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Exploring the vertical: science and sociality in the field among cavers in Venezuela

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Recent scholarship on vertical geographies has led to a critical reexamination of the relationship between space and power. In this paper, I develop a vertical geographies approach in an unexplored context and with a less tested method: that of cave explorers and scientists in the field in Venezuela, from an ethnographic perspective. Ethnographic analysis of exploration in practice, viewed in relation to a multi-dimensional environment and the social dynamics, bodies, and technologies involved in traversing it, illustrates the ways vertical geographies are constructed and experienced. For the Venezuelan Speleological Society, a group dedicated to cave exploration and science since 1967, examining these geographies highlights culturally specific ways the tension between sports and science in speleology play out and how new members are socialized in the field. Specifically, attention to verticality highlights the role that age, masculinist heroics, and other embodied dimensions play in the construction of speleological geographies. More broadly, an ethnographic focus on exploration, with humans probing the earth's sinuous contours, guards against thinking of verticality abstractly—doing so risks simplifying and even misrepresenting multi-dimensional and processual engagements among humans, their technologies, and the environment.

Keywords: vertical geographies; ethnography; field science; exploration; karst; Venezuela

Exploration du vertical: science et socialité sur le terrain auprès de spéléologues au Vénézuéla

Les recherches spécialisées récentes dans la géographie verticale ont mené à un nouvel examen critique de la relation entre l'espace et le pouvoir. Dans cet article, je développe une approche de la géographie verticale dans un contexte inexploré et selon une méthode moins testée: celle de spéléologues et de scientifiques sur le terrain au Vénézuéla, dans une perspective ethnographique. L'analyse ethnographique de l'exploration dans la pratique, vue en rapport avec un environnement multi-dimensionnel et les dynamiques sociales, les corps et les technologies que cela implique, illustre comment la géographie verticale est construite et de quelles manières on en fait l'expérience. Pour la Société de Spéléologie Vénézuélienne, un groupe attaché à l'exploration de grottes et à la science depuis 1967, le fait d'examiner cette géographie met en valeur la tension entre le sport et la science en spéléologie d'un point de vue culturellement spécifique et la manière dont les nouveaux membres sont inclus socialement sur le terrain. Plus précisément, l'attention à la verticalité met en lumière le rôle que l'âge, les exploits héroïques masculinistes et autres dimensions incarnées jouent dans la construction des géographies spéléologiques. De façon plus générale, un approfondissement ethnographique de l'exploration, avec des êtres humains explorant les contours

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sinueux de la terre, empêche de considérer la verticalité de façon abstraite – la considérer ainsi risque de simplifier et même de donner une image fausse des engagements multidimensionnels et processuels entre les êtres humains, leurs technologies et l'environnement.

Mots-clés: géographie verticale; ethnographie; science sur le terrain; exploration; karst; Venezuela

Explorando lo vertical: ciencia y sociabilidad en el campo entre los espeleólogos en Venezuela

Los estudios recientes sobre geografías verticales han dado lugar a un nuevo examen crítico de la relación entre el espacio y el poder. En este trabajo, se desarrolla un enfoque de geografías verticales en un contexto inexplorado y con un método menos probado: el de espeleólogos y científicos en el campo en Venezuela, desde una perspectiva etnográfica. El análisis etnográfico de la exploración en práctica, observado en relación a un entorno multidimensional y a las dinámicas sociales, cuerpos y tecnologías implicados en recorrerlo, ilustra las formas en que las geografías verticales se construyen y se experimentan. Para la Sociedad Venezolana de Espeleología, dedicada a la exploración y ciencia de las cuevas desde 1967, el examen de estas geografías destaca culturalmente formas específicas de cómo la tensión entre el deporte y la ciencia en la espeleología juegan y cómo nuevos miembros son socializados en el campo. En concreto, la atención a la verticalidad destaca el papel que la edad, el heroísmo masculino, y otras dimensiones corporales juegan en la construcción de geografías espeleológicas. En términos más generales, un enfoque etnográfico en la exploración, con seres humanos sondeando los contornos sinuosos de la tierra, protege contra el pensamiento de la verticalidad en abstracto—al hacer esto se corre el riesgo de simplificar e incluso de tergiversar compromisos multidimensionales y procesuales entre los seres humanos, sus tecnologías y el medio ambiente.

Palabras claves: geografías verticales; etnografía; campo de la ciencia; exploración; karst; Venezuela

Introduction

It had been a gruelling two days of hiking in the forested mountains of Mata de Mango in Venezuela's northeastern Monagas state (Figure 1). Rain made walking on muddy trails with heavy backpacks a challenge. One of the cavers had to abandon the expedition after slipping and fracturing his hand. A friend volunteered to accompany him to the small town of Yucucual, where the group had started the hike earlier that day. Another caver also considered dropping out due to a fever, but he recovered by the third morning. That was a good thing. Losing another expedition member would have crippled the chance of finishing the exploration and survey of three of the most remote known caves in the region. The group finally reached a spot in the mountains they deemed appropriate to set up camp. Here, two survey teams divided and headed to different caves. I accompanied one of them, hoping to join in the underground exploration. But that would not be. I had to wait outside of the tantalizing cave entrance, more of a throat gurgling water than a walk-in tunnel. I regretted my lack of mountain climbing skills. Not being able to 'get on rope' would limit my capacity to produce an ethnographic description of cave exploration, which is as much about traversing the rugged surface of the Mata de Mango karst, piercing through thick forest and warm, humid air, as it is about pushing passages underground. I sat on a rock outcrop, a safe distance from the edge of the crevasse, as I watched the cavers rig their ropes, put their harnesses on and descend into the darkness.



Figure 1. View of the Mata de Mango karst landscape during the SVE 2002 expedition, Monagas state, northeastern Venezuela (photo by Author).

This 2002 episode took place alongside members of the Sociedad Venezolana de Espeleología (Venezuelan Speleological Society or SVE), an independent and volunteer-based group that since 1967 has been dedicated to national speleology, or cave science. Joining them in the forests of Monagas, made evident what a number of geographers have argued: all too often we limit our understanding of territory and space to the surface, ignoring what goes on above and, closer to the case in point, below ground (Adey, 2010; Elden, 2013; Graham, 2004; Graham & Hewitt, 2012). In fact, we live in a textured world, what Timothy Ingold calls the ‘weather-world’, that includes the air, the subsoil, dynamic earth processes that mix the two and our engagements in such an earth that occur along greater or lesser degrees of inclination (Ingold, 2011, pp. 96 and 97). This appears self-evident. Yet, to what degree are we aware of our experience inhabiting such a complex and dynamic world? Some have suggested that limited somatic awareness, not to mention the conscious realization of our immersion in such a textured world, characterizes the condition of modernity for many (Leder, 1990). As Sarah Cant argues based on her work on the poetics of caving as a leisure pursuit, cave exploration disrupts patterns of everyday life, arousing this somatic awareness (2003, p. 74). With this, I suggest, comes a greater appreciation of and engagement with a multi-dimensional weather-world, no less because caves themselves are part of a complex and dynamic karst ecosystems. Appreciating this complexity and dynamism involves understanding earth processes both above and below-ground as integrated systems (Simon, 2008).

Recently, a number of scholars have called attention to exploration as practice, whether in the context of colonialism or modern urban exploration (e.g. Driver, 2001; Fabian, 2000; Garrett, 2010; Wylie, 2002). Indeed, James and Naylor question the periodization of the age of exploration and discovery as something of the past, purportedly ending at the close of the nineteenth century (2010, p. 11). Here I provide a historical and ethnographic analysis of recent and ongoing cave exploration as practice in Venezuela that builds on these insights. Specifically, this exploration’s relation to a multi-dimensional environment and the social dynamics and technologies involved in traversing it, illustrates how vertical geographies and explorer identities are mutually constituted and experienced in specific cultural and historical contexts. In the case of the SVE, this focus provides evidence for two arguments. The first concerns the tension between sports and science in speleology, a quality that Cant has shown to splinter speleological groups elsewhere (2006). From a historical and ethnographic perspective that focuses on the ways verticality

is experienced in the field, I demonstrate how this dual quality can unite as much as divide its members. It is also a duality upon which the production of speleological knowledge depends: on the one hand, too much emphasis on sport – on challenging the *vertical* karst environment – could threaten the inclusive, collective and non-hierarchical ethos of the group. On the other, some SVE members' enthusiastic embrace of mountain climbing techniques in the mid 1970s opened up a new exploration frontier in karst environments characterized by deep vertical pits that lead to important speleological discoveries.

The second argument I advance in this paper regards the characterization of cave exploration as a sensuous practice devoid of the male heroics (as in Cant, 2003) that typifies other adventure and field science pursuits (e.g. Hevly, 1996; Logan, 2011; Ness, 2011; Ortnier, 1999; Vivanco & Gordon, 2006; Yusoff, 2007). Cant's analysis of caving is based on caving as a leisure pursuit *within* caves (2003). However, for cavers intent on both exploring and surveying, as is the case of most caving groups around the world, the sporting, competitive and performative qualities of exploration are often entangled with scientific aims: for sports explorers to document their achievements, they need to survey what they explore. For scientists to study geology, hydrology, biology or archaeology, they need to explore to make observations, collect specimens and make a map (Chabert & Watson, 1981).

The most powerful way to illustrate the mutual constitution of vertical geographies and caving identities is to focus in (and with) depth on the life history and experience of one caver, Carlos Galán.¹ It is in Galán's life history and experience as an important long-term SVE member that these two arguments, the first on speleology's tension between sport and science and the second on the sporting and performative qualities of exploration, come into relief. I joined Galán in three SVE expeditions in 2002, 2004 and 2008. Ethnographic data from those events provide the evidence presented in this paper, along with ethnography of other SVE activities. Research of the SVE archives and interviews with Galán and other SVE members, primarily conducted in Venezuela between 2007 and 2008, further support the arguments developed here.

This paper makes an important omission and that is the relationship of SVE members with the indigenous Chaima men of the northern Monagas karst whose environmental knowledge and trekking skills have led to the success of expeditions in the area (Galán, 1981, 1991, 2001). Even in the expeditions described here, the involvement of these individuals was crucial. Indeed, Galán would be the first to stress this fact. This is an important and complex topic that is pending further research, but that I already address in some detail elsewhere (Pérez, 2012).

Exploring the vertical

In a world transformed by cityscapes, airplanes, Google Earth and drones, geographers' exploration of the vertical has pointed to a timely, complex and multi-dimensional landscape of power. This landscape includes the air above, earth's 'natural' and increasingly altered 'surface' and the underground (Adey, 2010; Elden, 2013; Graham, 2004; Graham & Hewitt, 2012). An emphasis on this multi-dimensionality and its dynamic interfaces has brought on a need to reformulate what we understand by space and life on/in earth. To some, this emphasis has led them to give up the use of the term landscape altogether (Ingold, 2011, p. 136). For example, Adey's work on how the technological conquest of the airspace has transformed our bodies and environments, both real and imagined, is emphatic about thinking of the vertical and horizontal, air and land, as interconnected and mutually constituting (Adey, 2010). I examine these perspectives and

dynamics among cavers, from an ethnographic perspective. Indeed, it makes geological and ecological sense to do so, if we appreciate caves in the context of a karst environment. To geologists, a karst environment is one ‘in which the dominant features owe their origin mainly to the dissolution of bedrock’ (Palmer, 2012, p. 411). Aside from caves, these features typically include ‘fissures, rock pinnacles, closed depressions, and sinking streams’ (p. 21). Understanding karst, including how this environment’s features are formed *and* explored requires acknowledging the earth in constant interaction with the air above (and within) as dynamic system. This is what geomicrobiologists and hydrologists do. They approach karst as a critical interface of a complex ecological system (Simon, 2008). In karst, water at proper degrees of acidity is what makes the dissolution of (typically but not exclusively) limestone possible in the first place. The proper pressure (a feature of the vertical), temperature and chemical conditions sustain and promote life in what was considered, until recently a dead frontier (Engel & Northup, 2008). This ‘frontier’ cannot be thought of in the two-dimensional sense. It is multi-dimensional and dynamic. So is its exploration.

In an effort to move beyond simple up and down, Elden suggests we shift, from verticality to volumes. There is a problem with this shift however. Volumes, by definition, *contain*. They are also bounded, precisely the quality that a multi-dimensional and dynamic approach to earth and its processes resists (see Adey, 2013 for a similar argument). Indeed, Elden’s own critiques of the concept of territory as a bounded space might apply to volumes (Elden, 2010, 2013, p. 36). Thus, despite the fact that a geography of volumes might better capture the multi-dimensionality of cave exploration, I retain the use of the term ‘verticality’ which resonates with a more ‘open-ended’ and boundless approach to space.

A number of scholars have focused on geographies of exploration that attend to the vertical, and the underground, specifically. In his recent review of the vertical geographies literature, Elden highlights the theme of urban exploration (Bennett, 2011; Garrett, 2010, 2011). Bennett’s ‘bunkerology’ poses fascinating contrasts and parallels with caving, not in the least the relationship between experience and representation (2013a), the role of gender and the positionality of the researcher obsessed with an odd study subject (2013b). Whether analysing caving, bunkerology or other kinds of urban exploration, however, most of these studies tend to separate the specific spaces of exploration from their broader spatial context.² As the case of caving exploration I put forth here illustrates, an ethnographic approach that focuses on explorers on the move helps avoid fetishizing specific sites of exploration. This is a fetish that characterized my past work that now, in retrospect, reads as too cave-centric (Pérez, 2013). Cave exploration spills beyond caves. Indeed, as Cant argues in her study of British ‘geographies of speleology’, caves are only part of the (spatial) story (2006). What goes below ground is as important as what goes on above. In this way, Cant points to debates regarding where maps ought to be archived, whether or not and how a national organization ought to represent regional caving clubs and the potential contribution of speleology to civic projects of national scope. Moreover, a focus on the open-ended and boundless vertical helps address the bias of staying too close to the ground. Attending to verticality questions the generalizability of caving as a particular kind of poetic and sensuous engagement with stone (Cant, 2003). In fact, the experience of caving is much more varied, not the least because of karst environments’ diverse and dynamic qualities, including their extraordinary multi-dimensionality. Going down a deep pit, a caver might not touch the stone at all, but instead, descend and ascend on a suspended ladder or, more likely, a single rope. In this paper, I attempt to correct the biased characterization of caving as if contained within

predominantly horizontal passages of stone. Questioned too is the popular view of the underground as ‘a space essentially associated with danger, risk, undermining and subterfuge’ (Elden, 2013, p. 6). Here I animate, broaden and deepen Venezuela’s ‘geographies of speleology’ (Cant, 2006). By ‘animate’ I mean this: my primary evidence on the history and practice of speleology in Venezuela is ethnographic, with a focus on the experience and life history of a particular caver. Following Galán among other SVE members results in an ethnography that is not only multi-sited, embodied and vertical, but also constantly on the move (Cresswell, 2010, 2011).³ These perspectives help avoid taking field sites as ‘self-contained units’ from which scientific knowledge derives (Kennedy, 2008, p. 22). Instead, it is worth examining ‘the site’ as only one component in a complex network of ‘intersecting locales within which scientists and science circulate’ (p.19). Indeed, the very same points can be made with our cavers: a focus on Galán underscores the importance of understanding the mutual constitution of speleological identities and vertical geographies. He is not alone *la Sociedad*, nor would he want to be.⁴ Sociality does not just provide context, along with culture and history. It is an essential constituting part of Galán, of *la Sociedad*, of speleological knowledge and also of the vertical geographies of Venezuela’s northeastern karst.

Finally, an important point on technology: much of the vertical geographies literature has focused on the increasing role of military/surveillance technologies from ‘above’ as tools of power (Graham, 2004; Graham & Hewitt, 2012; Gregory, 2011; Grosscup, 2006). But despite great technological advances, these tools remain limited in their capacity to reveal from the air what (or who) lies underground (Stierman, 2004). This fact has and continues to frustrate states’ efforts to police their borders (Lichtenwald & Perri, 2011). These same technological limits translate into a need for humans to get underground to explore and survey cave passages (Pérez, 2013). An ethnographic focus that includes the specific materialities of the environment, materialities encountered and engaged in embodied and emplaced exploration, tests abstract theorizations of vertical geographies and provides a potential comparative case of how such geographies might be constructed and experienced elsewhere.

The ‘sporting-science’ of speleology and its beginnings in Venezuela

French speleologist E. A. Martel, who popularized speleology in Europe and beyond in the late 1800s, hoped that the field’s adventurous quality would lure mountaineers by presenting the underground world as a pristine environment awaiting discovery (Chabert & Watson, 1981; Shaw, 1992, pp. 2, 260). But Martel, who had not formally trained as a scientist, also aimed to appeal to the established scientific community. His appeal was mostly ignored (Cant, 2006, pp. 775 and 776; Schut, 2006). Even today, only few universities worldwide feature speleology departments. Speleology mostly remains a marginal science. In Venezuela in the early 1950s, when three young men, an insurance agent, a lawyer and his brother, founded the first speleology group as part of the Venezuelan Society of Natural Sciences (SE-SVCN), the term was virtually unheard of. The situation improved only slightly by 1967, when that group dissolved and was reconstituted as the SVE, this time as an independent group no longer under the umbrella of any organization (Urbani, Galán, & Herrera, 2006, pp. 18 and 19).

Lack of scientific interest notwithstanding, Martel’s speleology caught on among outdoor enthusiasts. Among them were a few academic scientists, mostly from fields such as geology, biology and archaeology. Martel’s dedication to speleological societies and journals provided an organizational template that many, including the early Venezuelan

speleologists, aimed to follow. More importantly, his many publications about his expeditions, speleological knowledge and techniques promoted a common purpose and language (Shaw, 1992, pp. 248 and 249). Key here was the belief that *anyone* could do science. Yet, as even Martel was aware, *doing* science would have to involve, or at least rely on others to do a good amount of sporting, here understood as physically demanding and skilled activity necessary to locate, explore and survey caves.

To Cant, speleology's dual sport-science character contributed to the breakup of the British Speleological Association in the 1930s because it pointed to irreconcilable differences between the scientists and non-scientists (2006). In contrast to her case (but also building on her insights), I offer descriptive accounts of how this presumed duality plays out in the field. Attending to the verticality of this field, which includes but is not limited to caves, I suggest that in practice, speleology's sporting-science quality has the capacity to unite as much as to divide.

Galán and the 'minimalist ethic' in speleological exploration

As an anthropologist I am drawn, first and foremost, to the experiences and life histories of speleologists in the social, historical and spatial context of their practice. This perspective offers an original vantage point from which to examine the mutual constitution of vertical geographies and caving identities. But the focus is not on the individual alone, with the rest as backdrop. Appreciating Carlos Galán's experiences and perspectives on speleology's sport-science duality, along with understanding how the multi-dimensional karst of Monagas comes into being, is impossible without considering *la Sociedad* as sociality, as ideal, as collective enterprise. I illustrate these points in this section. This story of sociality and geographies weaves together not just karst and people interacting and on the move, but also the artefacts carried, used and displayed, all potent players not just for their symbolic power but also agentive materiality.

Why Galán? Cant indicates the role that strong personalities have in the shaping of British geographies of speleology (2006). Strong personalities too shape Venezuelan speleology. Carlos Galán has been an important actor within the SVE. In interviews with past and present SVE members, he often came up. He was described as either a caver dedicated to cave exploration and science, one that would pursue speleology at the cost of severing social ties within the group, or a complex mix of both. Galán hardly ever held a prominent leadership post within the organization, but often lead or participated in the most physically demanding explorations that lead to important discoveries. Quiet, purpose-driven, intense, sometimes even controversial, Galán has been a dedicated cartographer and consistent contributor to the group's journal, the *Boletín de la Sociedad Venezolana de Espeleología*. One long-time member, an anthropologist and fiction writer, describes him as mysterious, as having a complex inner life that few know about and appreciate. Another fellow caver stated: 'Galán was the Society's first true, and perhaps only, speleologist.'⁵ Whether rigging a cave pit or drafting a cave map, I was drawn to the complex and sometimes contradictory ways Galán embodied the sporting-science duality in speleology.

Galán was born in San Sebastián, Spain, in 1949. As a boy he moved to Caracas when his divorced mother married a Venezuelan. In high school, he was part of the La Salle Society of Sciences, where he met other future SVE members. Galán then returned to Spain to study biology at the university. He grew interested in cave biology, and began collecting specimens that he took to biospeleologists in the Society of Sciences Aranzadi (Spain) and at the Underground Laboratories of Moulis (France). Galán's growing interest in speleology paralleled his draw towards vertical caving. He joined international

expeditions that explored the deepest vertical pits in the region. Interest in rock and mountain climbing followed. In 1970, he was invited to a mountain climbing expedition in Argentina. There he ended up staying for seven years (a period that coincided with the Dirty War), and even helped form the Centro Argentino de Espeleología (Argentine Center of Speleology).

In 1976 Galán returned to Venezuela, where he reunited with old friends. The SVE became a home. Yet, he did not live in Caracas, as most SVE members did. A job as a cartographer led him to Sucre state, just north of the Monagas karst which he routinely explored during weekends. He would write and send exploration reports to his SVE friends in Caracas. It was also during this time and place that Galán developed an approach to exploration characterized by a minimalist ethic intent on overcoming the challenges of a vertical karst environment. This ethic was intimately tied to embodied practices, notions of identity and ideology.

Galán's stamina and stoic minimalism are expressed in everything from his talk to his gear. He packs his old blue mountain backpack without sparing a gram. He wears the same clothes, eats little and smokes constantly. During the Monagas 2002 expedition, I recall a contemporary SVE member saying of his friend Galán: 'That son-of-a-bitch (*coño de madre*) always has been and will always be like that, waiting for the rest of the group puffing a cigarette.' The comment was meant as a complement. From his strong and lean body, his choice and manner of packing his expedition equipment and his determination to get the job done in the field, Galán epitomizes a minimalist ethic that pervaded much but not all of the SVE in the 1970s. Indeed, a similar ethic became dominant within the (Western) mountaineering culture at around the same time (Hughes, 2008). New developments in technical equipment that was lighter, smaller and more effective also broadened the possibilities in exploration. Expedition groups got smaller, both in terms of participants and equipment. This shift also signalled a rejection of the militaristic and hierarchical arrangements of expeditions in the past (see Logan, 2011; Ortnier, 1999 for similar trends in mountaineering).

In a retrospective article on the SVE's 55 years of exploration, the authors (Galán among them) attribute part of the shift in exploration to the geographical and geological challenges posed by unexplored caves: 'When searching for new horizons [of exploration], since the caves of easy access had been explored, springs forth on its own the notion of lightweight [exploration], of small, autonomous, and efficient equipment. This also obeyed a geological imperative' (Urbani et al., 2006, p. 21). Until the early 1970s, most explorations had been carried out in 'places of relatively easy access, in predominantly horizontal caves, and at most, in vertical pits with only a short succession of small drops' (Urbani et al., 2006, p. 21). Prior to the incorporation of rock climbing techniques, whenever more substantial vertical distances were encountered, such as in the case of Walter Dupouy Cave (east of Caracas), a ladder would be used (Venezuelan Speleological Society [SVE], 1975, pp. 114–119). This 1122 metre-long cave has a number of drops along its passages, totalling a vertical distance of 120 metres (Figures 2 and 3). The most challenging of these is towards the middle of the cave. At 10 metres, this drop – a waterfall – plunges into a subterranean lake. The SE-SVCN cavers overcame this obstacle as did most of speleologists at the time: with an electron ladder made of steel cable wire and aluminium footsteps (Hughes, 2008). Although these ladders can connect together to expand their length, their safe use to overcome vertical distances is limited. For one, the explorer had to secure the ladder at the top prior to a pit descent. Thus, if exploration required climbing up a steep wall, and no conventionally sturdy ladder was available, the electron ladder – itself a hybrid between a conventional ladder and rope – would be useless.



Figure 2. The incorporation of mountain climbing techniques into caving made possible the exploration and survey of the extraordinary vertical pits and caves developed in Precambrian quartzites in southeastern Venezuela. These pits, such as Sima Aonda, 362 metres in depth, on Mt. Auyantepuy, range from 200 to almost 400 metres in depth (photo by Wilmer Pérez).

In 2008, I used an electron ladder during a short weekend trip with some Venezuelan cavers to Walter Dupouy Cave. The ladder was secured with rope to a protruding boulder just above the aforementioned lake. Water gushed down the passage and along this wall. I observed the proper technique: one must turn the ladder perpendicular to the rock, lest one's fingers get clipped by the aluminium steps and cable wire draping the rock. Going down feet-first requires placing the heels on each rung. During my descent I struggled to keep my form, the cable ladder turning and painfully clipping my extremities against the wall. I tried to use my elbows, knees and boots' tips to separate the ladder from the stone; but it was difficult because it now bore my entire weight. I finally managed to descend the short pit. Exhausted and bruised, I gained a greater respect for the 'old timers' who routinely used ladders in their caving exploration. In light of a vertical geographies perspective, recalling this experience underscores cave exploration as movement within a dynamic and multi-dimensional weather-world: rain would have increased the volume of water gushing within the cave passage. Knowing that water seeps through sumps and cracks slowly forming and transforming new cave passages, emphasizes the unbounded, open character of this geography.

Yes, using electron ladders requires great skill. Yet, it is beyond question that new climbing techniques broadened new possibilities of exploration. Caves with extensive vertical development became accessible to explorers' bodies and lights. For example, the



Figure 3. Venezuela's small community of 'proto-extreme sports' enthusiasts, some of them SVE members or close friends of SVE members, often rehearsed climbing techniques in urban environments that would later be used in cave exploration. Here climbing Caracas's Britanica building in the early 1980s (photo by Wilmer Pérez).

incorporation of mountain climbing techniques into caving made possible the exploration and survey of the extraordinary vertical pits and caves developed in Precambrian quartzites in southeastern Venezuela. These pits, such as Sima Aonda, 362 metres in depth, on Mt. Auyantepuy, range from 200 to almost 400 metres in depth (Urbani et al., 2006, pp. 22 and 23; SVE, 1983, p. 43). Exploration yielding new discoveries in these very remote and difficult to access regions goes on until this day. Galán, an avid mountain and rock climber, was a key participant in many of these expeditions.

The SVE's retrospective article points to the lack of 'proper' equipment as another factor explaining the limits of exploration of the earlier generation of Venezuelan speleologists. Description of this fact, however, is tinged with judgement of how an explorer *ought* to traverse the karst environment. In the old timers' explorations, the authors remark,

[i]numerable equipment items and supplies had to be transported for work in the caves. The explorers carried on mules countless bags (that included work tables, folding chairs, tarps and tents, gas lamps, hammocks, nets for bats, innumerable and heavy equipment including cages for living mice for mycological studies, materials for archaeological excavation, and the most diverse implements imaginable) to set up camp at the mouth of the cave whose access did not involve long trajectories. [...] A system of lightweight exploration by foot, in which all of its members carried on their shoulders all of the necessary equipment for a week of fieldwork had yet to be conceived. (Urbani et al., 2006, p. 21)

This description reveals the contours of the minimalist exploration ethic that Galán would embody and enact in the field. I argue, however, that this system of lightweight exploration was and is not just about the equipment available to the explorer or even a geological imperative. It was and is (also) about embracing the idea of self-sufficiency in the field, of packing only what is needed and to carry it yourself, *on foot*. There are performative and symbolic elements to these practices. Viewed in the context of post-colonial naturalist activities, this self-sufficiency may be read as a rejection of an imperialist mode of science and exploration. In this mode, the expeditions of European explorer-scientists rely on the labour of others (unnamed expedition members or natives) who carry extraordinary amounts of equipment (i.e. they are not self-sufficient) and increasingly, as the expedition progresses, heavy and voluminous samples collected in the field need to be carried and cared for as well (Logan, 2011; Pratt, 1992; for a neocolonial case of this in Venezuela, see Reig, 2006/2007).

The embrace of the minimalist ethic is also a repudiation of capitalist excess, a topic that in the 1960s and 1970s was in the minds of many SVE members, several of whom (including Galán) sympathized with the rise of leftist movements in the country and beyond. Also during this time, Venezuela enjoyed an extraordinary rise in oil revenues (Coronil, 1997). Despite this, the group struggled to secure monetary support for its work.⁶ By repudiating excess, SVE cavers are also critiquing the commodification of adventure and related mass-commercialization of outdoor equipment, which they, including Galán, see as a present-day manifestation of empire (Logan, 2011, pp. 13, 32).

Of course, attitudes on speleological exploration are not fixed. Indeed, sometimes they seem contradictory. But recall from the introduction: cave exploration requires locating and entering caves in order to map them. A passage that is not traversed, whether on foot, knees, bellies or on rope, does not get mapped. While there are increasingly sophisticated technologies to aid in this process, most cave mapping in Venezuela and elsewhere still relies on the use of a compass, a clinometer and survey tape. It requires teamwork (Pérez, 2013). Thus, furthering speleological knowledge *depends on* exploration, and the greater the 'sporting' abilities of the explorers, the greater the likelihood that more caverns and their passages will be explored and surveyed (Chabert & Watson, 1981). This is the speleology's science-sporting duality that Martel recognized in the late 1880s. As Cant has noted, the way that this duality manifests itself in a speleological group can be and often is tense, particularly given cavers' diversity in terms of bodies, exploration skills, professional identities (only some are academic scientists, whether biologists, archaeologists or geologists that might benefit from cave maps and samples), gender, etc. These identities and attitudes often do not correlate in the expected ways. They also change over time. Again, a focus on Galán in the social and historical context of the SVE, illustrates these points.

Despite his climbing and athletic skills, and attraction to the sporting aspects of outdoor activity, Galán has been concerned that sports (and its related equipment) further speleology. In a 1980 letter to the then SVE president, Galán expresses concern with the embrace of new climbing gear without focusing on the purpose of its use:

Personally I fear that the novelty of the jumars [ascenders] and the exploration of large deep pits instigate sports caving tendencies (*tendencias espeleistas*) contrary to the scientific practice that has characterized the work of the SVE for so many years.

Here Galán sets a seemingly stark dichotomy between sports and scientific practice. But this requires a closer look. Even as Galán decried 'sports caving tendencies', he embraced a minimalist ethic that in practice was hardly different from sports caving pursuits. What seems to be important to him, is that exploration be done to further

speleological knowledge. He acknowledges speleology's duality. He embodies it. Also, he expects other SVE members to do the same. However, how different members of the group experience or understand this duality has and continues to vary, often causing tensions within the group. The embrace of the minimalist ethic along with the so-called 'geologic imperative' led to planning expeditions to farther and less accessible parts of the country. It altered the composition and dynamics of exploration teams. Less sports-oriented (and typically, although not always) older members opted to participate in less physically and technically challenging outings. Those who embraced these new techniques of exploration constituted a group of elite speleologists within the SVE. Dubbed 'los cunaguaro' (the ocelots), these few men (Galán among them) were able to push the boundaries of speleological exploration in Venezuela, sometimes yielding important scientific contributions (such as the discovery of a new mineral in a quartzite cave in southeastern Venezuela) (Martini, 1982). In the Monagas karst, these cavers' capacities and skills also created the possibility of long-term engagement and collaboration with Chaima men, expert trekkers and hunters, particularly of the cave-dwelling guácharo, or oilbird (Galán, 1981). At the same time, however, they created rifts within the SVE and concern for those who emphasized the ideal embodied in *la Sociedad* of national speleology as a collective and democratic project.

Social dynamics among speleologists attempting to traverse Monagas' vertical karst environment best illustrate the tensions described so far. Some of the newer SVE members in the 1970s and 1980s took on the challenge of joining the 'ocelots' on their gruelling expeditions to Monagas. This was an opportunity for them to learn from the experts, a process that involved socialization and embodied disciplining that could either make or break an aspiring member of *la Sociedad*. Many trips were done over the weekend, with barely any time to sleep. Alexis Rodríguez recalled his first trip to Monagas in the 1980s when he was a teenager. On the hike back to the cars that they had left in the community of Yucucual, he could not keep up with the group's pace. He stopped in the middle of the dark jungle and fell asleep. William Padrón, one of the 'ocelots' and Galán's contemporary, turned back to find and wake him, yelling: 'Wake up, kid (*Despiértate, carajito*)!' Falling behind was not an option because a long 8-hour drive back to Caracas awaited; several of the expedition members needed to work on Monday morning. Jesús Álvarez, a contemporary of Rodríguez, also reminisced on the intensity of these outings. On his first trip he was miserable, literally unable to keep up with the hiking pace. He recounted how at the time he made the commitment to get into shape, so as not to be left behind, an effort that paid off in future expeditions.

These accounts are part of the SVE lore regarding both the Monagas karst and the speleologists that pushed the exploratory and survey efforts in the region. By this I mean that caves were accessed and explored not for the sake (or at least not exclusively for the sake) of adventure or showmanship but for surveying, making field observations and sometimes sampling biological or geological specimens. Indeed, Galán was among the most committed members to making sure field notes were translated into final maps, trip reports written and samples analysed. He was dedicated to synthesizing this information and producing regional karst studies, such as the one he published in 1991 on northern Monagas (Galán, 1991). In practice, Galán's body, his identity, are a result of all of these activities – exploring, mapping, synthesizing, publishing (see Ness, 2011 for a description of similar processes for rock climbers). At the same time, they constitute northern Monagas' karst geography, one that includes complex and three-dimensional processes. This geography resists bounding. It is porous. It is vertical. The potential that caves go deeper, that there are more caves, always remains. Thus, in the rugged hills of northern

Monagas, with their predominantly vertical pits hidden under the dense forest canopy, 'sporting' abilities were critical in accessing, exploring and surveying the caves of the region. At the same time, some SVE members questioned arrangements that resulted in a few elite cavers participating in a caving expedition. To Felipe Hernández, who was an SVE member for over 20 years, doing speleology is also about sharing with friends, enjoying the outdoors, about being part of a more inclusive team. Osvaldo López, who joined the Speleology Section as a teenager along with William Padrón in 1965 and was an active SVE member for many years, shared a dimmer view on the speleological elitism that Galán embodied. To López, the rise and adoption of new exploratory techniques in the 1970s is to blame for shunning the participation of the older cavers (*los viejos*).

Yet, even some of these *viejos* recognized the contribution that these elite cavers were making to the SVE's national project. More importantly, they admitted, in time, that exploration for its own sake is what attracted them to caves in the first place. In the 1960s, the late Juan Antonio Tronchoni, the most respected and loved of the SVE 'old timers', was emphatic about what defines a 'proper' speleologist. Certainly, just visiting and exploring caves is not enough (that is what *espeleistas* do). Instead, a speleologist focuses on

the very diverse and uncommon study of hypogean fauna (biospeleology); the climatological conditions, temperature, humidity, underground currents (speleohydrometerology); the intricate study and survey of underground galleries (speleometry); the varied photographic techniques (speleophotography); etc., in addition to the geological, archaeological possibilities and exploratory techniques ... [all of this in addition to] intense teamwork ... discipline and a spirit of camaraderie ... skill, agility, and physical strength Those who do not feel the calling of our 'world,' to work in some or all of the noted activities, will never be true speleologists. (Tronchoni, 1966, pp. 1 and 2)

In an interview 40 years later, Tronchoni softened his stance. After all, he had fallen in love, first and foremost, with the exploratory aspects of speleology, the very *espeleista* qualities that at one point he decried as a threat to the 'goals of this young science', but which he recognized characterized Venezuelan speleology in its beginnings. In an interview in 2005, he expressed regret that *espeleismo* had become a dirty word among some in the Society. To Tronchoni, this attitude made the group at times throughout its history too exclusive. This exclusivity, in his view, jeopardized recruitment and retention of new members drawn to caves but with no particular interest or professional ambition in science. Moreover, this attitude limited the scope of exploration and science in/of the Venezuelan karst, much of it far, deep, inaccessible, vertical, both within caverns and beyond.

Masculinist heroics in the vertical karst of Monagas

Previous research that focused on accounts of experience in caves argues that 'some cavers have constructed caving as a pursuit that is highly sensuous, disrupting conventional constructions of the "heroic" figure of caver' (Cant, 2003, p. 68). Several SVE members with whom I shared this research agreed with this characterization. At the same time, accounts such as the one about the ocelots described above beg a closer look at caving in practice and cultural context. As I have been arguing throughout, this 'closer look' involves following cave exploration as a group endeavour within and beyond caves. It involves understanding the karst environment as a dynamic and multi-dimensional system that is as vertical as it is porous. This is precisely what I do in the following ethnographic account of the 2008 SVE Monagas expedition. Here, we better appreciate the specific and diverse mobilities and technologies involved in exploring, and in the process producing, this karst environment. We also question the depiction of cave exploration as sensuous experience devoid of the masculinist heroics.

Also since the time of the ‘ocelots’ (in the mid 1970s and 1980s), the Society has gone through many changes. Most of Galán’s contemporary ‘hard-core’ cavers have left the group (and some, such as William Padrón, the country). Indeed, even Galán has returned to his native Spain, although he travels back to Venezuela to participate in SVE expeditions every year. Monagas remains a very special place for him to return to. Moreover, reasons to return remain, not least because potential cave leads await exploration. Trekking and exploring the Monagas karst in 2008 illustrates how exploration, science and ‘Society’ – in the form of sociality both within and beyond *la Sociedad* – come into the vertical geographies of Monagas karst, revealing their mutual definition and production. As always, the 2008 expedition began with a trip from Caracas. Illustrating the diversity that often characterizes other field sciences, given the field’s porous borders (Cant, 2006, pp. 778 and 779; Driver, 2000, p. 267; Kuklick & Kohler, 1996, pp. 4 and 5, 10), the group included a transportation engineer, an ecology researcher and an earthquake geologist, all in their mid-40s; two biologists (Galán and another in her early 30s); an electrician in his mid-50s and a designer and retail worker (Galán’s wife, also in her early 60s). The group did the 8-hour drive from Caracas to Caripe in two cars. Once united (I was already in Monagas), we totalled eight.⁷ For the first time in SVE history, the number of women equalled the number of men in an expedition.⁸

Galán had already been to this area of the Monagas karst, known as Los Altos de la Palencia, with the late Chaima cacique Domingo Maita. Several caves had been located, explored and surveyed, but Maita had suggested that potential for more remained. The caverns were expected to have vertical pits, so the SVE made sure to pack ropes and climbing equipment. Both are heavy. They also are, along with meals, a tent, survey tools, cooking stove and utensils, ‘collective’ equipment, e.g. items whose total weight was distributed among all expedition members. Galán and another experienced expedition member monitored what in their experience was the best weight distribution among the bags. Not everyone was in equally good physical condition. Likewise, not everyone had optimal hiking equipment (bags or shoes). We would move as fast as the slowest in the group.

Galán lit a cigarette, and spoke again to us about group hiking rules: if you see that the person behind you is slowing down, then it is probably that he is too heavy and you are too light. Offer to take some weight off him. Also, if you reach an intersection in the path, make sure the person behind you knows where you are going, Galán explained. These words would become the object of endless jokes, on the one hand, and a source of tension on the other, for as soon as the hike began, Galán betrayed his own recommendations. He would often be ahead. He would sit and wait for the group to catch up. But as soon as the group met up with him, he would get up, eager to carry on. This left little if no time for group members to rest.

After a day of hiking the steep valleys of northeastern Monagas, limestone outcrops began to appear. We were approaching the caves. The only fool-proof way to distinguish a small rock shelter from a more extensive cavern is to get to its mouth and explore it. Three hours into the 2nd day hike, we reached the pit or vertical cave that would be named *Alto de la Palencia Sima 1*, following the toponymic conventions that the Society had been following since the early 1970s. The mouth of this *sima* (pit) was imposing, a crack in the earth’s surface longer than it was wide that quickly swallowed daylight in its rocky throat (Figure 4).⁹

Galán began the preparations for the descent. Purpose-driven, swift and silent, he picked up a large branch from the ground and threw it into the pit. The time it took for it to hit the ground signalled depth. Startled guácharos cackled loudly.¹⁰ Galán had already moved on to secure the climbing rope on a seemingly sturdy tree at the lip of the pit. For



Figure 4. SVE member descends into the pit or vertical cave that would be named *Alto de la Palencia Sima 1* (photo by Author).

one of our teammates whom I will call Alvarez, however, the tree was too close to the edge for comfort. He said: 'Carlos, let's attach a second security rope to another tree [farther from the pit].' Galán did not deem that necessary. Alvarez stated that that's how many caving accidents happen, confidence in one's skill leading to careless disregard for basic prevention. But Galán did not accede. Still, Alvarez and another experienced SVE member attached an extension of the rope to a second tree. Soon after, they began their descent, Galán leading the way.

Back on the surface, Galán lit a cigarette and began sketching a plan and profile view of the cave in his field notebook (see Pérez, 2013 for detailed analysis of this mapping process) (Figure 5). He worked swiftly, able to fiddle and project complex volumes in his head, that he would then define on paper and even further refine in a computer drafting application at proper scale. From the *Alto de la Palencia Sima 1*, we walked downhill to another large cave pit entrance. This would be *Alto de la Palencia Sima 2*. The procedures to prepare for its explorations quickly picked up, Galán defining the pace of work. Log thrown. Guácharos disturbed. Rope rigged (at a more secure spot than in the previous cave), speleologists connected to the rope and descended into darkness. All the while, we watched the weather. Even a mild rain would flood these underground caverns, flushing out (or further pushing in?) whatever might roam within.

The last stop of the day was what would become *Alto de la Palencia Sima 3*. A much smaller looking pit, one of the younger female expeditions members (whom I will call



Figure 5. Galán begins to sketch a plan and profile view of the Alto de la Palencia I cave in his field notebook (photo by Author).

Hernández) and I convinced the group that we would lead the exploration. After a brief refresher in rappelling and ascending techniques, I connected my harness and rappel rack to the rope, leaned back towards the edge of the pit and began my descent. What a contrast to descending or ascending with an electron ladder: here I leaned back, into a light-filled pit, carefully balancing the weight of my body away from the rock wall. No worries about clipping extremities between ladder and stone. At various moments of the rappel, I am vertical: completely suspended from the rope that I have trusted other expedition members to properly secure up above. As a reminder of the extraordinary diversity of bodily engagements with/in the karst environment, here too I am caving, exploring the depths of a multi-dimensional and dynamic karst environment, aware of my weight. Caving identities and vertical geographies are mutually constituted: descending that rope, eager to lead the exploration, I affirmed my commitment to the group, to the SVE, to Venezuelan speleology. Indeed, my companions validated my affirmation as they looked on from above. The length of my descent also measured the depth of the pit, a length that would then be represented in the subsequent map of the cave, a map that added more detail to the northern Monagas karst.

At the end, *Sima 3* was a very short pit with a cave passage that petered out after a few metres. Its brief exploration was the last of this trip in el Alto de la Palencia. Galán would have had it otherwise. There was hope that during the return we would deviate northwards to find a cave whose exploration and survey was pending. However, several people

complained that they were too tired from four days of intense hiking with heavy backpacks. The deviation would add at least two more camping nights, exceeding the days the original excursion had been planned for. Food was running low. Why not leave this cave lead pending for a future expedition? Galán vehemently disagreed. 'This is a speleological expedition, not a tourist excursion.' Another expedition member, who had been caving with Galán for two decades, tried to reason with him, but to no avail. Upset, Galán, along with his wife, decided to abandon the group, and hike that very evening back to the cars. Exhausted, the rest of us set up camp for the night, and did not join up with the couple again until the next day. The discussion of the previous night was not mentioned again.

A broader perspective of exploration of the karst environment that accounts for its verticality provides a glimpse into social dynamics beyond the specific embodied encounter with stone that have been described as poetic, sensual, intimate (Cant, 2003). Yet, practices and attitudes involved in overcoming 'the vertical' can and often do echo expressions of Western masculinist 'heroics' described among rock and mountain climbers elsewhere (Logan, 2011; Ness, 2011, p. 77; Ortner, 1999). It is a heroism that is muted, performative in its cult of *nonperformance*, with calculated and goal-oriented risk-taking, as in the case of Galán arguing against the need of a more secure rig (from the perspective of the fellow cavers). It is a 'heroism' that plays out both in overt and subtle ways with the shift towards a minimalist ethic in exploration. The ways this shift plays out in the field created differences among cave explorers: those that could withstand the gruelling drives, hikes and technical climbs and those that could not. When the 'ocelots' set the pace of exploration, new members had either to adapt, drop out or participate in other SVE activities. The main 'ocelots' would probably reject the use of the term 'heroic' to describe their activities and ideologies. Among the SVE lore, however, the term 'duro' (hard-core) has been used to informally describe its different members throughout its history. At the same time, it must not be forgotten that every exploration led by the 'ocelots' resulted in a contribution to Venezuela's speleological science in the form of maps, cave descriptions and geological, archaeological or biological research. Galán's attitudes during the expedition must be viewed in light of his commitment to speleology as science and to *la Sociedad*.

The events that transpired during the 2008 SVE Monagas expeditions broaden and deepen our understanding of speleological practice within the multi-dimensional karst environment. Specifically, they open up speleology's inherent quality as both a sporting and scientific pursuit and reveal them as inseparable, in constant negotiations that forge identities in/of this vertical geography. In the context of the SVE's explorations of the Monagas karst, this quality is revealed as dynamic and shifting. Unlike Cant's analysis of British speleologists who divided up between the scientific and non-scientific camps (2006), their Venezuelan counterparts are neither one nor the other, but instead embody speleology's duality in different ways at different times depending on the intimate relation among their bodies, the equipment carried and worn, the environment and ideologies regarding the tasks at hand. To be sure, the SVE has counted on the membership of those that had academic careers in the sciences and those that did not. However, in the context of practice, these categorical identities do not map directly (or even consistently over time) onto either speleology as a sporting pursuit or speleology as a science. SVE founder Tronchoni, an insurance agent by profession, was one of the biggest promoters of the Society's identity as a scientific organization. In an effort to do this early on in the group's history, he rejected *espeleismo*, cave exploration devoid of scientific aims. Years later, aware of the difficulty to attract and retain new SVE members, he welcomed so-called *espeleistas* into the group, and hoped that fellow SVE members would do the same. His

concern was not just with the longevity of the organization, but with the productive practice of speleology *as a field that requires both sporting and scientific efforts*. Galán, a trained biologist and only SVE member to practice speleology as a career, was fastidious about guarding the group's scientific identity. At the same time, he epitomized stoic athleticism. Along with Galán in the field, newer SVE members learned both implicit and explicit social norms. Whether or not they embraced them beyond the hills of Monagas would determine the future not just of speleological practice but of *la Sociedad*. But whose ideal of *la Sociedad*? Dynamics in the field also reflect diverse perceptions of the group's identity. To another of the Monagas expedition members, sharing with friends and forging new friendships in common pursuits are critical parts of speleology. To him, Galán's impatience at end of the 2008 Monagas expedition was unreasonable. 'We are who we are', he stated simply, with a shrug, accepting the fact that on that outing, most participants could not match Galán's capacity to take on the vertical challenges of Monagas's karst.

Conclusion

Galán's article on the *Mata de Mango* karst contains a page-sized topographic map with dots noting the location of caves along the *Fila de las Cuevas* (Ridge of Caves) (1991, p. 3). Joining the SVE on expeditions to this region made the curving and tightly packed contour lines with elevations ranging from 300 to 1000 metres come alive. Hiking along steep muddy donkey trails, or clearing a path where there are no trails at all, vertical geographies, caver bodies and the group's identity are co-produced. Exploring the region emphasizes the open-ended nature of the map.¹¹ Twenty years since its publication, many more caves have been located and surveyed in the area. The expectation is that even more caves await exploration. Locating limestone outcroppings (on foot, since given the vegetation, Google maps are hardly of any use here) with openings big enough for humans to access invites exploration. Ropes are usually required. Best rig them and descend during the dry season, or at least when there is no sign of rain, because the caves of this region provide the voluminous drainage of water that falls on these mountains. Among cave explorers in the karst of northern Monagas, we experience the fact that we cannot limit our understanding of territory and space to the surface. Indeed, ignoring what goes on above or below ground could spell a very wet and uncomfortable time. It may even cost us our life. This world is a textured world. I do not mean just northern Monagas. But in northern Monagas, the awareness of this seemingly self-evident fact is felt in the quadriceps powering up a steep cliff, in our hips and shoulders carrying a heavy load, in our heart rates surging as we hurry to keep up with the rest of the group.

Who you are matters. Not all SVE cavers experience the mutual constitution of vertical geographies and explorer identities in the same way. To illustrate this point, I focused in and with depth on the life history and experience of one caver, Carlos Galán. Yet, appreciating Galán's experiences and perspectives on speleology's sport-science duality, along with understanding how the multi-dimensional karst of Monagas state comes into being, is impossible without considering *la Sociedad* as sociality, as ideal, as collective enterprise. This case study provides a lens into the dynamics of production of scientific knowledge among a diverse group of serious amateurs/scientists/explorers in Venezuela, a group committed to a national cartographic and scientific project that is as much about the product as it is about the process. Their activities remind us that exploration continues (Garrett, 2010). Indeed, for SVE members, the desire to do science, to contribute to the knowledge of Venezuela's subsoil by exploring and surveying its speleological heritage, to get to know the country and critically to do so among friends, are all important factors

that question the prevalent view of the underground, recently noted in a review of vertical geographies, as ‘hidden, dangerous, risky or insecure ... a space essentially associated with danger, risk, undermining and subterfuge’ (Elden, 2013, p. 6).

Beyond caves and cave exploration, this paper illustrates the risks of bounding the spaces of inquiry in ways that may distort not only identities, practices and mobilities of human activity, but also, the very environments in which these activities take place. Many scholars have called for the need to go beyond the very specific, proscribed and guarded spaces of science, whether labs or caves, to understand science as practice (Cant, 2006; Kennedy, 2008; Latour, 1999; Livingstone, 2003). Yet, thinking of the lab or in this case the cave as only one component in a complex network of ‘intersecting locales within which scientists and science circulate’ (Kennedy, 2008, p. 19) is not enough: examining the specific mobilities between and within these locales is critical. More importantly, we must question the assumptions of where (and how) these spaces begin or end. This openness, this boundlessness made evident both in the karst of Monagas and the porous boundaries of the SVE underscores my preference for thinking with the vertical as opposed to volumes. Finally, this study’s ethnographic focus that includes the specific materialities of the environment, materialities encountered and engaged in embodied and emplaced exploration, tests abstract theorizations of vertical geographies and provides a potential comparative case of how such geographies might be constructed and experienced elsewhere.

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Notes

1. The names of all living cavers are pseudonyms, except in the case of Carlos Galán, whose publications on Venezuelan speleology are referenced throughout.
2. Bennett’s photographs of half-buried bunkers, some slowly being taken over by vegetation in the middle of open fields, made me ponder the experience of bunkerologists locating and travelling to and from these sites (2013a, pp. 503, 512). These images also complicate the classification of bunker exploration as *urban* exploration.
3. U.S. caver and writer David W. Hughes’s book, *Vertical Bill: The Story of Bill Cuddington and the Development of Vertical Caving in America*, inspired what I have done here with Galán in the context of the northern Monagas karst (Hughes, 2008).
4. ‘*La Sociedad*’ (the Society) is how the members of the Venezuelan Speleological Society refer to their organization among themselves. I like to use the term because it emphasizes the importance of sociality in the history of the group. It also echoes how much *la Sociedad* was to many a unique space where broader social and civic values were perpetuated or challenged. In this sense, the SVE resembles the ‘civic science’ societies of nineteenth-century Scotland that Withers and Finnegan describe (2003).
5. Of all SVE members, both past and present, Galán is the only one to be hired within a scientific institute (in Spain) that recognizes speleology as one of its specialties.
6. In a 1969 editorial in the group’s publication, then SVE president and founder Juan Antonio Tronchoni states:

It sometimes strikes as strange that in our country – rich, generous, and splendid, receptive to all kinds of innovation, idea or modality, regardless of how frivolous or costly it may be – it becomes so difficult to obtain the means through which to publicize the patient and steady work of a group of young men, most of them university students, dedicated team members, without desires of personal aggrandizement and dedicated to the work of exploration, research, and promotion of our vast underground world. (Tronchoni, 1969, p. 3)

7. Two Chaima men, inhabitants of the region, guided us and provided support. Elsewhere, I provide detailed analysis of their participation (Pérez, 2012).
8. The implications of the recent changes in gender make-up in SVE membership remain to be examined.
9. Evidence of Chaima's earlier exploration lay at the lip of the shaft's opening: we found an *empalizada*, a set of horizontal logs, about 3–4 metres in length, held by two other logs staked into the ground at either end (Galán, 1981).
10. Guácharos or oilbirds (*Steatornis caripensis*) are a species of nocturnal fruit-eating birds that typically inhabit caves and use echolocation to navigate in darkness. Alexander von Humboldt first studied, described and scientifically named the species during his visit to Guácharo Cave, also located in Monagas, in 1799 (Urbani, 1999, 2005).
11. This is an illustration of mappings, a concept that emphasizes the ontogenic or emergent nature of maps (Crampton, 2010; Del Casino & Hanna, 2006; Kitchin & Dodge, 2007; Kitchin, Gleeson, & Dodge, 2012; Pérez, 2013).

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