Economy and Society
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713685159

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Online Publication Date: 01 November 2007
To cite this Article: Lepinay, Vincent-Antonin (2007) 'Economy of the germ: captial, accumulation and vibration', Economy and Society, 36:4, 526 - 548
To link to this article: DOI: 10.1080/03085140701589463
URL: http://dx.doi.org/10.1080/03085140701589463

Economy and Society Volume 36 Number 4 November 2007: 526–548

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Abstract

This paper draws attention to the challenge that Tarde raises for economics: he sheds light on a moment of innovation, literally a moment of vibration, and the root of innovative processes, but which can only be retained under a form that is deprived of its vibration. This germinal life of economies is the source of all changes, but when it is accumulated it loses its vibration and becomes dead capital. Labour and capital are revisited along the way and Tarde points to the lack of continuity between repetitive labour and economic change. One is always the same, the other is always different. Labour alone cannot account for what is observed as a continuously morphing series of activities, involving people, technologies and nature. The germ, as an analytical resource, is trapped between pure repetition, endurance and continuity on the one hand, and on the other, pure vibration, pure potential. The challenge for economists stands precisely at this crossroad. The continuity and repetition of the cotyledon is measurable, but it is not a good candidate to account for economies' relentless changes. Vibrations are the origin of the economy, but they escape any measure when they are observed in their purest form of a potential.

Keywords: capital; compatibility; invention; labour; network; Tarde.

Introduction

Tarde published *Psychologie Économique* in 1902, transforming his 1900 Collège de France lectures into a massive two-volume book. Yet despite its

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ISSN 0308-5147 print/1469-5766 online
DOI: 10.1080/03085140701589463

title, the 'economy' as such does not make much sense for Tarde; it is not a domain in itself and he approached economic phenomena in terms of a framework he had developed from an innovative reading of Leibniz' cosmology. Central to this framework were the concepts of repetition, opposition, and adaptation. This general framework allowed Tarde to divide the economy into three moments that reflect:

1. the endurance of economies – the fact that economies (and economic actors) need to persevere and survive;
2. the conflictual nature of economies – the fact that appropriating scarce resources leads to oppositions of all kinds; and
3. the adaptative nature of economies – the fact that, for economies as for any other entity (cell, virus, person, institution), to differ is the only way to endure.

This way of conceptualizing economies runs against a long-standing tradition of understanding economic process in terms of different factors of production. This latter division assigns a combination of production factors (labour, capital, land) to economic forms – conceived almost exclusively as human endeavours. At the same time, Tarde adds a fourth factor (invention) to the traditional three. With the addition of this factor, Tarde reassesses the contribution of labour and capital to the economy as one of both repetition and adaptation. In this context, the most clearly articulated insights of Tarde for social scientists with an interest for economics and economies are to be found in the concluding chapters of Vol. 1 of *Psychologie Économique* on labour, monies and capital where he advances a critical analysis of capital theories along with a daring opposition between germ-capital and cotyledon-capital. According to Tarde, germ-capital, unlike cotyledon-capital, cannot be understood in terms of the notion of accumulation. The sheer accumulation of stock, to use Adam Smith's terms, does not account for the very specific nature of capital in economies. The new definition of capital proposed by Tarde opens the stage for a very different theory of labour than that articulated by most classical economists. Exit labour and its centrality in classical political economy, enter the germ as a model to understand the dynamics of economies. Tarde rids labour of all the virtues that classical political economy – in both its liberal and its Marxist versions – attached to this notion. Yet, as I argue, the definition of the germ is far from clear. Tarde sometimes equates it with human-capital, but he more often associates it with intellectual-capital. The most obvious tension in his definition revolves around the difference between germ-capital as potentiality of differentiation and germ-capital as operator of compatibility. He resorts to the metaphor of the living organism to flesh out the first version, and to products of human speculation taken tam quam cadavera to illustrate the second version.

In this article, I draw attention to the challenge that Tarde raises for economics: he sheds light on a moment of innovation, literally a moment of

vibration, and the root of innovative processes, but which can only be retained under a form that is deprived of its vibration. This germinal life of economies is the source of all changes, but when it is accumulated it loses its vibration and becomes dead capital.

I start by reviewing the criticism that Tarde raises against the accumulation of capital paradigm. It entails spelling out the Tardian theory of invention and the connection between the hybrid and the germ. I then provide a detailed account of Tarde's conception of the conditions of existence for the two forms of capital, cotyledon and germ. I describe the theory of labour that Tarde embraces alongside this new definition of capital. The last two parts of this paper address the question of what the germ stands for. I interrogate both the self-sustaining properties of the germ and the emphasis put on the question of hybridization, rather than preservation, and conclude with a tentative interpretation of what Tarde calls the 'resistance of capital'.

Capitalism against accumulation

Tarde reassesses the relative importance of capital and labour in *Psychologie Économique*. In that respect, as in many others, he stands in stark contrast with a Marxist approach to capital and labour. Unlike Marx, Tarde insists that capital formation is not unique to capitalism. Accumulation does not originate with Marxian capitalism: on the contrary, the difference between the two forms of capital (germ and cotyledon) is given by what Tarde argues are logical and universal set of conditions. If history has any role to play in the economy, Tarde suggests, it is only through the series of inventions that accumulate, thereby augmenting the pool of capital goods, and feeding the memory of engineers and inventors. Historical change is path dependent yet, for Tarde, the distinction between cotyledon-capital and germ-capital is a stable one.

In *Capital*, Marx[1] (1867) sought a foundation for the dynamic of social formation through a historico-genetic approach in which history is conceived of as a process without a subject. History itself is the subject, which means that the dynamics and sequence of changes affecting the economy has its own laws and its principles; it is not up to human discretion. Yet, although the relative agency and autonomy granted to capital and its deployment is a common feature of Marx and Tarde, the latter has a subject, and he does not recognize any historical laws in capital's unfolding. This subject is the germ. The germ is an intersection of a number of different and not necessarily related set of causes. As such it is a contingent event, opposed to the apparently rigid fate of Marxian capital. It is a locus of concretion, a site where the unexpected takes shape for, 'of the two fractions of capital, the most important and by far, is the tiniest, the subjective part' (ibid.: 338).

I want to take subjective seriously here. The germ takes shape in the mind of individual geniuses. Yet, one should not be mistaken and assume that Tarde is an individualist, as Durkheim and his school hammered home with such great

success. At the very least, he does not start and end, by default, with individuals as units of analysis. Tarde mentions geniuses[2] because they are observable sites of innovative encounters. In geniuses, ideas thus far unrelated are collected and they produce effects. The common individual, as such, is also one of these collections, a meeting point of flows of desires and ideas: he is never a unit to begin with, he becomes a unit of action (whether economic or not) or a body of passion when he manages to connect to these waves:

> If we let ourselves be guided by the analogy of the tendency toward geometric progression of the examples of each species with the corresponding sociological tendency to growing propagation of examples of each kind, we observe that this has in itself the effect of producing innumerable crossings, interferences of imitative rays in the associated brains and that it is really there, the indispensable condition of the hatching of new inventions, but that, in the end, the very operation from where these are born is hidden in the intimacy of the privileged brain that we name 'genius'. Would there not be at the end of each new species appeared – truth be told, the same at the end of each individual variation of a species – something comparable to a trait of genius or ingeniosity?
>
> (ibid.: 11)

> As disaggregated, as varied as discoveries and inventions can be, they all have this common trait of consisting in the end of a mental encounter of two ideas, which, regarded up until then as strange and useless to one another, come to show themselves intimately attached to each other in a well gifted and disposed mind by crossing, either by a link of consequential principle or by a link of means-to-and-end, or by cause and effect. This encounter, this fertile junction, is the most unperceived event at its origin, the event hidden in the depth of a brain, from which an industrial revolution, the economic transformation of the planet, depends.
>
> (ibid.: 167)

The mind of the genius entrepreneur or inventor[3] has thus little to do with the mind of the rational actor. First, it has no privilege because it is only one site of germination among many others. From cells to collective institutions, so many other entities in nature gain and lose agency, following the flows of associations. A germ is a mind and a mind is a germ. Second, it is driven by many motives that cannot be understood narrowly in terms of rational action. Instead, if one were to look for another description of entrepreneurs closer to Tarde's conception of economic man, it would be Schumpeter's in *Capitalism, Socialism and Democracy* (1942) or Keynes's in Chapters 12 and 17 of *The General Theory* (1936). These two economists[4] also cast light on the necessary passions driving entrepreneurs in their efforts to build economies. The genius of Henry Ford or Thomas Edison did not follow avenues of cold calculation. It did not abide by the rules of maximization but took the risks of imagining new terrains for industries that were only in their infancies.

The case of Edison might help us understand the brain of a genius as a site of encounters and interferences of imitative rays to use Tarde's terms. To convince the reader even more that the brain is one among many other sites of these encounters, it is useful to read the account that Hughes (1983) and Cooper (1996) give of Edison's discoveries and his subsequent success at creating a market. The brain as such is nothing but a connection of hundreds of streams of information meeting in the same point. Edison cannot be distinguished from Menlo Park, from the bulb and the long tinkering process that led to his discoveries and inventions. When Tarde points to the brain as the very site of invention, he cuts within a complex fabric, but he respects the point of highest intensity. Within the flow of thoughts crossing Edison's mind, the germ stands as a unique solution to the multiple constraints bearing upon the genius. That is why Tarde so often associates mind and germ: it is as much a redefinition of what a mind is (intersection and interference of series of inputs meeting unexpectedly) as a description of the germ. The mind of the inventor in action differs from what the sheer repetition of the series of already available ideas would produce. Similarly, the capital good offering a new process for an industry also differs from what is already out there in the market. Accumulation does not do full justice to what happens around the germ since accumulation mobilizes only a repetitive process. But capital cannot be reduced to accumulation as such. To be sure, it is a substrate that needs to exist for capital to exercise its action but an analysis of accumulation it does not provide any insights for an understanding of the dynamics of capital. Accumulation was, for Tarde, a misleading term. Commenting on Darwin's theory of evolution:

> His error, seems to me to have been to insist much more on vital competition, the biological form of opposition, than on crosses and hybrids, the biological forms of adaptation and harmony. A function so important as the production of a new species would not know how to be a continuous and daily function, while the simple production of a new individual, the generation, is an discontinuous function. An exceptional phenomenon, and not a regular phenomenon, must be the basis for this specific novelty. And [. . .] an exceptional fertile hybrid is much more likely than a hereditary accumulation of small advantageous variations, by competition and selection, to explain the formation of new vital types.
>
> (ibid.: 10)

Even if any labour is a series of small challenges to be tackled locally, in the middle of a mostly tedious process of repetition, there is a difference – a categorical difference – between invention and repetition. Accumulation is on the side of repetition. In itself it does not introduce change into the economy:

> When in the decisive moment, on a battlefield, the right glance by the general tilts an hesitant victory, it is owed to this sudden idea not to the accumulation of previous efforts. And when out of a thousand researchers, only one discovers

> through sudden intuition the solution of the puzzle questioned by all, it is not through others' long and sterile efforts, nor even to the length and intensity of one's own – often less than theirs – that the merit of the discovery should be attributed.
>
> (ibid.: 224)

The 'penetrating gaze of the General' cannot be related to the accumulation of preceding efforts. Of course these efforts were necessary for his brilliant solution to occur in the first place, but there is no continuity between what came before and what is invented on the field. In other words, it is not possible to infer the next move from the accumulation of work or from previous innovative moves for the germ can only be pinpointed retrospectively. It is what gives preexisting conditions their distinctive quality – as the non-germ. As such the notion of the germ is also misleading. It is not a given identity but a historiographic term. In effect, a germ only becomes a germ, an organizing principle, a disruption and a discontinuity, *a posteriori*.

The conditions of capital

Machine, memory and capital accumulation

Memory and capital entertain a special relation in *Psychologie Économique*. Put in its crudest form, germ-capital, the only necessary part of capitalist economies, is memory.

> This indispensable part (i.e. the part of former products which is absolutely necessary for the production of new ones) consists uniquely in the existence and knowledge of trade secrets, methods of culture, procedures used for the extraction of raw materials and for the manufacture of tools or machines that are unique to the production of the new products [...] to be rigorous, the only indispensable thing to the production of a new locomotive is the detailed knowledge of pieces of a locomotive, the manner in which they are made and to first extract the materials from which these are made. This bundle of ideas from which an invention, big or small, owing to an inventor either known or unknown, this bundle of inventions collected in a brain is the only portion of the old products – because it is indeed a mental product, the fruit of scholarly training – which is strictly required for the construction of a locomotive.
>
> (ibid.: 333–4)

Memory assumes a large variety of forms, ranging from recollections and acquired skills, to books and guidelines that are scattered across industry.

> A discovery or invention which advances science or the power of man, or both, is incarnated either inside us, in our nervous or musculatory memory, or in the form of a mental cliché or acquired habit, or a notion or a talent, or outside us in a book or machine. A book is only an extension or an appendix of our brain; a

> machine an additional member. We can indifferently say that a book is an exterior memory, and that a memory is an internal book, that a sort of invisible librarian hidden beneath ourselves, puts us under the eyes at the desired moment. Similarly a machine is an exterior talent and a talent is an internal machine [...] It is thus that the artisans' diverse and multiple skills, their long apprenticeships, their long storing of special habits have been made useless in large part by the manufacture of machines across time. These are simply the exterior projection as well as the oft prodigious amplification of these talents and organs by which these talents were exercised. And we can also say that if the destruction of these machines forced those talents to be reborn if, for example, the suppression of printing shops brought calligraphers and illuminator of manuscripts back to life, or the suppression of sewing machines the former spinners, the talents thus reborn would be the simplified reincorporation of the destroyed machines.
>
> (ibid.: 353–4)

From this definition, Tarde achieves a double reversal. Labour does not do more than obey the script of a book when it applies its energy to a machine. The script channels it and makes the past inscribed in it steer an otherwise bare force. But talent is more than this naked force: it is immediately the solution of a problem, the minor and often neglected feature of a genius. Once it has been given the form of a machine, it is taken over by the principles of the machine. What was once the vivid memory of the craftsman becomes a reified and external memory. Amplification[5] is the specific contribution of machines, but as such, they do not include more than what talents have poured into their scripts. Machines are not minds, just as bodies are not minds. In effect, embodied memories work as little machines so that nothing can be expected from their repetitive summoning. But the mind nonetheless figures in a machinic account of bodies and memories when different sets of memories mix and breed together. At this point, reached only by the Tardian genius, what used to be a repetitive movement is disrupted and memory is intensified. The machine is brought to a halt and individual frames of memory emerge clearly to the conscious mind. If capital were only directed by accumulation of the same, according to a repetitive formula, the past would never become self-conscious.

Capital can only rise, as a force driving capitalists, if it comes with both the memory of the ingenious attempts of the past and an awareness of the future. This past assumes many forms, from the layers of talents that have been laid into techniques and tools to the clear recognition of our debt to our predecessors. The former can easily remain unnoticed. We live surrounded by these echoes of the past but we often do not grasp them as such and neither do we make them part of our collective memory. The latter demands both conscious recollection and an awareness of the specific lines of development which connect the present to the past. Moreover, in order to recognize the importance of the past, it may be necessary that a certain level of repetition

structures the economy. Without the reappearance of the same, it is difficult to imagine that a sense of debt towards the past could possibly emerge. Germ-capital must tone down its relentless invention of new forms and leave cotyledon-capital to repeat itself across generations. The combination of existing lines does not sever the ties with the past in the brain of the genius who invents a new brand or a new production method. But it disrupts the genealogical line that attaches us to the past: an economy changing too fast[6] and going through too many aspects would cut these fragile ties, weakening our memory. A developed sense of the past does not so much strengthen accumulation, but preservation. Thus, another perspective must be adopted to move from sheer preservation to accumulation, especially when it entails destructive creation, to use Schumpeter's term. This different inclination calls for faith, belief, and trust rather than remembrance.

Accumulation's qualities: faith and heritage

Against the reduction of capital to either labour or, indeed, any other factor, Tarde opens up the motives behind the accumulation and germination of new capital ideas. The lure of capital *per se* that pervades Marx's writing is replaced by an investigation of what drives capitalists in their search for new enterprises.

> The illusion is to believe that our agricultural production, industrial or otherwise, that our richness or our power of any kind, is the exclusive fruit of our labour. Our labour has never been such but for a part, it has only been worth to the extent of the secular collaboration of all the ancestors of which we are heirs. Yet that alone does not suffice; for our labour to have a great and lasting effect, we must make our very posterity collaborate in this contemporary work, which occurs when it is preoccupied in virtue of religious ideas or domesticated feelings, its thought amasses in us the treasures of devotion and abnegation which double our strengths and the price of our efforts. We use our forebears, even without thinking of them, but we cannot use our children nor grand-children in this regard except on condition of having the thought of them present, to love them and to be convinced that they are our reason for being.
>
> (ibid.: 119)

What is interesting in this excerpt is the double symmetry that he points out. A first symmetry regards labour and all the other production factors. Labour never operates alone. We come back to it in the next section. The other symmetry locates present economic efforts in relation to both the past and the future. When Ricardian/Marxian economists primarily looked at the past and the 'secular collaboration' of workers' labour, Austrian tradition economists following Mises (1949) look at the future and the energy that could be saved then by sacrificing now one's own effort in return of greater returns later, they still both agree – although never explicitly – on the one metric that

economists have to look at. Accumulation is immediately coded in terms of an abstract magnitude: value. Marx often described capitalists as driven by this one abstract force that absorbs them and leads them to act. What lies behind this abstract capital is made irrelevant by the monetary form of capitalist societies' transactions. Tarde, on the contrary, excavates the motives behind the drive. 'Affects' and beliefs are not entirely reducible to the lure of gold. The process of abstraction that occupies much of Marx's interest for the becoming-capitalist of primitive economies is approached differently by Tarde. Instead of covering real economic relations with a veil of ignorance, Tarde analyses how monetary forms of capital enhance relations that preexist capitalism and still hold. Once again, the key word is not abstraction but amplification: capital does not detach the capitalist from the primitive ground of kin's care. Rather, it creates the possibility of an extended perception of kin.

Cotyledon and trust

One of the specificities of capital in Tarde's economy is the fact that it cannot be mapped exclusively onto its past. In the least economistic part of the final chapter of *Psychologie Économique* (Vol. 1) he summarizes the previous three chapters and their technical discussions with the three notions of heritage, faith, and trust.

> I could stop here but again I have to remark that with regards to capital (cotyledon-capital and not germ-capital to use our usual expression), its real source is an act of faith and trust, first embryo of credit, which is manifestly the soul of civilized societies' productive life since the earliest beginnings of economic evolution. One does not tell half the truth when one sees the initial and essential economic fact in the contract of trade. Trade really only favours and directly develops consumption. The direct agent of production is another contract, no less primal but fundamental, the loan contract. Through trade one does a favour for another, but in distrusting one another: a tooth for a tooth; through the loan, one trusts another.
>
> (ibid.: 375–6)

Unlike Marx's primitive capital accumulation theory (Marx 1867: ch. 26), which locates the origin of capitalism and the birth of salaried labour in the violent deprivation of labourers, Tarde locates in the association and the primordial economic figure of lending – as opposed to the exchange – the possibility of accumulation. This shift does not rule out the exercise of force and power in the early stages of economic development, rather it fleshes out what one should understand behind the motto of 'uneven and rough' beginnings. The feature of unevenness is central to accumulation: it is what paves the way for economic transformation. Yet, it is not to be read as a sheer deployment of strength. In itself, strength does not lead to accumulation. Pure strength needs a focus in order to be effective. It needs a systematic and

organizing drive to produce any kind of accumulation. The technology of this accumulation is of primary importance for Tarde, whereas it recedes to the taken-for-granted in Marx's accounts of the early phases of capitalism. For Tarde, the necessary seed for capitalism to take off is rather on the side of the association of isolated and dispersed forces that suddenly gather momentum when they discover their compatibility.

> It is not necessary to be capitalist in order to found an enterprise with chance of success in our era. Forming a partnership and borrowing capital of others suffices. Ten proletarians who get together find credit that not one alone would have found.
>
> (ibid.: 353)

The germ and leisure

If cotyledon-capital, faith and trust are necessary for the accumulation of cotyledon-capital, what then is needed for hybridization? The genius mind, Tarde repeats adamantly, must be allowed to wander and stray to come up with a disruptive idea. It needs to get off the tracks of one example, repeating itself ad eternam, to meet the challenge of another example, which will eventually turn out to be an element of a radically new wave of examples.

> It is not, truth be told, the slave's unpaid work nor the laborer's unpaid overtime which allows capital to be born and grow up; it is, once again, the leisure of the free man of Antiquity or the modern 'bourgeois', leisure, father of pleasure, which they have to discover and to invent, after the painful torment of searching, and for which they are sometimes paid, but never too much.
>
> (ibid.: 350)

The two sides of capital have two different modes of coming into existence. Cotyledon-capital assumes the form of accumulation, and it requires faith and focus. It takes a straightforward path on its way to growth. By contrast, germ-capital assumes the form of hybridity, but it requires hesitation and usually takes a winding path on its way to inventions or discoveries.

The different characters of labour in *Psychologie Économique*

Tarde's views on labour should be read in the context of the Simondon's better known approach to technical systems (Simondon 1958). These systems in general, and machines in particular, have mostly been appraised from the perspective of labour and workers. As such, they have been critiqued in terms of their distance from real labour and the alienation this entails. For Tarde, as for Simondon 50 years later, machines and their inner development and meaning still have to be understood outside the frame that classical culture granted them. Simondon's eloquent plea for a new technical culture which

would not oppose either literary culture or engineering culture aims at repositioning the machine at the centre of a new humanism. Tarde, Simondon, and more recently, the French philosopher Francois Dagognet (2000) operate along a similar line of argument that defines humanity at the crossroad of physiological systems and technical systems. As Simondon argues:

> The opposition drawn between culture and technique, between man and machine [...] hides behind an easy humanism a reality rich in human efforts ('efforts humains') and it natural forces, and which constitute the world of technical objects, mediators between nature and man.
>
> (Simondon 1958: 9)

'Efforts humains' in this last quote needs be understood as human endeavours, not as human labour. That is where this philosophical tradition casts labour – attached to an easy humanism – against the machine and the intuitions that gave birth to it. It must be made a place for the inventor of machines and technical systems, quite independently of the use that will be made of these.

Along with this reappraisal of machines (engineers and inventors) and labour (workers) in the cultural system comes a more fundamental challenge for labour. Tarde summarizes concisely the difference between capital and labour in terms of the difference between the model and the copy.

> [...] if he does not have tools, the field worker will make them with other simpler tools, or even with his fingers; if the painter has neither colours nor brushes, he too will make them, but on the one condition necessary that each will have already seen similar tools as a model, or will have seen them made, unless, having never seen them or seen them made, will invent them [...] The distinction between capital and work thus comes back in the end to that between model and copy.
>
> (ibid.: 82–3)

Having cast capital as the model born in an inventive mind and not as a copy of laborious activities, some serious consequences follow. For Tarde argues against any attempt to reduce the economy to a small list of factors, questioning the economists' focus on production factors. His opening up of the manufacture of the economy leads him first to consider the first candidate to a foundational pillar to the economy, labour.

Labour as reproduction and the worker as reproduced

Tarde narrows down labour to a purely reproductive activity.

> Labour is a continuous stream of imitation, a periodic series of acts tied together, each of which had to be taught by others' example and strengthened by one's own repetition, by habit.
>
> (ibid.: 168)

> To reproduce, not to produce, is in the end the effect of work [...] Everything is imitation and reproduction in economic work [...] Finality is essential to work. When repeating the same act, the worker operates it mechanically almost while sleeping, when he is no longer conscious of the goal, the mean, or the adaptation of the latter to the former, and that reproduction of acts becomes automatic, there is a vital function, a vital work, but there is no longer work in the psychological and social sense of the word. By contrast, when groping (for something), one very consciously pursues a goal without knowing by which means, there is not work either. Work is thus a form of intermediary activity between the routine and the automated and the invention of genius.
>
> (ibid.: 224–5)

Unlike most classical economists, Tarde reverses the order of importance attributed to production factors. If labour loses its importance within the economic process, it is not by a lack of consideration for the importance of human involvement in economic affair. Tarde repeats time and again his interest, and even his affection, for certain forms of labour: craftsmanship and agriculture are praised throughout *Psychologie Économique*. Both forms of activity entail solving a series of puzzles, and demand collaboration in order to bring an economic enterprise to fruition. Both forms of labour are not what he otherwise describes as a dumb exercise of repetition, most painfully embodied in the 'machinofacture' worker. Tarde is emphatic[7] on the rewards that different categories of labour should receive, and he insists on a rule that can be found under a different guise in most political economists of the nineteenth century: the greater the problem-solving part of an activity – as opposed to its routine and repetition exercise – the higher should be the monetary reward.

But by and large, labour in its specific form of repetitive activity driven by a clear finality is not worthy of much consideration in PE. Indeed, inspired by a growing trend in favour of leisure (Lafargue 1883; Williams 1982) in this laborious century, Tarde makes a tricky case[8] for a division of labour in society that will leave as much free time as possible considering the growing demand for goods and the necessary increase in the labour force to meet this demand. The aristocratic order provided one class with all the desirable leisure and with income not tied to labour. Uncomfortable with this solution to the social division of labour, Tarde immediately notes the flaws of a fully egalitarian division that would only give a little leisure to the masses. The ground for his rejection of the socialist solution is not only on the fairness – or lack thereof – of a society where everyone would be given the same amount of leisure. It is also, and primarily, on the efficiency of this solution. Holding true to the idea that the greatest innovation has come from men who enjoyed a lot of leisure, Tarde concludes that the greatest social good will come from the unleashing of these great minds. Invention, once proprietary, will become a public good and benefit the population as a whole, not only the small circle of a happy few.

Tarde's humanism is a subtle one that makes space for a fragile humanity, informed and shaped by its activities. Exchanging and adopting qualities with

its surroundings, workers develop skills and capabilities through their close contacts with capital, machine and nature.

> Agricultural work is so much an association with this strange and divine veiled person that one calls life, that the long established intimacy between it and the peasant has stamped on him a reflection of life itself. There is something of living nature's genius in the sly and tenacious ingeniosity of the peasant.
>
> (ibid.: 242)

Nature, by its unmatched genius, makes peasants smart. It activates them and produces something that was neither in nature, nor in the peasants themselves. The organic potentiality of nature needs to be channelled by the art of the peasants to produce its fruits. A smart worker – unlike a routinized worker – responds to challenges that are raised by that very substance on which he works. Once again, Tarde situates the individual at the intersection of waves of influences. If a worker is positioned in an environment that produces only a limited range of these waves his ability to differ will soon wither. But make him tackle the mysteries of nature, and he will take over some of its more subtle features.

Labour as collaboration

For Tarde, among the elements contributing to the continuous transformations of the economy, nature ranks high. In this respect, he owes an unacknowledged debt to the physiocrats' definition of wealth grounded into natural forces – particularly germination and its cycles. Yet, if Tarde embraces nature, it is not to reify it, but to locate in its very principles – taken as ultimate production factors by the physiocrats – a collaboration. The seed is a site of collaboration between nutrients (cotyledon and the necessary water) and, what Tarde could not name, its DNA structure. Labour can never be considered isolated.

> All labour is a collaboration with nature: from the agrarian or the shepherd who steers vegetable and animal forces to industrial man who sets into work the physical and chemical forces, there is not a worker who does not act in concert with some natural agent without which all personal energy spent would be lost. With other men: there is not a piece of accomplished work in a society, even by the most solitary of artisans, which is but a fragment of a whole, a stitch in a fabric, a partial job clinging to a general elaboration which conception dominates.
>
> (ibid.: 240)

How to assign value to labour, nature or, even worse, to the relentlessly changing genius of nature and inventors? One of the problems that Tarde raises regarding germ-capital derives from its apparent lack of any economic basis. It is problematic to attach values to germ-capital goods, because they are not only associated with accumulation, which could be measured, but also

interferences and disruption of already existing processes, which cannot be. Even the notion of a 'germ-capital good' is already problematic because the gist of the germ stems from its differing, not from its being stabilized under a formula. The good comes from the vibration, the continuous change of the germ. This vibration itself is difficult to measure and reward. In this context, the value comes from the process of relentless changes and reshuffling, rather than established principles. The lines themselves are not enough, and they can't account for the value that comes out of the vibration. They are part of the value, and the greater these lines crossing the mind of the genius, the more likely he will be to come up with a revolutionary idea, but it is not the lines, rather the multiplicity of the lines, that contributes. The economics of swarming and multiplicity runs against the clean and orderly division of production factors.

The germ, as an innovative but unstable encounter of unrelated waves of repetition, is a potential and it should not be equated to the uncertain,[9] still less to the probable. It goes deeper than not being able to assign probabilities to states of the world – the definition of an uncertain future – in as much as it questions the very notion of states of the world. The vibration of a germinal encounter can not be mapped on a preexisting space – for example, the space defined by the lines of interference from which it originates – because the outcome of its movement is what becomes its space. *A posteriori*, it is always possible to trace back the lines of influence, but then the germ is only seized after it has lost its revolutionary vibration.

Economies between accumulation, destruction and preservation

For Tarde, as for Schumpeter, the challenge for capitalism is primarily to innovate through creative destruction (Schumpeter 1975 [1942]).[10] Hybrids are the solution to obsolescent goods and technologies and to the changing tastes of consumers. This dynamic of capitalism has long been shown not just to be creative but to create waste: destructive creation as much as creative destruction. Yet, if these paradoxes need to be observed, they may tend to lead astray and mislead the observers of capitalism. Preservation and conservation can claim as much credit as building blocks of capitalism as the more unexpected destruction that result from it. Tarde refers to conservation only once but it deserves quotation as it directs the attention towards an entirely different narrative of the origin of capitalism – one that stresses the care that people start feeling for goods instead of the violence of alienation. In the course of discussing the likely prehistory of accumulation, he mentions the historical phase during which goods do not persevere on their own and inventions need to be safeguarded. This stage he mentions as the 'cautious conservation of the plants or animal captured' (ibid.: 347).

Accumulation and conservation are different ways of relating to economic goods and should not be conflated. Doing so would run the risk of confusing

Marx and Tarde on this subject: it would mask the motives behind the rush for goods just as Marx claims to uproot capitalists' drive in the relentless quest for profit. If preservation is prominent in the rise of capital, it is through an extension and slowing down of time and uncertainty, rather than through its acceleration.

> This certainty of reproduction, only capital gives it, and all that gives it is capital.
>
> (ibid.: 347)

Yet, the passing of time does not affect the two sides of capital in the same way. The initial caring for plants and animals seems to leave the stage for a radically different perspective on conservation, whereby the germ sustains itself through time. In a couple of pages of discussion around the difference between germ and cotyledon-capital, Tarde makes a strong assumption that he never explicitly discusses or submits to critical inquiry. This assumption is all the more troubling in a discussion focused on capital and on the resistance and time span of economic arrangements. This assumption assumes the following form:

> Of course, the individual who, reduced to this intellectual legacy of the past, would have no seeds, provisions nor tools, would be in deplorable conditions to produce an agriculture or industrial good. But it would not be impossible for him to produce sooner or later. While, if provided with the most abundant seeds or materials, amassed and accumulated by saving, and the most perfected tool, he is also ignorant of industry secrets that he claims to run, or the methods of culture that he devotes himself to, he will be struck by productive impotence despite all of his supposed capital.
>
> (ibid.: 334)

Why is the leeway offered to those individuals who are rich in know-how and techniques not granted to cotyledon-capital? Why is it assumed that knowledge endures more and more easily than material capital? Why is it assumed that geniuses or gifted entrepreneurs can wait and, hence experience and enjoy a much looser time constraint than material capital? The economy is sometimes described as a game in which moves can be withheld as a player awaits for the arrival of better conditions. At least, players are endowed with capacities whose endurance and survival are not questioned. It all depends on this provision, alluded to by Tarde when he discusses the damages of the Civil War on America's prosperity

> But the ravages of a war [. . .] would not stop America, if it stayed enlightened and with instruction, from re-conquering its prosperity in a few years.
>
> (ibid.: 335)

Education and culture are what guarantees the survival capacity of germ-capital as opposed to the material preservation of cotyledon-capital. Yet, another element enters the conditions of germ-capital: endurance. Germs

circulate easily because, as parasites, they hop onto humans and activate the law of examples. This mode of diffusion for germ-capital is what protects it from the threats specific to cotyledon-capital; it is also what threatens them from other forms of germ-capital picking up and slowly taking over. Germ-capital is threatened by upcoming innovations and the changing tastes of consumers, whereas cotyledon-capital is threatened by natural disasters. But, on this critical assumption that makes germ-capital and cotyledon-capital differ in terms of mode of conservation, Tarde never theorizes the existence of a sphere of preservation for inventions. He states it explicitly:

> Thus, for invention-capital, individual property is a cause for growth, collective property is one for conservation.
>
> (ibid.: 351–2)

The existence of a collective locus for the preservation of innovation is taken for granted, although it is itself a form of capital that arises under very stringent conditions. If education is one condition for the emergence of inventions, it is not the only one as the leisure of the prosperous class accounts for a great deal of their most decisive ideas. Moreover, education will not work for the preservation of already existing inventions.

If capital is, as Tarde concisely puts it, 'the certainty of reproduction' (ibid.: 347), then a public space that operates as a medium for the circulation of ideas, once they have left the private domain of personal exploitation, is a necessary resource. Indeed, it may be the case that this very specific form of capital – providing security and certainty – never goes through the first stage of private or exclusive idea. Conservation[11] may require a very different set of expectations and conditions than accumulation or invention.

The resistance of capital: vibration and materiality of the germ

Tarde not only equates capital and certainty, he also sketches a theory of capital goods as *resistant*. Drawing on living organisms and technologies, he attempts to theorize rather broadly the link between resistance and solidity on the one hand, and capital on the other.

> All tools, it needs to be noted, for either manual or intellectual work are substances in solid state themselves and not liquid or gas. Why is it so? Because one leans against only that which resists. Solidity, it is resistance and support as well. Equipment and solidness are two ideas that are so intimately united that even in the work of the animal or vegetable life, from one end of the zoological scale to the other, we observe this strong composition. The tools of the living being are, for each cell, its appendices and its more or less mobile expansions, and for the entire organism, its limbs, always of a certain relative hardness compared to the rest of the body.
>
> (ibid.: 258–9)

If Tarde equates capital goods (tools for intellectual or manual exercises) and resistance, it is not clear whether he imagines this trend, from mutability and softness to solidity and hardness, to be a general rule of capital.

Resistance

A first reading of his account of differential in solidity is to assume that germ–capital embodies its insights in the form of hard cotyledon-capital. Each germ progressively becomes stabilized and assumes the form of a more or less resistant composition. It can be in the form of a book that expresses a composer's ideas, or in the form of a machine that expresses the creative labour of the engineer. As germs harden into machines, they also lose their versatility. The germ is dead as a process and only exists *tan quam cadavera*.

However, a second reading of the hard–soft distinction does not assign a particular state (soft–hard) to one of the two capital kinds singled out by Tarde. If neither cotyledon is equated with hard and stabilized, nor germ with soft and versatile, then things become more challenging. Could it be that cotyledon-capital is not necessarily on hard? What would a fluid and versatile cotyledon be? And what is the resistance specific to germ-capital?

Tarde germ's theory constantly oscillates between two possibilities: on the one hand, the germ as the still tentative and oscillating outcome of a process of combination that may end up into a new idea for the genius; on the other hand, a new organization in the organism or the system that has been reified into a process, either industrial or mental. Whereas it was once a dazzling revelation, aggregating waves of examples into an unprecedented new species, it has now become routinized. From this perspective, industries are nothing but the aftermath of particular bursts of genius, but unlike the bursts themselves, they do not strike us as remarkable anymore. They just repeat the same formula again and again. The difference between the organic (germ) and the non-organic (cotyledon) stems from the ability of the former to differ continuously. For industrial capital, the problem is to make an alliance of resistance and mutability. Liquid or gas would be good metaphors of the ultimate germ, which can morph depending upon the context, but such a germ would have difficulties in acquiring sufficient inertia to resist further change. On the other hand, a very solid tool may well have no ability to oscillate: it is trapped into its own form. This hesitation of Tarde around germ-capital's definition is problematic as it directs towards two different path of economies' resistance and two different theories of capital: capital as formal apparatus and capital as potential. One can easily be transmitted, transported and taught,[12] the other one easily transmits, morphes and mutates. One can easily be associated, the other one can easily associate with.

There are at least two strategies of resistance. One borrows solidity, identity and immobility. The Archimedean lever and its fixed point epitomize it. The

other one adopts the path of mutation and differentiation. The bacteria and its relentless adaptation to organisms it feeds on describes it best. Each strategy jeopardizes the other one. Stability endangers the bacterial mode of adaptation and mutation misses the point of the Archimedean lever, patiently built. For Tarde, intellectual-capital or human-capital are virtual until they slow down and assume a stable form, at which point they lose their important characteristics of being either waiting to be activated, or remaining silent. This is the point of transformation of a germ into a cotyledon. Yet, is it the fall into materiality of a spiritual germ and if so what meaning should one attach to the notion of the cotyledon?

Within this category, Tarde draws differences. There are several qualities of cotyledon, and not all are treated in one and the same way. The book economy example at the end of the introduction of *Psychologie Économique* draws our attention to one of these problematic material capital goods that seems to have not entirely severed its ties with their primordial germs.

> [...] considered either as a product or as instruction, a book is susceptible to partnering with other books or to fighting them. There is no book, considered as instructional, which is not made with other books from which it often gives the bibliography, and amongst which one can say that it is made for them, because it confirms and completes them. [...] If we were to look for the general conditions of book production, like economists have looked for that of merchandise production, we would see that the famous distinction of the three factors, Earth, Capital, and Labor, can apply here but with great and instructive transformations, notably regarding capital which ought to be conceived as legacy, relentlessly grown, of good ideas of the past, of discoveries and successive inventions.
>
> (ibid.: 258–9)

Consider another capital good, one that economists would categorize with circulating capital goods: water. Both are material goods but one seems to be much closer to a germ than the other one. The book contains its own script; it forces the reader to approach it in a more or less limited way. Think of a recipe book or an industrial blueprint: they come with rules for future use, and they foreclose the range of possible interpretations that readers can attach to them. On the other end, pure water does not provide the rules of its use. So many ways to make use of a pint of water, the germ seems far from the materiality of water. If the instant preceding the stabilization of the germ is one of indeterminacy and hesitation, it is striking that this is also the status of a pure cotyledon. In between these two states, the germinal-cotyledon – the book – displays a precise script.

Here, one question needs to be raised in connection with the materiality of cotyledons and the spirituality of germs. Rather than this opposition, is not what is at stake the openness of the cotyledon script? Through its ability and hesitation to graft onto many different enterprises, water has something of a genius, connecting unrelated lines of thoughts into a new idea.

Compatibility vs potentiality

One reading of Tarde's germ theory draws him towards a flattening of the purported intensity logged in it. It is the actor network theory understanding of economies and it borrows such concepts as compatibility and normalization, convergence and alignment (Law and Hassard 1999). If one follows this interpretation of Tarde, it dilutes the germ into a network of alliances and compatibilities. A germ would possess this unique ability to survive, because it is attached to many networks and not just one. Hence the paradox of water that soothes families' thirst, cools down electric power plants, and enters into all living organisms. The greater the number of networks that draw upon the properties of a germ, the less dependent it is on the existence of one network. The illusion of autonomy derives from the multiplicity of ties. Only the location of the germ – as a node in between several lines of interlinking entities – would make it what it is. Its endurance would only come from its borrowing the impulse of these other entities and only the pattern of the network would hold the secret of its otherwise delusive power. If one grants enough attention to Tarde's examples of germs, it is easy to accept the network interpretation and to stress the work of compatibility that is necessary to turn an entity into a germ. Vibration would thus be nothing but a context characteristic, or more exactly a quality of the germ fitting contexts.

The problem with the compatibility reduction of the germ is that it offers a very poor version of the strategy of difference. Describing this strategy in terms of its outcomes – the making of alliances and connections – does not exhaust the mechanism of a germ that can actually not only put together so far unrelated contexts, but also transform its own ability to achieve connections. It is the difference between a bacteria and water. The former not only tries and errs when surrounded with a new environment; it adapts its architecture to use this environment. Through this difference, Tarde attempts not to flatten out the economy. Some components (the germs) of this economy stand more prominently than others. They are richer in energy and potential than others and can survive thanks to their inherent glowing even though they are disconnected from the rest of the economic fabric. The intensity of a vibration can always be reduced to the extensions of its expressions, once they are accomplished. Yet, the accomplishment itself – the strength of the germ and its ability to change the path of capitalism – changes the resources themselves.

When germ is understood as intensities and potentialities, rather than as operator of compatibility, it adds a third kind of resistance to the first two reviewed above. A germ can be promising.[13] It is surprising that Tarde, who has earlier in the book some very illuminating comments on beliefs, does not spell out more explicitly this form of resistance of the germ. Its compatibilities are not yet clear. No one knows at the very early stage of a business intuition

whether it will turn out to be a success or another casualty feeding the pool of not-so-good-projects. Its ability to mutate quickly may not be great but, still, it is radiant enough to convince people to buy into it. The promise comes from the investigation of the germ properties: open and uncertain, the investigation raises as many promises as it is broad and multidimensional.

Conclusion

In 1902, Gabriel Tarde offered social scientists a radically different path to follow: instead of foregrounding labour, capital or land in the study of the economies, he sought to locate an elusive site of change, the germ. The difficulty raised by the Tardian theory of economic germination stems from the unstable existence of what it purports to make the central actor of change. The germ is a very thin line bordered by chaos and repetition. As far as repetition is concerned, Tarde speaks to Marx by downplaying the role of labour and its mostly repetitive nature. All that is not repetitive in labour points to a germinal activity that is foreign to the Marxian framework. Concerning chaos and the possibility of ever changing economies, lacking a repetitive momentum, Tarde adds to the Schumpeterian metaphor of destructive creation another metaphor drawn from the book economy in which associations and compatibilities play as much as a role in the dynamic of change as Darwinian metaphors of struggle. Yet, Tarde points to something original with the germ and I tried to show how a close look at its vibrating potentiality goes beyond the ANT reading it could suggest. It does not only come from prior associations of unrelated flows, it also makes associations possible and it points towards its future context.

In many ways, Tarde leaves the solid but unfruitful grounds of classical economy production factors only to elaborate another theory of production, as hierarchical and asymmetrical as the former. If labour is abandoned as the production factor *primus inter pares*, it is only to rebuild another difference between the necessary and the contingent, under the metaphor of the cotyledon and the germ.

As every economist who tried to tackle the tricky question of the distribution of profit, Tarde finds no continuity between repetitive labour and economic change. One is always the same, the other is always different. Obviously labour alone cannot account for what is observed as a continuously morphing series of activities, involving people, technologies and nature. But these changes are not pure Brownian motion. They have cycles, they last sometimes generations. The germ as an analytical resource is trapped between pure repetition, endurance and continuity on the one hand, and on the other, pure vibration, pure potential. The challenge for economists stands precisely at this crossroad. The continuity and repetition of the cotyledon is measurable, but it is not a good candidate to account for economies' relentless changes.

Vibrations are the origin of the economy, but they escape measurement when they are observed in their purest form of a potential. Only when it materializes does it become an object for economists' toolbox. Prior to this slowing down of the germ into a book or a method, its relentless vibration is bound to fail as much as to succeed, but it is too indecisive to be seized with enough certainty.[14]

Notes

1 I am only dealing with *Capital* here, even if too briefly. Earlier work – most notably *The Eighteenth Brumaire of Louis Napoleon Bonaparte* – deploys a slightly different version of Marx's take on individuality. Scholars who have tried to reconcile Marx and the subjective or individualist methodology (Elster, 1985) mostly grasp it when he is already a rational actor, not an apprentice genius unsuccessfully testing ideas.

2 On invention and geniuses, Helene Miallet (1999, forthcoming) has very fine grain descriptions of the conditions needed to make the brain work. Her current research on Hawkins shows clearly what a bodyless mathematician needs to gather to make mind grasp the abstract world of mathematics.

3 Inventors and entrepreneurs are rarely one and the same person, and they are rarely one single person either, but for Tarde they share the ability to locate themselves at fruitful intersections of existing flows and interfere with them. One needs to remember that a cell is already a society: the inventor and entrepreneur is a simplification of the societies of cells collaborating and conflicting within. More modern R&D teams populating large corporations are equally societies where simplification is only slower to come about.

4 Keynes and Schumpeter are primarily interested in economic agents and their departure from standard rationality. Tarde does not confine himself to the human world of economies, as his analysis of the 'book economy' bears evidence. Even Schumpeter's interest for different ways of innovation, by products, processes or organization tends to backstage the role of product compatibility and affinity. Schumpeter insists that the entrepreneur stands in opposition to his external world: only he can add to existing economic rhythms and forces and act upon them in a way that is transformative. For Tarde this transformation operates at many different scales, and not only nor exclusively through the entrepreneur. In this respect, Schumpeter and Keynes are special cases of Tarde. They may actually not have bought his grand metaphysics. In his study of Tarde's economics, Maurizzio Lazzarato (2002) points to another difference between Tarde and Schumpeter. The dynamics of change and innovation in economies would not be affected by the larger social disruptions (see the long discussion of crisis in Tarde) according to Schumpeter, whereas they would be part of the same phenomena in Tarde. This is part of the larger difference mentioned above in which the economic sphere is of no specific fabric in Tarde, whereas it is for Schumpeter.

5 One would also be tempted to add simplification to the machines' contribution to memory, even though Tarde surprisingly imagines that machines' destruction and talents' re-embodiment would not only belittle but also simplify.

6 On this complex question of changes, real and apparent, the sheer speed of change does not exhaust the issue. Fast changing economies can refer to the nature of goods, tastes or production techniques, to mention only a few, and the disruption is not the

same in each case. On this aspect of invention, see the discussion of anti-invention in Barry (2001).

7 This is why workforce always deserves to be paid more than mechanized production (ibid.: 226).

8 As for grand and capital ideas, of the ones that can be said to be really innovating, they were born out of leisure and of the freedom of mind, not of labour and constraint of a mind subject to one and a unique activity (ibid.: 228).

9 Uncertainty as opposed to risk has a long tradition of scholarship in economics, starting in the 1930s with Franck Knight and John Mayard Keynes and continuing with Shackle (1953) who later connects these questions with Austrian economics' interest in the nature of time in economies.

10 The opening up of new markets, foreign or domestic, and the organizational development from the craft shop and factory to such concerns as US Steel illustrate the same process of industrial mutation – if I may use that biological term – that incessantly revolutionizes the economic structure *from within*, incessantly destroying the old one, incessantly creating a new one. This process of creative destruction is the essential fact about capitalism (Schumpeter 1975 [1942]: 83).

11 On conservation, see the puzzles of financial species maintenance in an investment bank decidedly playing the capitalist game (Lepinay 2007).

12 David Kaiser offers a compelling account of these two strategies when he describes the dispersion of Feynman diagrams in the post World War II physics communities (see Kaiser 2005).

13 Charris Thompson (2005) uses the notion promissory capital to describe what goes on with families expectation over biological material held as assets. The quality of her work owes precisely much to a non-critical approach of these expectations and to a fine description of these new forms of capital.

14 The author wishes to thank the participants of the December 2005 Tarde workshop at the University of London. Andrew Barry has been very kind to read drafts of this paper and to comment on them. Two anonymous reviewers have also helped clarify the argument.

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