



The steel plant as assemblage

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ABSTRACT

In this paper I examine what economic geographies of the steel industry might learn from cultural economy and what cultural economy might learn from manufacturing industries. In particular, I draw on the concept of assemblage to outline a performative economic geography that emphasises the importance of material encounters, process, and working with, and containing, lively matter. My account argues that production complexes like steel plants are constantly made and unmade through material practices, doings and actions – all of which matter economically. The paper then puts the concept of assemblage to work, drawing on research during escorted tours to steel plants and employing literary narrative to frame the day-to-day rhythms and ruptures of industrial work. The effect is an economic geography of steel making that recasts overlooked and routine work (like monitoring, handling and transforming materials; repair and maintenance; and health and safety) as fundamental to economic activity and the creation of value.

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1. On a steel plant somewhere in northern Europe

A grubby office sparsely furnished with a battered table, an ancient computer, discarded safety kit, yellowing photographs of a work's football team, a kettle, mugs, piles of union pamphlets and health and safety posters. I am issued with my personal protection equipment – bright orange woollen overalls, heavy foundry boots, a hard hat, and safety goggles. It is a warm day, and in this protective clothing I feel unbearably hot and encumbered. Habitual movements become laboured.

As we leave the 1970s office block Paul, my guide, pauses at a poster and insists on talking me through the production process with the aid of this diagram. The basic oxygen steelmaking (BOS) process is distilled to a linear sequence. Paul explains that the 'hot metal' (molten iron) arrives by rail from the blast furnace some miles away. First the sulphur content of the molten metal is reduced, before the molten iron is poured into a BOS vessel that is already charged with about 40 tonnes of scrap metal. The 'heat' lasts about 30 minutes, during which oxygen is blown into the molten metal through a lance. When the required chemical composition and temperature are reached the vessel is 'tapped' and the liquid steel is poured into a ladle. During the tap various alloys are added and argon is injected to ensure the correct grade of steel is achieved. The liquid steel is then transported in ladles to a continuous caster, where it is formed into slabs, blooms or billets.

Once Paul is satisfied that I understand the rudiments of the process, we sign a register recording who is 'on site', and walk along a dusty approach road towards an opening in a vast shed.

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Leaving behind the July sunshine, we are engulfed by an oppressive, gloomy atmosphere. The dimness is punctuated by intense floodlights that illuminate areas of activity (walkways, stairways, crane riggings, scrap bays, control rooms, etc.) and shards of daylight that pierce holes pock marking the corrugated panels of the shed. These holes – Paul points out – are the traces of many minor explosions. Disquieting reminders of the liveliness of material transformations. As my eyes adjust to the darkness I notice particles – dust, graphite and metal fines called 'kish' – hanging in the air. The sensory assault is not only visual. The air is thick with the sickly stench of burning metal and grease. The cavernous shed is filled with an unrelenting din. A cacophony where the thunderous material transformations contained by the BOS vessels jostle with the noisy reverberations of extractor fans, pumps and locomotives; the whining of cranes passing over head; the reversing alarms of earthmovers; and the occasional crash as tonnes of scrap metal are charged into an empty vessel.

We venture further into the shed, following a route marked by lines painted on the ground, railings, staircases and suspended walkways. We snake past giant ladles, new refractory bricks, and the material remains of breakouts. I am struck at how little of the scale, brute physicality, violence and craft of what happens in this shed is registered in the accounts of steelmaking that I have encountered.

We're at the stand in front of the converters – the site where iron becomes steel. There are three vessels, each hidden behind heavy, contorted steel doors. The only sign of activity is an electric forklift truck that whirs backwards and forwards shifting pallets stacked with aluminium bars. We head for a cabin – a sign indicates it is the BOS control room. We pass through the contamination area – a

lobby decorated with health and safety reminders, a basin and instructions to wash hands and cover dirty boots with overshoes – without pausing. The control room is cool and quiet. The only noise is the gruff conversation between workers and the background murmurs of air conditioning units and computers. Six men sit back on swivel chairs. Only one seems to concentrate on a bank of computer screens and CCTV monitors. The blackened desk space in front of the screens and control panels is cluttered with mugs of tea and plastic bags filled with sandwiches, crisps and tabloid newspapers. The banter of the control room hushes as we enter. The men stare at me, before one asks my guide who I am and what I am doing there. Paul answers. The conversation quickly resumes, not least because Paul is a union rep., and they rarely see him on the shop floor because he spends his workday in a crane rig. The discussion moves quickly, ranging from the latest rumours about takeovers, pensions and redundancies to grievances about overtime, missing safety equipment and workplace disputes. As Paul gets drawn into these conversations, I talk to the worker next to me. He explains that only one vessel is working at the moment. Another is undergoing scheduled maintenance, while a dart that monitors temperature and chemical composition of molten steel on a third has failed and is being repaired hurriedly by engineers. Everyone is waiting for the next tap. And so I begin to understand the stuttering business of making steel, whose rhythms are shaped by breakdowns, scheduled maintenance, accidents, order books, environmental regulations, or the ability of other parts of the steel plant to supply and handle materials at any given time.

We've been in the control room for about 15 minutes when news comes through on a radio that the dart has been repaired. They are ready for another heat. Paul and I follow four furnacemen out the control room. As we reach the far side of the vessel the second of two skips filled with scrap metal is being tipped into the vessel. Another crane then manoeuvres a ladle carrying molten iron into place. The driver, frustrated by the delay in charging the vessel (and his lunch break), empties the ladle containing 160 tonnes of 'hot metal' in about 20 seconds, instead of the usual 2 minutes. The rapid mixing of cold scrap and molten iron sets off a violent reaction. Flames leap from the vessel. Showers of 'penny sparks' – fragments of burning metal – are expelled across a 30-m radius. Thick, acrid fumes escape the extraction hood designed to capture off-gases. The plumes rise and escape through an opening in the shed roof. As the vessel is returned to its vertical position, we move behind a worker who is positioned underneath a conveyer belt that dumps lime and dolomite into the molten metal. He stands feet away from the vessel, peering through an open blast-proof window observing the turbulent bath of the incandescent molten metal, his forehead beaded with sweat from the intense heat.

2. A performative economic geography of steel

2.1. Introduction

This narrative reconstructs an escorted visit to a steel plant in northern Europe.¹ It is an exercise in storytelling based on repeatedly observed and recorded practices in steel plants. This mode of writing takes its cue from recent arguments for a performative cultural economy that use literary narrative to 'foreground material encounters, the importance of process (and not just product), and materials' instability in process' (Gregson, 2009, p. 285). The steel industry has been central to the development of several key ideas in economic geography, but the material transformations integral

to making steel are precisely the things that are absent in many economic geographies of the steel (cf. Burawoy, 1989; Hudson, 2005a,b, 2011). This paper aims to recover the everyday struggles with matter that constitute 'worldly production' in a steel plant (Pickering, 2005, p. 360). I introduce the concept of assemblage to deal with the empirical and conceptual complexity of steel plants. Building on cultural economy's recent emphasis on the performativity of instruments and technologies, assemblage offers a tool that copes with the overwhelming array of technologies, materials and cultures that must hold together for a steel plant to function *and* recognises the agency of matter. By framing the steel plant as an assemblage the paper makes two key contributions. First, it shows how all kinds of routine, reproduction work – health and safety, repair and maintenance, monitoring and inspection – are fundamental to production. Second, it demonstrates the potential for cultural economy to open up different ways of doing economic geography and understanding economies. To date much of the work in cultural economy has focused on cultural and creative industries (Amin and Thrift, 2007). By focusing on the steel industry – perceived by many as a dirty, technologically unsophisticated industry – this paper shows how cultural economy offers something to the analysis of all kinds of economic activity.

The opening narrative introduces these concerns in two ways. First, it writes the industrial workplace through the body. It transports the reader to the midst of the material practices of containment and transformation necessary to the business of steelmaking (Pickering, 2005; Gregson, 2011). Second, the narrative writes materiality into accounts of industrial work. It emphasises how work on a steel plant involves a series of collaborations with materials and technologies through the day-to-day labour of monitoring, sampling, handling, transporting, repairing, manipulating and transforming. The rhythms and ruptures of working with materials highlight the liveliness and recalcitrance of matter and how things inevitably go awry. Continuous production processes rarely flow smoothly – as production diagrams or accounts of steel making might have us believe. By refusing to tune out mishaps, near misses, breakdowns, accidents, and the never-ending work of containment, we begin to understand the unstable, stuttering nature of industrial production. Breakdowns, accidents, and the considerable labour of holding together production processes, need to be considered as fully economic activities.

In Sections 2.2 and 2.3, I position my arguments in relation to work on the steel industry and cultural economy. First, I consider how the steel industry has become iconic in economic geography, featuring in the development of many of the sub-discipline's key theories and ideas. However, economic geography's encounters with the steel industry have been dominated by Marxian political economy, imparting a particular orientation to research and particular ways of figuring economic activity. Accounts of the steel industry tend to be framed by the dynamics of capital accumulation, labour geographies, regulatory frameworks or to the place of regional economies within a globalising economy. That the steel plant produces steel is taken for granted in all of these accounts. Even where the importance of material transformations is acknowledged in conceptualisation of economies, everyday practices and material transformations involved in industrial activity continue to be overlooked (Hudson, 2005a). Second, I outline a sympathetic critique of cultural economy. Cultural economy stages important challenges to taken-for-granted ideas of what an economy is and conventional ways of doing economic geography. However, cultural economy's focus on the creative industries and the 'softer end' of capitalist production has resulted in a neglect of the manufacturing industries. Furthermore, work in cultural economy tends to mobilise a notion of culture inherited from the anthropological tradition of material cultures that, ironically perhaps, tends to neglect the material register (Gregson, 2009).

¹ Gregson (2009, p. 295) notes that the 'doubly protective' discourses of health and safety and corporate confidentiality mean that escorted visits are often the only access that researchers can secure to industrial sites.

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