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World to Waste: *the Toxic Legacy of Consumerism and Technoscience*

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How will future generations look back upon contemporary Western society, how will they remember it? Of course, this is an impossible question without a definitive answer. But as a speculative exercise, what insights can it bring regarding Western society as it operates today? If Ancient Egypt is remembered for its pyramids, what artefacts will constitute the remembrance of current times? (Slade 2006, 7) What is the story that this artefact will tell, and how will it do it? In this text, I propose that this intergenerational horizon, and the question of intergenerational transmission, can only be thought from the perspective of consumerism and the way that it simultaneously renders worlds obsolete as well as that it produces waste. Waste is often seen as a byproduct from processes of consumption and innovation, but in the age of forever chemicals and permanent innovation, it is one of the only durable things that will outlast the generations that currently roam the earth.[1]

This text starts from a reading of Arendt's *The Human Condition* where the modes of activity labour and work will inform a reflection on consumer society and waste. Under consumerism, the durability of the world is threatened, and use-products become products of consumption. Arendt observes how this "turnover of the world" is accelerating and fundamentally changes the relations with humans and the world they inhabit. Arendt, however, does not explicitly attempt to explain the root causes of this acceleration. First, this acceleration is explained based on an economic analysis, where the accelerated turnover of the world is interpreted as synchronizing with the acceleration of capital's turnover, its circulation. Second, the notion of innovation will be introduced to enrich Arendt's descriptions of consumer society from a technological perspective. Based on the work of Bernard Stiegler and his notion of "permanent innovation" the acceleration described by Arendt is understood in relation to technoscience and the way that it destabilizes the world as well as that it produces waste. The figure of "forever chemicals" is used as a thought figure to illustrate how the world has lost its durability under consumerism, but that this non-metabolizable waste that it produces now fulfils this function. The situation of the contemporary consumer is that they are "proletarianized" they do not have the knowledge to understand the products they consume, but the effects are very real and don't care about this ignorance. The consequences of these forever chemicals affect the health of living humans and non-humans, as well as impact the lives of those generations that are not yet born. This toxic epistemic condition is thus related to the intoxication of the earth as such, and a pollution of what is inherited by future generations, as well as an intoxication of their horizon.

The Life of Labour and the World of Work

In *The Human Condition* (1958) Hannah Arendt anticipated a fundamental change in the relationship between humans and the world, driven by the rise of what she termed "consumer society". In this new economic and cultural condition, durable objects—once crafted to last and be used over generations—are

1 This is based on the work of Lisa Doeland, (2020) who on the basis of the work of Derrida and Žižek shows how seeing waste as the non-essential informs an ontology that becomes a hauntology. Namely, waste is something that is not rendered essential to the production or consumption process and is therefore excluded. But this exclusion backfires, waste comes to *haunt* those activities deemed to be essential. After all, once something is thrown away or rendered obsolete it always returns in one way or another, it is not deleted off the earth but often diverted to marginalized communities, such as non-Western countries in the Global South that have become dumps of waste that is produced in the West. In this sense, waste is only a byproduct from a certain perspective, and from a more holistic perspective waste is simply a product.

increasingly treated as disposable; consumed rather than preserved. Arendt's description of consumer society must be understood in the general schema of the human condition that she develops. Labour, work and action make up the modes of the *vita activa*, the active life of human beings, as opposed to the contemplative life, *vita contemplativa*. Labour and work are especially important to understand Arendt's description of consumer society.

Labour is human activity tied to the biological process of the body, in its metabolic relation to its environment, it is bound to the necessities of the circle of life, that of growth and decay (Arendt 1958, 7). The human activity of labour, tied to life and earth, is aimed at fulfilling man's biological needs of subsistence, the necessities to stay alive. Besides biological necessity, labour is also repetitive, it is cyclical like the metabolism of the earth, it must be done every day anew. It is quite simple: people who only drink water once a week will not survive, the body demands this nourishment every day anew. Labour, as a form of human activity is characterized by direct consumption. The goods of labour are consumed immediately and are not durable; they disappear in its consumption, which is its real quality. A loaf of bread disappears in its consumption, it is metabolized, converted into energy.

The relation between waste or excrement is present in Arendt's description of labour but is only loosely worked out. Arendt for instance describes how labour also encompasses the repetitive task of cleaning or repairing the waste of yesterday without going into further detail (Arendt 1958, 101). In extension of Arendt's loose descriptions can be said: to consume is also to produce waste. To drink is to urinate, to eat is to shit, to toil is to sweat. In labour, consumption and waste are co-extensive (Reno 2018). Labour is vital for human existence, but labour is not regarded as something that belongs to the highest articulations of human existence, or human freedom.

A different mode of being-active is to *work*. Whereas labour is necessary, cyclical and repetitive, work ends with a finished product (Arendt 1958, 98). These finished works constitute a world with a distinct 'thing-character,' as they are constructed out of artefacts. These works are characterized by relative durability, in contrast with the labour in which the object disappears in its consumption. Arendt distinguishes between labour and work based on the difference she draws between use and consumption, "The world . . . consists not of things that are consumed but of things that are used." (Arendt 1958, 134). A table is often something which gathers people, for instance a dinner table. It would be ridiculous if this table would be consumed like the food and wine placed on it; a product of work does not disappear in its usage but endures it. Hence, the things of the world, the products of work, are marked by 'durability', they last. This durability of things is not only relevant for living generations as it outlasts the life of an individual. Jewellery can stay in the family for generations through inheritance. Its durability is the condition of possibility for this transmission. What is directly consumed does not have this quality. A baker's child might inherit the family bakery – the building, the ovens, as well as documented recipes and permits - but surely not the bread.

The durable thing-character of the world thus is a 'beacon of stability'. Amidst the cyclicality of nature's metabolism - of growth and decay, of consumption and waste - the world, according to Arendt, constitutes a place where people can feel at home (Arendt 1958, 134). The human who works (*Homo faber)* is the fabricator of the world, and strives for permanence, stability, and durability (Arendt 1958, 125). But under consumerism, this relation between work and labour is fundamentally altered. In terms of the schema that Arendt sets out this means that the sphere of *labour* takes over the sphere of *work*. Consumerism blurs the distinction between durable works and consumption, eroding the boundaries that once protected the world from nature's cycle. Regarding consumerism Arendt writes: "It is as though we had forced open the distinguishing boundaries which protected the world, the human artifice, from nature..." (Arendt 1958, 126). Work, which Arendt explains as the 'artificial' as it is constructed by humans

and placed outside of the natural metabolism of growth and decay, is drawn into the circulatory process of the natural metabolism of the earth. What are the effects of this on the human-world relation?

Consuming a World Once Durable

Arendt observes how the sphere of work is slowly overtaken by the sphere of labour. Arendt observes that the products of work have been losing their durability; objects that were once meant for long-term use are now consumed and discarded. What Arendt describes is the emergence of a 'consumer society'. Under consumerism the differentiation between works that are durable, and the results of labour that are tied to the circularity of man's natural, metabolic relation to the earth is rendered insignificant. Arendt describes this transformation in terms of *acceleration*—the speed at which works are used and discarded is increasing *(*Arendt 1958, 125). Arendt writes:

> Under modern conditions, not destruction but conservation spells ruin because the very durability of conserved objects is the greatest impediment to the turnover process, whose constant gain in speed is the only constancy left wherever it has taken hold. (Arendt 1958, 253).

Arendt delineates a turnover process of things, of objects that used to be durable that are now consumed but fails to explicate the driving force behind this acceleration. I think the acceleration that Arendt describes, which she connects to the emergence of consumerism, marks the acceleration of this circulatory process of capital. The perspective of Marx is helpful to illustrate how this accelerated turnover rate of the world corresponds with an acceleration in the turnover rate of capital. Capital can only make use of its 'power of breeding' by being in movement, by circulating (Marx 1992, 128). Money becomes capital when it is invested to generate a return; capital is money that begets money. Marx distinguishes three distinct phases in the circulatory process of capital. Capital can exist in money-form, invested in production, or in the form of commodities (Marx 1992, 133). For instance, a venture capitalist has capital in the form of financial means, which are then invested in certain production facilities, raw materials, and labour to create a product. At the end of the production process the capital becomes fixated in the products that are made. The money that was first liquid is now fixated in the products, only when these are sold the capital is 'freed' and can be reinvested. This reinvestment is necessary as capital always searches for a new profitable investment to valorise itself, this marks the start of a new process of circulation.

Arendt is less concerned with the cause of this acceleration, and more with the way it affects the human-world relationship and the modes of being-in-the-world. Arendt remarks regarding this accelerated turnover of the things of the world that "we can no longer afford to use them, to respect and preserve their inherent durability; we must consume, devour" (Arendt 1958, 126). But the image that Arendt draws for this destabilizing effect on the world is even more dramatic. If we were to live in an absolute consumer society, where all work is entirely replaced by labour, Arendt warns: "we would no longer live in a world at all" (Arendt 1958, 134). In that situation, the artificial boundaries of the world would disappear, and the human would be completely subjected to the circulatory process that marks the metabolism of the earth. This economical perspective on the turnover of the world must now be substantiated by looking at different types of obsolescence.

Obsolescence and Consumerism

The previous paragraph laid bare the relation between the world of things and the world of capital, as manifest in consumerism. To understand the relation between the circulation of capital and consumerism it is important to look at the economical concept of Customer Lifetime-Value (CLV), which estimates. the total revenue a business can expect from a single customer over their entire relationship with the

company. From the perspective of CLV there is a maxim to increase the frequency of sales, if one customer only would buy one car in their entire life the revenue stream of the company would not be maximized. For a capitalist, this is suboptimal, as it limits the revenue stream extracted from each customer, which reduces overall profit. To repeat the words of Arendt: "*not destruction but conservation spells ruin.*"

There are various ways in which the frequency of sales can be increased, related to three types of obsolescence: planned obsolescence, psychological obsolescence and technological obsolescence (Slade 2006, 4). Planned obsolescence is the deliberate limitation of the lifespan of products and rendering products obsolete in an earlier stage of the product cycle. Thus, a renewed demand for new products is consolidated, which benefits the long-term profitability of the economy. Historically, the strategy of 'planned obsolescence' emerged after the Great Depression as a means of sustaining economic growth (Bisschop, Hendlin, and Jaspers 2022).

Psychological obsolescence is based on the perceived obsolescence by the consumer, where the desire for renewal is cultivated regardless of the durability of the object. This logic can be found in a speech Mark Rutte gave in 2013 where he argued that Dutch citizens could consume their way out of recession and deter corresponding severe austerity measures if and only if they consumed more. He encouraged the Dutch citizens to buy a new car even if the old car was still working perfectly (NOS, 2013). Hence, in the consumerist mode of capitalism the economically 'sound' thing to do is simple: consume and discard.

Where in the description of Arendt the root of this acceleration remains obscure, it turns out to be closely related to the circulation of capital, which is dictated by the laws of accumulation, of valorization. The last form of obsolescence is technological obsolescence which follows from technological invention and innovation which render earlier products impractical and obsolete. Understanding this requires a thorough analysis of technology as such in relation to consumerism. This will be conducted based on the work of Bernard Stiegler.

The Perspective of Technology

The commonalities between the work of Arendt and Stiegler are remarkable. Both are concerned with the destabilization of the world in the light of consumerism. Stiegler opens his second book *Technics and Time 2* with the following paragraph:

> An ordinary person of two centuries ago could expect to die in the bed in which he had been born. He lived on a virtually changeless diet, eaten from a bowl that would be passed on to his grandchildren. Through seasons, years, generations, his surroundings, possessions, and daily routines were close to identical. The world appeared to be absolutely stable; change was such an exception that it seemed to be an illusion. (…) Technics, as technology and techno-science, is the chief reason for this reversal. (Stiegler 1998b, 1)

What Stiegler sets out here mirrors Arendt's description of consumerism. Just like Arendt Stiegler notes how the world has been destabilized, change is no longer an exception, but the rule. Where Arendt only noted an acceleration without examining its causes, Stiegler explains why the acceleration occurs and what causes the transition from a world where stability is the rule, towards a world where it becomes the exception: technoscience. Furthermore, Stiegler points towards the durability of things, which stabilizes the human condition as a world, and allows its intergenerational transmission which is a topic that will return in the later part of this text. For now, it is important to understand technoscience and how it can be seen as an explanandum for the acceleration described by Arendt.

Technoscience denotes a historical situation where technology and science have become inseparable and give birth to industrial technology (Stiegler 2007, 30). Technology and science can no longer be separated, science is technological praxis in relation to nature, whereas science informs technological development. Stiegler situates the beginning of this discussed destabilization of the world in the 19th century, and attributes it to the rise of technoscience amidst the (second) industrial revolution. This historical epoch of technoscience marks the convergence of capital, science and technology, which are not *opposed* to one another, but *compose* what Stiegler calls technoscience (Stiegler 1998a, 39).

For Stiegler, the corporate R&D department is a key locus of technoscientific development, where innovation and the marketisation thereof are no longer separable (Stiegler 1998a, 41-42). As Stiegler writes: 'strategic marketing dictates the directions and conditions of innovation' (Stiegler 1998a, 89). What this means is that the aims of technological development are subjected to criteria of profitability, it must generate a return that is monetizable. In Stiegler's work this calculus of profitability is contrasted to what is beneficial for a system, what contributes to overall well-being (Stiegler 2010, 83). Technoscientific development relies on investment in the future—both financially and anticipatorily. That is, it is both a matter of expected return as well as a practice of projecting the possible on the horizon. In this system, profitability becomes the primary factor shaping the trajectory of technoscience and its openness to future possibilities. The horizon of technological development becomes a horizon of new possible markets, investments and profits. Thus, the development of technoscience, and the ever-recurring need of capital to be put into circulation to multiply, converge; the development of technoscience and capital are co-evolving.[2] And Stiegler, like Arendt, also observes an acceleration, he speaks of "permanent innovation". But before this can be grasped, it is important to take a step back and reflect on the notion of "innovation" as such.

The Notion of Innovation

The notion of *innovation* is absent in Arendt's work, but it is helpful for what I propose here; a technoscientific interpretation of Arendt's description of acceleration. According to the contemporary sociologist Benoît Godin, the current dominant meaning of the notion of "innovation" is 'innovation as commercialized technological invention' (Godin 2015, 9). Not only does this align with Stiegler's conception of technoscience it also makes it possible to connect the notion of innovation with Arendt's descriptions of the turnover of the world.

Innovation, as understood in the sense developed by Joseph Schumpeter as 'creative destruction', is always a combination of a development in the social domain and the technological, or economical domain. This is an example of how a purely technological or techno-economical understanding of innovation is too narrow (Blok, 2021). Schumpeter mobilizes this to explain how the evolution of capitalism is never stationary and how the economic structure is transformed '*from within,* incessantly destroying the old one, incessantly creating a new one' (Schumpeter 1976, 83). Thus, an existing economic structure forms the basis on which an innovation can emerge that destroys this base on which it is founded. In this sense, innovation is not a linear progress, but it also harbours a "Faustian", a destructive, component (Blok and Lemmens 2015). Each invention that is marketed disrupts the world from which it emerged, and thereby the modes of relating to it. Each innovation manifests technological obsolescence. This does not only point towards the disruptive effects of innovations but also that there is no technological change without corresponding social innovation.

[2] A full grasp of this relation between technoscience and capital would require a historical account of how banks and other financial actors have made the British and German industrial revolution(s) possible, which is beyond the scope of this text, but can for instance be found in Guinnane, Timothy W. "Delegated Monitors, Large and Small: Germany's Banking System, 1800-1914." *Journal of Economic Literature* 40, no. 1 (2002): 73–124. http://www.jstor.org/stable/2698594. And for the British context: Geoffrey M. Hodgson, *The Wealth of a Nation: Institutional Foundations of English Capitalism* (Princeton, NJ: Princeton University Press, 2023) pp. 158-184.

The notion of innovation as creative destruction is thus helpful for thinking about both the obsolescence of the artefacts of the world and the obsolescence of modes of being in that world. However, current complex innovations introduce another layer of destructivity. Take, for example, the transition from gas stoves to induction cookers powered by electricity. This transition has rendered not only gas stoves obsolete but also those pots and pans that "fit" a gas stove but do not fit an induction cooker. In this way, many artefacts were turned into waste, prompting a new wave of consumption, while certain modes of cooking became impossible on the new induction cooker. But this is not the only waste produced by this transition. This transition increased the demand for non-stick cookware, as electric stoves typically require pans with a flat, heat-conductive surface. Many non-stick pans are coated with materials that may contain Per- and polyfluoroalkyl Substances (PFAS), which is released from non-stick pans when they are overheated, scratched, or worn out. This is not a waste that enters its environment when it is rendered obsolete, but when it is used. This means that this form of innovation no longer pertains to something called "creative destruction" but rather a *destructive creativity*. One cannot understand this problem of PFAS without a technoscientific perspective on consumerism, which is provided by Stiegler.

Permanent Innovation and Time

What remains at stake in this text is to substantiate Arendt's take on the acceleration of the turnover of the world. Stiegler uses the notion of "permanent innovation" to explain the acceleration of innovations. This concept, borrowed from French historian Bertrand Gille, denotes a historical epoch where 'the rhythms of cultural evolution and the rhythms of technical evolution' are developing at different rates (Stiegler 1998a, 15). Technoscience, which marks the advent of permanent innovation, causes the technical system to develop faster than the social systems it is embedded in. The development of the technical system is thus always in advance related to a delayed social system. The problem is thus not essentially that innovation is disruptive, as the disruption of an older redundant system can also be something good. Rather, Stiegler problematizes the rate at which consecutive innovations follow up on one another, which makes it almost impossible for the relatively inert social system to recuperate the new technical developments.

The disruptive quality of innovations was already outlined Schumpeter, and Stiegler largely takes over the Schumpeterian account of innovation, where innovation is always tied to social innovation and disruption (Stiegler 1998a, 14). For Schumpeter the development of capitalism through creative destruction is what adds value, this is where Stiegler's analysis of innovation departs from Schumpeter's. For Stiegler, due to its speed, and its state of "permanence" where change has become the rule rather than the exception, innovation rather means an acceleration of 'the individuation of the technical systems without regard to the condition of psychosocial individuation' (Stiegler 2015, 188). In other words, the becoming of the technical systems overdetermines the becoming of the social systems and the psychological development of individuals. Innovation is regarded only as something techno-economical without considering its disruptive, social effects as something costly or something to take care of.

In accordance with Arendt's concern with altered human-world relations, and manifested in Rutte, Stiegler writes that permanent innovation installs 'a system tending to produce *chronic and structural obsolescence, a* system for which the *normal* relation to objects becomes *disposability*' (Stiegler 2010, 83). But Stiegler goes way beyond Arendt as he explicitly analyses the speed of innovation, the acceleration of the turnover of the world as a relation between technics and temporality. Stiegler writes: 'the transfer time of scientific discovery to technical invention and then to technical innovation has considerably shortened.' (Stiegler 1998a, 40). This acceleration of innovation – understood as marketed invention - compresses the time available for society to 'adopt' new inventions and find practices and orders in which this invention is

embedded. This adoption is rendered impossible as the *time* were these delayed social practices catch up, is already overtaken by new disruptions, perpetually postponing the possibility of calibration between the technical and the social. The interval of time that is necessary to think and to generate practices which embrace these new technical artefacts is shortened to such an extent, that it disappears. This installs what Stiegler calls 'proletarianization', this must be understood in relation to the knowledge and consciousnesses of consumers.

Proletarianization and chemical consumption

The problem of technoscientific consumerism is on the one hand, the complexity of the products it produces, and on the other hand, the speed of its development which makes it impossible for the social system to *adopt* the technics because there is a delay in the knowledge the community has of these complex products (Stiegler 2010, 100).This becomes clear in the case of these chemical substances where the products arrive at the market before the community of consumers have sufficient knowledge on the effects on their health and the effects on ecosystems in general.

A recent example is that the chemical substance bisphenol A (BPA), which is frequently used in food containers, reusable plastic bottles and coffee mugs, turns out to be harmful to the immune system, to fertility, and disrupts the hormonal balances of those exposed to it (Stikkelorum 2025). The question whether there has ever been a demand for carcinogenic chemicals in consumer products is a silly question. The fact that there have been consumers that have bought these products does not mean that they have been aware of the consequences. After all, these chemical substances are very complex, and most consumers have not followed a chemical education. In the terms of economists this means that there has not been 'perfect information', in the sense that uncertainty of the effects was not known beforehand for both consumers and producers, which is oftentimes true for these novel chemicals. Another option is that there has been an "information asymmetry" and that the producers had more information than the consumers and lacked the incentive to make this public. This has been the case with PFAS (Gaber, Bero, and Woodruff 2023)

The situation with BPA and PFAS both show how consumers are exposed to potentially toxic chemicals about which they lack the adequate knowledge to assess the potential negative effects of the materials or production process on their health and that of ecosystems in general. This is the direct result of permanent innovation, where the speed of innovation destroys the time of the social system to generate adequate knowledge about the technical system. Nevertheless, there is an incentive to introduce these new products anyway, as it is an opportunity for profit, for turnover.

This situation, where complex toxic chemicals roam the earth and exposure to it has become almost inevitable is called the 'chemical Anthropocene' by Yogi Hendlin (2021). Hendlin argues that the current "safe until proven harmful" model of chemical regulation has failed, as once chemicals enter the market, they are difficult to remove despite emerging evidence of harm. This failure is exacerbated by weak regulatory oversight. Regulatory agencies test only a fraction of chemicals, while industry resistance and long epidemiological timeframes delay the knowledge required to take restrictive action. Under 'permanent innovation' potentially harmful toxic chemicals are given the benefit of the doubt, which benefits those with a financial interest in it, whilst the risk that exposure to this chemical entails is often diverted to marginalized communities. Stronger precautionary measures are necessary. Advocating for ex-ante (pre-market) rather than ex-post (post-market) toxicity testing is fundamentally a call for delay—ensuring that risks are evaluated before products reach consumers. However, such delays directly contradict the logic of product turnover and threaten the projected revenue streams of innovation as they delay its marketisation.

This epistemic condition of consumers, in which they are foundationally stupid, is described by Stiegler as a process of 'proletarianization', a process of losing knowledge (Stiegler 2010, 83). Individuals or communities within this system no longer possess knowledge about the structures they inhabit and rely upon. This loss of knowledge is not incidental to consumerism; it is a fundamental feature of it. The "ideal" consumer" is a proletarianized consumer, someone who has little knowledge and little know-how is more likely to consume goods and services, and throw-away rather than repair since they miss the knowledge and skills. The ideal consumer can only consume and discard and is thereby reduced to a standing reserve of purchasing power and nothing more. This was visible in the formal approach to a consumer based on CLV, the consumer is reduced to a potential revenue stream. For Stiegler, this toxic relation with the technical system goes hand in hand with the actual intoxication of the earth and even the bodily interior of human and non-human beings by chemical substances, and it points to structural toxicity of the relation between the social and the technical system (2010, 49).

Inverting Arendt

The devastating effects of toxic chemicals, that are produced in the age of technoscientific consumerism, do not only concern living humans and non-humans, but it also jeopardizes the health of future generations. This is most evident in the existence of 'forever chemicals', such as PFAS. Forever chemicals are non-metabolizable (according to present-day scientific research) and in that sense take an awkward position in the Arendtian schema of labour and work. When waste becomes durable, it paradoxically takes on the characteristics of a work, it becomes constitutive of the world. This is something that has not been considered by Arendt.

Arendt understands that work becomes labour when she writes that under consumerism 'the whole economy has become a waste economy' (1958, 134). However, what she omitted was to recognize that durable waste also means that the domain of labour comes to resemble that of work. Not only has the economy become a waste economy, but the world has also become wasted and consists of waste. As Michael Marder describes in his book *Dump Philosophy* (2020)*:* the planet has become a dump for non-metabolizable industrial outputs, for the excesses of consumerism. He defines the word "dump" as 'a massive fall of stuff unloaded with unalloyed indifference, snowballing, swallowing all of the above into itself' (Marder 2020, 103). Marder writes that the world has become a dump, which means that the world is lost, which comes close to something Arendt only warned against (Marder 2020, 8). In addition Marder points out one cannot live in a dump whilst not being affected by it, the inhabitants of the dump are the 'dumped dumpers' (Marder 2020, 87). The following forms of dumping are all co-extensive: consumer products are dumped on the market, the world turned over is dumped, the world has become a dump which invokes dumping, and those who inhabit this world have also become dumped as mere standing reserves of purchasing power inhabiting structures of which they do not have adequate knowledge or skills to understand.

With the emergence of durable chemical waste in technoscientific consumerism, the Arendtian schema becomes inverted: the world is destabilized and consumed, whereas the waste of this consumption is durable, and thereby constitutes a world, a world that transcends the life of individuals and is inherited by the upcoming generations. The presence of toxic chemicals in consumer products exposes individuals to harm, but their effects extend beyond current consumers. Forever chemicals, defined by their extreme durability, create a persistent material presence that transcends individual lifetimes, forming a lasting imprint on the world in the Arendtian sense. 'Within its borders each individual life is housed, while this world itself is meant to outlast and transcend them all.' (Arendt 1958, 7). This means that this form of waste is an example of 'our past colonizing the future (Renfrew and Pearson 2021, 158). The waste of the 'chemical Anthropocene' haunts the living, but it will also haunt

those who are not yet born. How should we understand the implications of a world where waste becomes more permanent than the objects we create?

A Legacy of Waste

It is ambiguous whether or not this intergenerationality, mediated by dumped, durable chemicals, can sufficiently be thought by means of Arendt. On the one hand Arendt describes how (political) action is conducted 'without the intermediary of things' (1958, 2). Whereas on the other hand she argues that the world *is* the human condition and in that sense conditions those born into it. The position that I take is that there is no natality without thrownness, there is no creative act that is not embedded and situated in a specific historical context (culturally, linguistically, economically, geographically etc.). The Stieglerian take on this, is that this intergenerational embeddedness is always of technical nature, technical artefacts function as intergenerational intermediaries which make this transmission possible.[3] To be thrown is always to be born into a world that pre-existed this new life of which the traces are inscribed in technical 'works' that are durable and therefore can contain a message or necessitate interpretation. Once again, the work of Stiegler is helpful in understand how the human condition is always a technical condition and that there thus is no human action that is absolutely independent of artefacts (Stiegler 2013, 63).

The actions of unborn generations are conditioned by the world they are thrown into, they must deal with the traces that previous generations have left, whether this consist of churches, books or the chemical traces imprinted on the surface of the earth and the world, in the soil, the water and the air. The world one enters as a baby is always already there, it is built up of traditions and traces that are left by individuals who are no longer present as such, they have left the world behind after their death, a world that indeed transcends their individual life. Stiegler conceptualizes human existence as fundamentally mediated by technical objects, which form a 'prosthetic milieu' that precedes and conditions the self. Stiegler writes:

> The self is surrounded by *[au milieu de]* "itself", by its objects and prostheses, a milieu that is therefore not itself but its *other*. And this *other* precedes it, is *already-there,* as an unlived past. (2011, 49)

All newborns must relate to this other, this prosthetic milieu, that precedes it. Hence, there is no inheritance that is not mediated by "these thingly supports of everyday life, which supported the world and the making-world" (Stiegler 2013, 63). Hence, the existence of toxic chemicals in the environment of future generations will be a reminder of the present culture. The dumped chemicals, and other forms of waste such as plastics and e-waste, will remind them of the general dump that contemporary society is, which relates to both artefacts as well as human consciousnesses.

Time to Think

The speed and complexity of innovation have three effects that have been discussed in this text: the destabilization of the world of things and the modes of relating to it, the shortening of the time-interval in which social systems can adopt new technical developments, the production of waste that haunts living and unborn humans and non-humans. The life of the living, and the to-be born, is fundamentally conditioned and delimited by the microplastics in the water streams, and the forever chemicals in the soil of the backyards and agricultural lands. New generations are not born on a blank slate, but in a world, consisting of the durable traces left by previous generations. Within technoscientific consumerism, individuals disoriented by permanent innovation may be unaware of the lasting effects of their waste on

[3] This is the Stieglerian topic par excellence, the relation between technics and time, how technics relates to temporality, in this case it concerns memory, earlier we saw how speed or acceleration also is a concept that draws in the relation between technics and time.

the planet. Yet this unawareness does not make the consequences any less real. As the speed and direction of technical development - technoscience - remains subject to the logic of the accumulation of capital, it becomes tied to the circulation of capital which will not slow down by itself. Not only will this result in a constant reconfiguration of the world, and the modes of relating to it, it will also lead to more and more waste, as more and more things are rendered obsolete. Furthermore, the introduction of new materials constantly brings into the world highly complex products of which the long-term harms are not yet clear. What is needed most is not necessarily something new, a new product, an innovation, but a delay, a delay that constitutes the time of knowledge as the negation of acceleration. As time seems to be running out, and the dystopian future is no longer on the horizon but unfolds in the present, this time of knowledge is necessary to reflect upon the complex world that is inhabited as well as to create frameworks and practices that allow for the "undumping of the dump" (Marder 2020, xiv). This concerns both the intoxication of our consciousness by proletarianization, as well as the material intoxication of the earth with waste and forever chemicals.

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