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The psychology of accident investigation: epistemological, preventive, moral and existential meaning-making

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This paper extends research on accident investigation as exercises in political sensemaking, by considering the possible psychological meaning-making purposes of accident investigation. Accident investigations and reports serve epistemological or preventive aims: finding out what went wrong and avoiding recurrence. These are not necessarily the same: the variables that explain a particular event might diverge from those that help forestall a larger family of events. In addition, accident investigation serves moral and existential purposes. Accident investigations are (often implicitly) expected to render people's suffering accountable to reason and open to solution, prevention and elimination. The Western world tends to locate both the meaning and cause of suffering in the realm of human moral choice, which typically condenses accounts of failure down to single acts and actors. This competes with increasingly complex epistemological narratives of accidents that have neither obvious causes nor clear, linear cause–effect relationships.

Keywords: accident investigation; human error; epistemology; eureka part; complexity; prevention

Introduction

This paper takes a psychological perspective on the practices and products of accident investigation. It sees accidents as fundamentally disruptive events that call into question the validity of existing beliefs, world views and assumptions about the nature, location and distribution of risk (Lanir 1986; Turner 1978), and suggests that accident investigation is a psychological exercise in epistemological, preventive, moral and existential meaning-making (See Table 1):

- Epistemological: establishing what happened,
- Preventive: identifying pathways to avoidance.
- Moral: tracing the transgressions that were committed and reinforcing moral and regulatory boundaries.
- Existential: finding an explanation for the suffering that occurred.

Even though accident reports are *prima facie* written in an epistemological vocabulary of facts, findings, causes and effects, additional vocabularies intrude as other purposes make their presence felt. These are, for example, vocabularies of exhortation (e.g. to do

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Table 1. Different psychological purposes of accident investigation.

Purpose	Criterion	Vocabulary
Epistemological	Explain what happened	Findings, causes and effects
Preventative	Explain how to avoid recurrence	Exhortative
Moral	Explain deviance	Allusive, denunciary and instructive
Existential	Explain suffering	Outrage

things differently in the future), of allusion, denunciation and instruction (pointing out which boundaries were crossed and what not to do), and sometimes even vocabularies of moral outrage about the suffering caused by the accident. It will be argued that the same things that make an accident investigation satisfying with respect to one of the purposes (e.g. epistemological) can make it unsatisfying with respect to others (e.g. the existential). Epistemological insights into complexity and drifting into failure, for instance, attest to the difficulty (or even impossibility) of pinpointing a narrow set of 'causes' that link linearly to the observed effects (Dekker, Cilliers, and Hofmeyr 2011; Dekker and Pruchnicki 2014; Mandis 2013; Snook 2000). This can challenge the identification of preventive measures (as there is nothing obvious to 'fix'). More troublingly, it can undermine existential assurances that the suffering caused by the accident was narrowly context-dependent and thus localised and isolated. It can also dilute what is seen as fairness and accountability: if there is no 'Eureka part" to point to, no agent to whose mistake events can be attributed, then it becomes difficult to hold people accountable (Sharpe 2004). What makes this harder still is the 'banality of accidents' (Vaughan 1999) that the vulnerable conditions, rule transgressions or mistakes were not unique to that event or had no demonstrable causal connection to that particular outcome.

A 'thin' explanation for different epistemologies: political sensemaking

A deeper reflection on the above extends the previous research on accident investigation as exercises in political sensemaking (e.g. Perrow [1984]; Gephart [1984]; Sagan [1994] and, more recently, Brown [2000]). Political sensemaking involves different actors or agencies for whom accident reports serve hegemonic and legitimation functions. In other words, accident investigation is about pursuing agendas and protecting interests – from pushing lawmakers to do something about fatigue management in commercial aviation, for instance (O'Hare and Roscoe 1990), to protecting a country's manufacturing base from demands for expensive redesign (Byrne 2002), to shielding a government regulator from scrutiny of collusive practices (Shiavo 1998). This thesis sees accident investigation as an exercise in power. It involves different actors or agencies with competing interests, purposes and motives, which lead to the production of different descriptions of reality. These descriptions are mobilised politically for making sense of organisational activity and defending established interests, whether articulated or conscious or not. Such political processes of competition are also implied in theories that take bureaucratic and administrative processes of organisational risk control as their central concern, e.g. man-made disaster theory (Pidgeon and O'Leary 2000; Turner 1978), and they have figured largely in the recent accident post-mortems as well (Vaughan 1996).

The political sensemaking thesis can explain how two competent authors, or two well-resourced agencies, looking at the same set of facts and materials from a case, can come up with rather divergent stories and conclusions (Catino 2008; Galison 2000). Such

Table 2. Differences in conclusions from two official investigations into the same accident.

Conclusions of the aviation authority	Conclusions of the airline
Air traffic controller did not play a role	No standard phraseology, inadequate language and inattention by air traffic controller
Pilots' inadequate use of cockpit automation	Inadequate automation database provided by vendor
Loss of pilots' situation awareness	Lack of radar coverage in the area provided by authorities
Pilots' failure to revert to basic navigation	Overconfidence in automation sponsored by vendors
Efforts to hasten arrival by pilots	Workload increase because of sudden air traffic controller request to change runway

divergence is evident not only from numerous revisionist accounts of accidents – often written by insiders or researchers legitimated to speak about events in ways that differ radically from official accident or inquiry reports (Byrne 2002; Feynman 1988; Jensen 1996; Snook 2000; Vette 1984) – but also from different official inquiries. Two official investigations into the same accident in 1995, for example, produced radically different conclusions (see Table 2). One was conducted by the airline whose aircraft crashed in the mountains. The other was conducted by the civil aviation authority of the country in which the accident occurred, and who employed the air traffic controller in whose airspace it took place (Dekker 2006).

Also, it is not merely their conclusions that differ. Both stories narrate the same broad events, with the same players in it, but still they tell two entirely different stories which presage their respective (and different) conclusions. Political agendas in accident investigation are pursued by omitting, marginalising and selectively highlighting. Obvious remedies to such selectivity and protective manoeuvring involve greater democratic oversight and public transparency. A similar explanation is one that relies on differences in expertise, perspective, and background of the investigators and analysts involved (Svenson, Lekberg, and Johansson 1999). Such differences not only produce divergent accounts, but in themselves constitute a call for plurality and multidisciplinarity in the investigation process so that multiple voices are heard and given legitimacy (Healy 2003). In any understanding of complexity, however, such explanations are relatively 'thin' and their solutions almost trivial. All it says is that the empirical richness of an accident allows for multiple readings, for cherry-picking and for the pursuit of particular motives. Of course it does all that. Also, the remedy is as obvious: partisan pursuits in an investigation can be controlled by inviting multiple views and voices on the same event, by exposing all of them to mutual and democratic scrutiny, and by making conspicuous who contributes with what. This, however, is not uniformly done, if at all. Accident reports are rarely held to the same standard of source referencing as even some forms of journalism are. Though ultimately sanctioned by a board (typically composed of political appointees), accident reports often make it impossible to trace where a particular line of reasoning germinated, which 'facts' were left out, or which party contributed heavily to a particular conclusion.

Towards a 'thicker' explanation

A 'thicker' postmodern or critical explanation is possible, and perhaps even necessary. When we choose words and construct plots to order an accident history, we give the

crowded past and disordered chronology an order and a unity that neither the 'facts' nor the past possessed (Cronon 1992; Fischhoff and Beyth 1975). Our words bring facts into being (e.g. 'the pilots' failure to...'); our choices of where to look and what to call it *create* the epistemological world, the object of our accident investigation. Such a post-modernist critique on narrative not only questions the stories told, but questions the aims that motivated us in the first place to tell them that way – whether these aims are even obvious to us or not. It is in this negotiable space of any epistemological project, where other purposes can nestle and find their expression. There is something silently parasitical about this: other purposes can appear as if they were merely epistemological, i.e. they are offered in a legitimate vocabulary of facts, findings, causes and effects. However, while they do this, other concerns and commitments are communicated altogether.

In this paper, it is suggested that the different *psychological* purposes of investigation can be as much in competition with each other as the political forces that compete for dominance in establishing a narrative of the accident. Where the political explanation almost necessarily relies on competition between *different* parties or stakeholders, the psychological one suggests that competing meaning-making functions of accident inquiries can exist *within* single agents (e.g. an investigator) (Hilton 1990). This can lead to possible compromise and contradiction in the narratives suggested by them even before they are submitted to political scrutiny and control.

The epistemological

The epistemological purpose of an accident investigation is perhaps the most obvious one. In the words of many investigations themselves, it is to establish what happened. As an activity mostly rooted in engineering, this has long been seen as unproblematic (and in many quarters still is) (Galison 2000). With enough resources, the assumption has been that it is possible to factually or *accurately* establish what happened. The idea of 'epistemological accuracy' derives from a Cartesian–Newtonian vision of the world, where knowledge is a matter of correspondence between facts in the world and some mental or textual representation. Facts, in this regard, are discoverable and ultimately all knowable. The more facts an investigation collects, the more accurate the story, or representation, of the event can become (Dekker, Cilliers, and Hofmeyr 2011). A good investigation not only produces all the facts, but also builds an explanation that is exhaustive, i.e., accounts for all of them. Loose ends or unexplained facts undermine the epistemological project, and thereby, as the chief of the US investigation board said after the Trans World Airlines 800 accident, undermine 'the credibility of this agency and the credibility of the government to run an investigation' (Dekker 2011a, 75).

However, the accuracy is not enough. An epistemological account also has to be plausible, that is, link causes and effects in a believable way. In a Cartesian–Newtonian universe, such links are linear and proportional. Greater effects are generally believed to need bigger causes. Also, in such a universe, broken parts can account for broken systems. The (non-)functioning of the whole can be explained by reference to the parts (Leveson 2011). A plausible epistemological account is one whose narrative carries the plot on its inevitable downward sweep. A resume of a recent aviation accident report on a Boeing 737 that crashed shortly after take-off at night, is a good example of that. It describes how the pilots of the Boeing 737 jet had not noticed that the autopilot had not switched on (Dekker 2006, 44–45). At the same time, the captain got confused about which way the aircraft was turning and rolled the wings the wrong way (perhaps he was mixing up his old Russian artificial horizon display with the American one he was looking at now). The

first officer never intervened. The aircraft 'tracked inexorably towards what would be a dumb-founding revelation'. The first officer 'misunderstood' that you cannot engage the autopilot if the wings are not level, but he tries anyway. The captain was flying and 'evidently failed to register' what was going on, assuming 'that the autopilot was engaged and had control', which it did not, the report points out. With 'less than a minute before impact', the captain 'misread' the attitude indicator, 'confusion is evident', and an 'unhelpful reassurance' from the co-pilot only 'served to further mislead the captain'. 'The pilot continued to roll the wrong way. The situation turned critical' and then became 'irretrievable'.

A 'good' epistemological account in the traditional sense, then, is accurate, plausible, and exhaustive: it accounts for all the facts, and explains which causes were responsible for which effects in a believable way (which generally implies symmetry of their size/importance). Or so the Cartesian−Newtonian world view would have us believe. In an increasingly complex world, what constitutes a 'good' epistemological account is no longer so obvious. Complexity theory and system thinking have shown that 'effects' in a complex system *emerge* from the interaction between a multitude of different parts (which is often the normal work of what is seen by everyone as a normal system), rather than that they *result* from the (mal-)functioning of a single part (Leveson 2011). Also, a 'good' epistemology in complexity does not mean a single narrative. Different descriptions of a complex system decompose that system in different ways that cannot be reduced to one another. The knowledge gained by any description is always relative to the perspective from which the description was made. Also, only a limited number of characteristics of the system can be taken into account by any specific description (Dekker, Cilliers, and Hofmeyr 2011). What this means is that a 'good' epistemology of a complex system does not claim that one description is true and that all others are false, but rather that multiple descriptions can and must be made at the same time – partially overlapping and contradictory. In complex systems, there is no proportionality between cause and effect. And by extension, a complex epistemology does not commit to a Newtonian proportionality between cause and effect. Small 'causes' can be amplified hugely by the normal interactions and interconnections and multipliers in a complex system. (De Carvalho et al. 2009; Dekker 2011a; Vaughan 2005). In summary, then, the 'new' epistemology of system failure is suspicious of single causes, resists cause−effect symmetry and acknowledges that multiple (contradictory) narratives of the same event can be true at the same time. These are precisely the characteristics against which other psychological purposes of accident investigation militate – particularly, the moral and existential ones.

Prevention

An obvious purpose of accident investigation and accident reports, after putatively telling 'how it was,' is prevention. This is often stated officially as the most important (or even sole) purpose of accident investigation. What, then, is the overlap between *explanatory variables* (those that carry the epistemological or explanatory load of a specific instance of failure, in a particular context) and *change variables* (those that could amend and fix things in the system that produced the failure so as to prevent recurrence) (Stoop and Dekker 2012)? At first sight, it would seem that these two coincide comfortably. However, consider some cases in which they do not. In fact, a focus on explanatory variables can sometimes make prevention more difficult, as it locks attention onto the details of a specific instance (e.g. of a 'human error' or 'procedural violation') and fails

to consider the wider conditions of possibility that made the error inevitable or the violation desirable.

One example is the recurrence of hand injuries in contractors maintaining megatrucks used in the mining industry. Careful investigation of each instance revealed explanatory variables: the variety of places in the machinery where hands were most likely to get hurt, during which procedures, and with what shortcuts and improvisations that contractors applied. What these insights and subsequent interventions (e.g. more stringent procedural compliance demands) did not do was prevent the same injuries from occurring, nor did they reduce the injury frequency. It was only when it was concluded that most injuries occurred in the field, when trucks break down along the side of the dirt roads and require maintenance there. The change variable introduced in the business was to significantly invest in preventive maintenance – replacing parts and systems on specific (and short) intervals rather than running them to failure. Preventive maintenance takes places in hangars and workshops – controlled, well-lit, better-resourced and well-equipped environments where injury risk has traditionally been much lower. Explanatory variables, in other words, had little sway over the eventual change variable.

The distance between explanation of a specific instance and prevention of a family of occurrences also becomes visible in the immediate practical aftermath of many accidents. Industries and other stakeholders often pre-empt official findings (which may take months to be issued) by generating advisories, warnings or even pursuing redesign of critical systems so as to prevent recurrence. An official rendering of explanatory variables apparently has a limited role in either the substance or timing of such preventive activities. It also raises questions about the need to spend significant public resources on finding out or making official what everybody in the industry already knew (Perrow 1984). That said, the multiple divergent, and sometimes overlapping or even contradictory initiatives that typically follow an accident, supports the notion that 'controlling' the accidental is an oxymoron (Green 2003). Knowing what went wrong in a specific instance does not exactly offer us the certainty of knowing how to control future instances of (similar) failures, thus inviting or even necessitating – at least in principle – a multitude of interventions and initiatives.

Moral

A third psychological purpose of accident investigation is moral, or boundary maintaining. This comes foremost from a neo-Durkheimian idea originally driven by researchers such as Erikson (1966) and Cohen (1972). It proposes that the sociological problematics of ruling, rule enforcement and rule observance are dealt with by institutions of social control that reveal, and have languages to put to shame, boundary-transgressing behaviour of members of a profession. In most cases, investigation boards do not officially belong to the family of rule-regulating institutions – they are tasked not with enforcement but with prevention. This is not always easy to separate, however. Even investigation reports can become usurped in an official, public delineation of moral boundaries. Take the example of a regional jet that crashed on a ferry flight as a result of flying at too high an altitude. The investigation report cited only the following as the causes:

> the pilots' unprofessional behavior, deviation from standard operating procedures, and poor airmanship; the pilots' failure to prepare for an emergency landing in a timely manner, including communicating with air traffic controllers immediately after the emergency about the loss of both engines and the availability of landing sites and the pilots' improper management of the double engine failure checklist. (NTSB 2007, 75).

Anything to do with the aircraft, engine susceptibility to problems, pilot training and clarity of checklists and manuals was left unsaid or rendered merely contributory. Reports like this:

> act as boundary-maintaining devices in the sense that they demonstrate where the line is drawn between behavior that belongs in the special universe of the group and behavior that does not. (Erikson 1966)

Highlighting deviance, according to this idea, performs ancillary cultural work (Rock 1998). The transgressor provides an occasion for the clarification or reaffirmation of a rule or a line, and thus renders an important service to other members of the group who might learn more clearly than before what they may and may not legitimately do (Cohen 1972). Accident investigations help locate the source of trouble not only in a small nucleus of human agency (Galison 2000), but a nucleus around which clear boundaries existed, and which were, on this specific occasion, transgressed. What seems to be offered here is not just a vocabulary of facts, findings, causes and effects. It is, rather, a vocabulary of moral allusion (e.g., to professionalism), denunciation (e.g., "deviation" and "poor airmanship") and instructions to others (e.g., prepare for an emergency landing in a timely manner). Yet this vocabulary is dressed up as epistemological too. By placing it among the causes of the accident, it is transmitted as if it were a legitimate epistemological explanation of what went wrong and why. Yet by engaging an allusive, denunciatory and didactic language, the accident report can simultaneously import and denounce the statutory or procedural transgressions that were committed, and hint at the moral ones underneath.

Enunciating a moral commitment in a bureaucratic setting, under the banner of bureaucratically more legitimate purposes, is not without precedent. In fact, it has been argued that doing so is necessary for the effective functioning of any bureaucratic body. Sociological explanations take the reasons for moral enunciation by bureaucracies outside the societal function of patrolling boundaries and instead direct it inward to the bureaucratic enterprise. Moral commitment is said to sustain the political will to fund the agency, to develop coherence and consensus among in-group members of the bureaucracy, and to facilitate selective recruitment and retention of like-thinkers while repelling those who would detract from its goals (Dickson 1968).

The existential

Finally, the practices and products of accident investigation can be illuminated by a sociological and a theological literature on suffering. This literature allows us to locate accident investigation in the social dynamics of cultural reproduction and exchange: accident investigation offers not only institutional, but cultural inscriptions that help suffering attain meaning. This literature typically uses anxiety as its starting point. The sociological part of that argument, roughly, is that modernity has brought with it both an explosion of high-technological risks that can cause suffering (related to, for example, food safety, transport, energy, ecological, and more), *and* the communicative means to engender a heightened consciousness of and concern about this (Giddens 1991; Wilkinson 2001). Accident investigation, according to this literature, serves to identify and highlight risk, make it intelligible, and offer the succour of containing or controlling it (Galison 2000; Green 2003).

Implied in this is the conviction that the suffering caused by accidents is *not supposed* to happen; that a world in which risk is controlled, contained and its consequences absent,

is not only desirable but feasible. This is most explicitly communicated in 'zero-vision,' a commitment to *no* harm whatsoever made by many industries around the world (Zwetsloot et al. 2013). Note how this might share the vision of suffering promulgated by the Judeo−Christian tradition, which, most scholars agree, offers the master template on which the West's moral development has largely been scripted (Armstrong 1996; Douglas 1992; Pagels 1988; Wright 2009). In this tradition, it is legitimate to promise a world without suffering, and even small efforts to make it so are typically celebrated and valorised (Anderson 2009; Wright 2009). It is possible that the cultural residue of this salvation narrative lends accident investigation in the West moral weight. Sociocultural traditions more accepting of suffering might not do this to the same extent. Such cultural traditions tend to emphasise *compassion* ('suffering with') over the investigation and elimination of suffering (Berlinger 2005).

However, scholars also agree that this cuts two ways (Wilkinson 2005). The Western tradition has long located both the meaning and cause of suffering in the realm of human moral choice. In this tradition, memories of, say, natural disaster have become narratives of catastrophe due to human error and transgression. For example, a major flood might have morphed into a myth of sin, sanction and selective salvation (Noah), as did that of a volcanic eruption (Sodom and Gomorrah) (Anderson 2009). In a hyper-rational and largely post-secular society, license for the development of such narratives is virtually extinct, of course, but the need for the psychological service they provide probably is not. The early Christian theologian and philosopher Augustine too, emphasised that people would rather feel guilty than helpless. He rightly concluded that people would be willing to accept versions of disaster where human suffering occurs because of human fault. This template, offered in the early centuries of the Common Era, has become the accepted interpretation of, for example, the story of Adam and Eve (Armstrong 1996; Pagels 1988; Visotzky 1996), and has continued through Enlightenment and secularisation by putting the moral and rational human subject at the centre of society's successes and failures (Dekker 2011b).

Our descriptions of suffering, whether pre-modern narratives or modern accident investigations, seem to take place under the compulsion to render people's suffering accountable to reason and open to solution (Wilkinson 2005). In the West, this impulse almost inevitably inspires narratives of disaster or accident with a moral calculus of rational human choice. It links the existential question of why suffering occurs with moral questions, even the preventive ones. Just consider how we do not typically get upset when we see findings of 'human error' or 'procedural violations.' Our moral−cultural scripts, thousands of years in the making, have made this expectation natural. Also, more recent centuries have made our deliverance from suffering by pointing to clear 'causes' of risk consistent with reason and science (Beck 1992). Indeed, if nothing else was broken, we get upset when we do *not* find human choices or transgressions as easily localisable causes. Snook (2000), vexed by the loss of 28 lives in a friendly fire accident over Northern Iraq in 1993, came to such an experience. And he did not seem to like it at all (203):

> This journey played with my emotions. When I first examined the data, I went in puzzled, angry, and disappointed—puzzled how two highly trained Air Force pilots could make such a deadly mistake; angry at how an entire crew of controllers could sit by and watch a tragedy develop without taking action; and disappointed at how dysfunctional [the] Task Force must have been... Each time I went in hot and suspicious. Each time I came out sympathetic and unnerved... If no one did anything wrong; if there were no unexplainable surprises at any level of analysis; if nothing was abnormal from a behavioral and organizational perspective; then what have we learned?

Snook's inquiry was epistemologically brilliant – and existentially lousy. It was also lousy as seen from a preventive purpose. 'What have we learned?"'he asked. Not much. But the seduction was there. Whenever he thought he found a source of failure in some person or some team, he pushed in, 'hot and suspicious.' However, being an assiduous investigator, he saw one 'cause' after another evaporate into the banality of normal work. Soon he would find normal people, who did normal work in what looked to everybody like a normal organisation (where even the dysfunctional could have become the new normal). 'Unnerved and sympathetic,' he did see the putative cause disappear, and beyond it – nothing.

What this seems to suggest is that when an investigation tries to offer a 'full accounting' of all explanatory variables, it may well fail existentially – despite its epistemological efforts. There is existential pressure to find the single-fault nucleus (Galison 2000), the 'Eureka part' (Dekker 2011a). However, epistemologies can point the other way: in Snook's case they do not condense the account of failure to that one cause, but rather explode it all over the place, into normal work and normal organisations. This becomes unsatisfying on all other counts. It may be a really good (epistemological) story, a story of complexity and emergence. But how do we control risk, how do we prevent recurrence? Whom do we hold accountable? And how do we explain the suffering caused by 28 deaths if there is no 'cause' to point to? Was that suffering in vain? It is in the conflict between these psychological purposes that accident investigations have to make meaning out of a bad outcome.

Conclusion

Accident investigations are a confluence of conflicting psychological purposes, as well as political ones. The epistemological purpose is to establish what happened, and the preventive one to find practical ways to avoid recurrence. However, moral and existential purposes play a role as well: they help trace the transgressions that were committed, find succour for the suffering that occurred and regulate moral boundaries in a profession or industry.

This paper has suggested that nailing a cause because of an existential impulse to locate the source of suffering, sacrifices the complexities and contradictions of the multiple interleaving narratives that build towards a bad outcome. Epistemologically, at least in a complex world, truth does not reside in a single story. It lies in acknowledging and celebrating the multiplicity and diversity of perspectives and stories. This may also be welcome from a preventive point of view. After all, in many explanations and angles lie many different points of attack that can help produce a better system. On the other hand, many choices or possible things to work on could also be seen as bothersome, and the idea that 'causes' of trouble are to be found in normal people's normal work might eviscerate any obvious preventive intervention. What it certainly does is create tension with other psychological purposes. The more diverse an epistemology, after all, the less of a 'good story' there is left to tell and explain the suffering; the less solace there is that others will be spared in the future. Such a diverse, rather than the condensed story, after all, refuses to point to a highly context-specific and person-specific source of a bad outcome. Also, the more diverse the epistemology, the less satisfying boundary maintaining or moral entrepreneurism becomes. For its targets will be all over the place. If everything and everyone is responsible for 'causing' the mishap, then nothing or nobody really is (Alicke 2000). If 'normal work by normal people' lies behind the bad event (De Carvalho et al. 2009; Dekker 2005), then there is no reasonable way in which those people can be held to account.

Perhaps the lesson is this. We should desist from seeking the meaning of suffering in the past, in explanatory variables. We should locate it in the future, in change variables. We should demand from investigations not a backward-looking, but a forward-looking accountability (Sharpe 2004). We should seek solace not in trite (and surely false) assurances that 'this will never happen again,' but in an understanding that error and failure are inevitable by-products of pursuing success in a resource-constrained, goal-conflicted world (Vaughan 1996; Woods et al. 2010). If we do not, then today's accident reports might, in a sense, remain mere secular simile to ancient moral scripts. In our Western tradition, these typically make *somebody* bear the moral responsibility for the outcome of choices; choices that can be constructed to have led to the disaster. For sure, such scripts localise the suffering that was caused, and psychologically insulate us from what happened by sheer context specificity of the bad event. It also gives us something to do. We can target the transgressors and transgressions involved. The problem is that such scripts are likely unjust, limited and ultimately not very helpful.

Accident investigation has a societal license to distort a messy aftermath into clarity. It is expected to evoke some kind of order, some significance, to colonise areas of intense chaos and cover them with temporary shelter. But how can they do this responsibly? Disambiguating the epistemological, preventive, moral and existential impulses that drive accident investigation may be a good place to start.

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