Assessing the Vulnerabilities of the Fossil Fuel Industry: Can Sabotage Be Decisive?

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The notion of creating fundamental social change through sabotage—on scales ranging from the collapse of civilization to the comparatively modest abolition of government—is central to some anarchist and radical environmental discourse. This has been the case since radical environmentalism first articulated itself as a political phenomenon, but as climate change has emerged as an overarching agent of ecological havoc, the dialogue has necessarily shifted towards sabotage of the fossil fuel system. Because the global economic order is currently based on fossil fuels, this becomes a conversation not just about thwarting climate chaos, but about, in essence, destroying civilization in its current form.

However, there has been a relative lack of detailed, logistically-oriented analysis of the viability of this approach. Dialogue around sabotage is often vastly general, focusing on its ethical dimensions or on its alleged inherent, universal effectiveness or ineffectiveness. The remaining discussion tends to be merely tactical, comprising instructions for making incendiary devices or disabling security cameras.

There appears to be a need for analysis which occupies the vast middle-ground between these two levels of detail. Having a theory that validates the use of sabotage as a general form of political action and knowing how to attach a battery cap to an igniter is an incomplete framework.

What is also required is a coherent, systemic analysis of the machinery which the eco-saboteur wishes to dismantle, and a sober calculation of whether these wishes are within her means. Let us assume for a moment that we have all gained the courage to strike the match: the night obscures our shapes and our hearts long for victory or

death. Very well. What should we do? Who breaks what, where, and in what order? What are the anticipated effects?

This text is an attempt to introduce greater detail and methodological rigor into the dialogue around sabotage. It is written with the same ethical preoccupations—like defending nature and minimizing hierarchical relationships—as many other such texts, but it is based on literature on infrastructure vulnerability, terrorist threat modeling, and energy economics which is typically absent from the eco-anarchist oeuvre.

This professional literature is certainly not without its problematic aspects. The Western security analyst is a curious creature, after all: he has never known hunger but professionally claims to predict the behavior of those plagued by it. Energy security analysts and their ilk have a worldview to maintain, and some conclusions, whether or not they are founded, are inevitable in that worldview. Nonetheless, it is difficult to imagine that this large body of literature can tell us nothing.

More solidly than on the simulations of Defense Department mathematicians, this analysis rests on the three cases in recent history of political movements engaging in sustained sabotage of fossil fuel industry infrastructure: MEND in Nigeria, the post-US invasion insurgency in Iraq, and the combined efforts of FARC and the ELN in Columbia. These three campaigns of sabotage tell us a great deal about the scope of the impacts such efforts could have elsewhere.

The intention is not to advocate sabotage nor to dissuade anyone from it. Sabotage is an incredibly broad category of action which is arguably neither inherently good or bad, useful or useless. Its relevance and meaning is determined by its context and by the details of its application. That is precisely the point.

Finally, if the language sometimes seems sarcastic, please note this text is very much a product of self-critique and self-examination. The intention truly is constructive dialogue and not to cause offense. For some, fatalistic laughter is a means of preserving the ability to fight when there is every reason in the world to conclude their fight is hopeless.

First, We'll Sneak into Saudi Arabia…

A starry-eyed eco-saboteur, dreaming of taking the single decisive action that triggers catastrophic industrial failures and culminates in wolves howling from the tops of overturned cop cars, might find themselves eying Saudi Arabia's Abqaiq oil-processing center with particular interest. Somewhere in the seemingly endless pages of Phraeger Security International's *Energy Security Challenges for the 21st Century,* we read that a crippling attack on this one decisive industrial node would "easily double" the global price of oil. It is also here that the Earth First!-to-al-Qaeda pipeline first becomes conceivable, for we also read:

"al-Qaeda indeed launched an unsuccessful suicide car bomb attack against Abqaiq in February 2006. That attack against the world's largest oil-processing plant immediately sent oil prices up by $2 per barrel and highlighted the sector's vulnerability." (1)

If we imagine a scenario in which sabotage has indeed doubled the price of oil, it could safely be said the broad strategic paradigm of the saboteur

—of changing large-scale social behavior by making said behavior logistically or economically untenable—is in a position to be tested. If the general notion that sabotage can cripple industrial civilization is true, once the price of oil has been doubled, shouldn't it start limping?

While it's absurd to imagine that sabotage has *no* effect on economic activity, examining a graph of average oil prices over the years—or even the months—can be revealing. Geopolitical power contests and naked human greed seem perfectly capable, all on their own, of wreaking precisely the kind of large-scale economic tumult the saboteur is supposed to engender. In a sixth-month period of time in 1972, the price of oil quadrupled as OPEC punished the West for the Yom Kippur War with an embargo. A rapid quadrupling of price is very extreme, but a rapid doubling is merely unusual. It happened again when Iraq invaded Iran. After 9/11, it tripled, from around $30 to nearly $100 a barrel, then during the economic crisis a few years later it plummeted to around $50 and then rose to over $100.

There has also been a long-term higher price trend with oil. In 2010 dollars, the average U.S. price of a barrel of oil has been $20.53 since the mid-20th century. However, it has been much higher than that for the last decade. An economist from the Swiss National Bank tells us:

"The very long-term data and the post World War II data suggest a "normal" price far below the current price. However, the rise of OPEC, which replaced the Texas Railroad Commission as the monitor of spare production capacity, together with increased interest in oil futures as an asset class introduced changes that support prices far higher than the historical 'norm.'" (2)

The fact that oil prices have fluctuated with such wild abandon (indeed, markets are one of the common datasets in chaos theory) over the years reveals to us that the intuitively-appealing strategy of forcing industries to collapse by making them unprofitable may actually be a very complex proposition. It seems clear there is no known magic number one must cost an industry in dollars to put it out of business forever.

The model of costing a business so much money it collapses, when carefully evaluated, makes far more sense if one is trying to destroy a single business among competitors than if one is trying to cripple an entire industry. This is particularly true if the industry happens to be one many other industries depend on, and if it happens to wield tremendous political power.

Nonviolent direct action campaigns have often found that industry and police respond to even solitary protests with enhanced security. In 2013, Pacific Northwest activists who attempted to halt a shipment of tar sands infrastructure to Alberta found that after a single blockade their moving target was accompanied by a vast convoy of law enforcement. As arrests, bitter cold, and Christmas drove the campaign to extinction, those who remained watched the surreal convoy of bright lights, massive equipment, and armed escorts make its way through the empty sagebrush of the high desert. The scene underscored the reality that government reflexively provides the fossil fuel industry the tremendous subsidy of police and military protection whenever it encounters opposition, thus making economic calculations extremely nebulous.

Interestingly, the massive expansion of the North American fossil fuel system currently underway is largely dependent on the price of oil remaining far above its historical average (i.e. staying where the saboteur is pushing). The industry has devised methods of extracting hydrocarbons from devastated earth beyond enumeration in recent years, but they tend to be financially and logistically intensive and to occur in places which are far from refineries and subject to significant transportation constraints. Many Canadian tar sands projects are experiencing declining investment as pipeline projects languish and profitability remains contingent on the uncertainty of high oil prices. (3) In North Dakota's Bakken Shale, landlocked and far from refineries, extraction is only profitable for as long as oil sells at over $80 perbarrel. (4)

Thus, sabotage—indeed, activism in general—has highly unpredictable effects when it influences the complex economics and logistics of the fossil fuel empire. In some scenarios, a general increase in oil prices can translate into projects like the tar sands—arguably even more devastating than other forms of oil extraction—remaining viable when otherwise they would have failed.

If North America has an equivalent of Saudi Arabia's Abqaiq, it is Cushing, Oklahoma. Buying and selling of oil at this massive distribution hub, where multiple pipelines converge and tank farms belonging to an all-star cast of corporate evildoers have an 85 million barrel capacity, effectively sets the price for a type of oil called West Texas Intermediate, which in turn influences all domestic oil prices. Before the age of OPEC, when the Texas Railroad Commission still exercised production limits, Cushing was a crucial global determinant of oil prices.

Since one doesn't have to evade the entire apparatus of repression available to the Kingdom of Saudi Arabia or compete with al-Qaeda for the job of sending Western civilization into havoc, Cushing would perhaps attract the attention of a saboteur before Abqaiq. Here we can set aside for the time being the uncertain economics of sending a price shock through fossil fuel markets, and ask how, *exactly*, one would attack massive, economically important infrastructure like that to be found in Saudi Arabia and Oklahoma.

As far as oil terminals are concerned, it is doubtful the ecological saboteur's ideal method of attack would be to simply blow them up. The fleeting emotional gratification of seeing industrial infrastructure laid to waste would rapidly surrender to the horror of the resultant oil spill. If not explosives, what?

A vague but persistent sentiment pervades sabotage discussions that there are a few truly critical, vulnerable, irreparable links in the chain, the breaking of which requires only courage. Once decommissioned, the loss of these targets cascades throughout the industrial economy and sends it into havoc. If we are to take this vague sentiment and try to flesh it out in corporeal reality, Abqaiq and Cushing seem like logical places to look. But nothing about them has the appearance of ephemerality, nor that they contain crucial components which would be particularly difficult to replace. On the contrary, tank farms are exactly that: giant swaths of hulking concrete edifices filled with poison, just kind of sitting there.

There are some moving parts to oil distribution terminals: pumps, of course; quite often train tracks; sometimes massive arrays of heating coils to keep certain types of crude from solidifying; fleets of vehicles; monitoring equipment; lots of valves everywhere. If one wants to navigate the risk of post-9/11 criminal laws around trespassing at energy facilities, it's very conceivable one could sneak into a distribution hub and break *something*—but not something that doesn't already get replaced occasionally anyway; not something that would mysteriously cause a facility to grind to a halt.

Abqaiq was discussed because it is the place in the world sometimes described as most crucial to global "energy security," and this in turn led us to Cushing, which competes in the literature for the title of the world's biggest oil distribution hub. Essentially, the model we were operating in—without explicitly stating it—was one of identifying infrastructure of greatest economic importance and assessing its vulnerability. If we are to adopt a different approach—one perhaps less greedy for decisive victory by a single blow—we could begin assessing infrastructure simultaneously in terms of how important and how vulnerable it is.

This would land us very squarely within the rather bewildering and very frequently stupid terrain of energy terrorism threat modeling.

…and then We'll Brush up on our Vector Calculus

Terrorist threat modeling is no less prone to specialized terminology than any other discipline. The first and most apparent fact about the literature, rather than that it contains the decisive key to destroying civilization, is that it is predictably in love with sounding technical. One must endure things like being told an author's conclusions "should be obvious to anyone who has taken a course in discrete optimization."

But the second fact—and this is absolutely crucial to understanding the literature as a whole—is that terrorism modelers seem to have an emotional need to portray their adversaries as profoundly capable, relentless geniuses with globe-spanning networks of technically sophisticated infrastructure at their disposal. Thus, the magnitude of economic vulnerabilities they posit is dependent on attacks of greater coordination and expertise than have arguably been undertaken by any resistance movement ever.

There's a sense that they long for an enemy as sophisticated as they had in the Cold War, and are indulging a badly-needed fantasy that American military might is currently needed for something more than anonymously bombing Pakistani grandmothers and suppressing spontaneous and relatively ephemeral popular uprisings at home. And they certainly aren't above playing games to do it—with minimally disguised adolescent zeal, they call it "red teaming" when they pretend to be al-Qaeda or some other nefarious entity and try to figure out how to bring America crashing down.

Still, it is hard to imagine this literature can tell us nothing. The paradigm of collapsing civilization through underground action typically rests on the very general model of cascading systems failure, i.e. the notion that the industrial economy is so massively interdependent that attacks on fragile nodes (which are too common to be effectively secured) will cascade through the system, crashing it. For instance, Aric McBay's "Decisive Ecological Warfare" expresses the idea that

cleverly applied sabotage could completely disable the whole economy, describing a scenario in which "attacks would be as persistent as militants could manage. Fossil fuel availability would decline by 90%. Greenhouse gas emissions would plummet." (5)

Numerous conceptual tools to model exactly this scenario have been developed by world governments and academics. It's immaterial to discuss in any detail fault trees and embedded systems-of-systems here, but it can be useful to understand in a general sense how threat is modeled.

For the most part, whatever the mathematical paradigm, threat is assessed at a fairly local scale and with simplifications that no one can possibly pretend are immaterial. The kind of systems-level collapse that revolutionaries discuss is precisely the kind of hyper-complex phenomenon that is incredibly difficult to realistically model. The difficulty is one of integrating all the local and particular information with all the global and systems-level information. Calculations of the ease of making fertilizer bombs must be fed into calculations of the vulnerability of electric power substations to attack. These results must be fed into calculations of how the electrical grid responds to the loss of a power substation. This in turn must be fed into calculations of how every interdependent infrastructural system is affected and how they affect all others. In the end, there is simply too much information.

The European Commission's Joint Research Center tells us that this compartmentalization, along with a failure to model resilience under attack (rather than just susceptibility to it), are the two key deficiencies in current infrastructure

vulnerability analysis. Moreover, the authors acknowledge that the embedded systems-of-systems which comprise critical infrastructure have fuzzy boundaries and such complex interactions that they defy the existing frameworks known as systems theory. (6) This is a mathematical way of the masters acknowledging they have no idea how their own tools really work, and that while they may have largely cornered the market on using violence, that's not at all the same thing as "being in charge."

Assessing the terrorist threat literature for the perfect model for destroying civilization sounds incredibly fun, but also incredibly quixotic. Maybe the best place to start would be the military's Network-Centric Effects-based operations MOdel (NEMO), which assesses systems from the perspective of an attacker looking to attack with maximum interdependent effects (it is the military, after all). (7) But it's probably far more useful to simply note that even among the most outrageously paranoid fantasies of terrorism experts, ones in which saboteurs simply end civilization are lacking.

There is no lack of paranoid fantasies. The Heritage Foundation's 2010 Energy Game, a truly ridiculous exercise in conservative politics-infused game theory, is emblematic. The modelers simulated simultaneous, coordinated attacks which completely cripple an enormous array of globally valuable oil infrastructure. In the scenario, attackers disable US refineries where they are concentrated in Texas and Louisiana. They also render the Abqaiq oil facility inoperable. They completely shut down all marine traffic through the economically vital Strait of

Malacca by attacking multiple tankers and then mining the Strait with detection-resistant polymer-coated mines. Just to be clear about their commitments, they send Cushing, Oklahoma up in flames, too. (8)

If you've ever had trouble getting a room full of people to agree on a banner hang, you should be very intimidated by this list of attacks. It is arguably far beyond the scope of anything even attempted by anyone. A paper summarizing the international Energy Infrastructure Attack Database describes no instances of anything remotely like this ever happening. (9) Nonetheless, while the Heritage Foundation's modeled effects for this massive attack are considerable—oil selling at $250 a barrel and $325 billion in lost gross domestic product!—it's a very far cry from a complete disabling of the industrial system. The analysis hits a particularly deflating note when it concludes the biggest political outcome of the attacks would be a strengthening of Iran's geopolitical position. While this conclusion is of course entirely speculative, it illustrates how remote the prospect of total collapse is to most who study infrastructure vulnerability.

There are many forms of critical infrastructure other than fossil fuel infrastructure, of course. According to the US Army's *Critical Infrastructure Threats and Terrorism*, there are eleven, although some sound distinctly like things ecological revolutionaries would have no interest in attacking: agriculture and food; water; public health; emergency services; government; private defense contractors; information and telelcommunications; transportation; banking and finance; chemicals and hazardous materials; and the postal service. (10)

It is not clear that any of these systems truly has an Achilles heel. Modeling of attacks on other types of infrastructure also fails to yield scenarios in which civilization collapses. For instance, powerline sabotage—a tactic quintessentially associated with ecological resistance—is mathematically optimized under a Naval Postgraduate School model called the Vulnerability of Electrical Grids Analyzer (VEGA). VEGA simulates power flow, then disruptions to that flow (attacks), and coupled with information about how long electrical system components take to replace, calculates the overall disruption to the grid.

In one permutation of VEGA, modelers attack a portion of the US power grid with approximately 5,000 buses, 500 generators, 3,000 loads, 5,000 lines, 1000 transformers, 500 substations, a total demand of 60 gigawatts (GW) and a total capacity of 70 GW. A hypothetical cadre of ten saboteurs carries out the most damaging attack the model can find, which happens to be on three particular substations and one particular line. Nonetheless, even this mathematically-optimized ten-person attack yields only an unmet demand of 2.8 GW system-wide—the affected grid continues to operate at 95% capacity. (11)

The modelers are big on math and overestimating their opponents, but not huge on creativity. Thus the literature is of little value to militants looking to think up creative new tactics. When the experts cease all modeling or formal analysis and simply write lists of conceivable attacks, they tend to be based on real incidents (only in some cases massively upscaled), resulting in a predictable litany of refinery bombings, assassinations,

kidnappings, and pipeline attacks. (12)

This tour of infrastructure threat modeling is not by any means intended to be comprehensive, or even particularly thorough. Hopefully, however, it suffices to provoke critical thought among social movement participants—to help us evaluate what assumptions we're operating under and consider how explicitly we should try to develop our political strategies.

Ultimately, models are precisely that, and real-world instances of concerted efforts to cripple industrial systems through sabotage are worth taking far more seriously.

Or We Could Just Start Taking Hostages

For decades, Marxist guerrillas have waged a fairly concerted war of sabotage against the Columbian energy system. In Iraq and Nigeria in the 2000's, militants engaged in chronic, large-scale attacks against oil infrastructure. There have been other regions that saw relatively high concentrations of energy sabotage in recent years, but none on the scale of these three cases, and none with more pronounced effects. They thus serve as a dataset to examine the effects of asymmetrical warfare targeting energy systems, and specifically energy systems dependent on highly dispersed networks of infrastructure with relatively little redundancy (namely, oil pipelines).

Iraq certainly stands out as the most violent, the largest-scale, and often the most dramatic of these campaigns. From 2003-2007, frequently with the very explicit intention of disabling the ability of the country to export oil, militants attacked oil infrastructure more than 500 times. (13) 2006 alone saw almost 160 attacks. The scope of this assault on the fossil fuel industry is difficult to overstate. The Institute for Global Security Analysis provides an index of every incident, each one described in a few terse sentences. For instance, the entry for August 19, 2004, describes what they simply designate as "Attack #96":

"attackers infiltrated the Basra headquarters of the Iraqi Southern Oil Company setting a fire that obliterated warehouses containing drilling equipment, among other items, spread to the firm's offices, and cut electricity. "They came in droves, surrounded the building and looted it before setting it on fire," said a company official. Firefighters arriving at the compound were shot at and fled." (14)

After reading a few hundred of these, most people would find it hard to say that Iraqi insurgents didn't make a very sincere effort to cripple the regional fossil fuel economy with sabotage. The vast majority of the attacks were pipeline bombings which did in fact shut down oil transport for a period of time—just not for nearly long enough, and the shutdowns didn't cascade through the Iraqi system and crash it.

Iraqi oil production virtually ceased after the US invasion, but returned to the pre-invasion level of roughly 2.5 million barrels per day (bpd) by 2004. That year, as pipeline bombings proliferated, oil production never fell below 2 million bpd. For all of 2006, the year of greatest attack intensity, oil production in the country was at or above 1.6 million bpd. (15) This is a very significant reduction, especially because at the time of the invasion US planners stated their intention to double exports. It is not, however, crippling the whole system.

It is extremely difficult to imagine a more concerted and dedicated campaign of underground actions against fossil fuel infrastructure than what has already occurred in Iraq. It is crucially important to note that it was undertaken by people whose commitments to their cause very frequently superseded their desire to live. Imagining anti-fossil fuel activists from developed and privileged nations committing to this level of self-sacrifice, on this scale, is so truly absurd as to not be worth quipping about. Moreover, the insurgency took place in the context of a population sympathetic to acts of sabotage totally lacking from the landscape of the Global North.

Despite this, nothing that got broken couldn't simply be replaced, and most of it rather expeditiously. The case of the Iraqi insurgency provides a great deal of evidence about the vulnerabilities of highly dispersed networks of infrastructure with relatively little redundancy. Namely, the intuitively appealing notion that they are easy to crash—because they can be attacked anywhere, and these attacks will cascade through the system—appears false.

In fact, the lesson would appear to be that such networks of highly dispersed infrastructure with fairly little redundancy are virtually impossible to secure, but also incredibly resilient to attack. If you break something, they will fix it. If you start breaking things over and over again, they will employ a cadre of specialists whose primary function is to fix what you break rapidly, as a calculated aspect of their operations.

Militants waged war on the oil industry in Nigeria at the same time Iraqi infrastructure was so frequently in flames. This campaign was very different from the Iraqi one in terms of its origins, social dimensions, and to some extent its modes of conflict. Oil industry attacks were primarily carried out by the Movement for the Emancipation of the Niger Delta (MEND), a movement mostly comprised of people of Ijaw ethnicity who have suffered directly and brutally under the oil industry. MEND's campaign came roughly a decade after nonviolent oil industry resistance among the Ogoni was suppressed by the Nigerian government. Thus, the Nigerian campaign operated with a conception of the oil industry as inherently poisonous and destructive (but also with a desire for the wealth of oil corporations—politics is nothing if not complicated). (16)

If the Iraqi attack on oil was characterized by large explosions and unrestrained violence, MEND's was more reserved in it terms of carnage but also more prone to improbable feats of heroism. Over 200 foreign petroleum workers were kidnapped, but most were released for ransom. MEND mastered the art of attacking offshore oil drilling platforms from the same high-speed boats they used to navigate rivers, providing for a few truly spectacular David and Goliath moments in which dirt-poor resistance fighters with few resources dealt significant blows to the hulking ocean fortresses of multinational corporations and made off with their personnel. (17) As in Iraq, pipeline bombings were the most common form of assault.

The Nigerian resistance, despite never reaching the same fever-pitch of raw attack frequency as occurred in Iraq, had a tremendous effect on the oil industry. Between 2006 and 2009, MEND reduced Nigerian oil output by roughly 30%. (18)

Because multinational corporations had only the protection of the Nigerian government, their stated goal of driving said corporations out of the country seemed reasonably plausible. This point is illustrated by the writings of a breathless Western security analyst in 2008:

"Indeed, as I write attacks continue on almost a weekly basis as the price of oil climbs … What is the next step in this violent trend, and what will the next phase of violence look like? … as state and non-state actors cascade into this unfamiliar territory in a quest for rich mineral resources … they should examine the escalation of violence in Nigeria." (19)

Such words are encouraging, but ultimately the oil industry was able to continue operations during the intensive phase of resistance. While MEND continues to exist and to actively plan for the end of multinational oil in Nigeria, offers of amnesty to MEND fighters, the jailing of a leader, and greater representation of Ijaw people in electoral politics has deprived the movement of momentum.

The campaigns in Iraq and Nigeria were both fairly ephemeral. The Revolutionary Armed Forces of Columbia (FARC) and the National Liberation Army (ELN) have waged a far more sustained war on the Columbian oil industry. Pipeline bombings began in 1986 and continue to the present. Patterns of activity have varied over the years. The early-2000's witnessed a tremendous surge, with 177 attacks on the Cano-Limon-Covenas pipeline in 2001 alone, shutting it down for all but 99 days that year. (20) 2013 also saw a peak in activity, with a bombing campaign of renewed intensity and attacks on the camps of oilfield workers. (21)

Despite bombing the Cano-Limon-Covenas pipeline so many times it is colloquially known as "The Flute" (the Columbian government estimates more oil has spilled from it as a result of bombings than spilled in the Exxon-Valdez disaster), FARC and the ELN have not destroyed the Columbian oil industry. Curiously, in fact, while oil production declined as a result of sabotage in Iraq and Nigeria, it has risen in Columbia in precisely the window of time militants renewed the frequency of their actions. In 2010, there were 31 pipeline bombings and national oil output was 700,000 bpd. In 2013, there were 259 attacks and national oil output was over one million bpd. (22)

If it was inoperative for 264 days in 2001, then each of the 177 attacks on the Cano-Limon-Covenas pipeline that year resulted in an average shutdown of 1.5 days. This is one case in which it might be vaguely worth noting that model and reality appear to agree: the mathematically sophisticated paranoia of the Defense Department also fails to develop a pipeline attack scenario which disables a system for very long. (23) Pipelines appear easy to blow up but also relatively easy to fix.

Other campaigns against fossil fuel infrastructure have likewise relied heavily on bombing pipelines. Of 8602 worldwide energy infrastructure attacks occurring between 1981 and 2011, over 80% are bombings. (24) Pipeline bombing, on account of the consequent oil spill, is a tactic ecological militants would be unlikely to adopt. Nonetheless, tactics by which civilization could hypothetically be sabotaged out of existence have simply never been articulated. It is certainly worth examining the real-world efforts

of militants to destroy energy systems, both for the detail they provide about those types of campaigns specifically but also for their general lessons about industrial infrastructure.

Obviously, the failure of any of these movements to achieve decisive victory does not imply that decisive victory through similar means is impossible. This may or may not be the case. These failures merely illustrate that a war against industrial infrastructure is an extremely complicated proposition. To meaningfully consider such a thing is to examine the details of actual industrial systems, and to ask questions which have no obvious answer at the outset.

Fortunately, Our Enemies Are As Stupid As They Are Big

It is difficult to acknowledge that a favored aspect of one's strategy for saving the world needs evaluation of any kind. It often progresses into an anxiety that all political action is essentially futile. If we are honest with ourselves, however, many of the strategic frameworks we favor seem largely to reflect emotional bias rather than to be remotely based on sober calculation of their efficacy.

People with an emotional attachment to industrial capitalism believe, in order to validate this attachment, that industrial capitalism will be responsive to their marches and their moral high ground. As if to make clear that effectiveness is a secondary concern, they are perfectly capable of citing a nonviolent movement like the one against the Vietnam war as an ideal model of political action, despite that this movement was an utter failure (while the decidedly violent campaign of the North Vietnamese Army and the Viet Cong

was a stunning success). Likewise, however, those of us more inclined to outright confrontations with power have an emotional bias to believe such confrontations will be fruitful, and a seemingly equal ability to disregard contrary evidence.

The claim that industrial civilization can be crippled with sabotage, in an age when the acidifying ocean rises up to devour the burning earth, is morally significant. It is impossible to imagine that such a claim is not worth evaluating carefully, but also impossible to imagine that it can simply be considered valid without scrutiny. When we discover our previous notions were inaccurate or uncertain, it allows us to engage in a far more meaningful and informed analysis of what options are available to us.

If one thing makes itself clear from the security literature, it's not that Western military power is weak, or that the industrial system it guards is fatally vulnerable—rather, it's the unmitigated stupidity of power. While the prevailing political-economic order appears awfully hard to beat in a physical contest, it continues to blunder through the world with what can only be described as utter haplessness. Security paranoiacs consistently overestimate the ability of tiny cadres of technically sophisticated saboteurs, but they consistently underestimate, in almost unimaginably idiotic ways, the anger and power of masses who have decided there is nothing left to lose. Iraq is a rather obvious example.

Because collective action is utterly failing to halt ecological death, it is tempting to veer into a realm of thinking in which a dedicated elite initiates a decisive series of events. There is no reason not to consider under what conditions such

a scenario could occur. However, there's a real danger in essentially indulging a mutual fantasy with our oppressors, they needing to justify their apparatus of repression and us needing to feel like a far more powerful threat than we actually are.

The stupidity of power is worth thinking about very seriously. If being stronger than our enemies is not a viable praxis, it makes sense to consider being emphatically, programmatically smarter. Recall the admission by the European Joint Commission that nobody really understands the interrelationships of infrastructure. It begs the question of what advantages can be gained simply by understanding the global political-economic system better than those foolish enough to believe themselves in control.

The insights aren't necessarily going to involve crippling everything with sabotage alone, but maybe they'll tell us in what social movement contexts sabotage is most likely to be effective, or maybe they'll help us understand how to push back against the criminal justice system enough so that someone burning a bulldozer doesn't risk decades in prison.

Just as likely, though, better insight into how the systems we are trying to affect work might simply compel us to do something new. As the ecological crisis progresses along an almost unbelievably dire trajectory, and existing frameworks for political action fail spectacularly to do anything about it, the incentive to try to dream up new ways to fight, new ways to achieve our ends, is considerable.

Meaningfully assessing our abilities and imagining legitimately new prospects for political action would be aided by more rigorous processes for evaluating our ideas. As is hopefully apparent, beyond a specific assessment of sabotage, this writing is intended to advocate for more methodical inquiry of movement strategy in general.

A few recent assessments of resistance efforts have attempted to quantify their effects, with decently illuminating results. A report on efforts against the tar sands and its associated infrastructure describes declining investments in new projects and estimates the lost fossil fuel revenues and averted carbon dioxide emissions. It helps us assess in clearer terms precisely what is to be gained by mobilizing massive public effort around a single fight which is supposed to be emblematic of a larger issue—and precisely what is to be lost. (25)

Likewise, the general resource conflict literature attempts to measure the effects of various forms of opposition to industrial activity in various contexts. For instance, an analysis of 50 worldwide resource extraction projects that met with significant opposition, primarily in the Global South, found significant correlations between certain conditions—like opposition beginning in the planning stages—and victory. (26)

More methodical inquiry of this sort could allow us to discuss strategies on a far more solid foundation than we currently do, where everyone essentially operates with their own idiosyncratic headful of vague intuitions about social change. We will not have a perfectly scientific approach to resistance, but many of our assumptions could be far more intensively investigated.

Trying to understand the world better than the

people breaking it is an important part of fighting them. Let's remember that police departments have upper intelligence thresholds as a hiring criterion, and that those who tell the cops what to do take orders from an invisible man in the sky.

These do not sound like invincible enemies.

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