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The Specter of "Bad Blood" in Japanese Blood Banks

Tracing the controversies surrounding commercial blood procurement in Japan, this article inquires into the reconfiguration of social boundaries, bodies, and substances through blood banks. In Japan, designated day laborers' enclaves, known as yoseba, became major pools of not only cheap labor force, but also of vital substances in the mid-twentieth century. Despite recurrent public health scandals, commercial blood banks continued to resurge in these districts, until they were completely replaced by the centralized donation-based Red Cross system in 1990. Analyzing media reports, published accounts, and policy papers, this article demonstrates how "sold blood" collected by commercial blood banks became the quintessence of "bad blood" in the process of this transition. Although blood donation is considered as an occasion to celebrate social solidarity today, this article shows that the specter of "bad blood" continues to haunt the body politic of Japan.

Keywords: blood bank, biobank, commodification of blood, blood donation, bioeconomy, Japan

Introduction

In the summer of 2016, when I visited a blood collection center of the Japanese Red Cross in Tokyo, the manager of the center gladly offered to tell me about their strategies and challenges in recruiting donors. Proudly mentioning the good number of regular donors registered at the center, the manager confessed to me that he frankly would feel anxious to get blood transfusion abroad. "They might give you 'sold blood' (baiketsu), you know," he added, lowering his voice.[1] The fear of "sold blood" and the tantamount trust in the safety of Japanese blood banks, as shown by the manager, struck me as an epitome of the particular symbolic and corporeal categories conjured by the blood economy in Japan today. The term, "sold blood," which is periodically evoked in calls for donation, first appeared during the public health scandals in the 1960s, when more than 90 percent of blood for transfusion was provided by commercial blood banks.

Since many of these commercial blood banks were concentrated in underclass enclaves, their problematic operation had largely been ignored by the general public, until it became known that many recipients of transfusion contracted blood-borne diseases.

The indelible mark left by commercial blood procurement in Japanese history invites us to consider the role of blood banks in reconfiguring social boundaries, bodies, and substances in the growing bioeconomy. Blood banks, which appeared shortly after the propagation of transfusion medicine in the early twentieth century, could be categorized as one of the oldest variety of biobanks. As systems of collecting and managing biological samples and their data, biobanks aim at extracting and multiplying the economic and scientific value of living organisms, often hailed as "biological resources" (Milanovic 2011). In engaging with vital matter, biobanks also rearrange the terms of scientific knowledge production, ethical debates, legal regulations, and economic transactions. For this, some scholars characterize the simultaneous (re)making of the biological, the technological, and the social, as processes of "coproduction" (Reardon 2001). In other words, biobanks not only reassemble living organisms, but also transform the world(s).

Blood occupies a peculiar place in this changing terrain of bioeconomy for its dual properties: malleability and immutability. It is easily separated from the body, transformed into various forms, transported to distant places and bodies. Such a property is fully exploited by blood banks, as they make blood continuously flow across the corporeal, social, and spatial boundaries. In this sense, blood banks work towards consolidating the properties of blood around its utility as a universally shared animating force with quantifiable value. Yet, the opposite trend is also noted in many ethnographic and historical studies of blood banks. The screening of blood providers, for instance, often evokes different qualities of blood associated with particular populations, who are

stigmatized and excluded based on the calculation of risks and the fear of contagion (Kent and Farrell 2015; Kretzmann 1992; Seeman 1999; Strong 2009; Valentine 2005). Commercial blood banks, furthermore, explicitly target the socioeonomically marginalized for blood procurement, sometimes to the extent of affecting the quality of their blood by excessive extraction and viral infection (Anagnost 2006; Erwin 2006; Jing 2006). In other words, blood banks also reinforce social boundaries among people by attributing different qualities – imagined and corporeal – of blood to them. This leads us to ask, then, how do blood banks reproduce certain social categories and associations surrounding blood, all the while transforming and circulating blood across social and spatial divides?

This article seeks to answer this question by paying attention to the circuits of vitality activated and deactivated by blood banks since their emergence in mid-twentieth century Japan. Analyzing media reports, published accounts, and policy papers on blood selling and donation in Japan, I trace how commercial blood banks came to be closely associated with "professional blood sellers" and "bad blood," which ultimately led to their complete replacement by the donation-based Red Cross system in 1990. I question how a series of public health scandals reified commercially procured blood as an inherently problematic substance for their origins in stigmatized bodies, rather than raising the awareness of people's dependencies on each other in the vital and viral flows of blood. In order to understand this controversial history, we need to first consider how segregated enclaves – where commercial blood banks came to be placed – were formed at the intersection of long-standing ideas of the "pure Japanese blood" and the contaminating power of "bad blood."

Blood and Yoseba Districts

Blood has long been a subject of anthropological studies, as a key symbolic and

material medium maintaining or threatening the social and cosmological order in many societies, along with other bodily fluids such as semen, milk, or sweat (Daniel 1984; Jackson 1983; Strathern 1988; Taylor 1992; Wagner 1977). While central to defining and forming kin relations (D. Schneider 1980), its tendency to flow and spill also makes it a potentially dangerous and polluting substance (Douglas 1966). The biotechnological appropriation of blood, then, further induces creative engagements with these ideas of order, kinship, and pollution in intricate ways (Copeman 2009a; 2009b; Sanabria 2009; Simpson 2009; Street 2009). Most notable in the historiography of blood in Japan is the dialectic conjoining of the oppositional views of blood as a polluting substance versus an animating force.

In the Japanese Shinto and Buddhist traditions, blood (chi, ketsu) has been considered foremost as a source of symbolic pollution (kegare) associated with menstruation, childbirth, and death, which accompanied elaborate rituals of avoidance and purification (Narikiyo 2003; Okada 1982). During the Edo period (1603-1868), however, blood gained the positive meaning of "life force" and lineage, gradually overtaking the preceding key metaphors for heredity, such as bone-flesh (kotsuniku) and seed (tane) (Nishida 1995, 33-36; Robertson 2002, 192-3). Such semantic changes in the term occurred in tandem with the solidification of a hereditary status system that placed certain groups of people below the majority as being permanently "polluted." The two categories constituting this outcaste order were hinin (literally, nonhuman), a designation applied to a wide range of marginalized people, such as beggars, street performers, prostitutes, convicted criminals, and the physically disabled among others, and eta (literally, great filth), a derogatory label referring mainly to people whose hereditary occupations were closely associated with death and blood, such as butchering, execution, and leather-making (Groemer 2001; Ooms 1996, 243-311). In contrast to the

earlier times when ritual pollution tended to be regarded as a temporary state affecting anyone in defiling situations (Keirstead 2009), the Edo status system made pollution an attribute inherent to the outcastes. The Edo outcastes were subject to increasingly stricter sanctions that prohibited their contact and mixing with the rest of society by means of restricted residences, economic activities, special clothing, hairstyles, and tattoos (Groemer 2001). In short, as blood provided a powerful idiom defining lineages, its polluting property also came to be regarded as inheritable and permanent by the nineteenth century.

Although the status system was abolished by the new Meiji imperial government in 1871, these earlier conceptions of blood acquired renewed life with the introduction of eugenics in the late nineteenth century (Robertson 2002; 2005). Infused with the language of modern science, the pure Japanese blood, or "Yamato blood," was now heralded as a refined superior substance to be protected or enhanced through social programs of reproduction and health (Robertson 2002, 197). The eugenicist obsession with blood as a medium to modernize the Japanese race and nation is most emblematically shown by Ikeda Shigenori's (1892-1966) Eugenic Movement. In addition to eugenic marriage counseling services, Ikeda also organized programs promoting physical health and hygiene, such as the "blood depuration day (*jōketsu dē*)" in 1928, which offered free blood tests to identify blood types and screen for pathogens (Robertson 2002, 202-203; 2005, 340-343; 2012, 102). The appeal to pure blood in Ikeda's various initiatives attests to how purity was linked to "a body – including the national body – free from symbolic pollution and disease-bearing pathogens," as well as to "genealogical orthodoxy" in eugenic thoughts (Robertson 2002, 194).

The modern blood transfusion technology arrived in Japan at this historical juncture when the enthusiasm for "pure blood" was intensifying along with ambitions

for imperial expansion. First introduced to Japan in 1919, the transfusion therapy was rapidly popularized after a Tokyo Imperial University medical professor heroically saved the prime minister Hamaguchi Osachi (1870-1931) from gun shot wounds with an impromptu blood transfusion at the Tokyo train station in 1930 (Kōzai 2007, 145-146). Since the 1930s, blood transfusion was considered as more than an emergency measure for blood loss, but also as a treatment for beautification, rejuvenation, and nourishment (Kōzai 2007, 276, n.2). The newly discovered power of blood was mobilized by the Japanese imperial state, especially with the establishment of the Welfare Ministry in 1938. The Ministry not only urged people to manage their own blood through public events such as blood tests, but also to donate blood for the soldiers as the war effort intensified. Blood donation campaigns multiplied towards the last years of the Asia-Pacific War (1941-1945), most notably targeting young women to dedicate their "pure blood" (junketsu).[2] The imperial expansion itself was fraught with analogies of blood transfusion from the intermarriages as "racial blood transfusion" (minzoku yuketsu)[3] to blocking or cutting the "blood transfusion routes" (yuketsuro)[4] of the Allied Forces. Symbolically and materially, the eugenic control of sexuality merged with the technology of transfusion in the war, justified as regenerating the Japanese race and its empire.

The shifting discourses and technologies of blood since the seventeenth century reveal that, as anthropologist Jennifer Robertson incisively put it, the positive and negative views of blood "congealed as both a coeval and a mutually constitutive system of belief" (Robertson 2002, 195). A stronger association with life made blood an even more potent substance that might contaminate its carriers for generations, unless deliberate measures were put in place to control its transmission. By twentieth century, then, we see blood at the center of two interrelated enterprises: purification, which is

achieved through “pure-blood” unions, screening for pathogens, and the transfusion of young “pure” blood among others, and containment, which requires scrupulous identification, ostracization, and sterilization of carriers of “impure blood” in the name of “race hygiene” (minzoku- or jinshu- eisei) and public health. The logic of alterity underlying such preoccupation with purification and containment is consistent with the centuries-old folk theory of hypodescent and symbolic pollution, postulating that the intermarriage between a person of “black stock” (kurosuji), such as hinin/eta, and a person of “white stock” (shirosuji) would turn not only the latter but also the latter’s entire household “black” (Robertson 2002, 198; See also lewallen 2016, 63). Similar to the status system of the Edo period, the modern technologies of purification and containment provided infrastructural forms to such a belief, justifying the stigmatization of the marginalized as carriers of inheritable and contagious substances.

This is further reflected in the urban governance of day laborers in the latter half of the twentieth century, which anthropologist Tom Gill encapsulated as a “containment policy” based on “a germ infection metaphor, seeking to seal up the source of the potential social infection by concentrating or containing supposedly deviant elements inside the yoseba” (Gill 2001, 185, emphasis original). These districts, which came to be known as yoseba, were mostly designated in or adjacent to the historically segregated neighborhoods of the outcaste groups and the slums around licensed red-light districts. The yoseba of Tokyo, San’ya district, for example, appeared near the eta settlement of Shinchō, the Kozukappara execution grounds, the famous Yoshiwara red-light quarter of the Edo period. Likewise, Osaka’s Kamagasaki district emerged near Nagomachi, the hinin ghetto of the Edo period, which, together with the adjacent Tobita red-light quarter, formed one of the largest slums in the nation by the Taisho period (1912-1926). While yoseba also appeared in nascent districts such as Kotobuki in

Yokohama and encompassed a wide spectrum of inhabitants, the urban policing and cultural practices of exclusion and avoidance continued in all these yoseba enclaves.

As we shall see in the following section, it was such spatial segregation that made yoseba breeding grounds for commercial blood banks. Margaret Sleeboom-Faulkner and Prasanna Kumar Patra noted how biocapital captures profits generated from the divergent valuation of life in different locations, what they called "biohierarchies" (Sleeboom-Faulkner and Patra 2011). What the case of yoseba tells us is that the embodied associations evoked by substances themselves play an important role in the formation and reproduction of biohierarchies. In contrast to the growing middle class who enjoyed the comfort of improved urban infrastructures and comprehensive health insurance in postwar Japan, yoseba inhabitants were kept in deteriorating built environments with poor hygiene and minimal social protection. Utilizing these hierarchies, commercial blood banks could attract sellers, collect blood, and develop various blood products at a fast pace at low cost.

"The Human Dairy Plants" and Yoseba Blood Sellers

While the wartime blood donation campaigns effectively conjured up spectacles of sacrifice that mobilized the whole country, the fervor for donation subsided dramatically after the war in Japan. The close association between blood donation and war efforts might partially explain why donation campaigns in Japan failed to recruit volunteers in the immediate decades following the war. According to historian Nicholas Whitfield, it was the theatrical bonding between blood donors and imagined (soldier) recipients in the wartime that set the terms of the gift of blood in Britain, decades before the publication of Richard Titmuss's canonical book, The Gift Relationship (1970). Although Titmuss's work has been considered to be foundational in propagating blood donation as an altruistic act of sharing among anonymous strangers, what Whitfield

shows is that the gift of blood often calls for a more intimately imagined relationship between the giver and the receiver in their common pursuit, such as defending the nation. Anthropologist Jacob Copeman similarly drew attention to the imagined and embodied relationships enacted in patriotic blood donation in India, where donors were often called upon to "shed blood for the country" to the extent of evoking the figure of, what he called, "donor-soldiers" (Copeman 2009a, 133-139). Such sacrificial bleeding was intended to elicit patriotic sentiments not only from the donors but also from the wider public, as manifested in blood donation for restoring blood portraits of martyrs who died in the Independence struggle (Copeman 2013).

Blood donation in Japan has also been tethered to the affective bonds and patriotic sentiments that took their shape in the wartime. The prefix ken- in the Japanese word for blood donation (kenketsu) implies a devotional act, the Chinese character of which can be used in a verb form tatsu in classical Japanese, meaning making offerings to deities. In wartime media, kenketsu was often paired with the word *hōkō* (literally, service to the public), a term that has been historically associated with samurai's service to their *daimyō* (feudal lord). Blood donation in the wartime, then, signified a dedication of one's own body to defend the national body (kokutai), an imagined corporeal unity between the emperor and his subjects: in other words, sacrificial bleeding in the home front, on par with that in the warfront. It is no surprise that in occupied Japan, the rhetoric of gift was rather underplayed when blood banks were introduced by the American occupation authorities, which operated under the grand mission of the thorough "demilitarization and democratization" of Japan (Dower 1999). Blood banks were presented with the rhetoric of finance above all, although their connection to the war machine continued, as we shall see.

The concept of "blood bank" was first coined by the American physician Bernard Fantus (1874-1940) to refer to the facility he opened at Chicago's Cook County Hospital in 1937 (Lederer 2008, 56). As a system of collecting, storing, and distributing blood, Fantus's blood bank eliminated the intricacies of recruiting donors upon need. Now, instead of arranging an arm-to-arm transfusion between a donor and a recipient, the hospital could rely on a stock of blood that was available at anytime. The idea was immediately taken up by many hospitals throughout the United States, and soon similar systems were put in place across the world in the eve of the Second World War (Lederer 2008, 56; W. Schneider 2003, 211-216). Blood banks took various shapes in different places reflecting the conditions of institutional coordination among the hospital, the army, the government, and the civil society as well as of international knowledge transfer and technological innovations over the two world wars. Compared to France or Britain, where centralized donation-based blood banks were established with governmental support in 1938 and 1939 respectively, the United States had numerous private blood banks operating when the American Red Cross started its blood bank service in 1941 for the American troops (Lederer 2008, 59; W. Schneider 2003, 213-214; Whitfield 2013, 98-99). When the American Red Cross resumed its blood service after two years of hiatus since the end of the war, private commercial blood banks formed a coalition, the American Association of Blood Banks, thus, marking the start of a dual system, which largely continues today (Starr 1998, 175-176).

It was such a dual system that the American occupation forces brought to Japan, shortly following a scandal over syphilis contraction from a blood transfusion in 1948. The occupation authorities ordered the Ministry of Health and Welfare (MHW) to work with the Red Cross to establish a centralized donation-based blood bank, while also welcoming private investors and hospitals to build blood banks. The issue was of

pressing concern to the authorities especially amidst the rising geopolitical tension in the region, which eventually led to the Korean War (Kōzai 2007, 279, n.40). Following the launchings of a commercial blood bank company, the Nihon Blood Bank (Nihon Buraddo Banku) in 1950 and the national blood bank of the Japanese Red Cross in 1952, dozens of blood banks were approved to operate throughout the country.

The Nihon Blood Bank, which is better known for its changed name, the Green Cross (*Midorijūji*), is worth mentioning at length. Its founding members included war criminals such as Naitō Ryōichi (1906-1982) and Kitano Masaji (1894-1986), who had served for the Japanese Imperial Army's Unit 731 (1941-45) in Manchuria, a secret research unit for a biological warfare, which conducted virulent experiments on humans. Tens of thousands, mostly Chinese, Mongolian, and Korean prisoners of war and civilians, were known to have fallen victims of its biochemical weapons and physiological experiments. Although these crimes became known to the American occupation authorities, Naitō negotiated for the immunity of all related personnel in exchange of full disclosure of their research data (Starr 1998, 153). When Naitō planned to build a blood bank, he further received strong backing from an official of the occupation authorities, who provided him with up-to-date documents on the American blood bank system and ushered the MHW to approve the operation of his commercial blood bank (Kōzai 2007, 279, n.41). In other words, just as new conceptions were blended with old beliefs to make the substance of blood, the institutional tissues of blood banks were grafted onto existing assemblages of scientists, knowledge, and capital to create new networks of circulation.

The very fact that Japan's first blood bank was built on the basis of a murderous military organ lays bare how the technology of life and that of death mutually constituted each other. While the Green Cross ostensibly concerned the domain of life

and health, it inherited from the Unit 731 the deadly capacity for appropriating the vitality of marginalized populations. As Catherine Waldby noted, such an appropriation of vitality is not exceptional, but rather constitutes a fundamental function of the bioeconomy in its generation of "biovalue," defined as "a surplus value of vitality and instrumental knowledge which can be placed at the disposal of the human subject" (Waldby 2000, 19). What was peculiar about the Japanese commercial blood banks like the Green Cross was their exceedingly high efficiency in yielding biovalue, owing to their spatial concentration in yoseba enclaves.

Strategically placed in and near yoseba districts, the commercial blood banks rendered yoseba laborers readily "bioavailable" (Cohen 2005, 83) for the production of blood commodities. Throughout the 1960s and 1970s, the two major blood bank companies, the Green Cross and the Nihon Pharmaceutical, operated four blood-collecting centers in the vicinity of San'ya district. Since they operated shuttle buses between the district and the blood-collecting centers, San'ya inhabitants could sell blood multiple times a day. The police report in 1964 estimated that there were about 1,000 people selling blood daily in San'ya only.[5] A student research team noted the same year that there were about 500 people in San'ya who sold blood more than 20 units (4 liters) monthly, which approximates to the total blood volume of an adult's body (4.5-5.5 liters).[6]

A record-breaking case was noted by a doctor, who offered free medical checkups in San'ya. During his survey of patients from December 1962 to June 1964, he encountered a man who had made a living selling 12 liters of blood a month for more than a year (Takayanagi 1987, 150). "This person was a blood-making machine," the doctor wrote in his memoire, "and he had done a precious human experiment" (ibid., 150). The impressed doctor had even thought of inviting his hematologist colleague to

test the patient's bone marrow but eventually botched the plan fearing angry backlash from San'ya laborers. The man passed away soon after his hospitalization.

The commercial blood banks, then, allured yoseba laborers to a mode of living dependent on replacing blood at an interval faster than the physiological rhythm of replenishment. Often likened to a machine or livestock, yoseba blood sellers were remade into beings that put in question the human form of life (Das 2006), as poignantly depicted in the following special report:

> The blood-stained cotton pads are scattered on the concrete floor. I get stamped on my wrist marking "Pass" and "Blood Collection No." like a pig or a cow at a slaughterhouse. I give a nod at the staff on the other side of the glass window and lie down on the hard bed that still conveys the warmth of the blood seller before me. I stretch my arm under the small window. The needle sticks into my arm. I set my eyes to the shabby ceiling, clenching and unclenching my hand to squeeze out blood. At this moment, "the human" disappears and an unspeakable feeling dawns on me, as if I became a cow in a dairy plant.[7]

In other words, commercial blood banks not only extracted and transformed their blood, but also reduced their bodies to disposable reserves of blood. The commercial blood banks could further accelerate such a process, not only by capitalizing on the spatial segregation of yoseba districts, but also by creating cash flows complementary to the fluctuating day labor market. Various reports from yoseba districts in the 1960s reveal that the majority of frequent blood sellers were male day laborers in their 20s-40s, who worked in construction, dock work, and other miscellaneous jobs, or those who were unemployed (Serizawa 1964, 210 and 1976, 6; Kōzai 2007, 158). As most of the day laborers did not have stable incomes and fixed abodes, they tended to be excluded from the universal social insurance and pension

system, both of which were implemented in 1961.[8] Meanwhile, blood banks offered 4-500 yen per unit including a meal or snacks, which was roughly the equivalent of unemployment benefits day laborers could receive in the early 1960s. For day laborers who were unregistered, or who failed to meet the requirements of the benefits, selling blood offered an easy and preferable alternative, especially so if they managed to sell multiple units a day. For this, day laborers often referred to blood selling as "withdrawing money from the bank" (banku de okane wo orosu, in Kinoshita 1984), as if their bodies were savings accounts. Without sufficient time to be replenished, however, blood they sold was not surplus, but an advance of life taken from their own bodies. For, blood as a bodily commodity follows the law of diminishing marginal utility (Anagnost 2006, 523) and, when extracted at a pace faster than its regeneration, can accelerate the devitalization and depreciation of the body.

As anthropologist Ann Anangnost poignantly put it, the commodification of blood overturns the assumption of a "universal humanity" of all economic actors whose labor can be appreciated in quantifiable values by free exchanges in the capitalist economy. It rather reveals that "some bodies may be understood as having more 'value' than others, or that some bodies have 'value' for others, but only when they are disassembled into their several parts and grafted onto other bodies" (Anagnost 2006, 523). If the circulation of body parts and fluids complicates the valuing systems of the human body (Brown 2012; Waldby and Mitchell 2006), the interlacing of the labor market and the bioeconomy causes further contradictions for humans as economic actors. For those who are deemed as having "less valuable bodies" in the capitalist economy (Waldby and Mitchell 2006, 187), the participation in the market through the exchanges of labor and bodily matter can result in faster devaluation of the body with the excessive extraction of vitality in both forms.

The story of a seventeen-year-old boy Hiroshi, reported by a welfare officer in Kotobuki, is a point in case. Like the half million of his peers who moved out of their rural hometowns to work in urban areas over the 1960s propelled by the government's multi-year economic development plan,[9] Hiroshi migrated from the northern Fukushima prefecture to Tokyo to work for a glass factory upon graduating from middle school. Yet the working environment was harsh, and many of his co-workers developed tuberculosis. Hiroshi then met an older man who talked him into quitting the factory and moving to Yokohama's yoseba to work at the port. Hiroshi fathomed that with 1,500 yen of daily pay at the port, he could save a lot of money even as he set aside 300 yen for lodging and 200 yen for food. However, in reality, two days of work would be followed by three days of unemployment. The more Hiroshi worked, the weaker he became and even harder to find jobs. Then he started selling blood and eventually collapsed from severe anemia, finding himself unable to work again (Serizawa 1976, 6).

The fact that commercial blood banks acted as a de facto social security system for yoseba day laborers became most conspicuous during economic crises. During the strike of the All Japan Seamen's Union in 1965, for instance, hundreds of day laborers flocked to a blood bank in Yokohama's yoseba that the bank had to put a daily quota of 700 people.[10] The blood bank, conveniently located right across the public employment offices, collected about 7,000 units (1,400 liters) monthly during the year of 1965 amidst the recession that swept the country.[11] Similarly, the oil shocks in the mid 1970s or the short recession in the early 1980s led to an upsurge in blood selling in yoseba districts among the unemployed in desperate search for quick money.[12] As such, blood selling interlocked with the rhythm of labor in yoseba districts, and predatory forces strengthened this tie. Yakuza gangs took commissions ("pinhane") for recruiting blood sellers, as they did with labor recruitment (Serizawa 1964, 213), while the commercial

blood banks enjoyed the fast turnaround of profits without much supervision or regulation.

Tagging along the economic circuits generated by the day labor market, commercial blood banks accelerated the depreciation and deterioration of the bodies of yoseba laborers, pushing them irreversibly out of the economies of labor and blood. As commonly reported by medical practitioners and social workers in yoseba districts, frequent blood sellers came to suffer from a wide spectrum of symptoms, such as, anemia, hypochromia (pale skin), heart acceleration, vertigo, headache, ringing in the ears, cold constitutions, swelling, trembling, short breath, low immunity level, and general malaise and feebleness (Serizawa 1964, 211; Takayanagi 1987, 149-150). Weakened by these symptoms, some started resorting to blood selling as their only source of income, taking iron tablets and employing folk remedies to produce blood, such as eating spinach, dried seaweed, dried sardines, whale sashimi, intestine stews, and raw chicken blood.[13] These blood-making remedies would then cause further complications in their digestive systems, such as nausea, stomachache, constipation, diarrhea, and reflux esophagitis (Serizawa 1964, 211).

The bodies of professional blood sellers, in this sense, were products of the blood banks as much as their blood was. Their debilitated bodies, however, stayed secluded in yoseba districts, severed from their blood's movement across space. It was such spatial distance as well as technologies of sterilization and preservation that allowed the blood banks to transform blood collected from yoseba districts into a life-saving essence. Without any markers of its original providers, the blood was considered to be uniformly efficacious, whose value could be measured in units of 200cc. In the peak of 1963, roughly 2.9 million units collected by the commercial blood banks were used for transfusion, fulfilling 97 percent of the national demand (Yamagata and Honda

1967, 154-155). Moving across spatial and social boundaries in such vast quantity and velocity, the blood of yoseba laborers became a vital force that ran through the body politic (Scheper-Hughes and Lock 1987) of Japan. The vital associations and networks enacted by this massive circulation of blood, then, reached far beyond the bounds of yoseba encalves.

Surplus Vitality of the Body Politic

The exploitative extraction of blood from vulnerable populations in postwar Japan aligns with the trend shown in other countries, most notably the United States, where commercial blood banks proliferated (Lederer 2008; Starr 1998; Waldby and Mitchell 2006, 35-58). More recently, the devastation caused by the commodification of blood was on full display in China where aggressive commercial blood procurement in rural villages in the 1990s led to an HIV/AIDS crisis (Anagnost 2006; Erwin 2006; Jing 2006). In Shao Jing's (2006) captivating ethnographic study, we can get a glimpse of how such "harvesting" of plasma from destitute agricultural laborers was linked to economic liberalization in China, which led the financially troubled local governments and health institutions to seek revenue from the blood industry (Jing 2006; Jing and Scoggin 2009). In postwar Japan, the commercial blood banks emerged less as a solution to the retreat of the public health sector, but rather as an integral pillar for its foundation. As we will see in this section, the Japanese commercial blood banks activated circuits of vitality that incorporated the national health system and medical institutions by transforming the quantitative and qualitative value of the blood they collected.

As in other places, one of the most significant changes that allowed blood banks to be incorporated into the national health infrastructure occurred around the legal status of human blood in Japan. For human blood to be exchanged among people, it first had

to be recognized as an object separate from the person it belonged to, a categorical change that required institutional coordination as well as technological intervention. In the United States, blood – in so far as it was processed – was initially recognized as a medical commodity to be traded freely within the parameters of antitrust laws (Lallemand-Stempak 2016, 31-32). It was only in the 1970s, following President Richard Nixon's declaration that blood was "a unique national resource," that blood became a medicine regulated by the Food and Drug Administration (Lederer 2008, 97). In Japan, blood was recognized as a medicine early on, soon after the introduction of blood banks, when the MHW included blood in its drug tariff for reimbursement by the employee health insurance and the national health insurance. Commercial blood banks, then, could set the price of blood much lower than the standard set by the MHW so as to profit from the difference. In the 1960s when the standard price of whole blood was set at 1,650 yen per unit, for instance, the blood banks were buying them at 400-500 yen per unit. After adding anticoagulants and pasteurizing it for 96 hours, the blood banks could turn the cheap blood collected from yoseba into a vital medicine.

Meanwhile, blood from commercial blood banks were preferred by patients, because the Japanese Red Cross demanded that the recipients donate blood – or have someone donate on their behalf – in return afterwards, struggling with low reserves at the time.[14] In this sense, the coverage of blood as medicine made commercially procured blood a free gift of life to be enjoyed by every Japanese citizens compared to donated blood that burdened the recipients with a debt to repay. For this reason, Murakami Seizo (1916-1999), the head of the Japanese Red Cross Central Blood Center in the 1960s, argued that blood should be taken out of the national health insurance, so that people were forced to pay unless they donated blood.[15]

It was not until the scandal in 1964 that the value of such commercially procured blood was put into question. In an incident that dealt a blow to the whole country, the United States ambassador Edwin O. Reischauer, a known Japanophile and a beloved public figure, was stabbed in his thigh by a right-wing youth. The incident seemed to turn its head around when Reischauer expressed gratitude to Japanese after his hospital treatment in the following words: "Although I was born in Japan, I had no Japanese blood. But just yesterday, I received blood from quite a lot of Japanese, and I feel like I became of mixed-blood."[16] It only brought indelible national shame, however, after the revelation that Reischauer was infected with hepatitis. The incident came to inscribe the terror of "sold blood" in the minds of the Japanese public, stigmatizing the blood collected by commercial blood banks as a polluting substance that causes hepatitis. Compelled by the public outrage, the MHW banned the usage of commercially procured blood in transfusion, and by 1974, the Japanese Red Cross came to provide all blood for transfusion.

In the meantime, commercial blood banks, which were still permitted to collect blood for purposes other than transfusion, sought to recoup the value of their products by employing new technologies of collection and manufacturing. While the hepatitis scandal unfolded, major commercial blood banks like the Green Cross and the Nihon Pharmaceutical started to concentrate on the manufacturing of plasma-derived drugs.[17] Adopting the technology of plasma apheresis, which breaks down blood into its components through centrifuge, these blood banks could collect plasma at a fast rate. Over the 1960s to 1980s, they developed a variety of plasma-derived products, including albumins, gamma globulins, fibrinogens, clotting factors, as well as cosmetics such as anti-aging lotions and lipsticks.[18] The Japanese Red Cross, as was the case for donation-based blood banks elsewhere in the booming global market of plasma-

derivatives (Starr 1998), lagged behind in plasma supply and technology to develop plasma-derivatives at the speed and scale of commercial blood banks. Even when the Japanese Red Cross did catch up manufacturing a few types of plasma-derivatives in the late 1980s, the commercial blood banks gained the upper hand by offering products at significantly discounted prices, much lower than the fixed tariff set by the MHW. Accordingly, hospitals were incentivized to buy from the commercial blood banks, so they could profit from the price differences. Now, the blood bought by the commercial blood banks, was deemed more valuable than donated blood for its lower price and wider therapeutic utility. As seen above, the circulation of such blood was accompanied by a flow of money from the national health insurance fund to the hospitals, as much as from the hospitals to the commercial blood banks.

Fractionating, compounding, and circulating blood products, the commercial blood banks generated "surplus health" (Dumit 2012, 17), requiring ever more health conditions to be treated with plasma derivatives. By the 1980s, hospitals used plasma derivatives not only for blood loss or genetic conditions such as hemophilia, but also for nutritional supplementation and cold treatment. According to the MHW's report in 1984, 37 percent of the hospitals in Japan prescribed plasma derivatives such as albumin as nutritional supplements.[19] Although Japan came to boast one of the world's highest blood donation rate of 7% by the mid-1980s, the increased demand for plasma made it the world's top importer of plasma and plasma derivatives. From mid to late 1980s, Japan was consuming 1/3~1/4 of the total albumins, globulins, and clotting factors made in the world, less than 10% of which were made of plasma procured domestically.[20] The commercial blood banks that sold these products were known to have imported completed products or plasma mostly from the United States, but also from Mexico and South Africa, where commercial blood procurement was permitted.[21]

As such, the blood banks exponentially expanded the national and global flows of blood and money, while producing bodies that withered away on the one hand, and bodies that consumed blood in a variety of forms on the other. The commercial blood banks, in this sense, made Marx's insight about capital's vampiric appetite for laborers' vitality applicable beyond a metaphorical level, as noted by Ann Anagnost (Anagnost 2006, 519). Yet, in the case of the Japanese commercial blood banks, the vampiric figure did not exist external to the bodies it consumed. The surplus vitality generated by the blood banks rather innervated a symbiotic nexus interlinking biotechnology, the national health insurance, and medical institutions, which sustained the body politic. As the body politic absorbed surplus vitality, hospitals were guaranteed of their revenues, while citizens were granted access to state-of-the-art blood products and treatments.

For the continuous reinvigoration of the body politic, the polluting property of blood had to be suppressed. Yet, once more, at the peak of the plasma bubble, a scandal involving tainted blood from commercial blood banks erupted. Over the seven-year trial (1989-1996) brought by HIV-infected hemophiliacs, it was revealed that approximately 1,800 hemophiliacs had contracted the virus from imported blood clotting factors.[22] The trial put on display problems of bureaucratic mismanagement and corruption endemic in the blood economy, the main stage of which was claimed by the nation's largest commercial blood bank: the Green Cross. This time, the public was less forgiving, learning that the Green Cross had made backdoor deals with the MHW to allow "sold blood" to enter Japan. The public indignation was augmented by the revelation of the company's root in the Unit 731 as well as its involvement in the hepatitis scandal. Bad blood was now considered as more than an infelicitous by-product of its operation but rather a manifestation of its problematic genealogy: the Green Cross itself had bad

blood. The polluting property of blood had affected the commercial blood banks themselves, leading to their excision from the body politic in 1990.

The Specter of "Bad Blood"

With a nationally regulated Red Cross system collecting 100 percent of blood from voluntary donors, Japan today sits securely within what Jacob Copeman called the "contemporary globalized blood donation ecumene" (2009c, 2). However, as Copeman and many others have observed, domains of altruism and commercialism are intertwined in intricate ways in the blood economy (Copeman 2009b and 2009c; Erwin 2006; Waldby and Mitchell 2006). Their separation is achieved only partially and transiently through technologies and discourses of boundary-making, such as by spatial distantiation between remunerated and non-remunerated blood collections (Copeman 2009a), or by the re-embedding of remuneration into historically meaningful social relations (Erwin et al. 2009).[23]

What the case of commercial blood banks in Japan emphatically shows is the lasting imprints left by an epic failure in boundary-making, as reflected in the ensuing efforts to distinguish the substances themselves. The historically rooted notions of bad blood associated with the outcastes had created conditions of spatial segregation, allowing commercial blood banks to flourish in yoseba districts. The commercial blood banks, then, moved blood across boundaries, buying it as a commodity at one end, and offering it as a free gift covered by the national health insurance at the other end. Yet, the recurrent scandals made ruptures in the boundaries ostensible, augmenting the fear of bad blood permeating through the circuits across differentiated bodies. Then, how have categories of blood solidified as boundaries were made and redrawn?

When "sold blood" (baiketsu) was first identified as bad blood during the hepatitis scandal of the 1960s, it was typically described as "yellow blood" (kiiroi chi) or "contaminated blood" (yogoreta chi), as in the following excerpts:

> "The terror of yellow blood" refers to the phenomenon of crimson blood turning yellow as a consequence of frequent blood-selling up to 50 times a month beyond the normally permitted limit of once a month, withering away (kuchite iku, lit. rotting away) the vitality of blood sellers and spreading malignant serum hepatitis to more than 20 percent of those who receive transfusion from such blood.[24]

> "Yellow blood" refers to the bad blood (*furyō ketsueki*) when the blood reserve for transfusion was collected from sold blood a long time ago.[25]

As seen above, the etiology of what was known as serum hepatitis at the time was attributed to transfusion from "yellow blood." Yellow blood, then, conjured the vivid image of professional blood sellers, depicted typically as the "blood selling human trash" (baiketsu haijin) with bloodless face – "blue face," "yellow face" – and skeletal bodies – "crow-like."[26] The commercial blood banks were criticized mainly for bringing the blood of such professional sellers into the national supply, as if their blood had an irreparably contaminating property. Rarely mentioned were the possible routes of transmission via the unsanitary practices at commercial blood banks.[27] Similarly, in the case of the HIV/AIDS scandal, the media repeated the phrase, "blood clotting factors made of sold blood from the United States" as the self-evident cause of the problem, and accusations against the authorities and commercial blood banks focused on their collusion in importing sold blood. Here again, sold blood was linked to excluded bodies such as the blacks and the Latinos in the ghettos of the United States and the blacks in South Africa under apartheid.[28] In other words, these incidents led to the recognition of

a qualitatively different category of blood and its origins in devitalized bodies rather than to the awareness of viral flows – and their entwinement with vital networks – activated by the blood economy.

The fusing of morality and biology in the stigmatization of paid donors has been observed in many places where commercial blood blanks operated, notably in the United States (Kretzmann 1992; Lederer 2008, 96-97; Titmuss 1970, 114-115), India (Copeman 2009a, 32-33), and China (Anagnost 2006, 518-519; Jing 2006, 543). Typically identified as coming from impoverished areas such as skid rows, slums, and rural villages, blood sellers have been characterized as being morally corrupt, prioritizing their own monetary gains over the safety of the public so as to irresponsibly spread their viruses. Accordingly, donation-based blood banks often strived to deny any association with the "bad blood" of blood sellers by emphasizing the higher moral grounds held by voluntary un-paid donors. In this sense, their appeal to moral ideals, from altruism, to patriotism, civic duty, spiritual devotion, national integration, and to self-care (Copeman 2009a; 2009b; Erwin et al. 2009), also constituted their means of quality control.

Similarly, in Japan, blood donation campaigns have adopted slogans such as "the mutual aid of love," which were frequently accompanied by phrases such as "let's expel blood selling." In these discourses of donation, "love" (ai) and "good will" (*zen'i*) were featured as the necessary and sufficient condition for gathering "clean blood" (kireina chi). Consider, for instance, the following statement by a staff member of the Japanese Red Cross dissuading hospital officials from buying cheaper blood products from commercial blood banks immediately after the hepatitis scandal broke out.

> It is common sense now that people contracted serum hepatitis after transfusion because of sold blood. Donated blood is at least the blood of good will. There won't be anyone who wants to transmit one's disease onto others, and there won't be anyone who would donate blood hiding their diseases. As we still don't have any means of testing hepatitis, we have no other option than to sort out blood suppliers. Good quality blood cannot come from anyone else but from healthy people. (Kōzai 2007, 160-161)

Donation, in this sense, was promoted as a way of gathering "the blood of good will," that is, "good quality blood." Love and good will were promulgated not only to foster solidarity among strangers, but also to reinforce the separation between good blood and bad blood. The deterrence against being mixed with "sold blood" was so strong among donors that the Japanese Red Cross had to launch a separate organization to distribute donated blood exclusively to the hospital in 1967, instead of contracting it out to commercial blood banks as they used to.[29] The public outcry against the Japanese Red Cross's sale of overdue blood to commercial blood banks in 1984 further shows that Japanese did not approve of these tokens of love and good will being utilized by commercial blood banks even as they might go to waste.[30]

Even with the abolishment of commercial blood procurement, the specter of bad blood continues to haunt the Japanese public. Controversies surrounding the rewards to donors provide one such example: where should the line be drawn among the variety of goods and services the Japanese Red Cross provides to its donors, to prevent tarnishing "the good will" that generates "clean blood"? The contents of rewards have constantly been under strict scrutiny by the reshuffled Ministry of Health, Labor, and Welfare (MHLW) and subject to cancellations and changes, which at times agitated donors. When the 500 yen gift card was abolished in 2002, a frustrated regular donor sent a letter to the newspaper Asahi Shimbun, claiming that the gift card was a source of pride

for him as a symbol of doing good: "Indeed, 'blood-selling' is an undesirable act for reasons of sanitation as well as of morality. Yet, I think it's wrong to put 'blood-selling/sold blood' (baiketsu) and 'blood donation/donated blood' (kenketsu) in the same category," he argued.[31] As such, the distinction between "sold blood" and "donated blood" remains fundamental to the sustenance of the Japanese blood economy, yet the exchanges of blood across bodies incessantly raise the question of how to distinguish one from another.[32]

The celebration of "love" and "good will" and the strict regulation of rewards to donors can be viewed as part of a repertoire of strategies employed to chase away the contaminating power of bad blood. A most recent manifestation of such a strategy is demonstrated by the 2003 law regarding the labeling of blood products. The law mandates that all blood products should be labeled to indicate whether they include sources from donated blood or sold blood, along with their countries of origin, so that patients and their families can make informed decisions. The label of "donated blood" is strictly applied to products that satisfy the following three criteria: 1) the government of the country complies to the definition of "voluntary non-remunerated blood supply"; 2) the definition follows the standards set by the International Federation of Red Cross and Red Crescent Societies in 1991;[33] 3) and it is possible to confirm that blood is indeed collected in the manner according to the definition.[34] The pamphlet distributed to medical institutions by the MHLW further lists the five countries that supply the sources for blood products in Japan (Japan, the United States, Germany, Austria, and Sweden) and details how each of these countries defines non-remunerated blood donation and what kind of rewards and perks are provided for non-remunerated blood donation, based on the MHLW's field investigation in each countries in 2002. The MHLW further recommends medical institutions to provide such information on the sources of blood

along with the risks and benefits of the consumption of a given product to obtain informed consent from patients and their families. These measures demonstrate that the figure of "bad blood" continues to lurk behind the ideal of blood as a positive life force equally available to every Japanese.

The persistent concerns over bad blood in Japan bring us to consider the coproduction of biotechnology, social boundaries, and bodily substances over a long span of time. Emma Kowal and Joanna Radin have emphasized in a number of publications, how social and technical orders are coproduced ongoingly in their study of frozen blood samples of indigenous populations (Kowal et al. 2013; Kowal and Radin 2015; Radin and Kowal 2015). The indefinite extension in time assumed by the technology of cryopreservation gave rise to new political and ethical problems, leading to "cryopolitics" that make frozen blood samples oscillate between the states of latent life and incomplete death (Kowal and Radin 2015). Theses uncertainties induced "mutations" in indigenous populations, in the scientists who collected their blood samples, and in the blood samples themselves (Kowal et al. 2013). In our case, the technology of blood-banking has posed biological and social uncertainties with the continuous flows of blood across bodies. These tensions were resolved through the closing down of commercial blood banks sometimes or through the tightening of vigilance against bad blood at other times. The category of bad blood rather solidified in this process, as its symbolic and viral properties were congealed together over time. In the entangled vital and viral flows of blood, the specter of bad blood, one might say, has come to constitute the substrate on which blood gains its surplus vitality.[35]

Concluding Remarks

This article traced how blood banks reconfigure social boundaries, bodies, and substances, as they evoke embodied associations spanning across space and time. In

Japan, the long-standing notion that any contact with the blood of marginal populations and outsiders can be dangerous was rather strengthened by the recurrent transmission of blood-borne diseases via transfusion and plasma derivatives in the twentieth century. Stigmatized bodies like yoseba laborers, who were neglected to be "let die" (laisser mourir) in Foucauldian terms, were reincarnated in the figure of "bad blood" in this biopolitical enterprise to "make live" (faire vivre) (Foucault 1990, 137-140). The specter of bad blood in Japan today reveals how the power of vengeance might be inadvertently distributed to the blood of those who were sacrificed in the generation of surplus vitality. Blood banks continue to enable or quell such a power by forging and dissolving various relations of exchanging blood while appealing to an exclusive collective with homogenous blood. Bodies have become porous and mutually dependent on the pervasive flows of blood, yet the tendency to identify categories of blood according to its bodily origin continues in Japan.[36]

Today, even as commercial blood procurement is banned in Japan, as in many other wealthy countries, the majority of high-tech plasma derivatives is made by global pharmaceutical companies with branches and subcontractors operating commercial blood banks in different parts of the world. [37] With a rising demand for plasma derivatives, the global market for plasma is expected to grow even faster in the next years: valued at $28.9 billion in 2017, the worth of the market is predicted to reach $63.0 billion by 2025, according to one recent report.[38] As blood banks seek surplus vitality circulating blood and money across spaces with varying regulatory regimes and social hierarchies, they will continue to rely on bioavailable bodies, the bodies of those who are deemed less worthy in the biopolitical apparatus of care. It is only with the consideration of these entanglements of vital and viral flows across differentiated bodies over space and time that we can understand how blood banks give rise to a form of life

(Das 2006) in which surplus blood is shared among strangers, as well as to a life form (Helmreich and Roosth 2010) of blood as an animating essence.

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[1] Conversation, August 26, 2016.

[2] For instance, see Asahi Shimbun, March 31, 1944.

[3] This expression was used by political theorist Ijichi Susumu advocating for the intermarriage between Japanese males and Manchurian females for "the development and civilization of inferior peoples" (Robertson 2002, 198). For the eugenicist discourse of "pure-blood" and "mixed-blood" marriages in imperial Japan, see Robertson 2002 and 2005.

[4] For instance, see Asahi Shimbun, June 25, 1939.

[5] Asahi Shimbun, May 26, 1964.

[6] Asahi Shimbun, November 16, 1962.

[7] Asahi Shimbun, December 15, 1965.

[8] The only way day laborers could have access to social protection was to register for day laborers' insurance and keep track of their working days in registered ledgers, daily employees' insurance ledger and daily employees' medical ledger. They had to collect stamps (employment and health insurance) from their employers for each day they worked.

In the 1960s, they had to collect 28 stamps or more in the previous two months to become eligible for unemployment benefits of 240-500 yen/day for 13-17 days. However, many companies, often relying on yakuza gangs for recruitment, did not conform to these rules and did not distribute stamps to their employees. Even if day laborers did manage to collect stamps from their employers, working constantly for 14 days a month was extremely physically demanding and hard to achieve, especially when there were recessions or when the day laborers aged and their bodies weakened.

[9] Prime Minister Ikeda Hayato's Income Doubling Plan (*shotoku baizō keikaku* 1961-1970) aimed at reducing the rural population by two-thirds in a decade in order to accelerate urbanization and economic growth.

[10] Asahi Shimbun, December 2, 1965.

[11] Mainichi Shimbun, August 2, 1966.

[12] Asahi Shimbun, December 25, 1974; Mainichi Shimbun, March 2, 1983.

[13] Asahi Shimbun, November 16, 1962; Asahi Shimbun, May 29, 1964.

[14] Classified as family/replacement donation by the WHO, this type of system requires someone, usually family members or friends of recipients, to donate blood to replace the stored blood used in transfusion. For ethnographic accounts of replacement donation, see Copeman 2009a; Street 2009.

[15] Asahi Shimbun, June 8, 1964; Asahi Shimbun, August 1, 1964.

[16] Asahi Shimbun, March 25, 1964.

[17] Asahi Shimbun, December 18, 1964.

[18] Asahi Shimbun, December 18, 1964; Asahi Shimbun, November 10, 1984.

[19] Asahi Shimbun, November 10, 1984.

[20] Starr 1998, 303; Asahi Shimbun, May 29, 1988; Mainichi Shimbun, March 17, 1988)

[21] Starr 1998, 303; Asahi Shimbun, November 10, 1984

[22] The sales of unheated blood clotting factors imported from the United States were permitted in Japan from 1983 to 1987, despite the alerts placed by the United States Centers for

Disease Control and Prevention and the Food and Drug Administration as well as the recall of the products within the United States. For more on this, see Cullinane 2005 and Starr 1998:303-306.

[23] For the spatial and discursive boundary-work employed among staffers working for institutions governed by different economic logics in the umblical cord blood economy, See Machin et al. 2012 and Hauskeller and Beltrame 2016.

[24] Yomiuri Shimbun, November 16, 1962.

[25] Asahi Shimbun, February 12, 1977.

[26] For instance, Asahi Shimbun, December 3, 1965.

[27] Epidemiological studies of hepatitis in yoseba districts of this time are surprisingly scant, compared to studies on hepatitis contraction among recipients of transfusion. While the experience of selling blood has been linked with high risk of hepatitis infection, the possibility of contraction via unsanitary practices at commercial blood banks has not been scrutinized, despite anectdotal evidence supporting this hypothesis. For instance, journalist Honda Yasuharu, who wrote special featured articles on commercial blood banks for Yomiuri Shimbun in the 1960s, was known to have contracted hepatitis C from selling blood for the report and developed liver cancer in his later life.

[28] Asahi Shimbun, November 10, 1984.

[29] Asahi Shimbun, December 15, 1966.

[30] Asahi Shimbun, March 20, 1996.

[31] Asahi Shimbun, November 6, 2002.

[32] For the interlockings of blood donation and consumerism in different parts of the world, see Copeman 2009a and 2009b; Erwin et al. 2009; Robertson 2012.

[33] Decision 34 of the 8th session of the General Assembly of the International Federation of Red Cross and Red Crescent Societies in 1991 defines voluntary non-remunerated blood donors as “persons who give blood, plasma or other blood components of their own free will and receive no payment for it, either in the form of cash, or in kind which could be considered a

substitute for money." Small tokens, refreshments and reimbursement of direct travel costs are compatible with voluntary non-remunerated donation, whereas time off work, other than reasonably needed for the donation and travel, is considered as remunerated donation. http://www.ifrc.org/PageFiles/40636/IFRC%20Policy%20on%20blood%20systems.pdf acceessed on October 17, 2017.

[34] http://www.mhlw.go.jp/qa/iyaku/ketueki/ accessed on October 17, 2017.

[35] I thank Noémie Merleau-Ponty, Fabien Milanovic, and Perig Pitrou for inspiring me to conceptualize this point.

[36] Another persistent categorization of blood revolves around ABO blood types in Japan, which have been historically tied to racial groupings. For an extensive analysis from its adoption by eugenicist propaganda in the early twentieth century to its sociocultural significance in the present day see Robertson 2012.

[37] For the global economy of umbilical cord blood and the intricate networks of public and private institutions that constitute it, see Brown et al. 2011 and Hauskeller and Beltrame 2016.

[38] http://globalqyresearch.com/global-plasma-fractionation-market-professional-survey-report-2018 accessed on July 20, 2018.

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