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# Disobedient Things: The Deepwater Horizon Oil Spill and Accounting for Disaster

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**Abstract**
Analysis of the Deepwater Horizon disaster and the accumulative decline of BP demonstrate both the analytical efficacy of the capital-as-power approach to value theory, and the irreducible role of objects in the process of accumulation. Rather than productivity per se, accumulation depends on (1) control of productivity, and (2) the evaluation of control. Capital-as-power focuses on capitalization as an expression of the evaluation by owners of their own power. In this article, I argue that the power of owners translated into capital values is power over both the human and non-human components of systems of production. Power is actualized through entities defined as cultural and political, as well as economic. Capitalization translates into the commensurable financial units of capital the irreducible social order—including objects—that bears on accumulation. The decline of BP's capital valuation in the wake of the disaster expressed the market's falling confidence in the expertise, experience and equipment that comprised the company's productive capacity.

Keywords: capital; value; accumulation; disaster; crisis; things

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## Introduction

The Macondo well was difficult, but not exceptional. Equipment aboard the drilling vessel was misbehaving, but that was not, in and of itself, unusual. Drilling a deep-water well is a complicated undertaking, involving hundreds of workers and hundreds of millions of dollars of equipment, billions if you include the satellites required to maintain the rig's stationary position above the well. The workers are highly trained, highly skilled and well paid. Things can go wrong in an instance, but the workers know how to ensure the oil formation, the bedrock, the borehole, the drilling equipment and the vessel get along. Disobedience is expected, but when it occurs, it is swiftly contained thanks to an assemblage of documents, drills and devices (Law 1986). Unfortunately, the defiance of the Macondo well would exceed the expertise, experience and equipment of the drilling crew.

The name of the well—Macondo—came from the ill-fated town of Gabriel Garcia Marquez's *One Hundred Years of Solitude*. It now seems prescient because of what happened at 21.45 on April 20, 2010. Opening up the Macondo well was the Deepwater Horizon. The name of the vessel is now ubiquitous, invoking the deaths of 11 men, massive environmental degradation in the Gulf of Mexico and the near demise of BP, one of a handful of giant oil corporations.

Among the outcomes of the Deepwater Horizon disaster was a massive decline in the market capitalization of BP, the majority owner of the Macondo well (Figure 1). This decline emerged from calculative translations by market participants. Buyers and sellers of BP's shares observed and evaluated the qualitative events surrounding the disaster. That evaluation translated them into the quantities of finance. According to the capital-as-power theory of value (CasP), the decline of BP—assessed relative to the broader universe of corporations—constitutes an evaluation of a loss of power by the company. The originators of CasP, Jonathan Nitzan and Shimshon Bichler (2009), have defined power as "confidence in obedience" (17). That means a loss of power occurs with a reduction in confidence or an increase of disobedience. Evaluations get translated into the commensurable values of finance through capitalization, which is the defining "inscription device" (Latour 1987) of capitalism. Within the CasP framework, because those values are meaningful relative to other values, capitalists pursue *differential accumulation*. The concept will be described more fully below. However, for now it suffices to note that what capitalists seek is not simply a return on investment but a return on investment that outperforms the returns of the broad market.

In this article, I argue that things have to be included in our understanding of obedience and, in the case of the Deepwater Horizon disaster and the changing evaluation of BP by market participants, things were among the disobedient entities. This analysis offers an

affirmative response to Marion Fourcade's (2011) call for a "full-blown sociology of economic valuation," contingent on a broad, transdisciplinary understanding of sociology. It seeks to bring together insights from capital-as-power about the meaning of the financial practices that comprise capital accumulation with insights from actor–network theory (ANT) about the emergent qualities of human-thing assemblages. What is the relationship between the quantities and qualities of accumulation? In other words, *what is the relationship between values and that which is evaluated*?

Things enlisted in the drilling of the Macondo well operated outside their expected behavior, both individually and collectively. This transgression triggered a cascade of emergent responses with a plethora of qualitative impacts, including the deaths of 11 men, the worst marine oil spill in history, widespread public outrage, numerous lawsuits and regulatory changes. These complex, irreducible events were evaluated by market participants giving them quantitative sense.

As long as political economy defines value in terms of human labor or human desire it accedes to the bifurcation of humans and things that many sociologists, particularly in science and technology studies (STS), have argued against (Miller 1997; Latour 2005; Slater and Barry 2005; Pinch 2008; Swedberg and Pinch 2008). Conversely, Nitzan and Bichler's analytical method transcends the bifurcation as it assumes ongoing evaluation of human-thing assemblages that bear on the fortunes of capitalized entities. The practices of price construction attempt to account for anything that might affect expected earnings with no differentiation between "social" or "natural" causes.

The role of things in the formation and functioning of society was a motivating concern of STS (Callon and Latour 1981; Knorr-Cetina 1981; Latour and Woolgar 1985; Woolgar 1985; Callon 1986; Law 1986; Latour 1987). This has influenced a line of research examining how things shape finance (Knorr-Cetina and Bruegger 2000, 2002; MacKenzie 2006, 2008; Muniesa 2008; Preda 2008). Description and analysis of valuation processes has been one tangent of that research (Fourcade 2011; Muniesa 2011; Muniesa et al. 2017). With my analysis of the Deepwater Horizon disaster and the accumulatory decline of BP, I intend to demonstrate both the analytical efficacy of the CasP approach to value theory, as well as the irreducible role of things in the process of accumulation.

In the founding editorial of *Valuation Studies*, Claes-Fredrik Helgesson and Fabian Muniesa (2013) confront the question of objectivity. Sociologists have almost universally—and rightly—rejected the objectivity of capital values, in the sense that these values do not express some underlying reality. However, Helgesson and Muniesa, following Lorraine Daston and Peter Galison (2010), note that what matters is the process of objectification, which "makes valuation solid

or weak, meaningful or flawed, useful or useless in particular situations" (7). Capitalization is the defining valuation process of capitalism. The values it produces are obsessively monitored by market participants, who judge the specific values produced as "solid or weak, meaningful or flawed, useful or useless" through subsequent buying and selling that produces a new set of capital values. CasP theorizes these values to be to an objectified expression of the relative power of capitalists, as evaluated by capitalists. I am applying this insight to create a map of power redistribution. The map does not explain that power. Instead, it shows power shifts to then be explained. To my knowledge, this is a unique conjunction and application of CasP, ANT and the work found within *Valuation Studies*.

## What Do Capital Values Mean?

Capitalization is ostensibly a straightforward calculation that discounts expected future returns to establish the present value of an asset. However, as Muniesa et al. note, "capitalization has certainly to do with finance proper, but it is also *more* than that" (2017: 11, emphasis in original).

Muniesa et al. examine the ways that capitalization operates across and beyond the domain of finance. This needs to be situated in relation to capitalization as a process of finance proper, where it is also more than its ostensible operation. In particular, consideration should be given to the ways that capital values are subsequently evaluated as part of the ongoing process of price formation. There will be various timelines for the use of capital values in subsequent calculations. High-frequency algorithmic trading will immediately translate changing values into trading decisions. Conversely, market participants in the Warren Buffet mode of "value investing" will try to assess whether stocks are undervalued relative to their "fundamentals." None of this processing occurs purely in the minds of capitalists. Rather, financial values are both input and output of the distributed cognition of capital markets. Study that engages with the values created and the processes of creation can help us understand better the meaning of capital values to capitalists.

### *Capitalization*

Nitzan and Bichler (2009) theorize that capitalization folds the diverse institutions and processes that bear on earnings and volatility into capital. Capitalization is an obligatory passage point for capitalist metrology. Its meaning and practices get carried outside finance (Muniesa et al. 2017). These extra-financial operations subsequently inform measurements folded back into capital values via the calculative practices within finance.

Fabian Muniesa (2011) writes, "Valuation is about considering a reality while provoking it" (32). In the case of capitalization, the purpose of provocation is accumulation. Provocation is always an indeterminate process because (a) different accumulatory undertakings will seek different social transformation; and (b) the objects of intervention do not behave deterministically. Nitzan and Bichler (2009), drawing on Cornelius Castoriadis, have emphasized the potential disobedience of the populations subject to capitalist *creordering*—the creation of order. I argue, drawing on ANT, that things must also be considered potential sites of unruly behavior that defy intervention and, therefore, calculation. Conjoining the language of ANT with CasP confirms: the disobedience of things announces their status as *mediators*. Capitalization treats obedient things as intermediaries. For example, the capitalization of BP would consider, among much else, the productivity of the company's drilling operations, of which blowout preventers (BoPs) are a vital part. The Deepwater Horizon's BoP did not perform according to the expectations of either the operators of the drilling rig or the capitalists invested in BP. Blowout preventers are actants with an affective role in the extraction of oil, and therefore, the profitability of oil companies.

The drastic decline in the capital values of BP—and other firms—as the disaster unfolded is perhaps unsurprising. There was little doubt that BP's future included fines and lawsuits. As the disaster grew from an explosion on a drilling rig to an undersea oil leak of unprecedented proportions, the company's very existence was called into question. In that context, it is obvious that shareholders would seek to unload the company's shares. To do so, the shares had to be offered at ever lower prices to attract buyers. In the course of making these trades, market participants constructed a price. In assigning meaning to these prices both mainstream and critical political economy excluded the construction process. The meaning of these prices is narrowly conceived in terms of productivity. Yet, only a small portion of the decline in BP's valuations could be assigned to the disaster's effects on either company's productive capacity or output. According to the most widely used theories of economic value, the rest of the decline must be deemed "non-economic."

*Irreduction*

CasP makes the price-constructing process central to the meaning of capital values. Rather than a representation of underlying productive capacity, capital values express an evaluation by market participants of a capitalized entity's social power, of which productive entities are only a part. Government policies, consumer trends, technological changes and big weather events, among many other agents, can all be assessed and translated into the prices of capital. As such, there is no

"economic" and "non-economic" distinction to be made. Adopting Bruno Latour's conception of irreduction (Latour 1993a), I argue that financial values become the measure of the irreducible entities that comprise owners' matters of concern.

Latour introduces his conception of irreduction in a small work of aphorisms, published in English as the second half of *The Pasteurization of France* (1993b). The very first aphorism (1.1.1) reads, "Nothing is, by itself, either reducible or irreducible to anything else" (158). Aphorism 1.2.2 adds that "nothing is, in and of itself, either commensurable or incommensurable" (163). Applied to value theory, this means that the value of an asset cannot be ontologically reduced to production, productivity or anything else. Rather, "[w]hat is neither reducible nor irreducible [commensurable nor incommensurable] has to be tested, counted, and measured. There is no other way" (158). Measures perform an epistemological reduction and commensuration that is added to the world. Capital is the universalizing mechanism that allows owners to commensurate their control over the broad social order.

*Productivity*

The removal of productivity from the core of capital valuation is not a removal of productive entities from our understanding of value. However, their role in valuation needs to be reconceptualized and resituated. Things exude "unintended consequences" and necessarily exceed "dead labour" or marginal productivity. The construction of capital values is a translation of information about the complex, enfolded social order. That translation takes place along myriad intersecting metrological chains (Latour and Lepinay 2010). Systems of production, such as oil rigs, exist within "resource environments" that comprise "the complex arrangements of physical stuff, extractive infrastructures, calculative devices, discourses of the market and development, the nation and the corporation, everyday practices, and so on" (Richardson and Weszkalnys 2014: 7) that allow for production itself. The processes of financial valuation are entangled within these complex arrangements. But those valuation processes *add a reduction* into the complex arrangements in the form of financial values. Valuation takes into account much more than productivity, not least because productivity is not independent of the prices that emerge from financial valuations.

According to productivist value theory, increased oil rig efficiency—improving their potential output per unit of input—ought to increase their value. However, increasing the output of oil can reduce its price, lowering the value of the increasingly productive oil rigs. Therefore, oil output needs to be carefully controlled to bolster profitability (Nitzan and Bichler 1995, 2002; Mitchell 2011).

It is control of productivity, termed "sabotage" by early twentieth-century political economist Thorstein Veblen (1921), rather than productivity per se, that is the mechanism of accumulation. Hence, Nitzan and Bichler's claim that *capital is power*. My argument is that capitalist control is contingent not only on the human components of productive entities but also on the things involved in the process of production. Things are part of the domain of evaluation and their "obedience" is quantified into financial values. Productivity is an emergent quality of the worker–object assemblages that comprise productive entities. It cannot be ontologically reduced to human and non-human component parts. In other words, it is irreducible. When the valuation process constructs a price for an assemblage of production it does so on the basis of an assemblage's overall productivity, putting most of the worker-objects involved into a "black box" (Latour 1987). However, when a crisis emerges, as in the case of the Deepwater Horizon disaster, the black boxes will be opened, and market participants will peer inside to evaluate particular impacts on expected profits and perceived risks. Both humans and non-humans will be subject to this evaluation.

*Evaluation*

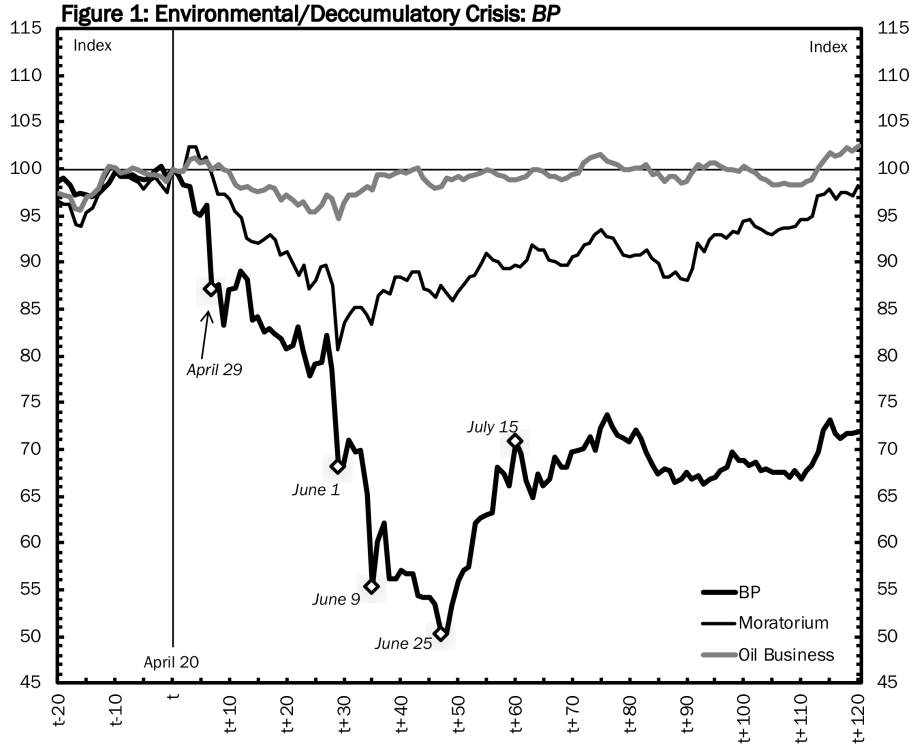
Importantly, the evaluations performed do not necessarily agree. Indeed, they are guaranteed not to. As will be seen below, although the capitalization of BP declined precipitously, the process was a fitful one, as sellers of shares were finding buyers. Both buyers and sellers are heavily equipped with economic technologies in the form of computing power, databases, algorithms, calculative techniques and much more (MacKenzie 2008). Among the buyers and sellers there are both widely shared and highly guarded technologies as they seek evaluative advantages that will translate into differential gain.

Fourcade (2011) notes that "the mere availability of certain economic technologies does not guarantee their performative effect" (1724). She said that these objects may lack institutional, political or cultural resonance. However, there is another factor in the murky performance of economic models within the calculative practices of capitalization. These technologies must be implemented by market participants pursuing a differential advantage. They will deploy myriad other techniques, often deemed intuition or genius. These differentiating practices are slavishly analyzed after the fact by the business press both when financial figures experience extended periods of beating the market, but also when those figures appear to lose their godlike market-beating ability.

*Power*

Power, as deployed in the CasP approach, does not explain constructed prices. Rather, conceiving of capital values as the market's evaluation of capitalists' power enables analytical insights in need of explanation. As such, CasP should be considered an analytical method rather than an explanatory framework. It highlights that which needs to be explained. So conceived, we bring into the analysis of business activities Foucault's insistence that the "mechanics of power" should be analyzed in "its specificity, its techniques and tactics" (Foucault 1980: 116). What the CasP framework adds to this perspective is recognition that the possessors of power are also evaluating their power. The assessment informs subsequent activities to maintain and expand that power. We can learn much about power by studying the mechanism by which the powerful assess their own power. It allows us to move beyond the common, widespread recognition of social asymmetry to identifying the topological shifts in that asymmetry. With the asymmetries identified, we can begin to answer the question: "where do they come from and what are they made out of?" (Latour 2005: 64). I argue that the decline of BP expressed the market's falling confidence in the obedience of the entities that bear on its profits, including the things that comprise its productive capacity.

**Figure 1: Environmental/Deccumulatory Crisis: *BP***



**Key: t = April 20, 2010, the day of the accident.**
**Source: Centre for Research in Security Prices. Series calculated by author. Note: Data points are indexed differential market capitalization (relative to S&P500; April 20, 2010=100).**

## The Quantities and Qualities of Disaster

Although placing a financial value on human life is widely considered crude and ethically objectionable, it is common (Zelizer 2010). For example, the fund established for the families of victims of 9/11 had three measures to establish payments: (1) financial loss; (2) set amounts for pain and suffering; (3) subtraction of life insurance paid. The first metric meant the lives of well-paid victims were valued more highly than those of poorly-paid victims. The high profile of the differential among payments provoked outrage, contravening moral sensibilities, but the act of valuing lives was accepted as a necessity of our thoroughly monetized society (Fourcade and Healy 2017). The extent of quantification facilitates capitalization.

### *Calculating Financial Quantities*

Eleven men lost their lives in the Deepwater Horizon disaster.[1] Within moments of the disaster, calculations were being made, including expected liabilities for the lives of these men. In addition to this computation, calculations would have been made about the probable distribution of liability, since the rig was being operated by the oil services company Transocean on behalf of BP. At the time of the explosion none of the markets listing BP's shares—New York, London and Frankfurt—was open. Nonetheless, market participants would have been speculating on the possible costs to the company and the reaction of their fellow participants. These costs would reduce expected earnings and could increase the risk to earnings.

At this stage, it is worth noting that the actual decision making involved in the evaluation process of market participants is incredibly opaque. First, social scientific attention to these activities is relatively new (Cetina and Preda 2004; MacKenzie 2008; Muniesa 2008; Preda 2009; Lepinay 2011). Second, and more importantly, with profits on the line, market participants are reluctant to share their time or knowledge. I will not try to interpret the intentions of market participants but rather focus on actual market outcomes—the price fluctuation and trading volume of BP shares—and interpret those

[1] Jason Anderson, Aaron (Dale) Burkeen, Donald Clark, Stephen Curtis, Gordon Jones, Roy (Wyatt) Kemp, Karl Kleppinger, Keith Blair Manuel, Dewey Revette, Shane Roshto and Adam Weise.

outcomes from the analytical perspective of capital-as-power that the goal of all market participants is differential accumulation. Undoubtedly, interviews with market participants that bought and sold BP shares in the wake of the Deepwater Horizon disaster, as well as documents created by them at the time would illuminate how the objects of evaluation became financial values. Unfortunately, gathering such knowledge is beyond this article.

In the early stages of the disaster, the scope was not well understood. There had been a blowout, the drilling rig was on fire and the deaths were reported with uncertainty. The continued fury of the flames indicated the BoP had failed. However, no one could know that the rig's eventual sinking would result in an uncontrolled spill that would last months. Early uncertainty meant calculations had very little effect on the valuation of BP. Any single event can be difficult to discern in the movements of a large transnational corporation, since the translations are accounting for ongoing processes and events around the world. One disaster on one drilling rig—as horrific as it was—is a minor event relative to BP's global operations. The volume of trading of BP shares would not reach an unusual level until April 26, the Monday following the disaster, despite the fact that the vessel sank on April 22 and the leak was announced on April 24. In the first four days after the disaster, the value of BP shares declined 5 percent relative to the S&P 500 (Figure 1). As per the capital-as-power analytical standpoint on accumulation as a differential process of redistribution, all descriptions of capital values are relative to the S&P 500, which serves capitalists—and CasP analysis—as a benchmark for "capital in general." This perspective will be described in more detail below.

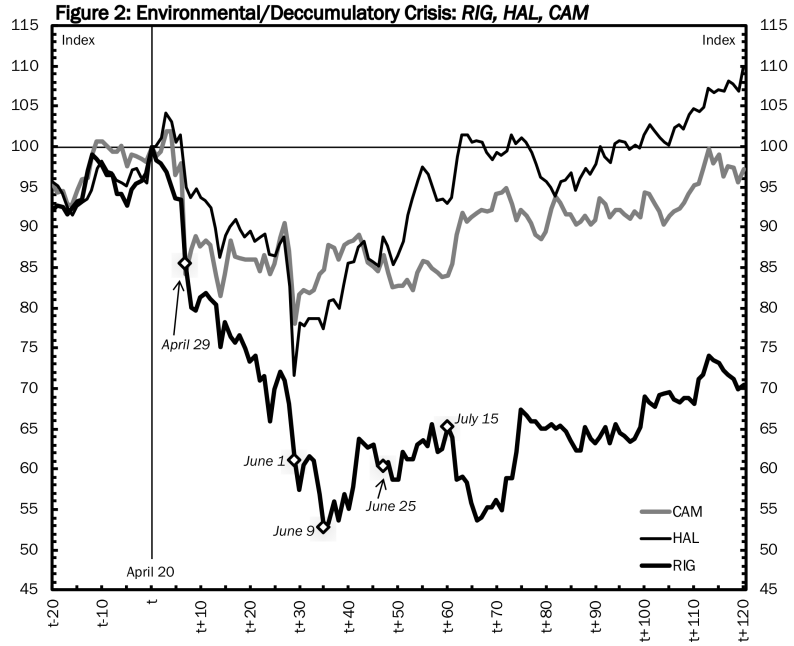
The initial increase in trading activity saw daily volumes double relative to average 2009 volumes. Of course, not everyone was bidding the value down, since each seller required a buyer. In fact, the divergent assessments of the event are evidenced by the large spread of daily high-low trading values relative to the closing price. By the end of the trading day on April 28, the value of BP had actually recovered 1 percent of its pre-disaster value. Those who expected the value of BP to recover outbid those who expected it to decline further. That changed on April 29. BP opened down 1.5 percent from its close the night before, and then lost another 6 percent. Although this decline is modest compared to the eventual loss BP's valuation would take, market activity increased markedly at 13 times the company's usual trading volumes. Just over a week after the explosion, and a week after the sinking of the Deepwater Horizon, the divergent calculations of market participants rendered extreme price volatility. Over the next week the company's market capitalization would fluctuate wildly between 7 and 22 percent below its pre-disaster value. During that week, BP's daily high-low spread averaged 6 percent of its closing

price, compared to a 3.6 percent spread for the S&P 500, expressing the efforts of market participants to calculate the future of an ongoing, indeterminate event.

This volatility moved around a precipitous, but not continuous, decline. On May 3, BP was 17 percent below its relative pre-disaster value, while the S&P 500 had changed by less than 1 percent. By June 1, BP had lost 32 percent of its relative value, shedding 13 percentage points over the prior weekend. Its most volatile day would be June 9, with trading volumes 37 times greater than usual, an 18 percent spread between the day's high and low, and the largest one-day decline in closing value of 15 percent. The bottom would come two weeks later, on June 25, when BP's market capitalization would be just over half its pre-disaster value. The trading volume and high-low spread for that day were greatly reduced from the high volatility two weeks earlier. There was a much tighter consensus among market participants about where the price of BP ought to go.

Over the next 20 days, the company would recover about 20 percent of its relative pre-disaster value, effectively returning to the value established on June 1.

**Figure 2: Environmental/Deccumulatory Crisis: *RIG, HAL, CAM***

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**Note: Data points are indexed differential market capitalization (relative to S&P500; April 20, 2010=100).**

BP's capitalization fluctuated around this relative value for over a year and a half. It would take until the end of August for both trading volumes and daily price spreads to return to relatively stable levels.

BP was not the only corporation whose capitalization was negatively affected by the disaster. Drilling platform operator Transocean (RIG), as well as Halliburton (HAL), which manufactured and poured cement used in the well, and Cameron International (CAM), the manufacturer of the Deepwater Horizon, all saw sharp relative declines in the first weeks of the disaster (Figure 2). RIG, in particular, saw substantial, lasting losses. Notably, the significant points for these three firms do not perfectly align with those of BP as different calculations had to be made to account for the effects of the unfolding event on the various companies.

Importantly for my account, other members of the oil and oil services industries also had relative declines, particularly those active in the Gulf. Figure 1 includes a series for the broader oil business and one narrowed down to companies in the oil industry significantly affected by the U.S. moratorium on deep-water exploration in the Gulf of Mexico, enacted on May 30, 2010[2]. After a brief increase relative to the S&P 500, both categories of companies saw a marked decline. Both saw their nadir on June 1, the first trading day after the U.S. Government announced the drilling moratorium. The non-BP oil business would return to its relative pre-disaster value by June 10. Market participants seemingly anticipated that any effects of the disaster on oil business profits would not extend to the entire field of companies. Unsurprisingly, companies affected by the moratorium would continue to feel the calculative effects of the disaster into October 2010, when the ban was lifted on deep-water drilling in the Gulf.

All of this quantitative movement emerged from hundreds of millions of trades involving an unknown number of owners, asset managers and traders mobilizing hundreds of billions of dollars. This quantitative flux took place alongside, and in contact with, the qualitative events of the unfolding disaster and BP's efforts along with the U.S. Government to stop the leak and respond to the spreading oil.

*A Disaster's Qualities*

The explosion on the Deepwater Horizon occurred when a "kick" in the Macondo well allowed hydrocarbons to enter the riser that

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2 "Oil Business" includes companies, other than BP, that satisfied the following conditions: (1) classified under SIC13: Oil & Gas Extraction, SIC291: Petroleum Refining, SIC3533: Oil & Gas Field Machinery & Equipment, SIC46: Pipelines, except Natural Gas, SIC517: Petroleum & Petroleum Products; (2) valued at US$1 billion or more on April 20, 2010; (3) had data for every day included in the chart. "Moratorium" is companies in "Oil Business" that saw a decline of 5 percent or more on June 1.

stretched between the drilling rig and the wellhead sitting on the floor of the Gulf.[3] Once the hydrocarbons reached the drilling rig, they spread to the engine room and were ignited. The fire was fed by the hydrocarbons that continued to flow from the riser. At this point, the automated dead man's mechanism on the BoP should have been triggered, clamping the well shut, stopping the flow of hydrocarbons and making it easier to extinguish the flames. However, for reasons that were unclear at that point—and long debated in the courts afterward—this did not happen. Once the Deepwater Horizon lost power, the dynamic positioning system that kept the rig in place above the wellhead stopped operating. With the vessel adrift, the riser stretched and buckled, likely initiating the leak. When the rig sank, the riser collapsed, resulting in a number of leaks along its bent, twisted length.

Over the next two and a half months, the well uncontrollably gushed millions of barrels of oil into the Gulf of Mexico. Initially, there was a great deal of uncertainty about the scale of the leak. Partially, this was because the hydrocarbons were flowing out of several fissures in the collapsed riser. The first estimated flow rate was 1,000 barrels a day (b/d). On April 29, this was increased to as much as 5,000 b/d. By June 19, the Flow Rate Technical Group, which was organized for the sole purpose of providing an estimate, suggested the oil was flowing at 35,000 to 60,000 b/d. The final estimate that would establish the total size of spill, was an average of 53,000 b/d, with an initial flow of 62,000 b/d that dropped off as the reservoir was depleted and its pressure lessened.

BP undertook several failed efforts to capture the oil and stop the leak. The first response was the use of a remote operated underwater vehicle to trigger the BoP. However, the BoP did not respond. Next, BP attempted to place a custom-made containment dome over the leak, with a spigot on top through which the hydrocarbons were to be diverted and captured. This failed when the hydrocarbons coming into contact with the dome crystallized, blocking the spigot and causing oil and gas to spill out the bottom. We might say that the hydrocarbons refused to obey the material order imposed by the containment dome. When that disobedience was publicly announced on May 10, BP's relative value fell by almost 5 percent. That decline undid most of a 7 percent increase in the days leading up to the lowering of the containment dome. Had the crystallization not occurred and the oil been successfully captured, BP's quantitative decline would almost

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[3] The information in the qualitative description of the disaster is taken from several reports on the event and its aftermath as well as news reports. These include BP's investigative report (BP 2010) and the President's Report from the U.S. National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling (2011).

certainly have been much less. On that day, disobedient hydrocarbons cost BP over a quarter billion dollars.

The company also tried a "top kill," which involved pumping heavy drilling mud into the well in an effort to staunch the flow of oil and gas, after which cement would be pumped to seal the well. A last-ditch effort as part of the top kill was the "junk shot," which involved sending small pieces of rubber into the well to plug it up. These failed, in part because BP was reluctant to ramp up the pressure due to concerns about how obedient the surrounding rock could be. Although the engineers and other officials involved were confident the rock would obey an order translated into a certain magnitude of pressure, there was concern it might defy an order accompanied by higher pressures. If the rock formation cracked, then hydrocarbons could escape from multiple, widely distributed places on the seabed. Such leaks could not be contained, and it is possible BP's liability would have bankrupted the company entirely. The decision was made not to risk the indeterminate disobedience that could bring with it an accumulatory death sentence.

BP was able to seal the well on July 15 (Figure 1; fifth marker) with a custom-made cap that attached tightly to the BoP. While short-term closure efforts were being made, BP was also drilling two relief wells that intersected with the original well. Drilling mud and cement were pumped into these relief wells to permanently seal up the leaking well. On September 19, the well was declared "effectively dead."

As the leak was occurring, BP made efforts to collect some of the hydrocarbons spewing from the well. At most, the company was able to recover half of the flow. To deal with the oil on the surface of the Gulf, the company used chemical dispersants. Dispersant breaks up the oil, causing it to sink below the surface. Critics have speculated that this was not the best environmental course of action, but undertaken as a public relations effort, since it would eliminate the oil from view. Although there are no clear traces of how these efforts translated into the company's capitalization, market participants were watching. Success or failure would be assessed and translated into decisions to bid share prices up and down.

## Prices and the evaluation of qualities

Although it is taken for granted that a relationship exists between quantitative movements of equity prices and qualitative events, the actualities of that relationship are unclear. The purpose of the trades that moved BP and other corporations' capitalization is largely beyond dispute: accumulation. However, the process of price construction is an opaque one, in part because on the one hand, mainstream political economic theory has conceived of stock markets as perhaps the ultimate example of the invisible hand, where supply and demand

converge to realize a fair and rational price. The reigning theory of stock market behavior is Eugene Fama's "efficient market hypothesis" (Fama 1970), which contends that securities prices emerging from new information are optimal.[4] Most critical political economy, on the other hand, has focused on the "real" economy, conceptualizing financial markets as a realm of fictional representations and dangerous speculative behavior. Financialization has emerged as a critical concept, in part, as a result of the long-standing productivist bias of critical political economy.

The sociology of finance emerged in recognition of the importance of finance as a social institution (Cetina and Preda 2004). A foundational theorist for the sociology of finance was Michel Callon, who also produced one of the original works of actor–network theory (Callon 1986). The Callon edited *The Laws of the Market* (1998b), along with *Do Economists Make Markets?* (MacKenzie et al. 2007), edited by Donald Mackenzie, Fabian Muniesa and Lucia Siu, are key texts in the "performativity" approach to the sociology of finance. Economists, equipped with the knowledges, technologies and materials of their trade, are centered in the analysis as actants informing, shaping and creating financial markets.

The sociology of finance research is concerned with the processes of price formation. This analysis has focused on the subjects, objects and relations that constitute markets as networks of connected localities with prices as their output. For example, Karin Knorr-Cetina and Urs Bruegger's (2002) analysis of the "global social system" in currency markets looked at patterns of behaviors among currency traders. The pair connected the behavior to the steady stream of currency values as the output of the financial processes. However, no attempt was made to assess what those values mean or what they do.

In a recent survey of the sociology of markets, Neil Fligstein and Ryan Calder (2015) identified institutions and objects that support market activity, including financial markets. They did not include the important feedback process by which the outputs of financial markets shape those very markets. Fligstein and Calder note that a critique of the performativity thesis in the sociology of finance is that "financial markets, once constructed, take on a logic of their own" (11). Capital-as-power argues that capital values, assessed in differential relation to a benchmark, are the mechanism of that logic.

As complex as stock markets are, they generate perhaps the simplest of all entities: a single number. For most stocks that number continually changes but remains a single number. When the markets close on any given day, a value has been assigned to every stock traded,

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[4] See Nitzan and Bichler (2009: 192–196) for more critical insight on the efficient market hypothesis.

which makes for a price on each corporation. Yet, each of those corporations is comprised of an incredible array of seemingly incommensurable entities. How does one price BP when it consists of a head office in London, staffed by technical experts, accounting clerks, human resources personnel, office administrators, and executives? To that are conjoined hundreds of wells and service stations around the world. The company subcontracts much of the actual drilling work and leases its name to franchisees operating service stations. It has proven oil reserves, refinery capacity and marketing campaigns. BP engages in R&D that generates technologies and alters the practices of oil exploration, extraction and refinery. BP also lobbies governments that pass laws concerning resource extraction, environmental protection and worker safety that will affect the profitability of the company's operations. Despite the globe-spanning array of entities comprising BP, just a small swath of which are described here, at the end of each day, BP bears a single value.

The magnitude of the Deepwater Horizon disaster actually allows us to connect specific events to drastic price movements of one of the largest corporations in the world. We know that speculation about the size of the oil spill would have been of great interest to market participations, since it would be used in the calculation of a fine to be levied on BP. If government spokespeople had said that the spill was much smaller than initially estimated, the price of BP would have risen. That rise would not just happen as a necessary, rational outcome. Rather, market participants would bid the price up. When, instead, the flow of the leak was continually ratcheted up, the value of BP continued to fall, pushed down by the recalculations of market participants.

When the "top kill" failed on Saturday, May 29, and the Gulf drilling moratorium was announced on May 30, BP's share opened on Monday, June 1 down 13 percent from their Friday close. Whatever else might have been happening in the sphere of BP's operations was dwarfed by the failure of this high-profile effort and the U.S. Government's actions. Traders mobilized shares at 19 times their usual volume, although price movements were only at three times the usual high-low spread. Yet, how these calculations were actually made is unknown. We can connect the capping of the well on July 15 with 12 times the usual trading volume, four times the usual high-low spread and the return of almost 5 percent of BP's pre-disaster value. However, how market participants arrived at this value is unknown. What is needed is a retheorization of capital and accumulation that accounts for the pricing process itself. My contention is that pricing accounts for both things and humans as consequential mediators.

## Retheorizing Capital and Accumulation

The accumulation of capital is widely understood to mean an increase in productive capacity. These gains are measured in nominal financial quantities which, according to both Marxist and neoclassical political economy, constitute a distorted representation of the real, underlying value of capital. Problems with this productivist conception of capital and accumulation, both analytical and theoretical, have long been identified and they were once the subject of heated theoretical debates (see Nitzan and Bichler 2009: 67–124 for a summary of these criticisms).[5] Unfortunately, the response to the problems has been eschewal by political economists of critical engagement with the concepts, despite their key role in all political economic frameworks.

The fundamental theoretical criticism of the standard conception of capital is an ontological one. It requires that "real" capital, i.e. productive capacity, has underlying quanta that make commensurable qualitative diversity. In other words, a vineyard, a tannery, a missile factory, a wind turbine, and all the rest of the heterogeneous material complexity of our systems of production have something within them that can be agglomerated in the process of accumulation. This is true of both Marxist and mainstream theories of capital. We can think of the standard theoretical conception as a "dual quantity" approach: observable quantities represent unobservable quantities, bypassing qualities. Much analytical energy has gone into converting nominal quantities into these postulated real quantities (see for example Shaikh and Tonak 1994). Now, however, that laudable project has been largely abandoned and most critical political economists simply use the problematic national accounting statistical calculations of "real" quantities, exemplified by real GDP (Stiglitz et al. 2009).

The CasP theory of value revisits the concepts of capital and accumulation and reconceptualizes them without the real–nominal dichotomy. Rather, observable financial quantities, the ones that capitalists construct and engage with every day, and which have earned a prominent place in western media, both in the daily coverage of changes in stock market indices, and reporting on notable financial events, are treated as consequential in their own right. In other words, financial quantities are *irreducible*. The calculations are added into the world. They are rendered objects through a process of objectification and have affect. Although CasP gives these values a representative function, that representation is not merely reflective of an objective

[5] The Cambridge capital controversy, involving economists at MIT facing off against economists at Cambridge University, was the most high-profile debate about the nature of capital. Among the combatants were Paul Samuelson, who defended the neoclassical conception, and Joan Robinson, who poked substantial holes in the concept. See Cohen and Harcourt (2003); Hodgson (1997) for a history of the controversy.

reality. Rather, the representation is *poetic* in the sense given by Elie Ayache (2010): the buying and selling of traders *brings forth* a price. Those prices become actants added to the world that have consequences overlooked by productivist political economy.

Within CasP, the capitalization formula is the ultimate translational mechanism of capital. The basic calculation of capitalization is:

$$k = \frac{\pi_e}{\beta \cdot r}$$

where $k$ is the present value of capital, $\pi_e$ is expected profits, $\beta$ is a risk coefficient, $r$ is the normal rate of return. The calculated value discounts expected profits by the uncertainty of those profits, and the expected returns from a safe asset, such as U.S. T-bills. This value can be calculated for a machine, a factory or an entire corporation. Capitalization is used by banks when they offer credit, by hedge funds when they identify a takeover target, by manufacturers when deciding whether to repair or replace a piece of machinery. The calculative mechanism for publicly traded corporations is the buying and selling of shares. Regardless of the complexity of an asset, whether a painting or an entire corporation, capitalization makes it possible to assign a single value.

One of the most important insights of CasP is that the value of capital is forward looking. Marx conceptualized the value of capital as the "dead labour" included within it. Therefore, within the labor theory of value, the price of a piece of machinery represents the previous labor expended in its manufacture. Capitalization, however, is calculated using the expected future stream of earnings. It is the future, not the past that is expressed in the value of capital. Or, rather, it is the capitalists' vision of the future, translated into the quantities of finance. This means that the capitalist vision of the world can be found, in part, by understanding the calculative process of value construction.

The qualities being accounted for in the calculations of value are much broader and more diverse than just the labor involved, although labor is undeniably important. Anything and everything that market participants understand to affect future profits will be translated by the calculation of capital values. Government policies, consumer trends, resource access, protest movements, community norms, product hype and much more will be taken into account—literally. This fact is one that "everyone knows." However, it is an uneasy reality at odds with standard political economy, not least because it obliterates the divisions between the economy and the other segments of the social order. Production cannot be isolated as a privileged domain

functioning free of these relationships. Both production and pricing are affected by non-economic processes since engineers and traders alike take account of these relationships.

As stated above, financial values are the way capitalists simplify the qualitatively complex world into commensurable terms. However, stand-alone financial values have no meaning in and of themselves. While early political economists tried to discern the meaning of financial quantities according to the perceived underlying real quantities, Nitzan and Bichler emphasize the relational meaning between financial quantities. Namely, accumulation is not meaningful in absolute terms by reducing nominal quantities to real ones, but rather in differential terms. Capitalists care less about an absolute gain than "beating the average."

If a company's share value grows by 10 percent, while its sectoral competitors grow by 15 percent that is a differential decline. Conversely, if the company endures a 5 percent drop in value, but its competitors drop by 7 percent, they achieve a differential gain. Capitalists assess their successes and failures not against any absolute register, but against continually changing benchmarks that average across segments and subsegments of the corporate world. This insight into the differential nature of accumulation should be uncontroversial, as benchmark comparison is commonplace in popular business writings and familiar to most people who engage with political economic issues.

Nitzan and Bichler's (2009) central theoretical claim is that the differential measure of capitalization is an expression of the relative power of capitalists, and differential accumulation charts the redistribution of that power. Again, this is the capitalists' own understanding of the power of themselves and their brethren. Capitalization occurs via market participants' translation of the world as it bears on what Nitzan and Bichler refer to as the "elementary particles" of capitalization: expected profits, hype, risk and the normal rate of return. Differential accumulation occurs when the assessment favors one asset over another. Rising oil prices may mean greater profits for Exxon, but higher transportation costs for Wal-Mart. Increased royalties on copper in Chile would be bad for transnational mining company Freeport-McMoRan, but of little consequence to Coca-Cola. Unrest in Cameroon might mean higher cocoa costs for the Hershey Company, but new defense contracts for BAE Systems.

As noted above, Nitzan and Bichler have defined power as "confidence in obedience." Resonant with a Machiavellian conception of power, capitalist power exists as potential rather than in action. A government is powerful when its populace is pliant, not when it must deploy the army to quell unrest. A corporation is powerful when all that bears on its earnings unfolds predictably. That means the power of

capitalists exists in their control over diverse parts of the broad social order, including but not limited to, labor. Accumulation occurs when they can either increase the confidence of market participants that those parts will behave according to expectations, or when more of the social order is rendered obedient. While the word obedience connotes human–human relations, insights from ANT and STS mean things have to be included in our understanding of obedience, corporate power and accumulation.

## Things and the Growth of Capitalized Entities

Although machines have played an important role in political economic theory since Adam Smith, they have been rendered by the theorists into what Bruno Latour (2005) calls "intermediaries". Intermediaries "transmit meaning or force without transformation" (39). According to Marxist and neoclassical value theory, machines provide a relay for the flow of value from labor to capitalists and/or consumers, but they are given no difference-making capacity of their own. This is a feature of the dual quantity perspective of both Marxist and mainstream value theory: visible quantities represent hidden quantities. Within these theories, the passage of "real" quanta through the qualitative world to become nominal quanta distorts them but leaves them fundamentally unchanged. While theorists acknowledge that machines perform a qualitative transformation on the materials that pass through them, they do not allow for machines to contribute quantitative meaning. According to the labor theory of value, machines serve as a repository for accumulated surplus-value that originates in labor, but are inert, hence their status as "dead labour." For the hedonistic conception of value of neoclassical theory, the machines are simply the means to satisfy the quantified desire of *homo oeconomicus*: individual utility-maximization.

Trevor Pinch (2008) observes, "the Marxist analysis neglects the enabling aspects of materiality and technology" (463). The capacities of equipped labor cannot be reduced to either the labor or the equipment. Instead, they emerge from the hybrid. Latour and others have advocated for things as the "missing masses" of the social sciences (Latour 2008). Rather than intermediaries, things must be considered "mediators," which "transform, translate, distort, and modify the meaning or the elements they are supposed to carry" (2005: 39). Mediators have affect.

Things are essential for our complex social orders. Things make it possible to stabilize distant human relations, which cannot be achieved when bodies constitute our only materials (Strum and Latour 1987). That stabilization is essential for the expansion that has been an important feature of human institutions. In one of the original works

of actor–network theory, John Law (1986) called attention to the role of things in long-distance navigation and empire-making. European navigational knowledge and colonial mindset meant nothing without objects to consolidate, standardize and spread that knowledge and actualize colonial practices. The possibilities of empire only existed because of human-thing assemblages that can transcend the limits of pure human-human sociality. Law identified three classes of "emissaries" necessary to the task of long-distance control: documents, devices and drilled people. They made it possible for those at the center to monitor and regulate activities at the periphery. This role of things in stabilization makes apparent their indispensable role in accumulation.

Alex Preda (1999) describes a conjunction between Foucault and Latour, which links the agglomeration of objects to power, arguing that "the larger the network with its objects, the stronger its force will be, and hence its authority, legitimacy, and power" (358). However, the linear equation of power with size overlooks the fact that expansion can also weaken entities, as many mergers and failed product releases have demonstrated. Indeed, one could point to the Deepwater Horizon disaster as evidence of just such a weakness. Had BP been smaller, perhaps it would not have subcontracted the drilling operation. Perhaps this particular well would have been better known and understood by the executives at the head of the company. Perhaps those monitoring the operation would have been the owners whose financial stake was directly tied to the well. Instead, absentee owners were left to respond after the fact, translating the disaster as a revelation of weakness. That is precisely the CasP interpretation of BP losing half of its value in the wake of the disaster: the company had become weaker.

The relationship between adding things and gaining power is complicated, which is one of the reasons nominal financial values cannot be reduced to "real" material quantities. Knowing that a corporation is adding things to itself is not enough to know its value will increase. Instead, additions are assessed within multiple affective contexts, such as current consumer trends, the pace of technological advance, and an innovation's degree of discontinuity. The corporations with the most employees and the most machines are not the most highly valued. Apple, for example, has demonstrated that a smaller customer base, but highly loyal to a restricted stable of products is of higher value than a more diffused product line. From the CasP conception, only expansion that translates into greater expected earnings or reduced risk, and thereby increases capitalized value, is interpreted as an increase in power.

## Equipment, Expertise and Experience

Objects can be considered more obedient when the relations they mediate become more stable. This can occur through greater knowledge that is distributed between the object and its operator (Hutchins 1995). The knowledge of the drilling workers was comprised of equipment, expertise and experience. All three are required to identify a "kick"—the unwanted intrusion of hydrocarbons into the wellbore. With the kick identified, an appropriate response can be formulated. Kicks are not uncommon events and workers quell the vast majority. Identifying the kick depends on reliable equipment that translates signals from the well, expertise about oil formations and drilling operations, and an experienced operator who develops intuitions combining the equipment and expertise. The operator can then trigger responsive actions that are relayed through a series of worker-object assemblages to quell the kick. Past experiences become standardized knowledge that gets passed on through textbooks and manuals. An expert operator is one who embodies the industry knowledge, one who utilizes the signals from monitoring equipment to recognize that a kick is occurring and enacts established protocols.

Preda draws on Latour's network conception of power and connects it to Foucault's insights on the relationship between power and knowledge. As Foucault (1980) argued, power can be increased by augmenting and improving knowledge of the entities under one's control, including things. Preda argues that things are essential participants in the development of knowledge and the performance of control. He remarks that while explanations for the social order should include artifacts, they should also consider the "strategies and resources through which human actors manage to account for a social order in which they take themselves as different with respect to the artifacts to which they are related" (Preda 1999: 361). In other words, not only are things an essential component of confidence in obedience, so too is their exclusion from our understanding of the social order.

Things play an important role in the transfer of power that is expressed in accumulation. An alternative to equipped, expert, experienced operators are mechanisms devised to internalize a task, incorporating the industry's knowledge and the operator's skill into an automated response. Skilled operators, when they perform according to expectations, are—from the perspective of a company's owners—intermediaries. Unfortunately for the owners, workers have a history and a habit of disobedience, becoming indeterminate, unpredictable mediators who defy the calculative expectations of market participants. Workers pose a constant threat of work withdrawal and more. While collective bargaining agreements and other negotiating mechanisms have made strikes more predictable and financially manageable, worker agency remains much more uncertain than that of

things. Hence, the history of technological development in the twentieth century is marked by automation as skill internalization, substituting relatively obedient machines for relatively disobedient workers (Noble 1984; Braverman 1998).

The relative obedience of machines contributes to making them calculable. As Callon (1998a) writes, "if calculations are to be performed and completed, the agents and goods involved in these calculations must be disentangled and framed" (16). The operating parameters of machines are well known. They break down at predictable intervals that typically occur as a function of the pace of operation. This means optimal levels of output can be calculated, making profit levels more certain. This can then be translated in the capitalization formula into a lower risk factor. Conversely, things can disobey in an unpredictable, contingent manner. When that occurs, an operator's agency is required; they must be mediators. In such an event, the worker must transcend their skills, combining knowledge and equipment in a new way to create an emergent procedure. Things provide the means to predictable, stable functioning. But humans are needed to restabilize a system that deviates in an unpredictable way. That said, restabilization will also require things with unwavering stability that cannot be matched by even the most heroic of humans.

It was the Macondo well's disobedience that triggered the enormous loss of BP's power. Human ingenuity enlisted things to perform in unprecedented ways to finally stop the leak. As seen in Figure 1, reports of the impending capping drove up the capitalization of BP. Market participants assessed greater power via the human-object assemblage responsible for stopping the leak. All the ingenuity in the world would have been useless without the things. The stabilization of the company's new relative valuation required numerous things whose behavior was calculable for the fact of being stable and predictable. Those calculations will black box the vast majority of BP's operations, with both humans and things inside, operating together in ways that are irreducible, but measurable (Latour 1993a). Typically, those boxes will remain closed as predictable, obedient entities unless there is an event that defies the calculations, as occurred with the Deepwater Horizon disaster.

## Going Deeper through the Blowout Preventer

The title of chapter 2 of the National Commission's Report to the President (National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling 2011) comes from a quote by an oil industry consultant uttered in 1970: "Each oil well has its own personality" (28). Knowledge of past wells can only partly inform engagement with present wells. Each well can be considered a subject,

according to the simple definition offered by Peter Sloterdijk (2013): unpredictability (58). Oil-bearing formations have to be studied to get a sense of what the well might be like. As the well is drilled, it is constantly monitored to understand its unique characteristics. The deeper is the well, the more unpredictable it will be. The task of drilling operations is to tame these unruly subjects. From the perspective of ownership, these operations are largely black boxed. Yet, within the black box, the drilling grapples with the subjectivity to increase confidence in the obedience of the well.

One of the most important pieces of equipment for taming a well is the BoP. The BoP serves several functions of well control. However, the most vital function is to kill a well in the event of an emergency, such as an uncontrollable kick. The mechanism of last resort is the morbidly named dead man's switch, which activates rams to seal off the well if the BoP loses contact with the surface. During the unfolding Deepwater Horizon disaster, the dead man mechanism failed to perform as expected. The reasons continue to be subject to dispute.

The BoP was invented in 1922 and made commercially available in 1924. Before the use of the BoP, wells were allowed to blow out until the subsurface pressure was reduced enough to allow capping. This led to the iconic scenes of thick, black oil gushing forcefully out the top of a drilling rig. The practice was dangerous, environmentally damaging and financially wasteful. The BoP made it possible to control the pressure differential and became a universal mechanism of oil exploration and extraction. Although the BoP continues to evolve, growing capable of handling higher and higher well pressures, its vital role is unchanged. As such, it is a stable—black boxed—part of the capitalization of firms involved in the oil industry.

Thomas Hughes (1993) identifies technological systems as a combination of technical, political and economic factors. It is the total combination that gets priced by capitalization. When something goes wrong and recalculations need to be made, the combination gets opened and parts identified for more precise recalculation. Those parts have to be situated within their technical trajectories, but also political and economic trajectories in order to perform such recalculations. Within the CasP framework, these examinations and resultant recalculations constitute a reassessment of power. The volatility of the price of BP during the disaster evidences the confusion about the make-up of the company's power. Some of the reassessment was an examination of the BoP, and its position within the broader assemblage of equipment, experience and expertise.

Was the failure of the BoP on the Macondo well because of material shortcomings? If so, were these material shortcomings because it was poorly formulated by its producer or because it was mishandled by its user? Was such mishandling due to cost cutting measures by the well owner and/or drill operator, or was it due to the faulty practices of

well workers? Might government regulations regarding BoP operation be revisited and changed in response? Might BoP installation and monitoring practices be changed? Might the structure of BoPs be changed? Each question opens up further questions, all of which have financial, and therefore accumulatory consequences. As well, each question has material indeterminacy built in. How might the BoP respond to these changes? What will be required to "tame" it and ensure the necessary compliance that will make its use predictable and therefore calculable? What will be the future political-economic-technological trajectory of BoPs? What will be the financial consequences? How will this impact the control of BP and other oil and oil services companies?

Early suspicions, confirmed by subsequent investigation, held that the problem of the Deepwater Horizon's BoP was unique rather than endemic. This suspicion, along with the expectation that the disaster would not result in widespread, costly changes in deep-water oil exploration practices, is likely the reason the differential decline of other Gulf exploring oil companies was relatively short-lived. By the end of 2010, these companies would be beating the S&P 500.

As part of the Deepwater Horizon drilling assemblage, the operation of the BoP—or one channel of its operation—took for granted an experienced, equipped expert who could recognize failures within the drilling assemblage and trigger the various rams capable of closing off the well. On the one hand, should everything go as planned, then the worker's actions will be black boxed as unfolding in accordance with established and expected routines. Owners can have confidence in the obedience of the entire assemblage. On the other hand, in expectation that the workers' actions may be disrupted, there are redundancies built into the system that are supposed to automatically trigger the BoP. However, these systems assume some prior work by others within the assemblage that are translated into material mechanisms, such as the dual battery systems that are supposed to drive the blind shear rams in the event that communication with the rig is lost. In the case of the Deepwater Horizon disaster, these batteries had not been properly installed or maintained.

There are multiple lines along which failures occur, including the regulatory line. There was no oversight to ensure that these batteries, and the systems they were to power, were functioning properly. Another line passes through the workers who were blamed for the error, but we could follow the line further and possibly find problems with their training or with training manuals. Was there a limit to their expertise that could be addressed? Perhaps the disaster exposed a gap in the experience of the crew, despite their collective years of operating drilling rigs. Might another crew have recognized the problem before it

became a disaster? The investigation of the disaster constituted a long line of opening black boxes and the quantifications of some market participants would have followed along trying to translate the findings into capitalized values.

## Conclusion

The neglect of objects from our accounts of social asymmetries is itself a mechanism of power. The more we overlook the irreducible role of equipment in the emergence of tactics used to order society the easier it is to develop and deploy such mechanisms of control. The dominant theories of value leave no place for things as mediators. According to these theories, objects are either intermediaries for the satisfaction of desire or stores of dead labor. I argue that Nitzan and Bichler's (2009) power theory of value, which conceptualizes differential capitalization as an expression of power, makes it possible to understand things as dynamic participants in the constant evolution of the qualities of capitalism. The construction of values is an ongoing recalculative assessment that closes and opens black boxes, inside of which are assemblages of worker-objects quantified through a variety of measures, but passing into the quantities of finance, culminating in capitalization. Capitalization is an ongoing epistemological reduction while accumulation is vitally connected to ontological irreducibility.

The Deepwater Horizon disaster unfolded as a complex, indeterminate event that market participants translated into uncertain valuations of BP and other capitalized entities. The capital value assigned to the company fluctuated wildly as it trended downward. The repricing occurred as black boxes were opened. First, market participants had to make qualitative sense of the contents, including such objects as BoPs, nitrogen-rich cement, float-shoes, blind-shear rams and hydrocarbons. Then, all this qualitative diversity had to be translated into the commensurable units of finance.

Financial markets have a single-minded purpose: evaluation. That evaluation is based on a remarkably simple criterion: discounted expected profits. However, the actual process of evaluation, one that tries to bring the future into the present, is incredibly complex. It draws information into and along what Latour and Lepinay (2010) call "metrological chains." Out the other end, via the process of buying and selling shares, a single number emerges. That number gets folded back into the calculations, which are without end. The incredible complexity makes it difficult to identify (1) what is being accounted for; (2) how anything is being evaluated; or (3) when new entities and processes get counted. Much of what counts is black boxed because market participants are confident in the obedience of what is inside. However, moments of crisis, such as the Deepwater Horizon disaster, can offer a window into the struggle of evaluation, as black boxes are thrown open and entities must be re-evaluated. The CasP method

offers a means of identifying the market's efforts to make sense of the world remade by the crisis.

Sociologists of finance are concerned with price formation, while the meaning and affect of prices have remained outside their analyses. In the analysis above, I noted the lack of information about the process by which social qualities are translated into the quantities of finance. This suggests the need for research that moves among these three domains: values, evaluation and evaluated.

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