Holding on to and letting go of seed: quasi-commodities and the passage of property

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Holding on to and Letting go of Seed: Quasi-commodities and the Passage of Property

This paper analyses the reframing of German seed as a market good in the mid-20th century. In the late 19th century, seed was first commercially sold on dedicated transregional markets. These emerging seed markets faced several problems, among them unpredictability, ill-adapted products and the proliferation of reproduced seed into the market, which made it difficult for breeders to alienate their product and for farmers to appropriate it. In this article, I explore how seed was turned into a 'quasi-commodity', a market good not fully alienated but completely appropriated. Highlighting the challenge that seed posed for the passage of property in market transactions, the article seeks to answer to what is wrong with the current excess of property rights in markets for consumer goods.

Keywords: property; seed; alienation; appropriation; plant variety protection; quasi-commodities

Introduction: the end of the commodity?

The last decades have seen a rise of goods of a new type, not just novel in material (digital books and music, electronic car components, genetically modified organisms) but also in legal terms. Today, a growing number of the products we purchase come with 'strings attached': accompanying end user agreements, compulsory terms of service or reinterpreted copy- and patent rights are increasingly restricting the ways in which we

may legally use ‘our’ acquisitions. This entanglement has profound consequences for our life with things. We are for example prohibited from repairing our own car (Samuelson 2016), barred from freely choosing from a range of complementary products (Perzanowski and Schultz 2018) or dictated the conditions under which we might use an object, and in what way (Schubert et al. 2011; Sutinen 2018).

There is unease with this development, and rightly so. Are we, as consumers, not allowed to freely decide how to use what we have paid for? How come we buy something and still do not fully own it? Perzanowski and Schultz (2018), analysing this development in the digital economy, proclaim ‘the end of ownership’: as more and more consumer goods incorporate digital, electronic or simply technical elements, we are increasingly subjected to the continuing property rights of producers, be these products ‘intellectual’ or tangible. In a similar vein, Birch and Muniesa (2020) announce the death of the commodity: increasingly, they argue, money is no longer made through actual sales. Finding ways around the market like renewable subscriptions, license fees and other steady income streams, companies escape decreasing. Both narratives see a tendency to replace the commodity with other economic forms – and with it things like consumer freedoms, price transparency and secondary markets.

Drawing from a much older historical case – the emergence of the first German seed markets and IP in seeds – I would like to offer an alternative interpretation of these developments here. The persistence of property relations beyond the sales act, I will argue, is not an excess but an essential feature of intellectual property. Although the dependencies between sellers and buyers that result from IP are indeed a recent phenomenon in markets, the continuation of property ties is not. Rather, as I want to show, this persistence has been an essential part of commodifying certain goods for which there would otherwise be no market. I understand ‘commodities’ as set of economic objects

characterised by passing through a market transaction that modifies their property status in a particular way. This is a narrower definition than can be found in many works in political economy, most notably Kloppenburg (2004). My concept of the 'market' employed here is, in turn, rather broad, referring to an exchange of goods that allows both parties to part as strangers (Callon 1999). The aim behind these two choices is to highlight the peculiarities of a broad economic realm and its specific requirements for goods.

The European seed market, as it evolved in the mid-20th century, relied on a reconfiguration of the property concept that underlies commodity exchange as well as a simultaneous definition of sellers as producers and buyers as consumers. In this context, persisting property relations did not contradict the commodity form. Rather, they allowed seed to emulate a commodity by guiding its flow through the market without interfering with farmers' practises. This arrangement was situated in a specific economic context, however, which started to dissolve toward the end of the 20th century. As a result, the market's centrality for the seed sector waned. New property relations between farmers and breeders emerged, which are drawing increasing criticism today.

The first part of the article will give a short account of the history of seed markets and their problems, which are largely rooted in the material nature of plant seeds. Market actors struggled to find an appropriate commodity form for seed, eventually introducing the heterogeneous concept of the plant variety. Drawing from historical literature and sources, participant observation and expert interviews conducted between 2015 and 2018, my goal is to understand why a particular market – the German seed market – first failed, then succeeded and then failed again to commodify plant seeds.

Against this historical background, the second part outlines a theory of commodity exchange as a passage of property, arguing that seed, as it was reframed materially, legally and economically, followed a different model. To grasp that

difference, I develop the concepts of the bundle of practices and of the 'quasi-commodity'; an economic form that approaches and mimics the commodity but relies on a quiet continuity of property relations between seller and good. In the final part of the paper, I ask why quasi-commodified seed lost its commodity quality and took on different material, legal and economic forms. From these considerations, I will attempt to draw a conclusion for the wider phenomenon of the demise of commodity-mediated property relations.

Among the first to analyse and criticise the excess of property rights in plant breeding, Kloppenburg (2004) history of the commodification of seed as synonymous with expropriation of farmers is still influential, and rightly so. Here, however, I want to argue that seed commodification in fact contradicts 'exploitation […] based on coercion, contract, and control' (Kloppenburg 2004, p. 30). Quite to the contrary: commodification, as I understand it here, produces economic relation that retain actors' freedom and independence. While perfect commodification cannot be achieved in the case of seeds for material and economic reasons, mid-20th century Western Europe marked a time and space where 'quasi-commodification' of seed was possible. It relied on IP rights not as vectors of dependence and exploitation, as Kloppenburg describes them at a later point, but as instruments for carefully disentangling breeders' and farmers' practises. It was only when this space closed and these practises entered into conflict with each other that European seed laws turned into a tool for extending, rather than limiting, property claims to seed.

Miscommodification: the Case of German Plant Breeding

Markets for seed are a comparatively recent phenomenon. For the longest part of agricultural history, plant breeding and farming were carried out by the same person

(Sanderson 2017, p. 22), commonly called ‘farmer-breeder’ (Acquaah 2012, p. 22). Only in late 19th century Europe and North America did plant breeding emerge as a distinct profession and activity, dedicated to the production of seed for others. These new applied breeders began to import foreign varieties, deliberately crossed existing races, selected the offspring for performance and purified it through selfing (Bonneuil 2006; Wieland 2006), at times supported by state actors (Kloppenburg 2004; Harwood 2012). In Germany, these first professional breeders were typically feudal estate-owners in the plains of the north or smallholders in the south (Harwood 2012; Brandl 2017).

At first sight, seed makes a good candidate for a commodity: it is usually small, durable and readily detaches from plants; it can be transported and, through reproduction, scaled up and down depending on demand. Compared to fresh tomatoes or cut flowers, for example, seed is easily shipped and stored. But while it is key for commodities to travel to and from marketplaces unimpaired (Cronon 1991, pp. 230–247), this ability alone is not enough to guarantee that a good will function as a commodity.

Transregional, anonymous seed markets were difficult to build at the turn from the 19th to the 20th century. Kloppenburg (2004), Moskowitz (2006; 2008) and Harwood (2012) go to great lengths to show how desire for and trust in new, improved seed had to be created among farmers by demonstrating its superiority to them before commercial plant breeding could take off. But the historical problem went deeper than just demand. As Harwood (2012, pp. 34–37) shows, supply was well ahead of demand, with commercial breeding taking off already around 1850 in Germany, while the seed market kept struggling until at least the 1930s. The problem, Harwood argues, was not that breeders could not produce superior seed or that farmers were not aware of such successes. Rather, farmers, confronted with the diversity of choices offered by the seed

market, failed to purchase the product they desired and, disappointed by commercial seeds, often resorted to their farm-bred ones instead.

In part, the problem was one of lack of information: farmers were buying seed, which, unlike their farm-bred one, they were not familiar with. Quality assessment would have involved large-scale trials and comparisons between very different products. Furthermore, the obstacle faced by farmers was not just of a cognitive or calculative but also of a material nature: once planted, even superior varieties often proved ill-suited for the local context of a farm. Plants that were well-adapted to the mild climate and ecology of the northern German plains, for example, did not perform well when sown by peasants situated in the hills and mountains in the south of the country (Harwood 2012, p. 40). As the contexts that a seed depended upon shifted, so did the quality of commercial seed shift from superior to inferior. 'In today's language,' Harwood (2012, p. 40) notes, 'here was a straightforward case of 'market failure.'

Farmers were not alone in struggling with commercial seed. For breeders, the looming failure of the seed market – or at least its inability to reach a considerable part of its target audience – represented a threat to their businesses. Moreover, the practice of re- and mislabelling seed also affected their products. In 1930, out of 1000 potato varieties in Germany only 130 were genuinely distinct (Harwood 2012, p. 84). This was not an exclusively German issue: in 1920s France, one and the same wheat seed was sold under four different denominations (Sanderson 2017, p. 139); British commentators complained that about a thousand different names were used a hundred varieties, which in turn represented only twenty genuine types at best (Sherman 2014, p. 576). All of this demonstrated that seed was a fickle good that – even in case it could be sold to farmers – could easily be misappropriated by crafty competitors.

The underlying cause was the widespread practise of inbreeding plants over several generations (pedigree selection), which followed the initial act of cross-pollination in the breeding process, eventually producing plants whose offspring would exhibit the same features (Bonneuil 2006; Harwood 2012, pp. 36, 42). Inbreeding allowed breeders to offer the same seed over several years in a row, but it also allowed others to circumvent the laborious breeding process (Timmermann 2009; Acquaah 2012) on their part (Sanderson 2017, p. 28). Anyone with sufficient acreage could enter the seed business, simply by purchasing, sowing, harvesting and reselling seed.

The Passage of Property: making seed flow downstream

At first glance, farmers' and breeders' problems appear unrelated: one concerns vertical relations (i.e. along the value chain) between producers and consumers of seed; the other horizontal relations between producers and their competitors. What connects both dimensions, however, is seed as a market good, linking them in the point of commercial passage. The very distinction between 'vertical' and 'horizontal' is at stake here, since the proliferation of seed through the market is what potentially enables consumers (buyers) to become producers (sellers). Commercial seed is thus not only confronted by but also mediates and reproduces market failure.

The social study of markets has mostly looked at goods through the lenses of calculability and accountability so far (Callon and Muniesa 2005; Çalışkan and Callon 2010). In contrast, I want to follow Slater (2002) and Muniesa (2008) here in understanding the market transaction not just as a temporary equivalence of calculations otherwise diverging (Callon 1999) but as a simultaneous dis- and re-entanglement (Thomas 1991) of objects of value. This move allows us to extend the focus beyond subjective agency to goods and their materiality.

Slater (2002, p. 234) notes 'that markets are best defined in terms of a form of transaction rather than a specific mode of calculation: market transactions involve the alienation of goods in the form of property.' The statement might as well be turned around: markets are also about *appropriating* goods. Although market transactions are not the only way of passing on property, their mode of transfer is quite distinct and remarkable. The contrast between gifts and commodities is instructive here (Muniesa 2008): the passage of gifts also involves the passage of a person tied to a thing; gift-giving thus makes personal ties, obligations and claims proliferate (Strathern 1988). The same is true for several other economic forms and transactions, such as inheritance or renting: they rely on a personal bond that extends further than the transaction itself.

In contrast, market goods are characterised by a particular form of passage: during the transaction, they are completely disentangled from their previous owners (cf. Strathern 1988, p. 109; Perzanowski and Schultz 2018, pp. 15–16). This means that the seller completely cedes control over her property to the buyer. If the spirit of the gift is characterised by a continued link between persons and things (Mauss 2011; see also Dobeson, this issue), the spirit of the commodity (cf. Muniesa 2008, p. 132) is precisely that it is not possessed by previous owners. Therefore, they are also not entitled to exercise power over buyers through the property object.

The fact that commodities are exchanged in market transactions also means that alienation and appropriation occur simultaneously on different sides of the transaction. While one person is separated from the thing, another person becomes attached to it. This is crucial, as buyer and seller are understood to part as strangers (Callon 1999). If alienation or appropriation are incomplete, both will have very limited means to repair the defect retroactively. In contrast, the open-endedness of the gift economy allows for remedy and compensation further down the line.

As we have seen, farmers struggled to appropriate seed: although it changed hands in the marketplace, seed often proved problematic later on when farmers tried to sow, grow and harvest it. Appropriation thus involves a more-than-legal operation. What unfolded before and after the market transaction was a set of material practises between farmer, seeds, fields and weather in which the re-entanglement of commercial seed often proved considerably more difficult than that of farm-grown seed. Not only the farmer had to appropriate a bag of seed: the wider assemblage of farming routines and ecological processes had to accommodate commercial seed.[1]

The difficulties of appropriation that some farmers faced in turn represented a challenge for breeders trying to alienate their seed. Where commercial seed was regarded as fickle, unreliable or inferior by farmers, breeders struggled to sell it (Harwood 2012, p. 40f.). But even those who managed to produce and sell seed that farmers could appropriate soon realised that seed was ill-equipped to be commodity: they saw 'their' seed reappear on the market under different labels (or their labels stuck to others' bags of seed). Commercial seed did not take its intended path down the value chain, passing from producers to consumers, but flowed back upstream and reappeared as a rival product. But as it was already alienated, it could no longer be submitted to the will of the original seller; there was nothing that could stop buyers from appropriating it as seed instead of grain (Kloppenburg 2004, pp. 37).

Remaking seed as a quasi-commodity: The Seed Act of 1953

Unsurprisingly, actors on all sides sought to fix the seed market. In the interwar years, state institutes emerged in the south of Germany, developing, testing and recommending plants that were adapted to local environmental conditions and handing them out to farmers for free (Harwood 2012, pp. 57–75). Meanwhile, breeders tried to address the

problems of the market by cooperating at large-scale testing of new seed. At the same time, they unsuccessfully attempted to combat seed resale with patent and trademark protection (Fowler 2000; Sanderson 2017). Commercial and public breeders fiercely debated whether the choice between an increasing number of different seed products was of use to the farmer, if private testing was biased or if public breeding constituted a distortion of the market (Harwood 2012, pp. 79–80).

The problem with trademark protection was that it was too loose: it would stop third parties from selling seed under a particular denomination, but not from brown-bagging it. Patents, in turn, were too strict: while keeping others from reproducing a variety, they would, crucially, also bar breeders from using their competitors' seeds for breeding new varieties (Snell 1939; Bent et al. 1987, p. 46); a common and essential practise for any German seed company to this day. The question of quality and reliability was most urgent for the farmers. It was tackled through market admission trials by the National Socialist regime as part of its attempts to strengthen smallholder agriculture (Harwood 2012, pp. 98–106; Saraiva 2016: 85–87).

It would take until after World War II for the market to be truly fixed. The solution that emerged in post-war Germany (and elsewhere in Western Europe) did not simply redistribute responsibilities between private and public breeding and testing programmes. More importantly, it redefined seed on the biological, the legal and the economic level. In 1953, Germany introduced a national seed act (*Saatgutgesetz*), which defined the material characteristics necessary for commercial seed. In order to receive approval by the newly created Federal Variety Office (*Bundessortenamt*), the law demanded that seed needed to be 'distinct' (morphologically distinguishable from other varieties), 'stable' (able to pass on its genotype unchanged) and of 'agronomic value' (i.e. increasing 'yields of a smaller or larger region' (Saatgutgesetz, § 2, nr. 4, translated)).

These provisions were not only a quality guarantee to farmers. They also had profound implications for the material form of seed that could enter into economic circulation. Of central importance was the concept of the variety (*Sorte*). While it had been used long before the creation of the law, it now received a precise meaning beyond a taxonomic rank below the species (Sherman 2008), referring to seed characterised by a particular set of features.

The requirement of distinctness barred all varieties from the market that could not be shown to be sufficiently different from existing ones. Phenotypic stability was already a prerequisite for many breeders for selling the same variety over subsequent years, but it also became crucial for an emerging nationwide assessment apparatus run by the public hand and coordinated by the variety office. Only if breeders could guarantee that the seed they sold was identical to the one tested by the research stations it would receive approval. One result of this new accounting apparatus was a 'national environment,' which breeders had to take into account when developing new seed.[2] Together with the emergence of a new regime of chemically supplemented agriculture (Uekötter 2010), which effectively levelled local ecological differences, this guaranteed that the varieties that made it to the market could be planted anywhere in Germany.

Another effect is visible to this day in the material form of modern agricultural plant varieties: planted in a breeder's nursery, it is indeed possible to spot, demarcate and replicate the identities of seed products between plots. The variety office developed a classification system of 'register characteristics' able to discriminate between individual varieties and to connect a specific phenotype to one specific name, thus enabling breeders, farmers and authorities to settle the identity of a variety. Names were fixed to a particular variety and could not be used for any other seed. However, breeders were simultaneously prohibited to sell their seed under any different name than the one it had be admitted

under. This purged the market of generics, reduced choices, created unambiguous references and identities or, to put it with Cochoy (2007), tended the garden of choices in seed retailing.

The emerging assemblage of product standards, chemical technologies, state-approved information and certification as well as a slimmed-down market offer allowed farmers to appropriate seed much more smoothly. While there were still considerable differences between plant varieties, farmers could rest assured that new ones were better than existing ones (at least when measured against the standards of the new national assessment framework). The fixation of names to plant varieties prevented both from changing their identity when travelling across the German seed market. All of these measures, however, only solved the farmers' part of the problem. They did not do much to address breeders' concerns about the misappropriation of plant varieties by buyers-turned-competitors. Worse even, while the seed act restricted the possibilities of breeders to alienate seed on the market, increased standardisation and stability made it even easier to reproduce varieties.

For that matter, the seed act introduced a new property regime, exclusively limited to the domain of plant breeding: plant variety protection (PVP). Where both trademark protection (which only protected product names) and patents (which only protected a technical principle) had failed in the interwar period (Fowler 2000; Pottage and Sherman 2010; Sanderson 2017, pp. 21–44), PVP took up elements of both with the aim of protecting a commodified market product. Fusing name and form in one and the same property object, it only allowed the original breeder of a variety to take it to the market.

Reporting on behalf the working committee for the Seed Act, MP Robert Dannemann (Free Democratic Party) noted:

> Deliberately, the Seed Act refrains from the following provisions: 1. Rights to prohibit or exclude regarding uses not linked to the production and commercialisation of seed. 2. Rights to prohibit or exclude pertaining to seed production and distribution insofar as these acts are not performed with the purpose of commercial distribution of seed. (Bundestag Drucksache Nr. 4339, p. 3, translated)

He further stressed that 'according to patent law, anyone drawing from the patented invention of another (dependent inventor) requires permission of the first inventor. In contrast, according to […] the Seed Act, the "dependent breeder" does not require the first breeder's permission for using seed of the dependent variety' (ibid., p. 5). In other words, breeders were exempt from each other's property claims so that one could not exert power over the other through her property object. 'Plant variety protection only covers seed produced for the purpose of commercial purposes […],' Dannemann added, 'seed produced by the farmer for his own operation is thus free' (ibid, p. 5). The provision was subject to a heated debate in parliament, but it was eventually agreed that 'exchange across the fence' of saved seed was what the law should still permit (268. Sitzung des Deutschen Bundestags, p. 13206). As an effect, PVP was a much slimmer instrument than either trademark or patent protection, a fact that it is to this day still widely praised for (Kloppenburg 2014; Brandl 2017).

In the years following the seed act, a group of twelve Western European countries worked together to harmonise their national PVP laws (Bent et al. 1987, p. 40–42). These talks eventually resulted in the UPOV convention of 1961, which would be expanded in the decades to follow (Sanderson 2017) and which cemented the ambivalent relationship between commodification and decommodification of seed under PVP. If patent law

knows a ‘patent bargain’, which grants property protection in exchange for making technological knowledge explicit (Bently and Sherman 2014, p. 406), UPOV introduced a ‘variety bargain’, in which breeders received extended property rights in exchange for making their seed distinct, uniform and stable – i.e. commodifying it materially.

Where the Seed Act conflated the horizontal (competition) and vertical (consumer protection) dimensions of seed markets, UPOV would disentangle them again, forcing Germany to create two separate laws in 1963: the Variety Protection Act (*Sortenschutzgesetz*) and the Seed Marketing Act (*Saatgutverkehrsgesetz*). UPOV member states had to provide harmonised IP instruments to ensure fair competition but were free to set different standards for marketing seed. Nevertheless, the distinctness, uniformity and stability criteria still bore testimony to the implicit assumption that only seed fit for industrial agriculture could be protected (Kloppenburg 2004, p. 150).

Giving to or Taking from the Farmer? Seed as Quasi-commodity

Despite PVP’s success, it cannot be overlooked that post-war varieties bear an uncanny resemblance to the new property objects criticised by Perzanowski and Schultz (2018): even beyond the point of sale, they remain subject to their producers’ property claims, limiting the freedoms of use buyers would otherwise have. Under PVP, seed is not fully alienated. Breeders retain a backdoor through which their claims are reactivated once their seed reappears at the market. (A visible sign of this is the inscription of seed firms’ name in variety denominations like RAGT Reform, KWS Tonic or SY Monolit.)

To use the popular metaphor of property as a ‘bundle of rights’ (Penner 1996; Klein and Robinson 2011), the sales act does no longer transfer the full bundle from seller to buyer: instead, sellers (breeders) retain a seemingly minor but crucial stick from the bundle, protecting them from alienating too much. This is what attracted Kloppenburg’s

(2004, p. 151) suspicion, who saw the US plant variety protection act the harbinger of patents on seeds and another step in its ongoing commodification.

Alienation of commodities, however, operates according to 'all or nothing' (Perzanowski and Schultz 2018, pp. 16–17). It is strictly binary, ceding property to one or the other party of the sales act. So if seed is not fully alienated, can it still be a commodity? Certainly, seed does not fully comply with the principle of alienation. The very success of PVP after World War II, however, was precisely that it managed to modify the terms of the sales act without disrupting the rest of the commodity framework. In fact, in every aspect other than alienation, it facilitated the commodification of seed on various levels. Seed travelled more easily to and from the market, became a calculable good and, crucially, did not tangle up breeders and farmers in interpersonal property relations.[3] To understand this apparent contradiction – the ongoing commodification of seed despite its de-commodification as a property object – it might be helpful to look at post-war seed as a 'quasi-commodity,' loosely borrowing from Serres' (2007).

As a quasi-commodity, seed passes through the market under PVP, but not like an ordinary commodity. It is not completely disentangled from the subject that produced and sold it (Muniesa 2008) but, in the rare instance that it should revert course and flow back to the seed market, returns to its previous owner. As the history of early seed markets demonstrates, seed threatens to undo its market without such an arrangement: if the passage of property is commodified any further (i.e. by adhering to the ideal of alienation), seed will undo the market. As a plant variety, seed is not fully detached from its original owner; a part of her – the right to commercialise – remains in it. Thus, like a gift or a trust, the plant variety is still 'possessed' by the seller. In strict property terms, PVP represents a step back from commodification: to the 'naked' seed, it reattaches a property tie that will outlast the market transaction.

How was it possible to reconcile de-commodification on a legal level with commodification of seed after World War II overall? Why did the persisting property ties of breeders to their seed not enter into open contradiction with the otherwise so central principle of alienation? The answer lies in the larger context of economic relations between breeders and farmers as well as the latters' understanding of their own profession. As far as farmers were concerned, they primarily bought seed to sow, harvest and sell it to processors. While there was also a group of farmers who bought seed, reproduced and sold it, this was not part of traditional farming practises, unlike reusing seed for one's own farming purposes. The bundle of material practises that corresponded to the bundle of rights was thus not actually affected by the redistribution of property through PVP – at least as far as it involved traditional breeders and farmers. The emerging group of farmers-turned-resellers, however, was squeezed out of the market by the seed act. PVP firmly drew boundaries around two professions that were not supposed to mix while at the same time defining the trajectory of seed for the social life (Appadurai 1986; Tsing 2013) of seed as a market object.

The economic landscape this object was embedded in was one in which both breeders and farmers played an important role for the war against hunger (Uekötter 2010; Harwood 2012). Both groups were politically and economically important. By carefully balancing the bundle of rights and practises attached to seed between them, post-war legislators in Germany and elsewhere in Europe managed to find an arrangement that allowed both farmers and breeders to prosper.

In its context, the practise and right of seed re-use for farming purposes were left with the farmers. Thus, despite increasingly buying their seed at the market, they could still *act like* sovereign owners of their purchase. In turn, breeders could rest assured that they were the only ones who could produce seed for the market. Drawing the boundary

between nursery and farm at the market, PVP legislation did not only give shape to a commercial seed. It also fixed the meaning of breeding and farming, two practises that, only a century earlier, had both been practised by farmers. It thereby cleared the market of resellers, brown-baggers and commercial reproducers whose activities and products could no longer be accommodated in the new regime since they transgressed the legal spaces of nursery and farm.

The Solomonic solution of PVP consisted in rendering unto breeders the practises that were the breeders' and to farmers those that were the farmers': breeders produced seed, farmers produced grain. As long as seed continued to flow down the value chain, it would not reappear on the market. Farmers could stick to their customs without being affected by the property claims that still rested in their seed. All the new property regime asked of them was not to turn this seed back into a market good. German post-war seed, rather than following the either-or rationale of conventional commodities, thus managed to be the servant of two masters. Although legally, practically and materially very different from classical market goods, seed emulated their trajectory and successfully extended the reach of market economics to the realm of plant breeding.

Entanglements proliferate: the changing Nature of Plant IP

Such harmonious relations were not to last, however. Towards the end of the 1980s, European breeding companies pressed for a reform of the UPOV convention and a departure from the original version of PVP. At the heart of this reform was an extension of breeders' property claims beyond the market (Sanderson 2017). Breeders demanded a monopoly for the marketing, but more generally for the reproduction of their varieties. This also touched upon the (still widespread) practise of saving and replanting seed. The amended version of the convention was passed in 1991 and subsequently adopted by

European and national legislation. What ensued was a fierce controversy between farmers and breeders over the legitimacy and amount of resowing and possible remunerations, which were eventually fixed at 30 to 50 percent of the royalties for commercial seed (Braun 2020).

The motives behind this one-sided departure from the post-war compromise are not quite clear (Sanderson 2017). In hindsight, however, breeders argue that primary revenues from seed sales are no longer sufficient for maintaining their business: competition, they stress, has increased while the commercial lifespan of their varieties has shortened:

> Back then, a variety like 'Reform', I think, would have lasted 15 years; today it's maybe seven or eight years. […] Well, breeding intensity was lower by a factor of five then, too. There would be three, four, five varieties admitted to the market every year and they would carry a long time. Here we had […] really one of the leading wheat varieties in Europe in the 60s and 70s […]. And for 20 years, it made good money, lots of money. (Interview with wheat breeder, April 2015, translated)

This account is supported by statistics on seed turnover: the market has become faster and more competitive, with varieties quickly peaking in sales and then dropping out of the market (Pallauf 2018).

It is this squeeze which, in the breeders' eyes, justifies moving the dividing line between their and the farmers' claims from the market onto the farm. Resowing for one's own purposes, they argue, is no longer necessary: after all, neither national food security nor supply with commercial seed are an issue anymore. In contrast, many farmers still regard seed saving as their birthright, pointing to the long history of agriculture (IG Nachbau n.d.; Gill and Brandl 2014). At the time of writing, the controversy has not really

been settled to the satisfaction of either side (Braun 2020). To this day, breeders only collect about 70 per cent of their calculated remunerations (Interview with industry representatives, September 2017).

The coincidence of the extension of breeders' claims in plant breeding with the emergence of new property objects and relations is conspicuous. Sanderson points out a general tendency toward strengthening breeders' rights at the expense of farmers' rights, certainly inspired by the strong protection which patents had just granted biotech firms for GM plants at the time. Things are not as straightforward, however: the Dutch delegation sought to retain the farmer's exemption in areas where it was already established, but wanted to prevent it from spreading into other fields where the traditional role of the farmer would not apply, e.g. in horticulture. In contrast, France wanted to get rid of it altogether (Sanderson 2017: 238). While this sheds light on motives, it does not tell us why exactly it happened in plant breeding. With Kloppenburg (2004), we could read the reforms as part of a longue durée of expanding breeders' rights, but I would rather argue that instead of a continuation, they marked a break with the past. Their function was no longer to safeguard fair competition between seed producers but to extend the relationship between producers and consumers beyond the sales transaction.

In any case, the 1990s revision of PVP marked a partial shift away from the seed market toward the farm and the field as new sources of income. It also revealed the entangled character quasi-commodified seed, only that the commodity status of seed was further eroded in favour of more asset-like business models (Birch 2017; Braun 2020). Seed thus joins smartphones, coffee machines, books, computer games (Perzanowski and Schultz 2018), tractors (Birch 2020) and even gas cylinders (Fast Company Staff 2015) in becoming an increasingly entangled property object. PVP is not the only factor contributing to the increasing entanglement of seed: biotechnology, patents and

technology use agreements also foster a dissolution of clearly defined market transactions (Schubert et al. 2011).

Conclusion: the End of the Quasi-commodity

In this paper, I have reconstructed the problems that the emerging seed markets in Germany (and elsewhere) of the 19th and early 20th century were faced with. Seed, although on first sight predisposed for commodification, proved an unruly commercial object. Farmers of the time struggled to appropriate it calculatively and practically; often resorting to traditional farm-saved seed. Commercial seed was not only an alien but also an alienated object, however – a fact that threatened the seed market even where farmers successfully adopted it. To fix the market, seed thus had to be remodelled in two ways: making it more appropriable for farmers and less alienable for breeders. The first was achieved by remodeling seed materially, the second by a legal layer that prevented the flow of commodified seed back upstream by suspending the principle of alienation. Since this legal modification did not interfere with their agricultural practise, seed was still fully appropriated as far as they were concerned.

Kloppenburg (2004) criticised the spread of IP rights in plant breeding as 'commodification' of seed. But while it certainly helped to establish new business models around seed, the persistence of property rights is, in itself, at odds with the alienation inherent to commodities. Hence why I called German post-war seed a 'quasi-commodity': during its social life, it travelled through a narrow interstice in which breeders' and farmers' usage of seed did not overlap and thus not enter into conflict.

This is why PVP is commonly praised by practitioners and commentators of plant breeding: redistributing the bundle of property rights in a way that would safeguard rather than harm the interests of breeders and farmers. What is often overlooked, however, is

that it was the specific circumstances of post-war agriculture that allowed for such an arrangement. With wartime food shortages still a vivid memory, the shift to professionally bred seed was desired and supported by the politics of the time, which sought to secure the food supply for a growing population. Meanwhile, agricultural production still made up a considerable share of the national economy; many people were not just consumers but also producers of food (Uekötter 2010).

More importantly, however, the PVP framework proved economically viable in the following decades. Revenues from commodity sales were sufficient for sustaining businesses and investing in the development of new varieties. In many crop species, the German seed market was characterised by low market concentration. Moreover, there were commercial breeding programmes for almost all important plant species except vines and fruit trees. Compared to the public programmes the US established to correct its domestic market deficiencies, the private approach was able to produce higher yields (Brandl 2017).

Toward the end of the 20th century, however, PVP became a property regime that no longer just sought to govern the market but also the field. Seed's nature as a quasi-commodity thus became apparent; German farmers were confronted with claims to objects they thought were ‘theirs’ because they had ‘bought’ them. I do not want to develop a critique of such ‘entangled objects’ as such (Thomas 1991; Muniesa 2008) or explore the assetified business model behind them in detail (Birch 2017; 2020; Birch and Muniesa 2020) here. My critique is a more general observation: an IP regime originally situated in the horizontal dimension has shifted to the vertical dimension. Although I have relativised Kloppenburg’s account of PVP, this is probably where we would agree (cf. Kloppenburg 2014): instead of reshaping relations between competitors (as PVP

originally did), IP is today increasingly used to govern the relations between sellers and buyers – not just in plants.

Both modern patents (Pottage and Sherman 2010) and copyright (Sherman and Bently 2003) were once created to draw a boundary between fair and unfair competition. At some point, however, they became instruments that increasingly undermine the principle of alienation between producers and consumers. Although, as Perzanowski and Schultz (2018) rightly observe, purchasing still emulates a sales transaction from the consumer's side, it in fact makes continued property claims proliferate. There was a time, however, when quasi-commodities, despite their entangled nature, were alienated in practise – at least as far as the relationship between producers and consumers was concerned. Today, this is less and less the case.

We can certainly mourn or condemn this development or look for the reasons behind the shift toward the decommodification of property. Such critique, however, comes at the risk of either romanticizing consumerism (Perzanowski and Schultz 2018) or taking for granted commodities, markets and alienation as the default model for circulating and commercialising goods. Alternatively, we could blame the material change of goods for the move away from the commodity as the primary economic form. Following that argument, e-books necessitate different business models than printed ones and living beings are not fit for commodification in the first place.

Commercial seed, however, has not become more or less biological since the 1900s or 1950s (Bonneuil 2006; Braun 2020). Neither does the short history of modern market seed suggest that the commodity has ever been its 'natural form'. It was only in the specific setting of post-war agriculture that seed and markets, life and commodity did not represent a contradiction. Alas, the world has changed, and so have the relations between objects, subjects, producers, consumers, rights and practises.

Perhaps we should draw a sobering rather than nostalgic conclusion. Once upon a time, it was possible to turn certain things into market objects that worked just like ordinary commodities. Where material qualities and legal provisions were aligned with business practises and wider social expectations, these things could successfully pass through markets. Between the early 19th and the late 20th century, a social and economic space seems to have existed in which quasi-commodities – patented cars, copyrighted books, trademarked food, variety-protected seed – could have multiple owners without anyone noticing. It is only as this space is closing that we realise that there was nothing trivial about these objects. This does not mean that we have to accept the one-sided solutions companies propose to the failure of markets for IP objects. What we might have to accept, however, is yet more sobering: that the world in which quasi-commodities could do justice to both producers and consumers will not return.

Notes

1. Demonstrating a connection between calculation and appropriation, reliable information about seed certainly would have helped the farmers to appropriate seed calculatively – rather than aesthetically (cf. Bourdieu 1984, pp. 267–283) – before purchase.

2. Plant breeders master this challenge by running a translocal testing apparatus themselves, seeking to anticipate and double-check the performance of their breeding lines in the national tests (Interview with wheat breeder, April 2015).

3. Although contracts play an important role in the production and cultivation of varieties in Germany, they either occur before (seed bulk-up) or after (contract cultivation), never across the market (Thiel 2014) – unlike biotech seed in North America

(Schubert et al. 2011). If PVP 'assetisises' (Birch and Muniesa 2020) seed, then only to a bare minimum.

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