The Lynmouth Flood Disaster as a 'Rural Enterprise Metabolic Rift' and Securitising Rural Regions Against Future Hazards of Planetary Collapse

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Abstract

This article advances a novel synthesis of two critical theoretical positions to reinterpret the Lynmouth flood disaster of 1952 – an event which caused the deaths of 34 people. Rural enterprise criminology and the metabolic rift concept are brought into dialogue to elaborate a foundation from which to articulate the multifactorial process that eventuated in the flood. The article fills an absence in the social sciences on the significant loss of life that moves beyond descriptive narratives of the tragedy and dated positivist epistemology. The article displaces determinist explanations of natural science and popular invocations of 'acts of God' and offers an account based in rural criminology and dialectical materialism. A range of strategies and land management negligence are shown to have led to environmentally deleterious agricultural stewardship. Processes that were oriented to short-term commercial gains and conditioned by the pressures of historically specific political economic contexts. The article proposes a novel reframing of the flood and a framework to securitize rural regions against future socially conditioned environmental hazards.

Keywords: Lynmouth flood; rural enterprise crime; metabolic rift; environmental hazards; dialectical

Introduction

2022 marked the 70th anniversary of the1952 Lynmouth flood disaster which occurred in Lynmouth, a village in North Devon in the United Kingdom (UK), just over 300 kilometres west of London and which culminated in the avoidable deaths of 34 people. In addition to the catastrophic loss of life, multiple vehicles and homes were washed out to sea and hundreds were left homeless. Many bodies remained unidentified or unrecovered (Delderfield, [1953] 1991, BBC News, 2001). The loss of life, possessions and livelihoods are argued in this article to be an outcome of a constellation of social interventions into the natural landscape above and around the seaside village of Lynmouth. Interventions enacted by rural landowners for the purposes of commercial food production and other market-oriented objectives.

The drivers of the disaster were predicated in farming and countryside commerce which were conditioned by historically specific political economic arrangements that span generations. Those long-term structural conditions are aetiological features of significance that tend to be glossed in popular narratives of the catastrophe or are omitted from existing natural science literature. In response this article advances a framework for examining the societal antecedent determinants that culminated in the flood which avoids those limitations. The thesis incorporates the interplay of political economic contexts at the regional, national and geopolitical levels. Those macro conditions are shown to coincide with the particular physical phenomena of unprecedented rainfall and exacerbating topographical features of the unique rural geology of the locality. A landmass which is shown to have been mishandled by countryside custodians working under those macro conditions - occupied with efficiency saving, commodity supply chains and revenue from emerging British food markets.

This specific social-political-environmental causal structure co-determined the complex process that eventuated in massive loss of life. Sets of social mechanisms occurred at distinct historical junctures in the twentieth century. Ones as diverse as the inter-war Great Depression era of global hardship and Post-Second World War UK agricultural policies which were instated to compel food production. The complex causal structure of the event implies a mode of relational analysis that draws from a type of critical rural criminology and the dialectical materialist concept of the 'metabolic rift'.

The case study of the Lynmouth flood, which is generally recognized, reductively, as an outcome of a cloudburst that overwhelmed saturated soil systems or an 'act of God' is reconceptualised using this hybrid approach. Consequently, the disaster is rearticulated as a socially conditioned long-term preventable process. The approach is framed by a type of alternative criminology that emphasises the environmental disorganisation produced by a continuum of relations and strategies of rural personnel. The article submits that rural landowners failed to maintain optimum ecological equilibrium of the land, which was instead solely focused on industrial production. Instances of environmental malpractice and neglect were multi-layered, spanning generations, avoidable and ultimately unintended. Problems were generated inter-generationally by a range of owner occupiers, under external pressures from a disparate and challenging variety of unique socio-economic conditions. Consequently,

no readings of criminal liability are to be entertained in this work. Rather the article submits a theoretical reframing from the sphere of non-criminal harms to the environment predicated in capitalist relations of production which unexpectedly contributed to the criminogenic outcomes of multiple deaths and the total destruction of a village.

Disorganisation to the environment that contributed to unforeseen loss of life were produced in two distinct ways: (i) through the *commissioning strategies* that were predicted on enterprise-oriented food production with the goal of expanding revenue streams for farmers in the post-war period; and (ii) in the *omissions of duty* in relation to the upkeep of rivers and critical land management of precarious landscapes, such as the cliffside above the village. Omissions that indirectly accelerated the physical processes that culminated in disaster. Here the rural enterprise harms of commission and omission are discussed under the terms of the novel critical framework of 'rural enterprise criminology' (Goodall, 2023). This approach reframes research problems with a focus on legitimate social relations within a broad range of social contexts that enable licit / illicit continuums and can produce criminogenic outcomes.

To better understand the degradation of essential ecological processes, such as the neglect of critical watercourse drainage and the over-exploitation of rural land, the article applies a "metabolic rift" conceptual framework to this case (Foster et al., 2010). Metabolic rifts are severe disturbances in natural processes or ruptures with earth systems. Examples of rifts are interferences with naturally occurring systems, such as water, oxygen or nitrogen cycles, predicated in capitalist forces for production. Karl Marx first applied the concept to the diminishment of soil fertility as an outcome of the over cultivation of fields. For Marx these processes were already visible during the second agricultural revolution, which created the conditions for the emergence of commercial agriculture. As such, this concept is particularly relevant to this case, and there is substantial potential for dialogue between the two frameworks.

There is a vacuum of theorisation on how and why the disaster unfolded in the manner that it did which goes beyond deterministic discussions of rogue natural phenomena, without unraveling how these factors took shape and for what objectives. Radical rural criminology is therefore a suitable site for the reframing of the avoidable acts that led to loss of life with a concern for social structure and political economy, rather than isolating criminal law causative determinations to specific agents. The synthesised conceptual apparatus of rural enterprise crime theory and the metabolic rift advanced here is a novel exploration that aims to illuminate a broader range of empirical particulars of the flood and the prior transformations of the rural environment. Specifically, it is an account which avoids reductive explanations wedded to positivist epistemology such as the existing natural science accounts of the causes of the flood which only analyse geological and metrological processes (Moses & Knutsen, 2019: 40). This approach is in keeping with a critically minded sociological account that looks beyond rational agents and isolated variables in favour of a process-oriented explication that focuses on historical preconditions above and beyond the situated

activity of calculating actors (Edwards and Hughes 2005). The two frameworks are brought into dialogue due to their relational, structural and social ontological attributes.

The article begins with outlining the two frameworks that are later synthesised to develop a novel account of the case study. Rural enterprise criminology is introduced, followed by the metabolic rift concept. The methodology is then outlined which is followed by a general non-theoretical account of the flood, which illuminates the existing common narratives of the tragedy. The new synthesised framework is subsequently applied to develop a reappraisal of the flood for the critical social sciences and heterodox rural criminology. The article concludes by attempting to think dialectically about Lynmouth and offers principles for the forecasting of future rural hazards. Finally, this article aims to elicit wider awareness of this significant event in the twilight of a notable anniversary.

Rural Enterprise Criminology – New Synthesis Framework 1

The concept of 'enterprise crime' foregrounds the insider impropriety and illicit activity commissioned by operatives employed within an industry. Rogue actors exploit the specialist skills, networks and opportunities of their employment or duties as owners of enterprises for acquisitive illicit gain (Lord et al., 2017). The analytical focus switches to the practices, relationships and contexts in which specialists, such as countryside custodians are shrewd perpetrators and corrupted guardians, rather than suitable victims of crime or upstanding stewards of the land. Framing illicit outcomes as a social process enables the incorporation of legitimate activities in the analysis if they contribute to criminogenic outcomes and ancillary crimes as part of complex continuums.

The enterprise concept enables an interrogation of occupational specialists in their line of work at a lower-level analytical order than that of alternative theorisations such as white-collar crime and liberates explanations from the loaded 'crimes of the powerful' label (Edwards & Gill, 2002: 203; Croall, 2007: 222). Rather than over-determining analysis more suited to the boardrooms than the barns, with the more nebulous categorisation of white-collar crime, the enterprise approach designates a lower order analytical schema to conceptualise wrongdoing as *the enterprise misconduct of the pastoral personnel*, rather than 'the crimes of the powerful' (Goodall, 2021a).

Sat within the growing subfield of rural criminology, the enterprise approach can be traced back to its origins in the work of Smith (2004) who explored the dynamics of livestock farming crimes. Smith noted the instrumentalisation of meat processing and drew on the interconnections with inner urban hospitality supply-chain demands. The framework has been developed by Smith and colleagues to explore the wide variety of entrepreneurial illicit endeavors of corrupted rural business (McElwee et al, 2011; Enticott, 2011; Smith et al, 2013; Somerville et al, 2015). Typologies of illicit rural activity have been advanced in accordance with the severity of the criminal intent of the enterprise which are transposed into cognate rural green criminology on enterprise eco-waste literature (Smith, 2021). This literature foregrounds the cunning malpractice and violations of food, countryside and wildlife legislation by industry specialists, such as some farmers, land managers, countryside

estate owners and game keepers (NWCU, 2021; BBC News, 2022). The authors of the initial enterprise framework used the new approach to contrast the routinised and overlooked deviance of those employed within countryside commerce with the more commonly held notion of the 'urban marauder' targeting the rural idyll (Mingay, 1989; Smith, 2010; 2019). As such, the enterprise crime category is a heterodox inversion of the criminological gaze in contrast to a more policy focused criminology. It can be argued to represent a dichotomous critical criminological approach as it exposes and opposes rural relations of relative power and resulting injustice to nonhuman entities or environments.

Enterprise crime has since been advanced to explore the inter-relationships between compromised occupational role holders and their organisational social contexts (Goodall, 2021a). It has been argued that the forms of subtle illicit acts commissioned by those with official responsibilities in the field of rural professions are seemingly bracketed from criminological interest and deprioritised as victimless crimes (Goodall, 2021b). It can be contended that while a theft of a tractor GPS causes a rural enterprise significant financial loss, the constant ancillary offending of countryside stewards, such as unscrupulous deer stalkers, deviant badger cull marksmen, violent farmhands and unlawfully acting gamekeepers, during the courses of their unregulated nightly duties, is a more patterned form of persistent volume criminality (Goodall, 2020; Smith, 2021).

Rural enterprise crimes are 'ancillary' in the sense that the transgressive nominal countryside guardian is able to strike from under the cloak of legitimacy granted by their professional role. This can take the form of non-criminal acts such as shooting foxes, trapping birds or other forms of harmful culling and land management. From these recourses to occupational legitimacy and with the benefit of the proximal settings of inhospitable natural environments, such as dense forest, boggy valleys, fragmented property boundaries or rugged terrain, deer, livestock or other potential lucrative assets can be targeted with little risk of apprehension (Goodall, 2023).

Those conditions then intersect with the enterprise actors' position nested within an industry network constituted by haulage firms, unscrupulous intermediaries acting as informal suppliers, negligent meat processor plants or complicit underground abattoirs in which to launder illegal meats. Further downstream collaborators might include final sellers, such as colluding butchers and wholesalers or even unwitting restaurateurs (Smith, 2004; Goodall and Smith, 2025). Such a process enables the integration of illegally killed specimens with other legitimately dispatched stock thus obscuring the legal status of the carcasses within a supply chain and defrauding the traceability credentials of food items. In this sense rural enterprise misconduct is an outcome of a continuum of relations, networks and practices that can span the legitimate, illicit and harmful. For our purposes in exposing subtle facets of the preconditions that contributed to the Lynmouth flood, the concept is helpful in determining the malpractice and negligence of rural owners of enterprise and agricultural workers in the commissioning and omissions of rural industry practices that eventually resulted in dire unforeseen circumstances.

Contemporary rural enterprise crime literature adheres to the principles of early enterprise crime theory and is predicated on a relational ontology. According to this seminal literature (Edwards & Gill, 2002: 204):

> In switching the focus of research from an exclusive preoccupation with the attributes of organised criminality to the relationships of exchange between "traders" in "dirty" or "grey" markets it is possible to identify a continuum of licit – illicit markets and corresponding interventions directed at their regulation.

This approach redirects explanations away from reductive ascriptions of causation that might focus on contested monocausal features such as ethnicity, biological linage, or personal backgrounds such as 'criminal lifestyles'. Instead, our focus is "directed at the regulation of interdependent licit and illicit markets' and when events become nuanced, slips between legitimate, grey and black-market enterprise" (Edwards and Gill, 2002: 211). It also highlights "how crimes are organised rather than who organises them" which develops our analysis of the "connections between actors" and "the skills and resources required" (Lord et al., 2017: 253)**.**

Enterprise crime maintains an ontological complementarity with the following concept of the metabolic rift, due to the shared focus on social relations of production and the fluidity (of criminal) networks embedded in dynamic historical contexts. Both approaches are coherent with a post-positivist realist epistemological stance which extends their complementarity (Sayer, 2000: 13-27). They adopt methodological holism and adhere to the principles of depth ontology. This entails avoiding restricting analysis to economistic rational actor calculus, discourse, or the surface level of social learning and actor inter-subjectivity (Jessop, 2005). It can be argued that by emphasising the matrix of interlocking occupational networks, social relations and causative social contexts which mediate relations, multifactorial and geo-historical accounts of rural crime commissioning processes can be advanced (Edwards and Levi, 2008; Edwards and Hughes 2005; Goodall, 2020). In doing so an emphasis on how professional continuums and occupational positions provide fortuitous standing conditions in the facilitation of rural enterprise malpractice can be made and a refined account of the dynamic dialogue between agency and structure in complex cases such as this can be advanced (Danermark et al., 2019: 92).

The Metabolic Rift – New Synthesis Framework 2

The metabolic rift is a critical concept associated with the Marxian approach to the sociology of the environment within the wider dialectical materialist tradition (Foster, 2020). The concept can be adopted to elucidate harmful relations between humanity and the natural world in a co-evolving dialectic (Foster, 2000; 2020). Originally expounded by Marx in select paragraphs of the various *Economic and Philosophic Manuscripts* and in Volumes 1 and 3 of *Capital*, then latterly associated with the works of Engels in *Dialectics of Nature*, the approach is now associated with the works of John Bellamy Foster and colleagues (Foster et al., 2010). As the progenitor of the framework, Marx transposed the concept from 18th century chemistry into social science to provide a framework from which to identify the

nature of the relationship between industrial societies and non-human environmental systems. Specifically, of note is how the relationship between humanity and nature is mediated by the labour process in its specific capitalist mode of historical form. As Foster states: "the concept of metabolism gave Marx a more solid—and scientific—way in which to depict the complex, dynamic interchange between human beings and nature, resulting from human labour" (Foster, 1999: 381). The concept can be understood as superseding the prior concept of alienation in the mature writings by Marx. In accordance with Marx's materialist perspective on historical development, labour is a key property of the concept of 'metabolism'. It was conceived, according to Foster (1999: 381), as "constituting the complex, interdependent process linking human society to nature".

Marx became aware of the destructive tendencies wrought by new farming techniques ushered in by the wider context of the second agricultural revolution evolving concurrently with the industrial revolution (Foster, 1999). He keenly perceived the spoilation of soil health resulting from the great transition to capitalist industrialised mechanisms of food production from the preceding non-commercialised forms of agrarian subsistence. The prior feudal form being markedly less invasive, mechanised and rationalised. Marx thus articulated the exhaustion of soil minerals and chemical imbalances in ecological systems, due to the precipitous intensification of capitalist agricultural procedures as causing unnatural interferences or a 'rift' in "the social metabolism with nature". Such rifts, Marx went on to note, were compounded by the introduction of synthetic fertilizers to overcome the depletion of essential elements such as nitrogen in the initial over-cultivation processes, thus overlaying additional, or "rolling" rifts in natural physical processes (Foster, 1999: 373-376).

In the sub-section titled 'Large-scale Industry and Agriculture' in Volume One of *Capital*, Foster notes that Marx argued:

> Capitalist production… disturbs the metabolic interaction between man and the earth, i.e. it prevents the return to the soil of its constituent elements consumed by man in the form of food and clothing; hence it hinders the operation of the eternal natural condition for the lasting fertility of the soil.

Marx (cited in Foster, 1999: 379) continued in the same statement:

> All progress in capitalist agriculture is a progress in the art, not only of robbing the worker, but of robbing the soil; all progress in increasing the fertility of the soil for a given time is a progress toward ruining the more long-lasting sources of that fertility.

According to Marx and following the chemist Justis von Leibieg, from the materialist position which they both shared, practices such as ploughing, draining soils, over-cultivation and invasive extraction processes, and the application of artificial fertilizers, destructively altered the objective relations of nature. Such relations can be understood as complex planetary processes and the relationships with human society are mediated by the 'universal metabolism' consisting of labour in its particular form, as determined by the mode of production of a historical period. When this relation is mediated in a rational, non-harmful

way, Marx argued, through initiatives such as localism and labour owned cooperatives, regenerative farming or small-scale subsistence level organic agriculture, socially mediated material practices, or *the universal metabolism*, are in a mutually beneficial reciprocal exchange with the natural environment. An environment from which human societies are both dialectically emergent from and an active/reactive part of the future development of. When processes are mediated by a metabolism of instrumentalisation, infinite extraction and pervasive exploitation, of land and labourer alike, the 'universal metabolism' becomes ruptured and severe environmental degradation is likely to result, in the form of 'metabolic rifts'.

The concept of the metabolic rift has been adopted by an array of thinkers to expose a variety of harmful environmental disorganisation: oceanic heating caused by industrial greenhouse gas emissions impacting the deep layers of the worlds' oceans has been conceptualised as a major rift (Hosewood, 2021). The historical emergence of commercialised fishing processes and the ecological conditions of the working classes in Victorian cities in England, following Engels, have both been analysed as rifts (Angus, 2018; 2021). Within earth systems studies, the violation of planetary boundaries, such as biodiversity loss, global heating and Ozone layer damage have been conceptualised as critical ecological rifts (Foster et al., 2010).

Methodology

Content analysis of primary data reports produced by the Exmoor National Park authority and secondary data in the form of historical natural science articles, media outputs and personal accounts were the main data collection procedures for the research (Bryman, 2016). Pre-existing grey, popular and academic literature were incorporated, to construct, elaborate and refine the theorisation of the case. Structured observation of all the major locations implicated in the case was conducted during a field visit to the region in the summer of 2020. The Exmoor moorlands above the town which became saturated and contributed to the acceleration of the disaster were traversed on foot; the routes and structures of riverways were observed. In accordance with this approach to theory construction for explaining cases, the adaptive theory tradition was the model of analysis implemented in the research (Layder, 1998). Upon reading the existing accounts and official reports it became clear that the chosen conceptual frameworks were most applicable to the advancement of a theory that would be able to render the multiple determinations of the disaster more comprehensible. The adaptive approach made it clear, on iterative reflection of the emerging data, as more was read and learned about the case, that the synthesis of rural enterprise theory with metabolic rift analysis would assist in refining a novel theoretical explanation.

A qualitative case study research design was implied by the research aims which resulted in an exploratory and revelatory case study of the historical event (Yin, 2018). This was implied in contrast to alternatives such as quantitative research strategies or experimental research designs which would have been less applicable to the exposition of social and natural relations in an in-depth study of a single case. Secondary data was obtained through database searches – university E-sources and library searches, Google searches for grey

media literature and non-academic books written by enthusiasts of the topic were purchased. Coding was therefore straightforward due to the dearth of sources being incorporated and ethical approval was not required because human participants did not feature in the research.

To complement the necessity of both social and natural relations constituting the case and to cohere with the adaptive theory analytical approach, a critical realist epistemology and dialectical ontology were adhered to (Sayer, 2010; Edwards, 2016; Goodall, 2021a). This approach facilitates analysis of a multiplicity of determinants of primary interest or internal relations and affiliated contingent contexts that mediate the outcomes (Danermark et al., 2019: 84). The material and social elements of the case could thus be brought into dialogue from a deep historical ontology that widens the focus beyond immediate subjects and discourse while also incorporating factors beyond the foundationalist stance that restricts analysis to the observable features of the empirical strata (Sayer, 2000; Moses and Knutsen, 2019: 7). The approach adopted here, in keeping with a realist and materialist position, depicts the external world as prior to and independent of our knowledge of that world, but understandings are always concept dependent, fallible and epistemically relativist or open to revision, refutation and advancement (Eldar-Vass, 2010; Jessop, 2005; Avery, 2019).

This approach shares ontological coherence with dialectical materialism, the tradition the metabolic rift originates from (Foster, 2000). The approach privileges fluidity, dynamism, change and inter-penetration of entities in contrast to viewing outcomes as determined by de-historicised isolated causes (Foster et al., 2010: 215, 249). A Key dimension of dialectical analysis is that of *emergence* or 'the negation of the negation' as a fundamental feature of explanations (Engels, 1934: 62). The approach therefore emphasises the criticality of structures of relations generating new, emergent outcomes, that are irreducible to the sum of their aggregate parts (Eldar-Vass, 2010). Further fundamental features of the dialectical approach that will be elaborated later are the qualitative transformation of matter due to quantitative fluctuations and the unity of diverse determinations in our analysis of complex totalities, or the 'unity of opposites' (Foster, 2020: 239-241).

The Great Flood of 1952 –The General Account

On the evening of Friday 15 August 1952 what is regarded as the "worst post-war flooding disaster in Britain" was unleashed upon the unsuspecting rural North Devon village of Lynmouth in the Southwest of England (BBC Devon, 2008). The picturesque seaside destination sits at the foot of a sheer gorge accessible in part by a funicular, the world's highest and steepest water powered cliff railway. With the town of Lynton positioned directly above and vast expanses of the rolling moorland of northern Exmoor beyond that, Lynmouth is nestled vulnerably below significant landmass. During the two weeks prior to 15 August, it is widely agreed that the area experienced 250 times the normal monthly rainfall anticipated (Delderfield, 1991). Heavy rains, not seen in the region before or after, lasted for roughly 24 hours and engulfed the shallow tributaries that snake through the rugged valleys of Exmoor. The water is then dispersed into the two main watercourses of the region, the East and West Lyn rivers. The rivers converge at the settlement of Lynmouth, the village in question, directly adjacent to the Bristol Channel, which is at sea level with clear views of South Wales

beyond the coast. The village is built upon all of these precarious natural elements of rockface, gorges and proximity to cascading riverways.

According to official documentation from the park authority, on the night of the flood: "a massive thunderstorm resulted in 230mm of rain falling across the high moorland catchment area of the East and West Lyn rivers in just 14 hours. This is equivalent to 22.5 billion litres of water" (ENP, 2022a: 1). During the 14 days of the month of August prior to this phenomenal deluge, it is maintained in the official documentation that: "152 mm of rain had already fallen on the East and West Lyn catchment and consequently both the shallow top-soils and the thicker underlying peat were already saturated" (ENP, 2022a: 1). The cumulative downpours culminated in a flash flood that inundated the already saturated natural landscape and breached the swollen rivers, finally overwhelming the village of Lynmouth.

To view shocking footage of the immediate aftermath of the devastation and to witness the torrent still flowing, you are encouraged to watch the excellent British Pathe Productions footage located in the bibliography (British Pathe, 1952). In total it is estimated that 34 lives were lost in the tragedy, although a survivor's account puts the death toll at 36 (BBC News, 2001; Haynes, 2021). In addition to the tragic loss of life, "420 people were made homeless, 34 buildings were completely wrecked and 70 others badly damaged, 29 bridges were demolished, and 38 motor cars and several hundred trees were washed away into the oblivion of the Bristol Channel" (Eden, n.d.). According to a BBC investigation (BBC News, 2001):

> Bodies washed out to sea were never found. Dilys Singleton lost six members of her family, including her grandmother. She recalls: "Mum identified her by this huge wart on her back because she hadn't got no head, or arms, or legs when they found her".

Existing literature on the flood can be categorized by official documentation released by the Exmoor National Park, popular literature written by enthusiasts or thoughtfully penned by those with personal connections to the tragedy. Media reports and an assortment of relatively dated natural science academic articles constitute the remainer of the existing literature. Two key official documents are provided by the park authority and are freely available on the official website (ENP, 2022a). One document is a detailed exercise task sheet which categorises key factors of the case in the form of learning materials for students and visitors. The other document is a qualitative longform account containing critical analysis and detailed empirical descriptions (ENP, 2022b).

According to data task sheet (a), the two rivers that eventually converge at the settlement of Lynmouth begin flowing from high moorland positions and descend through dense woodlands containing many mature trees, *"*[d]uring the height of the flood thousands of large trees were ripped away from the banks of the river by the swollen and turbulent water and carried on downstream towards Lynmouth" (ENP, 2022a:1). Many of the bridges built over the Lyn rivers prior to reaching Lynmouth became blocked with trees and other debris gathered from the surrounding landscapes. These elements interacted to produce the effects of multiple micro-dams which purportedly held millions of tonnes of water until they

were breached. In conjunction with the water volume, “hundreds of huge boulders weighing up to 46 tonnes” were swept up from the riverbeds and off surrounding banks by the ferocity of the torrent and compounded the exponential pressures created by the water and trees at the temporary dams (ENP, 2022a: 2).

The bridges over the two rivers and additional structures built over tributaries of the rivers eventually collapsed enabling the body of water and debris to envelop the steep gorges above Lynmouth. The trajectory of the watercourse exacerbated the problem further as it flowed, “through very steep sided gorges with narrow channel widths which consequently have little capacity to cope with sudden heavy periods of rainfall” (ENP, 2022a: 2). Further aggravating factors compounding the route of the swollen rivers include prior rainfall preceding the deluge on 15 August and geological features of the surrounding terrain: in the fortnight preceding the thunderstorm 152 mm of rain had already fallen in the region which overwhelmed the shallow topsoil and saturated the dense layers of peat below which typify the upper regions of Exmoor. Underneath the thick layers of peat sits an impermeable layer of rock which is found throughout the catchment area - a feature that prevents water percolation (or drainage) through the rock layer. With no alternative dispersal route, accumulated water flows over the surface to its natural destination.

The key existing academic literature on the causation of the flood are historic articles dating back over 70 years. Existing accounts are published by the house journals of the Royal Meteorological Society and the Geographical Association. Due to the disciplinary origins of the literature there is a focus on weather patterns, geological features particular to the region and the general climatic conditions preceding the rapid downpour. According to Bonacina ([1952] 2011: 119) the main causative determinant of the flood was a “cyclonic warm front thunderstorm, prolonged and widespread”.

Marshall (2011: 120) working at the Met Office (UK official weather agency) during the flood ascribes the origins to an ‘anti-cyclonic spell’ which resulted in ‘absolute drought’ that finally gave way to 18 hours of ‘incessant rain’. Marshall (2011) continues with a series of further features which contributed to the flood. The highly irregular topography of the north Exmoor coastline above Lynmouth which descends 1500 feet to the Bristol channel in four miles is one such notable facet of the terrain: “the rain – representing more than half a million tons of water per square mile – came pouring down every hillside and valley with a rapidity only possible in such steep surroundings” (Marshall, 2011: 122). Geographer Kidson posits an account of natural phenomena arguing that “the very heavy rain of August 15th found its way to streams and rivers with unusual rapidity” (Kidson, 1953: 1), while McGinnigle states that: “The meteorological explanation for the very heavy and prolonged rainfall was given as large-scale atmospheric ascent associated with the depression and its acquired fronts, coupled with the involvement of deep instability and further enhanced by orographic ascent over Exmoor” (McGinnigle, 2002: 237).

Personalised accounts written by enthusiasts with in-depth local knowledge and by survivors of the flood paint vivid and moving portrayals of the disaster. The witness narratives differ from the park authority and physical science papers by their literary

invocations of higher powers at play. Richard Haynes (2021: 21) experienced the flood first-hand as an eight-year-old boy and writes:

> [t]hen as the water swirled around me waist deep, I hung onto the door entrance and as a wave hit me the sidewall of the shop collapsed, and I went down with it. I thought I was going to drown. I put out my hand, as I was being washed away and managed to grasp the iron railings alongside the road.

Haynes then queries, "was the Lynmouth flood disaster an act of God or man-made?" (Haynes, 2021: 15). The definitive popular account of the flood is written by Eric Delderfield and has been republished with multiple editions since 1953. Delderfield avers that on the night of 15 August, "there occurred one of those catastrophes of nature – a cloudburst" (1991: 23). Of the subsequent torrents, he writes, "[t]en ton boulders cascading down like corks, smashed against the walls of buildings and went through them like a bullet through paper… lit by lightening which gave it a ghostly and terrible complexion and accompanied by a noise as of battle.. [s]o the great floods came to Lynmouth!" (Delderfield, 1991: 24).

It could respectfully be suggested that in some instances there is a tendency of the scientific accounts, based as they are in positivist science, to reduce the research problem to one key driver predicated on natural phenomena, such as atmospheric shifts. Or to offer a reductionist account by implicating one fundamental causal mechanism, or constant conjunction, such as meteorological and geological factors. A dialectical rejoinder to the reductionist accounts could identify the notable absence of sustained ontological theorization of the nature of the flood as an open system (Foster, 1999; 2020: 240). The existing science literature has a tendency to bracket additional amplifying aspects of importance, such as societal influences, political contexts or historical processes (Edwards & Levi, 2008; Eldar-Vass, 2010).

This preliminary review of literature categorically seeks to avoid the critique of non-academic publications carefully written by those associated with the tragedy and historical literature from disparate disciplinary traditions. To complement and extend the existing work, robust frameworks within criminology and in the wider methodological literature of the social sciences can be applied to the case. Those approaches maintain the centrality of situating a case study in its geo-historical context and social structural conditions of existence (Edwards & Hughes 2005, Sayer, 2010: 58). As such, it can be suggested that the descriptive narratives and positivist science now reviewed would benefit from being developed with critical social theory to further unpick the historical processes and generative contexts that led to the flood. To advance this multifaceted approach, the most appropriate mode of analysis implied by the research aims are rural enterprise criminology and the concept of 'the metabolic rift'.

Reframing the Flood as a 'Rural Enterprise Metabolic Rift'

The following section applies the synthesised concepts of the metabolic rift and rural enterprise criminology to provide a framework to reframe the flood. From this perspective the

case can be rearticulated not as a freak weather event, geological glitch or act of God, but as a historically conditioned outcome driven by the multiple social interventions of rural land-owning elites or their personnel into fragile natural environments, predicated in relations of commercial enterprise. Interventions that were avoidable acts that unwittingly co-determined metabolic rifts with nature – destabilising ecological systems until the point of collapse.

Dense forests had covered large swathes of Exmoor between the end of the last ice age and the onset of the bronze age, roughly 4,000 years ago, when deforestation is recognised to have begun in the region (ENP, 2022c). Data sources note that deforestation was carried out for hunting, animal rearing and early agricultural purposes, but may also have been caused naturally by climatic conditions (ENP, 2022c). The space limitations on this article do not permit a deeper historical analysis of such vast historical junctures, but it is generally agreed that woodlands, (re)forestation and the process known as primary ecological succession absorb larger quantities of water than barren landscapes devoid of biodiversity and consequently reduce the likelihood of major flooding events.

Establishing optimum absorption levels reached by primary succession or the proliferation of mature trees and diversity of other biota is constrained by the process known as ‘swailing’. This is the process of routine burning of heath and the essential surface layers of moorlands. While burning of moorlands occurs in northern Britain by the shooting industry for the purposes of creating conditions for grouse shooting, swailing is initiated on Exmoor to reinvigorate the pastures that livestock such as sheep graze on (ENP, 2022c).

The interventions by rural stewards into moorland ecology over extensive temporal periods have generated metabolic rifts in the natural processes of the universal metabolism with the nature of Exmoor, embedded in the bronze age proto-agricultural practice of deforestation and the 19th century rural enterprise practice of swailing. As such these rifts in the natural composition of soils intentionally commissioned by rural enterprise actors for livestock rearing purposes are contributory factors towards the initial deleterious preconditions for why the absorption levels of the soils above Lynmouth were diminished and hence contributed to the force of the flood waters many years later. This argument is echoed in the survivor account of Richard Haynes, who writes: “Exmoor is a vast reservoir of water. If Exmoor had been replanted with trees that I understand was once its natural state, then these would absorb the excess water and no disaster would have occurred” (Haynes, 2021:15).

Conversely, the mismanagement of existing woodlands also intensified the outcome of the flood. Trees that had been left to take root in hazardous locations in the middle of rivers and at river edges were uprooted from riverbeds on the night of the storm and were ultimately transformed into battering rams by the raging torrents (ENP, 2022b). The rural landowners with official oversight of the upkeep of the vast private lands that the rivers flowed through have been identified as being negligent in their duty of maintaining the integrity of the waterways. Such negligence produced absences or environmental acts of omission. The dereliction of key environmental management duties by landowners was purportedly conditioned by the massive global economic recession of the 1930s, at which

time; "there was little maintenance carried out to the valley sides as these were held in private ownership. As a result, large trees of sycamore, birch and ash were growing in the riverbed and among shoals and shattered rock at the side" (ENP, 2022b:7).

Since the tragedy, river maintenance and flood prevention protocol have been brought under state control and regulated by the public sector office of the Environment Agency. As such, it can be maintained that the wider political economic context co-determined the cost efficiency saving strategies of rural landowners and their operatives. Such conditions of retrenchment constrained expenditure and the resources available for upkeep of the rivers during the inter-war period. Accordingly, historical macro forces constrained essential rural landscape maintenance, resulting in the avoidable acts of omission that culminated as outcomes of those relations.

Large-scale rural enterprise interventions into the ecology of the moorlands above Lynmouth had begun in the 19th century by a prior landowner, which generated the preconditions for the diminishment to the structural integrity of the landscape. Attempts to penetrate the deep and naturally wet soil to direct water to rivers by digging gutters had failed in the 1800s (ENP, 2022b:5). A geographical area known as the 'northern plateau' of a terrain referred to as 'the Chains' region of Exmoor is notable for its perennial saturation. There was an absence of effective draining of the northern plateau until the adoption of the steam plough became common agricultural practice. The environmentally degrading impacts of peat cutting for drainage and swailing for livestock grazing purposes was compounded by developments in ploughing mechanisation – a process which rapidly accelerated after the *Agricultural Act 1947*. The Act was introduced to stimulate domestic food production in the aftermath of the Second World War. According to official documentation: "[s]ince 1947 there have been government grants for agricultural drainage and there is evidence that runoff is more rapid now than before that time. This rapid runoff has been blamed for the apparent increase in flash flooding" (ENP, 2022b:5). The documentation attributes the poorly constructed artificial channels or gutters improperly dug by the then landowner or personnel compelled by them as accelerating the flood waters. Such acts can be conceptualised as producing commissioning strategies and thus compounding the outcomes of the metabolic rift (ENP, 2022b:2).

The post-war agricultural policy context that spurred a range of interventions into the environment incentivised the rural enterprise practices of intensive ploughing and mismanaged drainage. These processes were implemented five years prior to the flood. Soil ecology scientist Magdoff (2021: Para, 'Rift in the Flows and Cycles of Soil Carbon') states:

> [w]hile farming practices contributed to atmospheric greenhouse gases, there is a major additional problem—as soil organic matter becomes depleted, soils become less healthy... As soil organic matter decreases as a result of the rift, soils hold less water, provide lower levels of nutrients to plants, and have lower biological diversity... As less water is able to infiltrate, more runs off, carrying soil particles.

At this point, it is important to examine the severe effects that agricultural exploitation has had on the capacity for Exmoor peatlands to absorb rainwater. Research by the International Mire Conservation Group concluded that Exmoor's deep peat layer is 90 percent degraded. In Scotland this figure drops to 60 percent and in Wales to only 50 percent (Carell, 2020). The peat of Exmoor is officially the most damaged in the UK due to rural land conversion practices or the creation of metabolic rifts with the peat ecosystems. The over cultivation of the land due to intensive ploughing coupled with the swailing to artificially generate the optimum conditions for livestock grazing, and the resultant ecological damage produced by these processes, translated here as metabolic rifts, was the catalyst for the Porchester Inquiry of 1977. The inquiry highlighted many of these environmentally problematic issues and was the catalyst of the Wildlife and Countryside Act 1981. In their Report to the Royal Society, Burchardt et al. (2020: 20-21), state that the consequences of the 1947 Agricultural Act were 'devastating' for the environment:

> Farmers brought new land into use, or upgraded the use of existing agricultural land, by draining marshland, ploughing up moorland, grubbing up woods and removing hedgerows, leading to acute confrontations with conservationists, for example over the ploughing of parts of Exmoor.

The structural constraints of global recession and inducements from the abundance of lucrative agricultural financial subsidies which followed, incentivised rural enterprise personnel to cause rifts in their social relationship with the land. Short-term commercial gains for rural enterprise were the key goals with disregard for harmful by-products or unintended consequences that might result from the intensification of agricultural processes. Foster (1999: 383) reminds us:

> Marx employed the concept of metabolic rift to capture the material estrangement of human beings in capitalist society from the natural conditions of their existence. To argue that large-scale capitalist agriculture created such a metabolic rift between human beings and the soil was to argue that basic conditions of sustainability had been violated.

The impact of this rift with the ecology of the upper chain levels of the saturated Exmoor peatlands is notable given the relevance of soil health and integrity for flash flood mitigation and absorption purposes identified by Magdoff (2021, para, 'The Importance of Soil Organic Matter (Organic Carbon)').:

> Soil organic matter is so critical to soil health because it improves essentially all soil biological, chemical, and physical properties... It also helps soil particles clump together into aggregates, thereby enabling greater rainfall infiltration and water storage…One of the ways to understand the importance of soil organic matter is to study what happens when it declines. As organic matter decreases, there is a decrease in the diversity and activity of soil organisms; soil structure deteriorates; erosion intensifies because more water runs off the field during intense rainstorms.

Finally, and in conjunction with the rural enterprise relations of production now outlined, the British state and local authority planning office played a significant role in shaping the outcome of the disaster. The settlement of Lynmouth is built at the confluence of two rivers. Due to the narrowness of the valleys and the steep gorge, the only available land to construct the village on is directly adjacent to the rivers, offering little in the way of protection from the watercourses should they breach their carrying capacity; "[c]onsequently most homes, hotels and services such as shops in the village have been established over the years only a few meters from the water" (ENP, 2022a: 2).

In keeping with many coastal resorts in the South West of England during the Victorian period Lynmouth became a popular tourist destination. As its popularity grew, more viable space for development was required. Consequently, a river was drained and redirected for the development of the burgeoning tourist industry on the newly available dry land. This interference into the landscape and considerable alteration of integral natural processes is an emblematic instance of a metabolic rift. The West Lyn River was diverted into a much narrower and more restricted artificial channel before flowing into the Bristol Channel (ENP, 2022a: 1; Calver & Anderson, 2004). Due to the cascading torrent, the artificial watercourse was overwhelmed, and the river diverted back to its natural route; "despite the fact that many homes and other properties had been built on it over the intervening years following its redirection" (ENP, 2022a: 1). Because of these commissioning strategies, predicated in capitalist relations of production, lives were unknowingly put at grave risk.

Thinking Dialectically about Lynmouth

The metabolic rift framework originates from the subdiscipline of dialectical ecology (Foster, 2000), which is couched in the broader Marxian tradition of dialectical materialism (Foster, 1999). The central facets of the dialectical approach are complimentary with the relational ontology of rural enterprise crime and have been adhered to in the development of the explanation in this article. The main principles of the dialectical way of thinking are that of superseding static, decontextualized and mono-causal accounts of multifaceted historically contingent problems (Foster, 2020: 221). Causal atomism is replaced by an approach that views things as dynamic, contradictory and multi-causal. Preceding Marx's own work on the concept of the metabolic rift was that of his long-term collaborator, Engels. It was Engels who extended the application of dialectics to the natural world (Engels, 1934; Foster, 2020: 232). According to Engels in his *Dialectics of Nature*, the dialectical approach to social-ecological problems is constituted by three core principles. Those principles are the law of transformation of quantity in quality and vice versa; the law of the interpenetration of opposites; and the law of the negation of the negation (Engels, 1934: 62). The three principles that can be more appropriately understood as tendencies in modern terminology are to be applied in the wider context of the general dialectical model of thinking. This is an approach which frames entities as existing in a constant state of emergence, reciprocity and discontinuity.

In an attempt to present the final analysis in a manner that honors those tenets, it can be argued that when the water-table of the saturated upper chains of the northern Exmoor plateau positioned above the village of Lynmouth accumulated a volume of water that the diminished soils were simply unable to contain (i.e., 230 millimeters of rainfall in 14 hours – s22.5 billion litres of water) the *quantity* of accumulated and widely dispersed water transformed into a *qualitative* surge - a wall of water that engulfed the gorges, inundated the tributaries and finally devastated the village carrying with it the boulders and uprooted trees of the long neglected rivers. With this evidence, *the law of transformation of quantity in quality,* can be satisfied. A diversity of disparate causative determinants featured throughout the analysis, such as the mismanagement of crucial waterways during the inter-war economic recession, the over-cultivation of land induced by the promise of the bounty of agricultural subsidies in the context of post-war food production policy, and the re-direction of natural watercourses for tourism. The ensemble of those historically differentiated aspects works towards satisfying *the law of the interpenetration of opposites.*

As such, these rural enterprise relations and the assortment of strategies of commission or omission they generated, which are themselves mediated by political economic structures, are a 'unity of opposites' when coupled with the unique geology of Exmoor and the unprecedented rain that fell on 15 August 1952. The analysis has advanced a critique incorporating fluidity and dynamic transformation of phenomena that challenges de-historicised reductionist accounts of isolated factors. Finally, the *'negation of the negation'* aspect of the dialectic – or emergence of a novel, unique entity from its lower strata properties and conditions of existence – can be satisfied as the emergence of the explosive metabolic rift in the form of the great flood of 1952, which was generated by the combination of all the interacting aspects outlined thus far.

Securitising Rural Regions Against Future Hazards: Forecasting Metabolic Rifts

The general principles of the broad framework adopted in the analysis of this case can be transposed into the securitisation of rural regions. The concepts can be incorporated into future oriented hazard response assessments in the context of climate heating and associated planetary emergency. Examples of socially conditioned natural threats accelerated by ecological breakdown might be inland flooding, increasing sea levels and coastal subsidence, droughts and wildfires, novel pandemics and biohazards, violent storms or the collapse of critical infrastructure such as dams, bridges and railway lines.

The approach can be applied as a forecasting tool to theorise combinations of seemingly disparate socio-environmental factors prior to them reaching the point of disaster. Rural regions tend to combine built and unbuilt environments which are the emergent entities of the complex balancing of competing demands – rural commerce, tourism, the needs of local inhabitants, agriculture, necessary environmental stewardship and the local authority officials. Rural regions are often overlooked and underfunded by policy makers in contrast to the metropolis. Economically prosperous city regions are likely to have more securitization protocols which are absent from rural policy. The approach enables a type of horizon

scanning for when and where potential socially conditioned natural threats might arise and what can be done to mitigate those hazards to rural communities.

To conduct accurate forecasting of future environmental hazards in rural areas, we must examine the social history of a region and carefully unpack the interventions into landscapes that have occurred. When interrogating situated practices such as construction of infrastructure or the diminishment of soil health, we should think critically about the political conditions, cultural processes and socio-economic contexts that enabled or constrained such practices. Those generative contexts will guide the strategies of commission or omission, leading to interventions into, or negligence of, the environment. We then bring the pieces of the puzzle together to forewarn of any potential future hazards that might emerge as unintended consequences, unforeseen by those who contributed to processes long before.

Conclusion

This article has offered a rearticulation of the Lynmouth flood tragedy that moves beyond speculative accounts and positivist approaches that reduce complex outcomes to isolated causal mechanisms. By articulating the case through a novel conceptual synthesis of metabolic rift and rural enterprise criminology, the article argued that the Lynmouth flood disaster of 1952 was the combined dialectical consequence of inter-generational and multifactorial 'rural enterprise metabolic rifts'.

Rural enterprise *rifts of commission* were identified as interventions in the forms of deforestation, swailing, over ploughing and poorly executed drainage of critical peatlands that maintained the physical integrity of the natural environment above the village. Those interventions are in conjunction with *rifts of omission*, such as the preventable negligence of the upkeep of crucial riverways, gorges and saturated peatland. These rural enterprise (non)interventions into the natural environment predicated on cost efficiency savings for rural industry and profit maximisation in the context of free market economic pressures unintentionally exacerbated the disaster. An event which was the unforeseen by-product of these mutually reinforcing aspects. Aspects which combined, as a unity of opposites, with other natural factors rooted in geology and meteorology and finally overlain with the town planning focus on boosting tourism. The article argues that the catastrophe, hastened as it was due to malpractice of the pastoral personnel, can most appropriately be defined as a *rural enterprise metabolic rift*.

The synthesised conceptual framework and geo-historical multifactorial analysis advanced throughout enabled a dynamic and historically contingent political economic explanation that has hoped to avoid the bracketing of any relevant phenomena. It is an approach that can be adopted for horizon scanning for potential hazards in disaster prone rural regions. As weather turbulence and unpredictable socially conditioned climate breakdown events escalate due to the metabolic rifts emblematic of the worsening planetary emergency, future oriented scanning for such hazards is likely to become more necessary.

While many populous metropolises and urban centres of power are the focus of climate change mitigation technologies, this article has pointed towards how we might think about providing rural frontiers with similar security. It suggests a model for identifying the risks posed by past industrial interventions into sensitive ecosystems before the impacts can escalate into large-scale unanticipated metabolic rifts eventuating in loss of life. A repeat of the avoidable tragedy and unnecessary suffering in Lynmouth can be prevented in the future, but the memory of that tragedy should be remembered today.

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