and the state of West Bengal more generally. Like in other parts of the world, science generated the “fantasy of regenerating economies devastated by economic restructuring” (Anagnost 2006:525). Envisioning a landscape that had suffered from centuries of colonial rule to become economically fertile again, Organon employees in India were highly invested in the collection program. A former managing director of Organon, Mr. Dasgupta, explained to me that he and his colleagues were delighted to set up “something great in West Bengal, where nothing was growing.” To turn the region into a fertile field for private investment, so to speak. And they even mobilized public resources to do so. According to a report in *The Statesman* (1980), “[t]he West Bengal Government has directed hospitals and health centres in Calcutta and parts of the adjoining districts to help make the private sector project a success.” The company enrolled a wide support network of politicians, state officials, and doctors who promoted urine donation by appearing on stage during recruitment events, making sure the program ran smoothly, and calling attention to pregnant women. Beyond economic reasoning, there was an affective dimension at play, as the manufacturing of pharmaceuticals was understood as a patriotic project in line with broader postcolonial policies pursuing self-sufficiency and self-reliance. Dr. Chatterjee, for instance, told me that Dr. Mukherjee convinced him to join the project with the words: “this is something India has not done yet. We have to do it. It is your golden opportunity to do it for the country.” They were proud of India to join the ranks of countries that produced hCG. This ethos was apparent in many conversations with former employees in India. They depicted themselves and the company as pioneers who kept the nation’s best interest at heart by working for scientific progress and economic development¹⁸.

Gynecologists also viewed the company’s arrival as an opportunity to improve infertility care and boost their clinical practice. They helped Organon because they were hoping that the pharmaceutical material they required for clinical procedures and research, especially in the realm of infertility, would become more easily available in India. This was particularly urgent, as due to laborious and costly import procedures, most doctors had to procure gonadotropins during trips abroad and smuggle them into the country (cf. Neveling 2014).

For the state, Organon’s presence promised local manufacturing of drugs, foreign exchange earnings, and new employment opportunities. In its application for a Manufacturing License in 1974, which included eleven steroids and their formulations as well as hCG and its different preparations, Organon argued that these were “essential drugs where the indigenous manufacturing is not enough to cater to the needs of the mar-

18 Particularly after the „indianization“ of the company (see footnote 11).

ket.” The production of drugs would not only increase their local availability but also promote foreign exchange. The application projected a total foreign exchange earning of almost 320 lakhs Rs. [32,000,000 Rs.] over the course of five years for all products, roughly two thirds of which were expected to derive from import substitution and one third from export earnings. Finally, the company promised the “direct employment of over 300 people.” Organon concluded its application with the observation that “the dual national objectives of growth of employment and conservation/generation of scarce Foreign Exchange are being met by the Company”—important goals of the Government of India at that time.

And not to forget, Organon also produced gynecological products that were in line with state-sponsored population control programs, such as the contraceptive pill or home pregnancy tests, for which the company in the Netherlands obtained the first patent in 1969. Both fields, population control and infertility management, have been closely aligned historically. In their license application, for example, Organon specified two clinical uses of hCG: as infertility management in women and men on the one hand and as an “immunological test for early and reliable diagnosis of pregnancy” on the other hand. And indeed, Dr. Mukherjee was not only interested in hCG for infertility management. He apparently hoped that it would result in the dissemination of home pregnancy tests and contribute to population control, which would ultimately lead to economic development¹⁹. As Dr. Chatterjee recounted:

Subhas [Dr. Mukherjee] was a nationalist, he was a scientist. He wanted that pregnancy test should be available from the government to every person. He wanted the family planning program to succeed. He said that population is one of our main problems. Ultimately, population control, you can only do it when you know that you are pregnant. And for knowing it you need pregnancy test kits. And hCG is needed for making pregnancy tests. That’s why he wanted it to happen in India. That’s why he wanted that hCG is made, so that they can make the kits. He could think far ahead of other people. Commercially, it was a commercial idea. But ideologically it was for reducing pregnancy in India²⁰.

It is not surprising then that one of the conditions the Government of India posed in response to Organon’s application for a manufacturing license was the local production of pregnancy test-kits after the first two years.

¹⁹ See Sayantani Sur (2017) for the entanglement of family planning, poverty alleviation, and economic development.

²⁰ This reasoning implies that women in India can decide to perform an abortion, if they find out that they are pregnant early on. The Medical Termination Of Pregnancy Act from 1971 states that pregnancies may be terminated until twelve weeks by approval of one registered medical practitioner and until twenty weeks by approval of two registered medical practitioners. “The inclusion among the grounds for eligibility of failure of a contraceptive device made abortion more or less available on demand” (Rao 2004:41).

Unfulfilled Hopes

Commercial Flows

The actual commercial flows, however, contradicted the hopes associated with the urine collection program in India. Or, to put it in Dr. Chatterjee's words, commercial goals overruled ideological ones. In 1974, Organon India began to extract hCG from urine of pregnant women and starting from 1975, crude hCG was exported to the Netherlands²¹. This implied that formulation production did *not* take place in India and that the exported substance was *not fully* purified. The final purification and manufacture of the branded pharmaceutical happened in the Netherlands. Ampoules of the finished product, *Pregnyl*, were introduced in India only 10 years later and were still "too expensive for people here," as Mrs. Roy, the former ladyworker, observed. Further, in contrast to the statement in the license application, pregnancy tests were not produced in Kolkata, as this required hCG of the highest quality²². Hence, the hopes harbored by parties who tried to improve infertility management and population control remained unfulfilled.

My interlocutors speculated that one reason why the final purification of hCG did not happen in India, was that Organon was not prepared to equip the factory in Kolkata with the necessary technologies and know-how. Mr. Banerjee explained that "if they would purify it here, (...) Organon would not have full control, they would not be the sole authority. With the crude method, everything is controlled from Holland." In this way, Organon could remain the "*zamīndār*" (landlord). Mr. Velden, in contrast, emphasized the requirement of labor power. While the collection in India relied on a large workforce, a handful of people sufficed to accomplish the last step of purification in the Netherlands. In any case, Organon could rely on material resources and cheap labor from India while remaining in control of the production process.

When some of my interlocutors confronted the company with the question of why hCG was not fully purified in India, Organon articulated the following rationale: "impurity"²³. One IVF doctor, who used to support Organon's collection program, remembered that the company answered his recurrent queries by blaming the Indian climate and dirt. Similarly, Mr. Velden stated that raw material from India would contain

21 Already in their application for a license Organon had stated that hCG "will be exported in full Qty" for an expected foreign exchange earning "in the order of Rs. 92,00,000/- for 5 years". The application further explained that "the unique feature of the project is that most of the production is planned to be exported due to its tremendous demand in international market". The license was granted by the Government of India under the condition that Organon exports *at least* 60% of the production of hCG to gain foreign exchange.

22 Organon began manufacturing and marketing its pregnancy test *Pregcolor* in India only in 1986.

23 Paul Gaudillière (2005:613) describes the importance of a "purification paradigm" in pharmaceutical culture. Within this paradigm, research and production strive for the preparation of "homogeneous (if not pure) compound."

only a fraction of the international units of hCG as compared to urine collected in the Netherlands. Apart from problematizing high temperatures, he assumed that women in India would “cheat” and deliver water in order to receive gifts. The earlier question of whether poor Indian women could produce hCG had now been scaled up to the question of whether India could produce *pure* hCG. This has to be interpreted in light of larger discursive strategies in which notions of impurity or adulteration have long been deployed to prevent competition and delegitimize alternative forms of pharmaceutical production, such as generics (Hayden 2013; cf. Kumar 2001). In the case of hCG, the addition of fake material, poor health conditions of donors, or challenges of specific places were often named as factors compromising the quality of the source material once collection had expanded globally (e.g., Leão and Esteves 2015:306). Thus, evaluations of purity prevented the fulfillment of promises of productivity in India while simultaneously adding to the valorization of hCG in the Netherlands.

Additionally, the export of unpurified hCG might have allowed for greater flexibility regarding its final use. hCG is a volatile substance that can be turned into different kinds of end products from a non-purified and non-branded state. Organon India, for example, used to experiment with the use of crude hCG for fish breeding in Bengal (Inscape 2007). And *Mothers for Mothers*, the collection program for Organon in Oss, admitted that urine donated by pregnant women in the Netherlands and later in Brazil had been used to produce P.G.600, a mixture of hCG and pregnant mare serum gonadotropin that introduces estrus in pigs (Trommelen 2013). In these instances, purification not only created value by biochemically enhancing a substance but also by alienating it from its history. Processing the hormone in the Netherlands may have obscured traces of pregnant women in India and allowed “earlier promises embodied in things” (Tsing 2013:23), such as the slogan “mothers for mothers,” to be forgotten. Erasure, however, can never be complete, as the protests of Dutch women against alternative uses of their urine (Trommelen 2013) demonstrated. In the case of P.G.600, hCG could not be fully alienated from its promise of somatic fertility, at least not in the Netherlands.

Remnants of Disinvestment

The commodity chain of hCG not only relied on broken promises but also reinforced global inequalities along familiar fault lines. This becomes obvious when one considers the remnants of the project a few decades later. After the Government of India began to initiate economic reforms in the late 1980s, the legal restrictions for MNCs to manufacture in India were gradually loosened. Once Organon was freed from these obligations, the company divested the chemical factory in Kolkata. “When they got the majority [of shares],” Mr. Dasgupta remarked bitterly, “they dismantled everything we had built up.” Following a larger trend of deindustrialization in West Bengal,

Organon's headquarters shifted to Mumbai in 2003 where the company once again concentrates on marketing rather than manufacturing²⁴.

When the hCG production unit was shut down in the beginning of the 1990s, management staff was relocated within the company while low-level workers were laid off after being compensated. The early closure of this project was also related to the fact that a new generation of fertility drugs had been launched in the late 1980s. Recombinant hCG, which is produced using biotechnology and no longer depends on urine as raw material, was hailed in the medical world for its purity: it promised less biological contamination and more consistency in quality (e.g., Lunenfeld 2013). But while these new, recombinant versions dominate the international market today, highly purified urinary products have not lost their appeal, particularly in low-income countries. The end product is much more affordable for patients of low socioeconomic backgrounds, especially since "urinary gonadotrophins, in principle, have come off patent protection and can now be offered under generic pricing structures" (Gleicher et al. 2003:476). Hence, while most MNCs shifted to recombinant gonadotropins, Indian pharmaceutical companies still produce urinary products, using crude hCG imported from China. And many patients in IVF hospitals in India do consume these ampoules.

Conclusion

The inscription on the signboard in Mr. Velden's photograph was more than a request. It also constituted a promise: the promise of fertility for childless couples that pregnant women in Kolkata could help to fulfill. Viewed in a wider context, it promised economic development for a region considered to be industrially infertile after centuries of colonial extraction. These promises mobilized a multi-layered relational infrastructure on which the making of hCG as a pharmaceutical product relied. However, at a later stage, traces of these relations were obscured: they were neither detectable in the final product nor communicated in the hospital.

In the end, most hopes connected to hCG production remained unfulfilled. Infertility management and population control in India, for example, took a back seat. And although inequalities between providers of bodily raw material in the global South and consumers of medicine in the global North, which uncannily resembled colonial trade routes, have shifted over time, dynamics of exclusion certainly have not disappeared. Organon not only closed down the urine collection program but also stopped manufacturing pharmaceuticals in India after economic reforms and policy changes. This is in line with more recent developments of the country's pharmaceutical sector: since the

24 However, the factory that produced hCG was sold to an Indian company, which specializes in the synthesis of active pharmaceutical ingredients and produces hormonal bulk drugs.

early 2000s, India does not produce sufficient bulk drugs anymore but is dependent on imports, mainly from China (Joseph and Ranganathan 2016:11).

Through a conjoined reading of political economy and medical history, I demonstrated that the transfiguration of hCG from urine in India to ampoules in Europe did not constitute a straightforward alchemical process. Urine neither flowed abundantly nor was it easily converted into gold. Rather, hCG's valuation relied on a complex and asymmetric relational infrastructure—an infrastructure that animates most commodity chains and has long sustained the field of reproductive medicine.

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