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12 DIY Research in the Psychonaut Subculture A Case of Unwanted User Innovation

Johan Söderberg

STS ON DRUGS

The involvement of unauthorised practitioners in scientific research and technical development has received much attention from science and technology studies (STS) scholars over the years. The conflictual aspects of this trend have often been emphasised: user and/or patient involvement blurs professional boundaries and challenges epistemological hierarchies, while opening the door to marginal perspectives on science and technology. Some of the terms employed to capture this phenomenon and the conflicts it entails are "lay expertise" (Wynne 1992), "scientific citizenship" (Irwin 2001; Elam and Bertilsson 2003) and "technology-and-product-oriented social movements" (cf. Oudshoorn and Pinch 2003; Hess 2005). These studies are paralleled by writings on free and open source software development as a model of open innovation, practices that have recently expanded to include open hardware development and open biology. A culture of DIY research, emerging from the margins of natural science, is transforming the way officially sanctioned research is financed and conducted (Delfanti 2013). Furthermore, the introduction of a physical infrastructure to enable such initiatives, ranging from the creation of hackerspaces (Kostakis et al. 2014) to the development of user-friendly "open" tools (Söderberg 2014), suggests that this trend will continue to grow in importance and scope. Indeed, this process is backed by an improbably wide range of actors, from EU policymakers and corporate executives to hackers and anarchist militants. Any one of these would readily subscribe to the following statement:

This kind of kitchen chemistry is definitely something that should be maintained. It is a dying art and if the only people who are able to actually do these kind of manipulations in the future are the people that have been to the university and have the appropriate licenses, if that is how it becomes, then we lose a large part of our potential as humans. (Interview person B)

Except that the "kitchen chemistry" referred to here is the extraction of dimethyltryptamine (DMT), a Schedule I drug under the UN Convention on

Psychotropic Substances. Home manufacture of this substance is punishable by long prison sentences in most jurisdictions in the world. My case study of user innovation in the methods of extracting from hallucinogenic plants is presented as a corrective to the often consensual and celebratory talk about the benevolent and emancipatory potential of DIY practices. Kitchen chemistry on controlled substances reminds us of the need to think about state regulation of the growing conflicts that can be expected to follow from greater user participation in scientific research and innovation.

Ten years ago, taking the pulse of existing literature on users, Dale Rose and Stuart Blume lamented that the role of the state had largely been overlooked (2003, 107). They pondered the possibility that this omission was embedded in the very subject matter under discussion. The notion of the “user” implies a person located outside (state) institutions and the symbolic chain of authority for which the state is the guarantor of last resort, in particular, the university. Indeed, the emancipatory promise sometimes attached to user innovation largely stems from this purported “outsider” position. One ambition of this chapter is to reconnect with Rose’s and Blume’s musings on the relation between the state and its citizen in the case of user engagement with technology. The authors’ argument revolved around the ability of the state to exercise its authority over citizens by obliging them to participate in vaccination programmes. The officially stated goal of such obligations is to reduce the risk of epidemics, an objective that even those who, for various reasons, refuse to participate in vaccination programmes, are likely to support. In order to put my argument in terms as unambiguous as possible, I have chosen a case—drug control—where the goal of state intervention is instead hotly contested, at least by those subject to its enforcement regime, i.e. users doing research and product development on controlled psychedelic substances.

It could be argued that drugs offer the quintessential example of a core STS insight, namely, that an object can be two diametrically opposed things depending on the context. As Paracelsus famously put it, the dosage makes the poison. For this reason alone, drug use offers a compelling field of empirical investigation when reflecting on user engagement with technology (Gomart and Hennion 1999; Westhaver 2011). The difference between a poison and a remedy is a matter of degree, not of kind. The ambiguity of the drug itself is transferred to the act of its administration, which can be framed alternately as a medical act or as an act of intoxication and recreation. There is therefore relevant in extending STS discussions on patient advocacy to the sphere of illegal drugs (cf. Epstein 1995, 2008). It has been shown, for instance, that self-medication with controlled substances is highly prevalent among patients diagnosed with schizophrenia (Addington and Duchak 1997). From the other end of the telescope, much substance abuse has been attributed to the consumption of prescription medicines in non-prescribed contexts or quantities (Thøer et al. 2012). In sum, drug user groups and patient groups exist on a continuum.

One controlled substance that stands out in this respect is cannabis. The effectiveness of cannabis in the treatment of medical conditions such as multiple sclerosis, attention deficit hyperactivity disorder and rheumatism is attested to by large groups of patients. Some of them claim to choose cannabis over prescription medicines because they find the prospect of becoming addicted to the latter more frightening (Pedersen and Sandberg 2013). The difficulty of distinguishing between the medical and recreational use of cannabis is reflected in a contradiction in US legislation. Since 2010, the medical use of cannabis has been permitted in 14 US states, while continuing to be regulated at the federal level as a Schedule I substance. The criterion applied in giving a substance a Schedule I classification is that it has no currently accepted medical use (Hoffmann and Weber 2010). Cannabis has won cultural acceptance in the general public that has not been granted to most other controlled substances. But much the same message holds true for more controversial, psychoactive drugs. One example is cluster headache, a chronic, periodically recurring and very painful medical condition. In a forum dedicated to this illness, a member suggested that the symptoms could be relieved with psilocybin, the active substance in “magic mushrooms”. Many forum members were outraged by a claim that, in their eyes, sought to legitimise a controlled substance by associating it with their clinical condition. However, some tried psilocybin and felt that the mushroom alleviated their suffering. They launched their own patient group, called “clusterbuster”, dedicated to this particular treatment. Following this, cluster headache became a celebrity cause in the underground, psychedelic press (Sewell 2008). In STS literature, it is old news that the label “patient” itself is charged with meanings which, in some cases, presuppose the very assumption that demands scrutiny. In other words, the act of ascribing sickness or health is highly political in a society that has become medicalised through and through (Brown and Zavestoski 2004; Zavestoski et al. 2004). The case with controlled substances allows us to examine ongoing STS discussions concerning the epistemological authority of a medical diagnosis in the light of punitive legislation and law enforcement.

This connects this chapter with another fruitful field for STS inquiries, namely the study of science in the judicial system. It has provided a testbed for recurrent questions about epistemology and truth claims in relation to expert witnesses and forensic laboratory work (Jasanoff 1995). Applying these questions to illegal drugs, Nancy Campbell has examined the controversy surrounding drug-testing equipment. Despite concerns about the reliability of such equipment, the test result is made to bear a heavy epistemological burden when courts take decisions on parole and on the enforced removal of children from parents (Campbell 2005). Here, I propose to angle the discussion in the direction of user involvement in science and product innovation. A case in point, to be discussed later, is the appropriation of drug-testing equipment by users for the purpose of determining whether or not a compound offered for sale is correctly labelled. The central argument

that I make in this chapter is as follows: although users seem to stand outside state institutions, the state cannot be left out from reflections over how users matter.

AN OUTLINE OF PSYCHONAUT SUBCULTURE

Defining the “drug user” is fraught with as many ambiguities as defining the “patient group”. It could be said that the psychoactive substance of choice plays the same central role in the identity formation for the former as does the medical condition for the latter (Beard 2004). Telling are the multifarious distinctions made by the users of various controlled substances, drawing boundaries between hard drugs and soft drugs, individualistic drugs and social drugs, chemical drugs and natural drugs and so on. Needless to say, these classifications relate only partly to the pharmaceutical properties of the substance in question. Equally important is the desire among groups of users to distance themselves from more disreputable drugs and drug users in order to gain legitimacy for their particular drug of choice. A case in point is the push for the decriminalisation of cannabis use, which goes hand in hand with a strong emphasis on the therapeutic properties of the herb. The medicalised language transforms a subculture of drug users which for decades justified their practices in more political and confrontational terms (Pedersen and Sandberg 2013).

With regard to the arguments that I intend to advance here, I have chosen to look exclusively at a group of drug users who have forged a strong collective identity in opposition to medical expertise and legal authorities. As a byproduct of this confrontational stance, they have developed a counter-expertise around the drugs they use. The group I have in mind gravitates around substances that are variously labelled “psychedelic” or “hallucinogenic”, the best-known being LSD, dimethyltryptamine (DMT) and psilocybin (i.e. “magic mushrooms”). Experimentation with lesser-known compounds with psychoactive effects falls into the same category, and will be referred to here as “legal highs”. Users dedicated to this constellation of drugs often refer to themselves as “psychonauts”, a composite term coined by the German futurist Ernst Jünger from the words “psyche”, meaning the mind, and “nautes”, meaning a voyager. It gives a sense of the cultural sensibilities of the people who adopt this name. Most drug users are found on the margins of the psychonaut community and have only a fleeting interest in psychedelic experiences. They would be more accurately described as belonging to club culture. My interest is with the core-set who identify themselves as psychonauts, share the values of this group and regularly contribute to the common project.

One advantage of focusing on psychonauts, in comparison with many other groups of drug users, is that they self-organise in forums in which they collectively reflect on and give meaning to their own practices. Besides

discussions on web forums dedicated to psychedelic drugs, they regularly hold festivals and conferences on both sides of the Atlantic. The observations and interviews that underpin this study were collected during four psychonaut conferences held between 2011 and 2013 in Milan, Amsterdam, Berlin and London. My experiences are limited to the European psychonaut scene, but the subculture is global in its outlook. The psychonauts share a sense of common history rooted in 1960s American counterculture, and many of its gurus are still held in high regard. Besides Timothy Leary, we find in the Parnassus of this subculture the novelist Aldous Huxley, the inventor of lysergic acid diethylamide Albert Hofmann and Alexander Shulgin, another legendary chemist who synthesised and made publicly available 200 novel psychoactive substances. The output of books and fanzines is prolific and helps to constitute a reading public. It covers trip reports, how-to-do manuals, arguments in favour of decriminalisation and spiritual and/or neuroscientific interpretations of drug experiences. The intake of psychedelic drugs is framed as an intellectual and/or spiritual pursuit.

This rationale distinguishes psychonauts from the mainstream of “recreational” drug users who take drugs chiefly in connection with parties and festivals. Embedded in this narrative is a negative judgment of the reckless and uninformed manner in which inexperienced users take drugs. That judgment carries force, because medical emergencies are put down to *uninformed* substance use, as opposed to being attributed to the inherent pharmacological properties of the substance itself. This case is typically made by stressing the importance of “set and setting”. The first refers to the state of mind of the user when a drug is taken, and the second to the physical environment and other precautions taken by the users. Set and setting resonates with the priority given in STS research to the situational rather than the essential properties of an object. The stress on informed drug use reallocates responsibility, as the uninformed drug users not only puts themselves at risk, but jeopardizes the psychonaut community as a whole. Emergencies attract the attention of the media and politicians, accelerating the rate at which a novel substance is scheduled and thus imposing restrictions on the whole psychonaut subculture. There is consequently an esoteric and elitist strain in the psychonaut community—bordering on the paternalistic—alongside the exoteric, libertarian outlook, according to which psychedelic drugs should be kept out of hands of ordinary partygoers. It is this circle of lay experts that interests me, rather than the recreational users with only a passing or instrumental attachment to the drugs they take.

A final word is in order on how I have demarcated the drug users in my study. I have chosen not to consider substances associated with severe addiction problems and forced treatment programmes, even though methamphetamine cooking in the rural US is tangential to my arguments here (Sexton et al. 2006; Reding 2009). The mere mention of it casts a shadow over the buzz around do-it-yourself research and “user innovation”. Unsurprisingly, psychonauts are as anxious as are DIY biologists to disassociate

themselves from the methamphetamine cook. This is well illustrated by the introduction of vaporisers, an electrical device that has become popular for administering cannabis or DMT. They are preferred over the ordinary glass pipe, where the compound is placed inside the glass bowl and a heat source is applied under the bowl. Vaporisers are designed to bear as little resemblance as possible to the glass pipe, for reasons that psychonauts are quite lucid about: the glass pipe, better known as a crack pipe, is associated with crack cocaine, crime and social misery. Of course, these are precisely the kind of boundaries erected by practitioners that an STS researcher ought to question when setting the parameters of his or her inquiry. The reason I have excluded problematic drug users from my discussion of clandestine drug innovation is because psychonauts tend to be highly articulate and assertive about what they are doing, in a way that better fits the intent of this chapter.

Psychonaut subculture contests the epistemological authority claimed by government agencies, the medical profession and pharmaceutical companies, paralleling much of what has been said before about patient group activism (Akrich and Rabeharisoa 2012). The implications of commanding epistemological authority in this context are suggested by in the validity ascribed to diagnosis. It is the diagnosis that separates medical from non-medical (thus recreational) substance use. In the same breath as this expertise is assigned to a doctor—the holder of a title certified by a state-sanctioned educational institution—patients are deprived of the authority to self-diagnose their conditions, and, subsequently, to claim their drug consumption to be medically motivated (Illich 1976). The epistemological challenge posed by psychonauts goes beyond questioning the authority invested in medical doctors and law enforcement. A thematic core in collective psychonaut identity formation is the claim that psychedelic drugs give them access to an altered state of consciousness, opening doors of perception that remain closed to the state, indeed, to the scientific rationality of modernity as a whole (Doyle 2011). The metaphysical ramifications of these claims play out more mundanely in a widespread mistrust of government-backed information sources. Trust reached a low point in the psychonaut community in 2009 with the dismissal of David Nutt from his position as the UK government's adviser on the misuse of drugs after he had compared the statistics on horse-riding accidents unfavourably with emergencies arising from the use of Ecstasy (Nutt 2009). Psychonauts seized on the opportunity to call for an "evidence-based" approach to drug information and harm reduction, as opposed to existing drug policies, which they contended to be ideologically driven. Here one can detect a tension in the various arguments advanced by the psychonauts, similar to the difficulties encountered by various alter-native medicine movements. One side renounces *in toto* the hegemony of "Western" rationalism and science, while another seeks to lay claim to some of that legitimacy for its own oppositional practices (Goldner 2004). Be that as it may, over the years, drug users have built up a counter-expertise in

pharmaceutics, to the point that some have acquired both interactional and contributory expertise (Collins and Evans 2002). Indeed, because of the low level of confidence in government information about drugs among target groups, health personnel and law officers often have access to these people only through the information channels that have been set up by legalisation activists. This gives the activists a lever for institutionalising their agenda inside government-sponsored organisations that promote drug education and health issues and monitor the drug market. Unsurprisingly, attempts to institutionalise a counter-discourse on drugs are met with strong resistance from within these institutions. Again, the situation can be compared with the resistance that advocates of complementary and alternative medicine encounter within hospitals and clinics (Goldner 2004).

As well as contesting the content of drug education and drug prevention programmes, psychonauts champion medical research on psychoactive and controlled substances. Such research is hampered in most countries by a general lack of public funding, the strictures of ethical committees and the requirement for special licences and security routines. Once a substance has been listed as a Schedule 1 substance, which is to say, once it has been classified as lacking any legitimate therapeutic effects, it is likely to stay in that category, because pharmaceutical companies avoid taking the risk of investigating any potential medical uses. One of the oldest activist organisations in the field, the Multidisciplinary Association for Psychedelic Studies (MAPS), was conceived as a "non-profit pharmaceutical company", according to its president, Rick Doblin, with the aim of filling this gap in research on psychedelics. MAPS organises conferences and funds research on psychoactive substances. It can be said to represent one strand within psychonaut subculture, struggling to win public recognition for psychoactive substances as a legitimate field of research, to be conducted within established, official channels of science and clinical medicine. The other strand upholds the right of the layperson to do research without being accredited by a university department. In the newsletter Erowid, a key reference in psychonaut subculture, which publishes trip reports, reviews of new drugs and updates on changes in the law, the chief editors summed up this idea as follows:

[. . .] there are no hard lines between researchers and the subculture. Members of the psychedelic subculture have access to the same scientific understandings about psychedelics that researchers do, such as mechanisms of harms like MDMA neurotoxicity, or spiritual benefits of psilocybin documented by the Griffiths group at Johns Hopkins. The distinction between scientific researchers, pharmaceutical researchers, subculture researchers, and that chemistry geek in the college dorm are more blurry than they have been since before the explosion of psychedelics into the culture, and the backlash against them, in the mid-1960s. (Erowid 2010, 18)

Indeed, the expertise in chemistry and pharmaceutical science on some web forums dedicated to controlled substances is at times of a professional standard. One token of this is that, during my research for this chapter, I could access pay-walled academic journals through a link posted on a forum dedicated to DMT extraction techniques. Forum participants used the link to consult medical journals in order to keep abreast of recent developments in the pharmaceutical field.

Users of controlled substances differ in at least one all-important respect from most other unruly, uncooperative users and patients. In their case, the epistemological authority invested in the medical profession and in the pharmaceutical industry is backed up by the court system. The unauthorised user who self-medicates or engages in DIY research on drugs runs the risk of being subjected to law enforcement and criminal sanctions. The fact that psychonaut subculture as a whole occupies a legal grey zone profoundly affects their practices, their self-understanding and their interaction with the wider society. This makes it rewarding to consider them in relation to existing STS literature on users and patients, where the epistemological challenge of users typically stays within legally established boundaries. In consequence, those boundaries have not received much attention, whether from unruly practitioners or from scholars. The example of drug users puts the spotlight on the state as the lawgiver, which sets the baseline for user innovation and lay expertise. This holds as true for cases that fall well within the margins of the lawful as it does for illegal ones. The meaning of user innovation changes drastically, however, when it takes place within a legal grey area. Here, the state plays the role of a hothouse in driving innovation among users. This is remarkable in that controlled substances are one of few policy areas where today's regulators try hard to prevent innovation and entrepreneurship. Both in its presence as a hostile external force, and in its absence as a benevolent regulator, the state contributes to fostering and channelling user innovation of controlled substances. In respect of the former, innovation works to make law enforcement harder. In respect of the latter, innovation works to compensate for the lack of consumer protection afforded to or imposed on market actors. In the next two sections, I discuss first the hostile-punitive aspect and then the benevolent-regulatory aspect of state intervention in relation to user innovation in controlled substances.

USER INNOVATION TO CIRCUMVENT LEGISLATION AND LAW ENFORCEMENT

A major incentive for members of the psychonaut subculture to engage in innovation is to avoid detection by law enforcement agencies, and/or to circumvent existing legal definitions of controlled substances. Broadly speaking, two strategies for neutralising the law can be identified. First, users try to stay ahead of the game by finding as-yet unclassified plants and compounds.

Second, methods for growing and manufacturing drugs are developed to spread their use to ever-larger numbers of people. The first strategy has made it into the headlines with expressions such as "designer drugs", "legal highs" or "novel psychoactive substances", depending on who is doing the talking. According to the European Monitoring Centre for Drugs and Drug Addiction, seventy-three novel psychoactive substances were identified on the European market in 2012 alone, and the trend is upward every year (EMCDDA 2012). The pace of innovation is driven by the involvement of for-profit entities, which may invest substantially in research and development. The design and production of new psychoactive molecules have been systematised and integrated into a global value chain in which Chinese laboratories play a prominent role.

Confirming an observation well established in the literature of innovation studies, private companies enter this market segment as late adopters of innovations that originate with users (Interview person K). The chief innovation is not the discovery of any single plant or psychoactive substance, but the realisation that novelty is a loophole in the controlled substance act. Though it is impossible to say exactly when this realisation was first made, the practice spread to a segment of the 1960s counterculture with the criminalisation of lysergic acid diethylamide. The LSD ban was first introduced in 1966 in California state law; it was written into US federal law four years later and then implemented internationally the year after with the UN convention on psychotropic substances. Overnight, it had become unlawful to manufacture and to possess the emblematic drug of the hippie identity. The often idealistic and eccentric milieu in which LSD had been consumed and manufactured gave way to more criminal and self-serving elements (Schou 2010). Nevertheless, some of the LSD manufactured today is still produced for political-ideological motives. When such chemists are caught by law enforcement, they regard themselves, and are recognised by the psychedelic community, not as criminals, but as political prisoners (Fielding 2011). The most recent example is Casey Hardison, who was released in 2013 after serving a nine-year sentence for manufacturing LSD and dimethyltryptamine. In court and throughout his time in prison, the chemist refused a lawyer and contested the legitimacy of the law under which he was convicted (Hardison 2007). Few are willing to pay such a high price for their convictions, no matter what the political cause. Another sign of this commitment is that, since the day LSD was outlawed, users have gone to great lengths to find as-yet legal substitutes. Of the many analogues invented or rediscovered at this time, the most popular was MDMA, better known as Ecstasy, which remained unclassified in the US until 1985 (Collin 2009). The clampdown on Ecstasy and its corollary, the rave movement, in the late 1980s and early 1990s, unleashed a new wave of discoveries and innovation amongst drug users, especially a renewed interest in psilocybin-containing "magic mushrooms".

The second way in which innovation is mobilised against the controlled substance act is through the development of methods that lower the threshold

for growing and processing scheduled drugs. With wider dissemination of the practice amongst users, it becomes harder for the police to intervene and press charges. This points to another contradictory outcome of law enforcement. Not only does the law quicken the pace of an innovation process that it was intended to suppress, but it may also give users incentives to acquire the know-how and skills to manufacture drugs. A telling example of this dynamic is a thread on an important forum in the psychonaut community, Drugs-Forum.com. The discussion concerned a vendor of designer drugs in United States who faced criminal charges. He was recorded on a Drug Enforcement Agency wiretap admitting to a Chinese supplier that the chemicals he was enquiring about were intended for human consumption. One of the commentators on the forum drew the following lesson:

Maybe the next person who gets the bright idea to get rich quick will take a chemistry class instead and learn how to cut China out of the picture all together. (2012-04-20)

The willingness of participants in a community to learn about and engage in shared practices is a precondition for the continued existence of that community. In this sense, then, the law also plays a role in preserving the identity and cohesion of the psychonaut community. One way of testing the plausibility of this postulate is to compare psychonauts with users who stay within the bounds of the law and whose innovations circulate on white markets. Here, it is a recurrent finding that the community is swept away by the commercial success of the innovation that it helped foster. The core developers fall out with each other over alleged betrayals of ideals or conflicting intellectual property claims. Concurrently, ordinary users lose interest in the service provided by the community as their needs are catered to by the regular market (Söderberg 2011). The dynamic is somewhat different in markets in controlled substances. In a study of the Norwegian cannabis market, Sveinung Sandberg notes that cultivation takes place in a two tier-system that has proven remarkably stable over the years. A proportion of the drug circulates in extended friendship networks governed by a moral economy distinct from the main cannabis market. Sandberg's explanation for this is that legal risks increase with the scaling-up of operations. This leaves a niche for users who engage in small-scale drug manufacturing for personal use and occasional sales (Sandberg 2012). This observation is confirmed by at least a small minority in the psychonaut community who opposes the decriminalisation of psychedelics drugs. According to this line of argument, criminal law is what protects the community from being co-opted by dominant institutions (Bey 2000).

The backbone of the drug-using community is the information channels where discussions are held, new products advertised or recommended and methods shared. In the 1980s, these channels were provided by fanzines and printed newsletters. Later, they were hosted on bulletin board systems,

before everything moved out onto the Internet. Instructions on how to cultivate illegal plants such as cannabis or how to process controlled substances from accessible precursors are now easy to come by. To follow these instructions and actually synthesise a drug is a more demanding task. Besides the tacit knowledge presupposed for laboratory work and the associated safety measures, synthesis might require laboratory conditions and secondary reagents that are closely monitored by law enforcement agencies (Interview person A). More within reach of what ordinary users can do in their homes is the extraction of psychoactive alkaloids from plants. At this point in the argument, it should be stressed that the difference between synthesising a chemical compound and extracting it from plant material is a matter of degree, not of kind. Indeed, most drugs said to be "chemical" have their origin in the plant kingdom. For instance, amphetamine has a sibling in the ephedra plant, which contains a chemically related alkaloid, ephedrine. LSD is made from lysergic acid, which can be isolated from an ergot that grows on rye. A precursor for Ecstasy is saffrole oil, obtained from the bark of the sassafras tree. Small amounts of saffrole are also present in nutmeg, and the prospect of making pure Ecstasy from this widely available nut is a recurrent, though elusive, "holy grail" for psychonauts. The field that has generated the most systematically organised, collaborative research project is the extraction of dimethyltryptamine, or DMT.

As DMT remains relatively little known outside psychonaut culture, a brief description is in order. The drug is usually administered by heating DMT crystals in a glass/crack pipe. When the fumes are inhaled, the substance is delivered to the brain, giving an intense but short-lived psychedelic effect. The drug does not enhance mood or increase stamina, which may partly explain why it has so far had limited appeal for recreational users. DMT users belong to a tight-knit community that tends to emphasise the drug's role as a vehicle for mystical experience. This claim seeks support in the ethnographically rich history of the DMT molecule. It is the active compound in many brews taken in shamanic and ritual practices, the best-known being Ayahuasca, a brew originating with tribal peoples of South America. The appetite for discussions and writings on the deeper meanings of the DMT experience testifies to the intellectual culture that has grown up around this drug. This is also apparent in the community efforts put into improving the methods employed for its extraction. Before returning to the processes of innovation that arise in this setting, I will give a brief technical description of the most popular method among the several possible extraction techniques.

The ingredients required include plant material containing DMT alkaloids, a basifier, usually sodium hydroxide, and a widely available petroleum-based solvent such as lighter fuel. The plant material is ground to a fine powder and soaked in water. The basifying ingredient is placed in the water to raise the pH level, shifting the polarity of the DMT alkaloids. This makes the alkaloid susceptible to a non-polar solvent, so that when the petroleum

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The willingness of participants in a community to learn about and engage in shared practices is a precondition for the continued existence of that community. In this sense, then, the law also plays a role in preserving the identity and cohesion of the psychonaut community. One way of testing the plausibility of this postulate is to compare psychonauts with users who stay within the bounds of the law and whose innovations circulate on white markets. Here, it is a recurrent finding that the community is swept away by the commercial success of the innovation that it helped foster. The core developers fall out with each other over alleged betrayals of ideals or conflicting intellectual property claims. Concurrently, ordinary users lose interest in the service provided by the community as their needs are catered to by the regular market (Söderberg 2011). The dynamic is somewhat different in markets in controlled substances. In a study of the Norwegian cannabis market, Sveinung Sandberg notes that cultivation takes place in a two tier-system that has proven remarkably stable over the years. A proportion of the drug circulates in extended friendship networks governed by a moral economy distinct from the main cannabis market. Sandberg's explanation for this is that legal risks increase with the scaling-up of operations. This leaves a niche for users who engage in small-scale drug manufacturing for personal use and occasional sales (Sandberg 2012). This observation is confirmed by at least a small minority in the psychonaut community who opposes the decriminalisation of psychedelic drugs. According to this line of argument, criminal law is what protects the community from being co-opted by dominant institutions (Bey 2000).

The backbone of the drug-using community is the information channels where discussions are held, new products advertised or recommended and methods shared. In the 1980s, these channels were provided by fanzines and printed newsletters. Later, they were hosted on bulletin board systems,

before everything moved out onto the Internet. Instructions on how to cultivate illegal plants such as cannabis or how to process controlled substances from accessible precursors are now easy to come by. To follow these instructions and actually synthesise a drug is a more demanding task. Besides the tacit knowledge presupposed for laboratory work and the associated safety measures, synthesis might require laboratory conditions and secondary reagents that are closely monitored by law enforcement agencies (Interview person A). More within reach of what ordinary users can do in their homes is the extraction of psychoactive alkaloids from plants. At this point in the argument, it should be stressed that the difference between synthesising a chemical compound and extracting it from plant material is a matter of degree, not of kind. Indeed, most drugs said to be "chemical" have their origin in the plant kingdom. For instance, amphetamine has a sibling in the ephedra plant, which contains a chemically related alkaloid, ephedrine. LSD is made from lysergic acid, which can be isolated from an ergot that grows on rye. A precursor for Ecstasy is safrole oil, obtained from the bark of the saffras tree. Small amounts of safrole are also present in nutmeg, and the prospect of making pure Ecstasy from this widely available nut is a recurrent, though elusive, "holy grail" for psychonauts. The field that has generated the most systematically organised, collaborative research project is the extraction of dimethyltryptamine, or DMT.

As DMT remains relatively little known outside psychonaut culture, a brief description is in order. The drug is usually administered by heating DMT crystals in a glass/crack pipe. When the fumes are inhaled, the substance is delivered to the brain, giving an intense but short-lived psychedelic effect. The drug does not enhance mood or increase stamina, which may partly explain why it has so far had limited appeal for recreational users. DMT users belong to a tight-knit community that tends to emphasise the drug's role as a vehicle for mystical experience. This claim seeks support in the ethnographically rich history of the DMT molecule. It is the active compound in many brews taken in shamanic and ritual practices, the best-known being Ayahuasca, a brew originating with tribal peoples of South America. The appetite for discussions and writings on the deeper meanings of the DMT experience testifies to the intellectual culture that has grown up around this drug. This is also apparent in the community efforts put into improving the methods employed for its extraction. Before returning to the processes of innovation that arise in this setting, I will give a brief technical description of the most popular method among the several possible extraction techniques.

The ingredients required include plant material containing DMT alkaloids, a basifier, usually sodium hydroxide, and a widely available petroleum-based solvent such as lighter fuel. The plant material is ground to a fine powder and soaked in water. The basifying ingredient is placed in the water to raise the pH level, shifting the polarity of the DMT alkaloids. This makes the alkaloid susceptible to a non-polar solvent, so that when the petroleum

is stirred into the mixture, it sucks up the alkaloid. The water, which has now turned into a greenish-brown vegetable goo, and the transparent petrol form two superimposed layers. The next step is to separate out the solvent, which contains the DMT, from the spent water-goo. Ideally, this is done with specialised glassware. Thanks to the recent popularity of molecular gastronomy, users at least have "plausible deniability" when requesting specialised equipment of this kind. This seems to happen often enough that when one of my respondents approached a glassblower, he was warned that another customer had been caught by the police (Interview person A). It is easier to obtain a metal syringe, which is almost as effective for the job. In England, at least, supermarkets sell them around Christmas as turkey "basters" (Interview person B). Once the two liquids have separated, more of the solvent is added to the water-goo and the same process is repeated several times to ensure that all the alkaloids have been extracted. The petroleum solvent is then poured onto a flat tray. One incremental improvement in the extraction process that has been made through collective learning and information sharing in the community is that a higher yield can be obtained by temperature changes. In the past, the tray was simply left in the open till the petroleum had vaporised, but nowadays, it is common practice to place it in a fridge. The solvent holds less DMT at lower temperatures and this forces the DMT out of the liquid. The end result is a fine white powder and, if the user is lucky, crystals of DMT left on the bottom of the tray.

The extraction process is not without hazard. Sodium hydroxide is highly corrosive and can, for instance, cause damage to the eyes. There is a small risk of this, because a heat reaction can cause splashing when the sodium hydroxide is introduced into the water. Likewise, it is an ongoing discussion on Internet forums whether vaporisation removes all of the petroleum solvent. It seems plausible that traces of it remain in the end product, the DMT crystals. Alternatives to the above extraction process are under development, where potentially hazardous chemical substances have been replaced with food-grade materials such as vinegar and limonene oil, a derivative of oranges. These and many other improvements to the extraction process are driven by health concerns, aesthetic factors or curiosity, and do not differ in kind from user innovations that take place in legally recognised white markets.

However, there is another class of user innovations specific to the psychonaut subculture, arising from the illegal status of DMT extraction, in other words, innovations made in direct response to or in anticipation of law enforcement activities. Although DMT is a Schedule 1 substance under 1971 UN Convention on Psychotropic Substances, enforcement agencies have given a low priority to this drug. By contrast with Ecstasy, DMT has not attracted a mass consumer market of recreational users and, unlike some experimental designer drugs in recent years, DMT has not set off an avalanche of emergency cases. Perhaps this will change in the next few years. The community continues to devise a steady stream

of new methods for administering the drug. One is to saturate dried herbs with the extracted crystals and roll them into cigarettes. Another is a crack pipe that uses steel wool to conduct the heat more evenly, thus making the drug easier to administer. The reward for deskillling is a bigger market, but it also attracts media and political attention and increases the pressure on law enforcement agencies to uphold the law in this area. For now, it remains relatively easy to find plant material containing DMT on sale on the Internet and to have it shipped internationally, without seizure by customs authorities. The two most popular plant sources for DMT extraction are *Mimosa tenuiflora*, imported from Brazil, and a subset of the acacia family native to Australia. Although the bulk of the trade in these plants is unquestionably driven by the demand for psychoactive alkaloids, they have other uses as well. *Mimosa tenuiflora*, for example, can be used to dye cloth. The legal status of this plant is currently under review in many countries. Since 2005, possession of the raw plant material has been banned in France, subject to the same control measures as the DMT substance itself. As for England, the possession and sale of *Mimosa tenuiflora* is permitted on the condition that it is not intended for human consumption. Selling *Mimosa tenuiflora* in powdered form is banned on the assumption that it has been prepared for extraction. The user can easily overcome this obstacle by grinding the bark in an ordinary food mixer. The law has been effective, however, in that the additional preparation step reduces the quantities of plant material that can be extracted from a single batch, simply because of the limited capacity of food processors (Interview person B). Besides new legislation, there are signs that higher priority is being placed on the enforcement of existing laws. In the US, the supply of *Mimosa tenuiflora* dried up after the September 2012 clampdown on major importers and retailers.

This development was anticipated by the psychedelic subculture, spurring it to scan for alternative plants and fungi native to European and North American flora from which DMT can be extracted. It happens that floras containing the prized alkaloid are prevalent in the plant kingdom (Shulgin and Shulgin 1997, 247). As far back as 1992, the fanzine *The Entheogen Review* published instructions on how to extract DMT from grass of the phalaris genus, which were soon followed by more meticulously executed studies (Applesseed 1992). The advantage of phalaris grasses is that they grow abundantly in the temperate zone, but there are also numerous drawbacks. It is difficult to identify inert from active subspecies of the herb. The quantities of DMT are highly variable, depending on the season, growing conditions and harvesting techniques. If discussions on dedicated web forums are to be believed, the volume of alkaloids can even be affected by the time of day when the herb is harvested. Furthermore, additional steps must be taken and chemical products added in order to remove vegetable fats and chlorophyll from the plant material before the actual extraction process can begin (Interview person A; Festi and Samorini 1994). Most troubling is the presence of a neurotoxic alkaloid known as gramine in some subspecies of

phalaris. An indication of its toxicity is that agro-business sees gramine as a promising base material for developing new strains of insecticides.

As long as tropical plants are easy to import, the choice of extracting DMT from phalaris grass is made on ideological or aesthetic grounds. However, the clampdown on *Mimosa tenuiflora* retailers in the US gave new impetus to the community's research efforts. One line of research seeks to improve techniques for identifying active subspecies of phalaris grass and methods for removing unwanted plant materials. Concurrently, a lot of effort is going into monitoring and publishing data on the concentration of DMT and other psychoactive and toxic alkaloids present in other plants growing in temperate climates. In some jurisdictions, it is possible to circumvent legal definitions by inventing unclassified extraction processes. This is the case in Brazil, where the state is trying, on the one hand, not to prohibit the DMT-containing Ayahuasca brew integral to native traditions and, on the other hand, to honour international conventions on drug control. In this balancing act, the state permits DMT use but prohibits its extraction, an approach that raises the problem of defining what counts as an "extraction process". The native Indians too prepare the plant material that goes into the sacred brew. This has been resolved by specifying that preparation counts as extraction if it involves petro-chemicals. With this legal definition in mind, one of my respondents in Brazil has developed a method of obtaining solid DMT compounds from *Mimosa hostilis* without using any petro-chemical products. Instead, he relies on the protein in egg whites to purify his DMT-containing brew. The liquid can then be solidified by placing it in a food dehydrator, an appliance usually used for drying fruit. The end product is a DMT compound that has been obtained without petro-chemicals and therefore without violating the Brazilian ban (Interview person E). In a pamphlet on DMT manufacturing distributed at a psychonaut conference, tributes were paid to these initiatives that well capture the spirit of the DMT community:

The major advantage of underground entheogen research is that researchers are not subjected to reviews or guidelines of agencies like the FDA or DEA, and do not have to submit methodologies to the Institutional Review Board for approval.

(Nickles 2012)

The reference to the Food and Drug Administration (FDA) in this quote gives pause for thought. The powers invested in the FDA to regulate the pharmaceutical market were signed over to them in the aftermath of numerous cases of adverse drug reaction, most notably the thalidomide scandal in the early 1960s (Gaudillière 2012). What is experienced as a freedom on the side of the manufacturer recoils as a risk on the side of the consumer. Because there are no state-backed guarantees in underground entheogen research, the reduction of health risks and allocation of responsibility have to be self-managed by the subculture itself.

USER INNOVATION TO COMPENSATE FOR THE ABSENCE OF STATE REGULATION

It is not only in its role as an external, hostile force against drug users that the state generates innovation. Equally often, it is the absence of the state as a paternalistic-benevolent regulator that compels users to innovate. A parallel can be drawn with a less controversial example, the trend towards urban gardening and home vegetable growing. At least in part, this trend can be attributed to faltering confidence in the willingness and capacity of the state to regulate the excessive use of pesticides in agro-business (Hren 2011). Applying the same logic to cannabis cultivation and drug manufacture, where the use of pesticides is unabated, growing and brewing psychoactive substances at home is a way of maintaining a minimum level of consumer safety. User communities have developed various strategies to compensate for the absence of consumer regulation in the field. One is to engage in peer education about risks. Another is to broadcast systematic customer reviews on dedicated web portals run by harm reduction activists. The drawback with information obtained in this way is that a product is discovered to be dangerous only after an emergency. In addition to collecting data, harm reduction activists provide facilities for users to test their pills and compounds. The rationale behind these initiatives was explained by an activist in the following way:

It was heavily weighted on the side of the dealer [...] they would give you anything and it wouldn't matter. We just put more tools in the hands of people for them to be able to push back. (Interview person F)

False labelling and the use of adulterants are commonplace. The purity of tablets sold as "Ecstasy" fluctuates greatly from year to year, depending on the availability of precursors (Vogels et al. 2009). Governments monitor the chemical composition of pills that end up in forensic laboratories, but little of that information reaches drug users. When a particularly dangerous substance is encountered, the police issue a warning. In most countries, the police refuse to give details of what the dangerous pill looks like, on the grounds that if such details were given, users might interpret the warning as an official sanction to take non-identified, and, by implication, less dangerous, pills. For activists, however, governments are jeopardising the lives of users by withholding critical information. Of particular concern is a substance called PMA that is occasionally sold as Ecstasy. PMA is more potent than Ecstasy and slower acting, with the result that users have been known to take a second or third pill thinking that the first was inert, resulting in fatal overdose. Another factor is that it is not unusual for customers to be sold mislabelled amphetamine tablets—worth a fraction of the price of MDMA. The concern about medical risks is accompanied by the fear of being cheated. Consumer information blends into risk awareness when drug users informally discuss their drug experiences.

These spontaneous interactions have given rise to more sustained efforts to systematise exchanges of information and circulate results to the wider community. A case in point is the user-generated platform Pillreport.com, a globally expanding database where users can post photos and write personal accounts about a drug they have tried. An indication of the site's importance is that it receives 15,000 individual hits per day. By cross-referencing police warnings with the information found in the user-generated database, users can identify the mislabelled pills to which the warnings refer. Pillreport.com's web administrator believes that the website and similar initiatives by the harm reduction community have encouraged the police and public authorities in some countries to become more transparent with government data (Interview person F).

A few independent pill testing programmes, such as EcstasyData in the US and EnergyControl in Spain, have the resources to commission their own laboratory tests, and ask users to submit their pills for analysis. Similar resources are available in the Netherlands, where pill testing has been integrated into national drug policy since the early 1990s. In other European countries, for instance Germany and France, grassroots pill testing initiatives operate in a legal no man's land. On the one hand, local and regional authorities fund organisations that provide the service, and cooperation with medical institutions has been in place for many years. On the other hand, depending on the political climate at the time, drug-testing activities may also be targeted by the police. The varying degrees to which the different organisations are integrated are reflected in their differing attitudes to the publication of test results. Whereas the Berlin-based group Eve and Rave asserts the right of users to be informed and therefore makes all its analytical data public, others are careful only to pass information on to the user directly concerned (Kriener 2001). The reticence about making test data public arises from the difficulty of separating the user, potentially a victim of mislabelled drugs, from the dealer, potentially the predator and propagator of such drugs. In media and policy language, this line is sharply drawn, but on closer examination, it often turns out that people may both use a drug and sell it within their wider friendship circles. Consequently, testing facilities are always on the verge of becoming relays in the market circulation of drugs. This leads to an intriguing observation: in spite of a general mistrust of government information about drugs, the state is still trusted as a neutral broker between products on the market. A government-backed testing facility offers the one thing that is in shortest supply and thus in greatest demand in the grey or black market for drugs: trust. This is why test facilities teeter on the edge of becoming waystations in price negotiations on controlled substances. In addition to this risk, government officials are suspicious that harm reduction initiatives serve as a publically acceptable front for a more far-reaching agenda on drug legislation. The suspicion is not entirely unfounded, as is suggested by the fact that the discourse on "risk reduction" and "industry self-regulation" has been adopted not just by activists, but

also by head shop trade associations in countries where those are allowed to exist (Ryall and Butler 2011)

As for users and harm reduction activists, they are no less wary of the opposite scenario, i.e. that pill testing facilities and similar harm reduction initiatives are being turned into government monitoring devices. The users are, as the saying goes, experts in themselves, so user-generated databases often provide a superior source of information about new products on the market, and are frequently consulted by the police and medical personnel. There is a telling story about one police officer in Australia who could no longer obtain access to Pillrapport.com. Assuming that he had been banned from the website, he contacted the web administrator and asked to be let back in. The web administrator promised that the website was accessible to everyone, including law officers. It turned out that the website had been blocked by a filter put in place by the police station's IT-department (Interview F). This anecdote suggests how anxiety to maintain a sharp demarcation line between licit and illicit becomes an obstacle to the policing of that very boundary. Or in other words, in order to effectively police the border between legitimate and illicit, traffic must cross that border in both directions, even as the existence of such a crossing must simultaneously be denied in public. An example of the same traffic, but this time from the other side of the frontier, is the adoption of drug-testing equipment by grassroots harm reduction activists. The most commonly available equipment for testing pills is known as the "colour reaction test". This was originally a forensic method used by the police when arresting drug dealers, a field test that allowed them to quickly determine whether an unknown compound found on a suspect was a scheduled substance and therefore cause for arrest. Colour reaction test kits were sold by firms specialising in forensic equipment. A list of forensic technology firms offering this and other instruments for sale figured in a legendary psychonaut newsletter from the 1990s, *Psychedelics Resource List*, next to a column with reviews of vendors selling controlled psychoactive substances. As the editor of the newsletter put it:

There's no good reason that such technology should be in the hands of the police only.

(Hianna 2004, 127)

Nowadays, drug-testing kits are staple ware in many head shops. However, before this market was established, and still today in countries where head shops are not allowed, users and harm reduction activists made their own colour reaction test kits, which were often distributed for free or priced at shipping cost. A kit consists of an "Eppendorf tube", a standard piece of lab equipment that contains the chemical reagent in question. There are many reagents used to identify different products. The most popular is called "marquis reagent", which owes its popularity to its ability to distinguish

between MDMA and amphetamine. It consists of nine parts concentrated sulphuric acid (H₂SO₄) and one part formaldehyde (CH₂O). Sulphuric acid is highly corrosive, and the fumes from formaldehyde are unhealthy if inhaled. Making a kit requires little more than placing a drop of the liquid mixture in a tube, but because of the hazards involved, some extra precautions are needed. At first sight, it seems equally straightforward to test a pill with the kit. The user simply scrapes a sample of the unknown pill into the tube. The liquid changes colour when it comes into contact with the substance, and this colour is compared against a colour map supplied with the chemicals. If the liquid turns purple-black, it indicates that there is MDMA in the pill. If not, the user has a strong indication that the pill does not contain that particular substance. This information is sufficient for a police officer to make an arrest, but is very short on information for someone intending to swallow the pill. In particular, it says nothing about the dosage or the presence of cutting agents. Drug dealers trying to pass off mislabelled Ecstasy tablets quickly found a way to trick the colour reaction test, simply by placing a batch of non-MDMA pills in a bag that had previously contained MDMA and shaking the bag so that the test would subsequently show positive (Interview person F).

The main drawback with the colour reagent method is that it requires the user to possess a lot of tacit knowledge in order to produce reliable results. A seasoned harm reduction activist can spot nuances in the colours produced by the chemical reaction and make an educated guess about the purity of a tablet. In countries such as Portugal and Netherlands, where drug laws are permissive, harm reduction activists can provide these services for festivalgoers without any problem. Such permissiveness, however, is more of an exception than the rule. In many jurisdictions, it is considered a drug trafficking offence to receive a controlled substance and hand it back again, even if no money changes hands. A further level of uncertainty is added in countries where the possession of "drug paraphernalia" is considered to be a crime in its own right. Here, pill-testing equipment is only one step away from the same list as crack pipes and precision scales for dosing (Interview person H). The likelihood of a harm reduction activist actually being charged for drug trafficking or the possession of drug paraphernalia depends largely on contingent and local factors, such as the political climate and the priorities of whoever is running the local police service at the time. In many, if not most, countries, pill testing exists in an ill-defined legal grey area, where national and municipal policies are often in direct conflict (EMCDDA 2001). France is an exception, because there the law explicitly forbids harm reduction associations from conducting pill tests with colour reagents. When this provision was introduced in 2004, harm reduction associations in exchange were given official recognition together with the right to apply for public funding. One activist alludes to the history of the reagent tests when explaining this tough stance on them

in a law otherwise designed to normalise the working conditions of the associations:

It was a real issue, the ministry of justice wanted to have its tool back, and not to see it being used by the associations. (Interview person M)

In countries where pill testing is either explicitly prohibited or left in a legal grey area, activists try to work around the restrictions by instructing users how to conduct the tests by themselves. Harm reduction associations go to festivals, hold workshops and set up tents where users can test their pills under optimal conditions. However, because tacit knowledge cannot be passed to users in this way, the test results tend to be unreliable. Indeed, the unreliability of the method in the hands of inexperienced users provided the scientific pretext for banning harm reduction associations in France from conducting colour reagent tests on behalf of users. The ban is the reason for the method's unreliability, which in turn provides the pretext for the ban. More resourceful associations have been able to work around the legal and technical limitations of colour reagents by employing technically more advanced analytical methods, such as gas chromatography. This is a routine laboratory technique that produces standardised, reliable results, but it is expensive and requires laboratory conditions that cannot be reproduced in the field, so with gas chromatography, there is no way for drug users to be involved in the testing process. This is crucial, because the main point of pill testing for many harm reduction activists was not to supply users with an analytical instrument, but to provide an entry point for peer education about drugs (Interview person M). The dissemination of more advanced forensic equipment might improve conditions for grassroots pill testing in the future. A case in point is an association in Australia called Enlighten that tried to buy a state-of-the-art "chemical scanner" from a forensic firm, a device originally designed for detecting drugs and explosives at border controls. The scanner is a black-box method for analysing chemical contents at a distance, which activists hoped would remove the legal risks of receiving and handing back a controlled substance, and at the same time remedy the unreliability of user testing. In this case, there was high-level intervention by the Australian government to prevent the firm from selling the scanner to the association, but it is foreseeable that such tools will eventually become available on the secondary market (Interview person F).

Concurrently, the need for harm reduction initiatives has been accentuated by the wider market circulation of "research chemicals", "designer drugs" and "legal highs". Whereas these experimental compounds used to remain within closed circles of connoisseurs, they have now begun to circulate among mainstream recreational users. By contrast with popular but unambiguously illegal substances like MDMA, heroin, etc., where acute risks and long-term effects have been documented over the years, novel

psychoactive substances are unknown unknowns. Incubation time, dosage, adverse drug reactions and inadvertent effects from mixing substances, are vital information gathered on a trial-and-error basis and haphazardly documented in user-generated databases and discussion forums. Staying up to date with the latest developments on the market is imperative for a responsible drug user. The spread of novel psychoactive substances to ever-wider and consequently ever-less-informed circles of drug users is driven by the ambiguous legal status of these products. In most countries, where the law has not been amended to prevent this from happening, novel psychoactive substances can be advertised on websites, delivered by mail order or sold in brick-and-mortar head shops. The European Union and national parliaments in Europe are passing new laws to close this loophole (already closed in the US), but as a consumer pattern and a corresponding mass market has already been established, the likely effectiveness of these laws is much in doubt (EMCDDA 2012). The response to the new laws will not be compliance, but innovation. One pointer is the surge in encrypted and anonymous trading places, starting with Silk Road and, after its organiser was arrested by the FBI, its many lookalikes. These peer-to-peer distribution channels have upset the old patterns of drug diffusion. Previously, it was fairly predictable how a substance would circulate on regional drug markets, because of the existence of established networks and value chains. This is another facet of the challenges that innovation poses to harm reduction activists. A central function of user-generated databases is to warn users and activists about the circulation of particularly dangerous products. With these alerts, it used to be possible to make an educated guess where the product would show up next (Interview person F).

As these examples suggest, it is not only governments, but equally, drug users and activists, who find that their efforts to regulate the drug market are being disrupted by innovation. The need to put a halt to unacceptably dangerous practices and products is voiced by segments of this community as well. There is a telling editorial in *The Entheogen Review*, the fanzine mentioned above and whose claim to fame is having published the first instructions on how to extract DMT from phalaris grass. In the years when information about drug manufacturing moved from the fanzine underground to the Internet, the editor shared some deeply felt concerns with his readers:

Because virtually anyone with a computer can post anything they want (without the benefit of editors or peer review), information found on the Internet is suspect by nature.

(Entheogen Review 1998, 1)

A parallel can be drawn between grassroots harm reduction initiatives today and a turn of events in the history of the 1960s counterculture. As the youth rebellion drew to a close, the communities of LSD-dropping hippies,

with their hopes for a better world, became infested with amphetamine addicts or "speed freaks". Seeing the detrimental effects of amphetamine on the addicts, as well as on the community and their political cause, hippies began to speak out against the drug. Nicolas Rasmussen ends his study of the history of amphetamine on a surprising yet compelling note: the fact that amphetamine was placed under restrictions by the US government, in spite of it being the most profitable product of the pharmaceutical industry in twentieth century, attests to the healthy influence of the counterculture on American political culture (Rasmussen 2008). To this observation, we can only add the following: the waning of that influence coincides with a political failure to impose restrictions on the free circulation of the cold medicines from which the precursors used for methamphetamine cooking are derived (Reding 2009).

CONCLUSION

For a long time, the co-construction of technologies by users was seen as an outlier, occurring on the margins of society and subsequently an object of study only for specialised research communities. The phenomenon has since spread to the point that it is close to becoming a generalised model for procuring research and innovation. The dissemination of advanced manufacturing tools and the media promotion of identities such as the "maker", help to render these practices ubiquitous. As a consequence, the conflictual aspects of use and non-use, already highlighted by STS scholars at an early date, also become more pronounced (Oudshoorn and Pinch 2003; Söderberg 2013). In this chapter, I have offered the DIY production of controlled substances as a limiting case for discussion on users and lay experts. The extreme nature of the case might lead the reader to think that it is also an exception. In order to argue for the general purport of my observations, I will end with a reference to something very ordinary, namely traffic regulation. Since at least the 1950s, youngsters have tinkered with their motorcycles in order to exceed inbuilt speed limitations. User innovations in this sphere have proliferated to the point of being manufactured for a mass market. Today, the driver bent on breaking speed restrictions without being caught by the police can choose from a range of products. A glossy substance sprayed onto the licence plate, while transparent to the naked eye, reflects the flash from speed cameras and overexposes the photo, making the registration number invisible. Drivers can equip themselves with radar detectors to forewarn them about police controls down the road. Now, consider how many more options will be available to user-drivers to tailor their vehicles in order to circumvent traffic laws if C,mm,n, OsCar or eCars take off. These are the names of three projects originating in the open hardware movement that are working on the development of modular car designs (Malinen, Mikkonen, Tienvieri, and Vadt 2011). In the case of controlled

substances, opinions on state intervention are highly polarised. With traffic regulation, by contrast, everyone agrees on the desirability of the ultimate goal of reducing traffic accidents and congestion. Even motorists who go out of their way to commit traffic offences are unlikely to publicly advocate *laissez-faire* as a principle of traffic regulation. They just decline to act in such a way that their conduct could be raised to a universal law.

The example of traffic regulation is analogous to the relatively uncontroversial goal behind vaccination programmes. No human being is likely to side with the non-humans in this conflict, i.e. the homicidal viruses. Of course, this does not rule out the possibility that the method of achieving the common goal, preventing epidemics, may be fiercely contested (cf. Fressoz 2012). It is not the implementation of one or another vaccination programme, however, but the founding principle underlying government intervention as such that is at stake in Dale Rose's and Stuart Blume's musings. Resistance is growing among individuals to surrender their immunity systems to the state sovereign for the greater good of national bio-security. In this trend, Rose and Blume see a measure of escalating individualism. This form of radicalised individualism concedes no grounds for the state to overrule the interests of one of its constituents for the sake of the whole. This line of thinking, though not ubiquitous, is well represented in the psychonaut subculture. The state is here experienced as an external, hostile force. In saying this, I do not question that this opinion is well grounded in experience. What is problematic with such an outlook is that it forecloses the possibility that the state could play a role as the benevolent protector of the realm. Indeed, because criminal law declares markets in psychedelic substances to be out of the bounds of state regulation, entrepreneurs have free rein to sell mislabelled and contaminated products with impunity. Or, at the very least, dishonest entrepreneurs are no worse off than the honest ones who sell properly labelled and unadulterated controlled substances. Deprived of state-backed consumer regulation, users have to resort to peer learning and self-organised, community-supported warning systems. At the same time, the responsibility to stay informed is placed squarely on the shoulder of the individual who, having taken a risk, has only himself to blame if something goes wrong. Extreme as this case might sound, something of the same political outlook and ethos can be found in many other DIY-communities and subcultures. A case in point is the strategies developed by Japanese citizen-scientists in the wake of the Fukushima incident. Mistrust of government information about the accident was rampant. Hackers and activists responded by holding workshops on how to make geiger counters and set up user-generated databases to map out contaminated areas (Kera 2012). It takes nothing away from these laudable initiatives if I say that they are a testimony to the decay of representative democracy. The possibility of petitioning representatives and swaying the state into performing these tasks on behalf of citizens had become almost unimaginable.

We might say, therefore, that psychonauts are not merely "lead users" in respect to psychedelic substances. They are early adopters of a new kind of

"scientific citizenship", though it would be more appropriate to call them "scientific *sans-papiers*". Psychonauts have made themselves at home in the stateless future. The average medical patient is exposed to much the same chemical compounds as the psychonaut, but runs greater risks by putting his or her trust in the state and its certified experts. Such trust looks increasingly misplaced as safety regulations and clinical trials of medicines are increasingly scaled back in response to industry lobbying and neoliberal dogmas (Nik-Khah 2014). The same holds true for every other kind of potentially hazardous laboratory compound that finds its way onto the market (Demortain 2013; EEA 2013). What I want to direct the reader's attention to here is not the absence of industry regulation, but the extent to which psychonaut subculture has internalised this condition and celebrates it as something desirable. To them, it is a sign of individual freedom. This is consistent with the romantic and anarchistic intellectual current that the psychonauts inherited from the 1960s counterculture (Riley et al. 2010; Dabrowska and Bujalski 2012). In this perspective, authentic individuals are set against an oppressive state that is beyond reform or moderation. The state must be smashed, not through open confrontation, but through withdrawal. Exactly how this withdrawal is supposed to happen differs from case to case. In the 1960s, the hippies followed the example of Thoreau and started communes in the desert. According to at least some psychonauts, the state can be resisted just as effectively by escaping into altered states of consciousness. The most eccentric expression of this dream is the plans that frequently surface among fleshers and hackers to physically relocate their servers to ships and islands located outside territorial waters (Johns 2009). The master plan, however, is to flee into the near future of innovation, the not-yet regulated. This is what all the optimism about DIY practices, hackerspaces and open machinery tools ultimately means, an optimism shared by practitioners, academics and policymakers alike (Söderberg 2014). The latter group, although in charge of state institutions, might have their own reasons for wanting to withdraw from governmental rules and regulations. This ought to make us think twice about buying too quickly into the purported outsider position ascribed to the user-innovator, upon which the emancipatory claims attributed to grassroots innovation are founded.

What is missing from this political imaginary is the recognition that, because there is no such thing as an "outside" of society, the unrestrained freedom of the emancipated user-innovator will be experienced by everyone else as constraint, if not outright despotism. This outlook has but one answer to the question of how our living-togetherness in a shared geographical and biochemical space can be collectively managed: *laissez-faire*. We face a choice between longing for an ideal market, or for an equally idealised citizenry. According to the latter idea, freedom is not to do as one pleases: freedom is to voluntarily subordinate one's individual claims under the collective interest of all citizens, in exchange for the right to be part of the legislative process of that collective, i.e. "the state".

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Interviews

- Interview A—extracted DMT from phalaris grass, Brussels, 2012-12-13
- Interview B—extracted DMT from mimosis, London, 2013-07-13
- Interview C—extracted DMT from mimosis, London, 2013-07-15
- Interview E—extracted DMT from mimosis using egg white, London, 2013-09-08
- Interview F—harm reduction activist (Enlighten & Pillrapporsts), Australia (Skype), 2013-09-08
- Interview G—synthesized MDMA on a license, Berlin, 2013-05-26
- Interview H—harm reduction activist in organisation Daath, Hungary, London, 2013-07-14
- Interview I—harm reduction activist in organisation Rave & Eve, Berlin, 2013-05-27
- Interview J—working with the monitoring of new psychoactive substances in France, Paris, 2012-12-05
- Interview K—working with the monitoring of new psychoactive substances in Belgium, Brussels, 2012-12-12
- Interview L—working with food and health regulation in Netherlands, Tilburg, 2013-05-08
- Interview M—working with drug monitoring in Netherlands, Amsterdam, 2013-11-14
- Interview N—initiator of harm reduction and pill testing, Amsterdam, 2013-11-15
- Interview O—self-described psychonaut, working in a coffee shop, Amsterdam, 2013-11-16
- Interview M—harm reduction activist (Techno+), Paris, 2013-01-21