LEARNING ABOUT STP

A Forgotten Psychedelic from the Summer of Love

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Abstract: In 1967, a synthetic psychedelic drug, nicknamed STP, escaped from the archives of Dow Chemical and flooded the Haight-Ashbury neighborhood of San Francisco. The resulting public health crisis can be seen as a case study in how new unsanctioned psychoactive substances become legible to society through the efforts of different actors. STP was interpreted by young hip doctors, underground chemists, and the users themselves. While the first group achieved recognition as experts, the others were largely omitted from media reports on the drug. This article brings together contemporary media reports, pharmacology, and first-person accounts to explore how STP came to be understood as a dangerous drug. As psychedelics gain renewed attention, it is timely to use historic events like the STP crisis to understand how knowledge of new drugs is formed and what sources are recognized or overlooked in the process.

Keywords: DOM, STP, San Francisco, 1967, Alexander Shulgin, Owsley Stanley

Learning about Drugs

Once called "designer drugs,"[1] psychoactive substances/psychedelics are now referred to as "new psychoactive substances" (NPS), which is the term currently favored in forensic sciences to describe psychoactive drugs that are developed and marketed as "legal highs." In contrast to prescription drugs, which

1. Rudy M. Baum, "New Variety of Street Drugs Poses Growing Problem," *Chemical and Engineering News* 63, no. 36 (1985): 7–16.

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HISTORY OF PHARMACY AND PHARMACEUTICALS | 65:1
ISSN 2694-3034 | E-ISSN 2694-3042 | doi:10.3368/hopp.65.1.93

come to market with approved uses and well-adjudicated lists of side effects, new NPSs enter society as mysteries to be digested and experienced. Their characteristics and effects are initially unknown and are often contested. MDMA, for example, has been the subject of a prolonged dispute as to whether it should be perceived as a dangerous neurotoxin or a unique aid to psychotherapy.[2]

For society at large, NPSs can pose a problem in distinguishing reliable facts from mere rumors or rosy marketing. Today, well-funded programs, such as the European Monitoring Centre for Drugs and Drug Addiction and the UN Office on Drugs and Crime Early Warning Advisory system, coordinate to minimize this problem. These programs identify and characterize NPSs, contributing to a consensus about specific drugs and how they should fit into existing regulatory frameworks.

In the late 1960s, these programs and their frameworks did not exist, and NPSs were digested by society via idiosyncratic pathways. One path that NPSs often take is to first appear in scientific journals or patents before they are noticed by underground chemists.[3] The drug STP, which had the chemical structure 2,5-dimethoxy-4-methylamphetamine (abbreviated as DOM, for "des-oxy-methyl," by its inventor), traveled a particularly improbable path from the laboratories of Dow Chemical to the streets of San Francisco without prior publications describing it. Beginning in 1967, STP dramatically captured the media's attention, developing a reputation for high potency and toxicity before sinking into obscurity.

STP was marketed by an underground psychedelic chemist as a legal substitute for LSD, which had been banned in California on October 6, 1966.[4] STP ultimately turned out to be less desirable and apparently riskier than LSD. This pattern of decreased desirability of a substitute drug was noted decades later with synthetic opioids and cannabinoids and suggests that drug prohibition may perversely increase risks to drug users.[5] STP specifically turned out to have a nonlinear relationship between dose and effects, with higher doses producing experiences that were not just more intense but also longer, sometimes lasting

2. Rick Doblin, George Greer, Julie Holland, Lisa Jerome, Michael C. Mithoefer, and Ben Sessa, "A Reconsideration and Response to Parrott AC (2013) 'Human Psychobiology of MDMA or "Ecstasy": An Overview of 25 Years of Empirical Research'," *Human Psychopharmacology: Clinical and Experimental* 29, no. 2 (2014): 105–8, https://doi.org/10.1002/hup.2389; Andrew C. Parrott, "Human Psychobiology of MDMA or 'Ecstasy': An Overview of 25 Years of Empirical Research," *Human Psychopharmacology: Clinical and Experimental* 28, no. 4 (2013): 289–307; Dominik K. Biezonski and Jerrold S. Meyer, "The Nature of 3, 4-Methylenedioxymethamphetamine (MDMA)-Induced Serotonergic Dysfunction: Evidence for and against the Neurodegeneration Hypothesis," *Current Neuropharmacology* 9, no. 1 (2011): 84–90.
3. David E. Nichols, "Legal Highs: The Dark Side of Medicinal Chemistry," *Nature* 469, no. 7328 (2011): 7.
4. "STP Takes You Four Times as Far," *Berkley Barb*, April 28–May 4, 1967, 1.
5. Nichols, "Legal Highs."

several days. These effects resulted in drug users seeking emergency treatment. The drug accordingly developed a reputation as a substance that was all peril and no promise. The formation of this reputation can be used as a case study in how unsanctioned NPSs become understood by society. Although many new psychoactive substances appear and disappear on gray markets, STP is unusually well documented because it appeared in a time and place of great media interest.

STP is conceptually noteworthy because it appears to share pharmacological features with LSD and amphetamine. The underground chemist who released STP as a street drug even hoped its amphetamine-like qualities would allow it to appeal to amphetamine users and "wean [them] toward a more spiritual trip."[6] LSD and amphetamine have a complex shared history: both have been portrayed in different contexts as enhancing aspects of cognition and alternatively as producing psychosis.[7] Given these similarities, the drugs have interacted in popular and scientific imagination as foils, where emphasizing features of one drug serves to change interpretation of the other.[8] Thus, while LSD and psychedelics have famously context-dependent effects,[9] the stimulating-psychedelic qualities of STP and its chemical relatives provided these new drugs a great deal of interpretive flexibility in 1967.

Drugs in the Changing Haight-Ashbury

The 1967 Summer of Love was the culmination of dramatic changes in the Haight-Ashbury neighborhood. LSD had originally "hit San Francisco like a bomb" in fall 1964 and helped establish the Haight-Ashbury as a crucible of cultural experimentation, distinct from the older beatnik scene of North Beach.[10] By the summer of 1967, an estimated 90 percent of the neighborhood's young residents had taken LSD.[11]

The neighborhood was an ideal focal point for what was later called the counterculture. The many unfashionable post-Victorian buildings could be rented inexpensively, while the nearby Golden Gate Park and its panhandle

6. Charles Perry, "Owsley and Me / Augustus Owsley Stanley III," *Rolling Stone*, November 25, 1982, 19–22, 88.
7. Erika Dyck, *Psychedelic Psychiatry: LSD from Clinic to Campus* (Baltimore, MD: Johns Hopkins University Press, 2008); Nicolas Rasmussen, *On Speed: From Benzedrine to Adderall* (New York: New York University Press, 2008); Justin Garson, "A 'Model Schizophrenia': Amphetamine Psychosis and the Transformation of American Psychiatry," in *The History of the Brain and Mind Sciences: Technique, Technology, Therapy*, ed. Stephen T. Casper and Delia Gavrus (Rochester, NY: University of Rochester Press, 2017): 202–228.
8. Garson, "A 'Model Schizophrenia.'"
9. Ido Hartogsohn, "Constructing Drug Effects: A History of Set and Setting," *Drug Science, Policy and Law* 3 (2017): 1–17.
10. Hank Harrison, *The Dead Book: A Social History of the Grateful Dead* New York / London, Links, 1973), 89.
11. Donovan Bess, "What the Hippies Are Really Like," *San Francisco Chronicle*, June 19, 1967, 2.

extension into the neighborhood offered public space for impromptu performances and events. Musicians like the Grateful Dead and political artists like the Diggers moved into the area and held festive public events that gave the neighborhood a uniquely participatory character. New businesses appeared, such as the Psychedelic Shop, selling music, books, and other supplies for a "good, enlightened, and safe trip."[12]

Increasing media attention to Haight-Ashbury in 1967 brought more visitors, few of whom understood the participatory nature of the culture.[13] With the end of the school year and the beginning of summer, an estimated 50,000 youth began to arrive in Haight-Ashbury.[14] The neighborhood became so crowded that the police initiated regular arrests of people blocking traffic on Haight Street and the municipal bus system considered rerouting buses to avoid the area.[15] The housing and other infrastructure were plainly inadequate for this population explosion. The streets became crowded with homeless youth, and street drug dealers were numerous.[16]

The influx of new people had multiple effects, all of which could be (and often have been) attributed to "the hippie," the media-amplified image that had attracted the new inhabitants. First, the crowds created a public health problem, one that the Haight Ashbury Free Clinic was soon founded to address. Second, naive youth, eager for new experiences, made the neighborhood into a petri dish of drug experimentation, leading to an epidemic of amphetamine abuse within months.[17] Third, the new conditions helped push earlier residents out of the neighborhood or city, many to explore country living.[18] Haight-Ashbury became a ship of Theseus, but one with the replacement parts based on secondhand impressions from newspapers and magazines.

STP was introduced into this setting in early 1967. Because public knowledge of this drug was initially nonexistent, early users learned by rumor, trial, and

12. "Who Saw the Summer of Love? Part I—Merchants & Diggers," 2017, https://summerof.love/who-saw-the-summer-of-love-merchants-diggers/.
13. Stephanie D. Jowett, "Welcome to Psychedelphia: Identity and Community in the Haight-Ashbury District of San Francisco, 1965–1967," thesis, Concordia University, 2006; Stephen Siff, *Acid Hype: American News Media and the Psychedelic Experience* (Chicago: University of Illinois Press, 2015).
14. Charles Perry, *The Haight-Ashbury: A History* (New York: Random House, 1984), 107; "Where Are They Now? The Haight-Ashbury Scene," *Newsweek*, December 2, 1968, 1–20; Peter Schubart, David E. Smith, and Robert Conrich, "The Concept and Design of a Regionalized Health Facility for the Haight-Ashbury Subculture," *Journal of Psychedelic Drugs* 1, no. 1 (1967): 113–16.
15. Perry, *The Haight-Ashbury*, 121.
16. David Elvin Smith, "Runaways and Their Health Problems in Haight-Ashbury during the Summer of 1967," *American Journal of Public Health and the Nations Health* 59, no. 11 (1969): 2046–50.
17. David Elvin Smith and John Luce, Love Needs Care: A History of San Francisco's Haight-Ashbury Free Medical Clinic and its Pioneer Role in Treating Drug-Abuse Problems (Boston: Little, Brown, 1971), 39.
18. "The Sick and the Lost," San Francisco Examiner, April 7, 1968, 5–6.

error. Mentions in the underground press provided only limited information, such as the exceptional duration of its effects. As 1967 progressed, STP became understood through the efforts of different actors and how they interacted with the media. The most influential were UCSF professor Frederick H. Meyers and postdoctoral fellow David E. Smith, the latter of the whom becoming known for founding the Haight Ashbury Free Medical Clinic (HAFMC) in mid-1967. Meyers and Smith drew conclusions about STP by treating or sharing information on patients seeking care and combining these observations with street rumors. Although these methods were imperfect, they benefited from the institutional prestige of UCSF and easily achieved recognition as experts. In contrast, with the exception of sparse coverage in the underground press, the chemists who were actually responsible for STP and people who used it had very little influence on how the narrative developed. Accordingly, representations of unproblematic use of the drug were absent from mainstream media stories.

The UCSF Psychopharmacology Study Group

In 1967, Meyers was a full professor in the UCSF Department of Pharmacology and Experimental Therapeutics. By all accounts a brilliant if somewhat curmudgeonly, man, Meyers brought a classic physiologic approach to studying pharmacology.[19] Among his activities, Meyers was the faculty sponsor for a campus group at UCSF called the Psychopharmacology Study Group (PSG). The PSG, which had been founded by Smith, sought "to compile and disseminate objective information on psychopharmacological drugs … and their role in science and society."[20]

The PSG seems to have played an important role in germinating new approaches to public health in San Francisco. Although membership was officially limited to students, the group held seminars and other events that included progressive-minded people in the area who shared an interest in psychedelics. In addition to Smith, several regular attendees—all of whom seemingly sharing interest in psychedelics—were or became prominent activist physicians. Psychiatrist Joel Fort had already founded the San Francisco Department of Public Health Center for Special Problems in 1965, where he pioneered sympathetic social services for transgendered people.[21] Psychiatrist Eugene Schoenfeld wrote a nationally syndicated newspaper column as "Dr. HipPocrates," providing information and advice on sex and drugs to

19. Bert Katzung, "Frederick H. Meyers, Pharmacology & Experimental Therapeutics: San Francisco," in *University of California: In Memoriam, 1998*, ed. David Krogh (San Francisco: Academic Senate, University of California, 1998).
20. University of California, San Francisco, *Medi-Cal* (San Francisco: University of California, 1967).
21. Susan Stryker, interview with Joel Fort, July 23, 1997. https://docs.glbthistory.org/oh/Fort_Joel7-23-1997_web.pdf.

youth who distrusted the establishment. Perhaps the most colorful attendee was a former private investigator, now LSD dealer, from San Jose named Robert Conrich. Conrich had begun taking LSD in 1966 and, as a result, "dropped out of business to do something constructive."[22] A close friend of Meyers, Conrich did much of the legwork for creating the HAFMC in June 1967.[23]

The projects of PSG-associated people had in common a sympathetic view of potentially marginalized patients and a belief that everyone deserved health care. The PSG was able to leverage the resources and reputation of UCSF to advance this approach to public health. As Conrich described it, despite having one foot in the counterculture, PSG "became the establishment":

> If we needed a chemical analysis done or the advice of an epidemiologist, we didn't have to do a car wash to raise the funding to pay for it. Meyers would walk down the hall and ask for it and it was done. With taxpayer money. It was almost subversive.[24]

Affiliation with the university and the ability to leverage its prestige and resources enabled the PSG to effectively sound the alarm about the dangers of STP. Despite having considerable experience with LSD, their understanding of STP was based on inference from individual patients and street rumors. This would lead to some inaccurate statements, which were amplified by the press.

Owsley Stanley and Alexander Shulgin

The inferential, indirect knowledge of STP deployed by Meyers, Smith, and the PSG can be contrasted with the experiential approach of the two psychedelic chemists most responsible for STP: Owsley Stanley III and Alexander Shulgin. Stanley was a stubborn autodidact who made civilization-changing amounts of LSD when he wasn't improving concert sound quality using Grateful Dead performances as his laboratory.[25] From April 1965, when he returned to the San Francisco Bay area with his first batch of LSD,[26] Owsley's "acid" had earned a reputation for being strong and pure. Like several other LSD manufacturers and distributors,[27] Stanley was at least as interested in providing people with meaningful, potentially life- and society-changing experiences as he was in making money.

22. David Perlman, "Haight-Ashbury Free Clinic, as It Was Described in 1967," *San Francisco Chronicle*, March 10, 2017, https://www.sfchronicle.com/entertainment/article/Haight-Ashbury-Free-Clinic-as-it-was-described-10987562.php.
23. Smith and Luce, *Love Needs Care*, 132–33, 36–44.
24. Robert Conrich, personal communication, January 20, 2020.
25. Robert Greenfield, Bear: The Life and Times of Augustus Owsley Stanley III (New York: Thomas Dunne Books, 2016).
26. Perry, The Haight-Ashbury, 5.
27. Casey Hardison, "A Brief History and Motivation of an Entheogenic Chemist," Drugs and Alcohol Today 7, no. 2 (2007): 26–31; Leigh A. Henderson and William J. Glass, LSD: Still with Us after All

Stanley used psychedelics frequently, supplementing his personal experiences with idiosyncratic observation of others. He believed he could see LSD's effects on the Haight-Ashbury as a whole. Perhaps his experiences at Ken Kesey's Acid Tests and Grateful Dead shows had focused his attention on group psychedelic phenomena. Whatever the origin of his beliefs, Stanley told his former housemate Charles Perry that he "would sit back and wait, and sure enough, ten days or two weeks after a [LSD] batch went out, there would be a whole rash of new developments in the Haight-Ashbury."[28] Although this phenomenon may have been the result of LSD catalyzing social changes, Perry smartly notes that new batches produced an influx of cash and economic activity as temporarily wealthy dealers spent their money locally.[29] The people of Haight-Ashbury may have dropped out from straight culture, but they were still subject to the totalizing powers of capitalism.

When LSD was banned by California, effective on October 6, 1966, Stanley began to search for a legal LSD replacement. Perry quotes Stanley as explaining to him months later, in the summer of 1967, that new drug laws would not be effective: "We've got a whole raft of new psychedelics … and they're gonna have to make each one illegal separately. We're gonna keep 'em running for years, and by that time, everybody will have been turned on!"[30] Stanley, who considered himself more a recipe follower than a chemist,[31] likely hoped to collaborate with a chemist able to supply his operation with these new psychedelics.

Stanley ultimately found an appropriately obscure legal LSD replacement with help from Alexander "Sasha" Shulgin, a chemist who had developed many novel drugs at Dow. The replacement drug, DOM, had a chemical structure that looked like a hybrid of the stimulant amphetamine and the psychedelic mescaline. This led Stanley to hope that it might be a gateway drug for "speed freaks" to switch from addictive amphetamines to nonaddictive psychedelics.[32]

Shulgin, who was a postdoctoral fellow at the University of California, San Francisco in 1967, had invented DOM in 1963 while still employed by Dow. Shulgin was a confident chemist who delighted in upsetting orthodoxy. In 1960

These Years (New York: Wiley, 1994); Nicholas Schou, Orange Sunshine: The Brotherhood of Eternal Love and Its Quest to Spread Peace, Love, and Acid to the World (New York: St. Martin's Press, 2010).

28. Perry, "Owsley and Me."
29. Perry, "Owsley and Me."
30. Perry, "Owsley and Me." See also "STP Again: Chron Censured for Scarepiece," *Berkeley Barb*, June 30–July 6, 1967, 1, 6, which quotes someone who may be Stanley.
31. Henrik Dahl, "Tim Scully on the Brotherhood and Making LSD with Bear," *Oak Tree Review: Writings on Psychedelic Culture*, May 9, 2009, https://oaktreereview.com/a-correspondence-with-tim-scully/; Greenfield, *Bear*, loc. 42.
32. Perry, "Owsley and Me."

he had taken his first psychedelic and had what Mike Jay labeled "the most consequential mescaline trip of the sixties."[33] In it, he vividly relived forgotten episodes of his childhood and felt for the first time in years a childlike and fearless love of exploration. Amazed that this could be catalyzed by a chemical, Shulgin trail-blazed a brilliant, idiosyncratic research path.[34] He invented new psychedelics and inferred their structure–activity relationships by "tasting" them in informal unblinded experiments with himself and then with close colleagues as participants.[35]

Self-experimentation has often played an important role in science.[36] Yet Shulgin was out of step with modern methods. The new field of psychopharmacology had made impressive progress with methods such as double-blind experiments, statistical analysis of symptom questionnaires, and paid research subjects who knew little about the drugs they were testing.[37] Regulations on human research, concerns about liability, and increasing social controversy had begun to reduce psychedelic research to a trickle.[38] As a result, Shulgin reportedly found his employer becoming uncomfortable with his research,[39] which led him to amicably leave the company at the end of 1966.

Even as Shulgin was preparing to leave, Dow was moving forward with plans to evaluate his molecular inventions as potential medicines.[40] This work was led by Solomon H. Snyder.[41] Snyder was a psychiatry resident at the Johns Hopkins University School of Medicine when his department chair, Joel Elkes, proposed the project to him. Elkes had been approached with the opportunity by his friend Melvin Calvin, the American biochemist and Nobel Prize laureate, who was a

33. Mike Jay, *Mescaline: A Global History of the First Psychedelic* (New Haven, CT: Yale University Press, 2019), 243.
34. Beckley Foundation, "Ann and Sasha Shulgin in Conversation about Mescaline and MDMA," *YouTube*, June 6, 2014, https://youtube.com/watch?v=YHRWxPCaXKQ; A. Shulgin and A. Shulgin, *PIHKAL: A Chemical Love Story* (Berkeley, CA: Transform Press, 1991), loc. 56–59.
35. Matthew J. Baggott, "Seed Crystal: On the Contributions of Alexander Shulgin to the Science of Consciousness," in *The Commemorative Edition of Pihkal and Tihkal*, ed. Joshua Marker (Berkeley, CA: Transform Press, 2018); Alexander T. Shulgin, Ann L. Shulgin, and Peyton Jacob III, "A Protocol for the Evaluation of New Psychoactive Drugs in Man," *Methods and Findings in Experimental and Clinical Pharmacology* 8 (1986): 313–20.
36. Lawrence K. Altman, *Who Goes First? The Story of Self-Experimentation in Medicine* (Berkeley: University of California Press, 1998).
37. David Healy, *The Creation of Psychopharmacology* (Cambridge, MA: Harvard University Press, 2009).
38. Katherine R. Bonson, "Regulation of Human Research with LSD in the United States (1949–1987)," *Psychopharmacology* 235, no. 2 (2018): 591–604; Matthew Oram, *The Trials of Psychedelic Therapy: LSD Psychotherapy in America* (Baltimore, MD: Johns Hopkins University Press, 2018).
39. Shulgin and Shulgin, *PIHKAL*, 87–88.
40. Keeper Trout and Paul F. Daley, "The Origin of 2,5-Dimethoxy-4-methylamphetamine (DOM, STP)," unpublished manuscript, 2022.
41. Solomon Snyder, phone interview, February 13, 2020.

member of Dow's board of directors. Because Elkes was busy, he suggested Snyder take up the task. Intrigued, Snyder visited Walnut Creek, meeting with Shulgin and reading his lab books, and was impressed with "the evident rigor of his work."[42] Snyder was invited to go to Michigan and present his conclusions about Shulgin's work to the full board of directors. Snyder, who was just starting to set up his laboratory at Hopkins, vouched for the promise of the program and proposed that he could further study select compounds in human volunteers in his lab.

Although samples of DOM were also sent by Dow, 1-(4-ethyl-2,5-dimethoxyphenyl)propan-2-amine (DOET) was chosen as the most promising molecule to study. Shulgin had tried 1.5 mg of the hydrochloride salt of DOET one morning and had experienced an emotionally positive, talkative state with a "drunk-like loss of inhibition to all behavior and speech" that lasted until into the evening.[43] He wrote in his lab book that it was "without doubt the most effective, potent energizer" he had ever experienced and that "it certainly should be exploited."[44] Shulgin's enthusiasm for DOET was such that he was not dissuaded when, a month later, his friend and colleague Thornton Sargent III tried 1.7 mg and experienced an "intense lethargy" that was followed the next day by a "profound depression."[45]

The decision to move forward with clinical trials of DOET is plausibly why Dow filed a patent on these and other related molecules in late December 1966,[46] during the last days of Shulgin's official employment. Excited to see DOET receive sympathetic evaluation, Shulgin continued to support the work after he left Dow, including visiting Johns Hopkins in January 1967.[47]

42. Solomon H. Snyder, personal communication, February 17, 2020.
43. Alexander T. Shulgin, Alexander Shulgin's Pharmacology Lab Books: Book 1 Notes, 1960–1976 (Grass Valley, CA: Erowid, 2007), 110–11. Shulgin's assessment of STP, DOET, and other molecules seems shockingly informal from the perspective of contemporary psychopharmacology. Given the small numbers of experiments with each drug, statistical methods would be largely unable to reliably distinguish true characteristics of a specific drug from idiosyncratic responses. Shulgin's written reviews of the study of psychedelics acknowledge these difficulties and provide considered rationale for his methods (e.g., Alexander T. Shulgin, "Psychotomimetic Drugs: Structure-Activity Relationships," in Stimulants, Handbook of Psychopharmacology, vol. 11, ed. L. L. Iversen, S. D. Iversen, and S. H. Snyder [Boston: Springer, 1978]; Shulgin, Shulgin, and Jacob, "A Protocol").
44. Shulgin, *Lab Books: Book 1*, 110–11.
45. Shulgin, *Lab Books: Book 1*, 111.
46. A patent application was filed on December 29, 1966, to which Dow added material on two occasions before it was awarded on December 10, 1970, as patent no. 3,547,999.
47. Shulgin and Shulgin, PIHKAL; 91st Congress US House Select Committee on Crime, 1st Sesson, "Statement of Dr. Alexander T. Shulgin," in Crime in America—illicit and Dangerous Drugs, Hearings before the Select Committee on Crime, 91st Congress, 1st Sesson, Pursuant to H.Res. 17, a Resolution Creating a Select Committee to Conduct Studies and Investigations for Crime in the United States (Washington, DC: US House of Representatives, 1970), 174.

Given the ongoing clinical evaluation of DOET, it is particularly mysterious why Shulgin agreed help Stanley, thus jeopardizing the program (and his nascent consulting career).[48] One possibility is that Shulgin feared DOM, which he considered a promising molecule, would be buried in Dow's archives. He may have shared information about DOM when Dow appeared unlikely to patent or otherwise publish information on it.

Whatever the circumstances, Shulgin seems to have provided limited assistance, reportedly in the form of a index cards with information and a sample of about 50 g of DOM.[49] After this exchange, Shulgin appears to have not given further assistance to Stanley's group. Instead, Stanley's technician Timothy Scully was forced to do research in the University of California, Berkeley, library to work out details of the synthesis, which he finally began at the end of April 1967 in Denver, Colorado.[50] Ultimately, the team produced an estimated two pounds of DOM, enough for roughly 450,000 tablets.

Testing and Selection of STP Doses

In a decision that many later regretted, Stanley and his team pressed their DOM into high-dose tablets. These are usually said to have been 10 and 20 mg, although quantitative analyses of STP or any other street drugs in the late 1960s are rare. Scully believes few of the 20 mg tablets were distributed and that most were 10 mg.[51] This is consistent with quantitative analyses reported by the U.S. Food and Drug Administration (FDA)[52] and reports from publications by the FDA's Bureau of Narcotics and Dangerous Drugs (who encountered yellow tablets containing 9.1–10.2 mg and white tablets containing about 9.2 mg DOM).[53]

Even 10 mg was a strong dose of DOM. By way of comparison, Shulgin and Shulgin give 3–10 mg as the dose range, while suggesting that 6 mg is sufficiently potent.[54] Moreover, Shulgin's lab notebooks indicate that in the 1960s, Shulgin

48. See Trout and Daley, "The Origin of DOM, STP," for an informed discussion.
49. Lorenzo Haggerty, "Tim Scully and Orange Sunshine," episode 631, Psychedelic Salon podcast, October 12, 2019, https://psychedelicsalon.com/podcast-631-tim-scully-and-orange-sunshine/.
50. Stewart Tendler and David May, *The Brotherhood of Eternal Love* (London: Panther, 1984), 44; "Acid Trip: Denver's Secret LSD Labs Fueled the Psychedelic Revolution," *Colorado History*, 2017, https://www.westword.com/news/denvers-underground-lsd-labs-fueled-the-psychedelic-revolution-9644844; Rhoney Gissen Stanley and Tom Davis, *Owsley and Me: My LSD Family* (Rhinebeck, NY: Monkfish Book Publishing, 2013), loc. 1016.
51. Haggerty, "Tim Scully and Orange Sunshine."
52. Ten milligrams in Solomon H. Snyder, Louis Faillace, and Leo Hollister, "2, 5-Dimethoxy-4-methylamphetamine (STP): A New Hallucinogenic Drug," *Science* 158, no. 3801 (1967); 8–12 mg in Robert J. Martin and Thomas G. Alexander, "Analytical Procedures Used in FDA Laboratories for the Analysis of Hallucinogenic Drugs," *Journal of the Association of Official Analytical Chemists* 51, no. 1 (1968).
53. "STP," *Micro-Gram* 1, no. 8 (May 1968): 3.
54. Shulgin and Shulgin, *PIHKAL*.

himself had only tried up to 1.4 mg and others in his group had only tried up to 4.1 mg.[55] The discrepancy between Shulgin's and Stanley's dose ranges can be seen as further evidence that Shulgin was not involved in STP production. Later batches of Stanley's tablets had reportedly lower doses,[56] implicitly admitting the initial ones were too high.

Various theories have been given for why such high doses were used. Many assume, apparently without evidence, that the dose was unintentional. For example, Jarnow ascribes the high doses to a possibly metaphorical "misplaced decimal point."[57] Another theory is that the chemists had built up a tolerance to the drug from repeated use before they made the tablets. However, the most direct evidence available, including Scully's recollections, indicates that the doses were intentional if naïvely chosen.

The high initial doses were also consistent with Stanley's preference for substantial doses of LSD. Indeed, comparisons with LSD may have been the source of the initial dose selection. Stanley believed the LSD dose of Albert Hofmann's famous bicycle ride, 250 μg, "was a strong dose but the right one."[58] As this amount as roughly ten to twenty times a minimally noticeable LSD dose,[59] it may have seemed reasonable for Stanley to begin exploring STP at doses ten to twenty times higher than whatever Shulgin considered a minimal DOM dose. Shulgin's personal experiments had found that 1 mg had a threshold effect and 1.4 mg was clearly active.[60] In Kleps's report of early STP use, Stanley recommended 30 mg doses.[61] Stanley's philosophy may have also led him to discount reports that the STP doses were too high. However, feedback and direct observation of the long, strange STP trips eventually did lead him to reduce the dose of his pressed tablet, first to 20 mg and then to 10 mg.[62]

55. Shulgin, *Lab Books: Book 1*, 84.
56. So-called purple wedges contained 6 mg, and yellow variants had 5 mg, according to David Elvin Smith, "The Psychotomimetic Amphetamines with Special Reference to DOM (STP) Toxicity," *Journal of Psychedelic Drugs* 2, no. 2 (1969).
57. Jesse Jarnow, *Heads: A Biography of Psychedelic America* (New York: Da Capo Press, 2016), 37.
58. Greenfield, *Bear*, 51.
59. Anya K. Bershad, Scott T. Schepers, Michael P. Bremmer, Royce Lee, and Harriet de Wit, "Acute Subjective and Behavioral Effects of Microdoses of Lysergic Acid Diethylamide in Healthy Human Volunteers," *Biological Psychiatry* 86, no. 10 (2019): 792–800, https://doi.org/10.1016/j.biopsych.2019.05.019; Harold Alexander Abramson and Andre Rolo, "Comparison of LSD with Methysergide and Psilocybin on Test Subjects," in *The Use of LSD in Psychotherapy and Alcoholism*, ed. Harold Alexander Abramson (Indianapolis: Bobbs-Merrill, 1967), 53–73.
60. Shulgin, *Lab Books: Book 1*, 84.
61. Art Kleps, Millbrook: The True Story of the Early Years of the Psychedelic Revolution (Oregon: Bench Press, 1977), 241.
62. Haggerty, "Tim Scully and Orange Sunshine."

Informal testing of DOM was ongoing in early April 1967, indicating that Stanley was using material Shulgin had provided, since Scully only completed the synthesis of DOM in Denver at the month's end. Art Kleps described the incapacitating effects of taking a gelatin capsule containing 30 mg of Shulgin's DOM during Stanley's April visit to the mansion in Millbrook, New York, where Timothy Leary was staying.[63] Stanley "recommended 30 milligrams per person, so that's what they took … For three days and two nights, meals had to be served on trays, because no participant could do anything much more complicated than visit a toilet and return."[64] This same visit likely also explains why the Bureau of Drug Abuse Control (the predecessor of the Drug Enforcement Administration) encountered DOM on the East and West Coasts in April 1967.[65]

The name "STP"—usually said to stand for "Serenity, Tranquility, and Peace"[66] but confusingly derived from a commercial motor oil—was the result of an early trial of the material by James "Curly Jim" Stalarow.[67] Stalarow, who is said to have sold LSD for Stanley, was also the first manager of psychedelic rock pioneers The 13th Floor Elevators.[68] Stalarow apparently had a gift for naming things, as he has also been credited with coining the term "psychedelic rock."[69] Naming of the drug by an insider in Stanley's social circles seems consistent with the fact that the drug's initial appearances employed the STP street name.[70]

63. Haggerty, "Tim Scully and Orange Sunshine"; Kleps, Millbrook; Stanley and Davis, Owsley and Me, loc. 469–50.
64. Kleps, Millbrook, 200.
65. "STP," Micro-Gram 1, no. 1 (November 1967): 1–2.
66. Different expansions of the abbreviation STP have also been given. When a mysterious "alchemist," possibly Stanley or his protegé, Nick Sand, visited the Berkeley Barb to respond to negative local press about the tablets, he told them STP stood for "serene, tranquil, and peaceful—and that's where it's at" ("STP Again: Chron Censured for Scarepiece"). A close variation of this, "Serenity, Tranquility, and Peace," is by far the most common explanation in the literature. However, Shulgin and Shulgin (PIHKAL, 944) note three other possibilities: "Super Terrific Psychedelic," or "Stop The Police," and "Too Stupid to Puke."
67. Jesse Jarnow, "Skull & Roses 50: Side C," *Good Ol' Grateful Deadcast* podcast, 2021, citing an email from Stanley provided by Rhona Stanley.
68. Jarnow, "Skull & Roses 50: Side C."
69. Jarnow, "Skull & Roses 50: Side C"; Paul Drummond, *Eye Mind: The Saga of Roky Erickson and the 13th Floor Elevators, the Pioneers of Psychedelic Sound* (Port Townsend, WA: Feral House, 2007).
70. Tendler and May (*Brotherhood of Eternal Love*, 44) attribute the name to "one of Owsley's friends." Smith and Luce (*Love Needs Care*, 173) cite lore that it was named because "it makes your motor run smoother and lubricates your head." Charles Perry reports the drug was first called DNA or ZNA "but a hanger-on at the Straight Theater dubbed it STP and the name caught on"; Perry, *The Haight-Ashbury*, 117. Perry may be confusing STP with a fake drug prank, as ZNA is more often described as a mixture of dill and monosodium glutamate that was falsely alleged to be psychoactive. Abraham D. Krikorian, "The Psychedelic Properties of Banana Peel: An Appraisal," *Economic Botany* 22, no. 4 (1968).

Charles Perry, friend and former roommate of Stanley, learned of the drug on May 4 and tested a sample, which "turned the world into a river of butterscotch for three days":

> I took an STP tab one Saturday and got so stoned that for three days it made no difference whether my eyes were opened or closed, I was seeing the same things. In fact, there was no difference between anything and anything else, except that sounds were like wood shavings curling in freeze-frame motion, while smells were more like subtly different levels of vibration with smoke coming out of them.
>
> I told Owsley that this stuff had turned the world into a river of butterscotch for three days running. "Oh, that's right," he said, in almost the same words I'd heard after guinea-pigging his first LSD. "You had one of those pink ones. Hey, they were too heavy. You should have only taken half."[71]

These casual trials of STP seemingly failed to detect the slow onset of effects that is one of the signatures of DOM. Moreover, Stanley apparently did not consider that DOM might be pharmacologically and toxicologically different from LSD. This naïveté, while understandable given the small set of known psychedelics in 1967, meant that no one was anticipating the potential for STP to cause a public health crisis.

The Release of STP to the Public

STP began making its way to better-connected members of the public in April 1967. Early evidence of STP on the West Coast comes from underground newspapers. The April 28–May 4 issue of the *Berkeley Barb* contained a short piece titled "STP Takes You Four Times as Far," noting the longer duration and legality of STP compared with LSD.[72] Shortly after that, the May/June issue of the psychedelic newspaper the *San Francisco Oracle* reportedly praised STP as a legal alternative to LSD.[73]

Reporter David Pearlman wrote a story about STP for the *San Francisco Chronicle* that ran with the headline, "A War Drug on LSD Scene" on June 7, 1967.[74] Seemingly based heavily on a conversation with Smith, the article endorses the theory that STP was developed under contract by the army. Unusually, it quotes an STP user who says the drug is "a real mind-bender, like LSD." Two days later, an anonymous article in the same paper announced that samples were being sent by FDA agents to Washington, DC, where there was expertise and equipment to

71. Perry, *The Haight-Ashbury*, 117; Perry, "Owsley and Me."
72. "STP Takes You Four Times as Far."
73. Smith and Luce, *Love Needs Care*, 173.
74. David Perlman, "A War Drug on LSD Scene," *San Francisco Chronicle*, June 7, 1967, 1, 16.

identify the active ingredient(s).[75] The article correctly identified Stanley as the source of the drug but also cited someone at UCSF who incorrectly speculated that STP may stand for "serotonin triphosphate."

STP made its biggest splash when Stanley distributed it for free at the June 21, 1967, Summer Solstice celebration in Golden Gate Park, San Francisco. Reports suggest the number of DOM tablets given out may have rivaled the number of people attending the event—five thousand tablets according to Dushek,[76] versus either "over a thousand people"[77] or "no more than five thousand" people in the morning.[78] Whatever the actual number of tablets, it was sufficient to saturate the market for the drug in the Haight-Ashbury neighborhood. Prices reportedly dropped from $5–$7.50 down to five to ten cents per STP tablet.[79]

Adverse Reactions to DOM

DOM had a slower onset than LSD—a fact that was initially unknown to many who tried it. This made it all too easy to have long and intense trips if an impatient person concluded they had reached disappointingly mild peak drug effects and opted to take more.[80] DOM had other physiological effects not commonly seen with LSD, such as sweating, tremors, and large increases in heart rate.[81] The exhaustingly long trips and worrisome physical effects brought STP to the attention of a new group who needed to learn about the drug: health care providers, including the PSG. Overall, the syndrome of those seeking treatment appeared comparable to amphetamine psychosis, with effects of STP lasting up to four days.[82]

Treating people on STP who sought help was made complicated by the fact that no one knew what drug was actually in the tablets. This forced health care providers to experiment with treatments. The first case of STP intoxication seen at the HAFMC was a nineteen-year-old man who sought help after being up for two days.[83] He was given a sedative and was able to sleep, after which he felt

75. "Washington to Analyze Hippie Drug," *San Francisco Chronicle*, June 9, 1967, 9.
76. George Dushek, "New Hippie Drug—Army Ancestry," *San Francisco Examiner*, June 26, 1967, 14.
77. "Hippie Sun Greeters Stay around for Moon," *San Francisco Examiner*, June 22, 1967, 17.
78. Smith and Luce, *Love Needs Care*, 174.
79. Perry, *The Haight-Ashbury*, 125.
80. George Dushek, "Doctors Scared Hippies from Using STP Drug," *San Francisco Sunday Examiner & Chronicle*, July 7, 1967, A7; "Hippies' New Psychedelic Drug Is Lethal," *Detroit Free Press*, June 27, 1967, 4A.
81. Smith, "The Psychotomimetic Amphetamines," 37–41; J. Fred Shick and David E. Smith, "The Illicit Use of the Psychotomimetic Amphetamines with Special Reference to STP (DOM) Toxicity," *Journal of Psychedelic Drugs* 5, no. 2 (1972): 131–38.
82. "Hippies' New Psychedelic Drug Is Lethal"; David Elvin Smith, interview with Matthew Baggott, December 6, 2019; Shick and Smith, "The Illicit Use of the Psychotomimetic Amphetamines."
83. Smith and Luce, *Love Needs Care*, 173.

recovered. However, a later attempt at Mission Emergency Hospital to calm an STP patient by giving the antipsychotic chlorpromazine failed and seemed to worsen the patient. This led Frederick Meyers to erroneously think the drug had a different mechanism of action from LSD.[84]

Because of chlorpromazine's failure, the HAFMC used primarily supportive techniques a few days later when STP users began to arrive in the aftermath of the June 21 Summer Solstice Celebration:

> The physicians eventually left much of the detoxification up to a familiar bearded witch doctor named Swami or Superguru, who sat five STP victims in a circle in the calm center, instructed them to stare into candles, and intoned at length about vibrations and love.[85]

More than twenty-three STP patients were treated on the first evening,[86] with thirty-two patients ultimately seen at HAFMC and another thirteen treated at SF General Hospital over the next few days.[87] Smith also believed that for every patient who sought treatment, another ninety-nine were riding out bad trips in the community.[88]

Press Conference and Media Coverage of STP

Seeking to warn the public about STP, Meyers and Smith held a press conference on June 26. They had directly experienced the difficulty of managing STP-related adverse events, and it was important to share their new knowledge with physicians who might treat STP patients and drug users who might take STP. The resulting press coverage understandably but noticeably lacked any reference to psychedelic proponents like Timothy Leary or even any STP users from the Haight-Ashbury, who could have articulated why STP might ever have any value. Press coverage emphasized the most vivid details of the press conference.

There had been rumors in the Haight-Ashbury that STP was a military invention, possibly related to the military incapacitating agent BZ (3-quinuclidinyl benzilate).[89] For a while Meyers and Smith entertained the possibility that the drug or its formula had been stolen from a military contractor, but they set aside this idea after speaking with Stanley. (Ironically, because Shulgin's former employer, Dow, was a military contractor, this theory was essentially correct.)

84. Smith and Luce, *Love Needs Care*, 173–74.
85. Smith and Luce, *Love Needs Care*, 174.
86. Smith and Luce, *Love Needs Care*, 174.
87. Frederick H. Meyers, Alan J. Rose, and David E. Smith, "Incidents Involving the Haight-Ashbury Population and Some Uncommonly Used Drugs," *Journal of Psychedelic Drugs* 1, no. 2 (1968): 139–46.
88. Carolyn Anspacher, "Dire Warning on Hippies Latest Drug," *San Francisco Chronicle*, June 27, 1967, 1, 12.
89. Dushek, "Doctors Scared Hippies from Using STP Drug."

Still, Meyers had noted that this rumor was consistent with one patient seemingly worsening after receiving chlorpromazine. He theorized that STP might be an atropine-like anticholinergic drug, possibly mixed with cocaine or amphetamine.

Both the military origin and the anticholinergic theories played prominent roles in media coverage. While the *San Francisco Chronicle* only briefly mentioned a similarity between STP and BZ, the *San Francisco Examiner*'s coverage emphasized the military theory with the headline "New Hippie Drug—Army Ancestry," the story noting details of military anticholinergics such as BZ.[90] The *Berkeley Barb* tried to correct the record, disputing that claim that STP was the "result of World War II experimentation" and stating that it had been made by "everyone's favorite little old dope dealer."[91] However, this information had seemingly limited effect. A July article in the Seattle underground paper the *Helix* repeated the theory that STP was related to BZ.[92]

In their press conference, Meyers and Smith stated that the greatest danger was that "giving chlorpromazine, the drug usually prescribed as an antidote for bad LSD 'trips', intensifies the potentially fatal side effects of STP."[93] The *San Francisco Chronicle* repeated the "dire warning" with the headline on the story's second page, "A Warning on New Drug—STP Can Be Lethal," ignoring that the risk of lethality was said to be from a possible drug interaction rather than STP itself.[94] The *San Francisco Examiner* more accurately captured this danger in their coverage, with the headline reading "Potentially Fatal, LSD Antidote Dangerous—MD."[95] PWG affiliate Eugene Schoenfeld, in his HipPocrates column, provided a gentler warning that "bad trips are bad indeed because there is no way now known to bring the tripster down."[96]

Someone, possibly Stanley, visited the *Berkeley Barb* to respond to the negative coverage. The resulting story, "STP Again: Chron Censured for Scare Piece," described being visited by "a mysterious man who claimed to have factual knowledge about the manufacture of STP." This "alchemist" corrected the idea that STP was atropine-like before reciting results of early research on LSD antidotes.[97] The article concluded with a Stanleyesque comparison of drug laws to Roman attempts to suppress Christianity and the suggestion that underground chemists would be able to make "our sacraments" faster than the government could pass laws. As with

90. Dushek, "New Hippie Drug—Army Ancestry."
91. "STP's Faster, Here's Why," *Berkeley Barb*, June 16–22, 1967, 3, 5.
92. Jack Delay, "Dope," *Matrix* (Seattle, WA), July 1, 1967, 4.
93. "Hippies' New Psychedelic Drug Is Lethal."
94. Anspacher, "Dire Warning on Hippies Latest Drug."
95. "Potentially Fatal, LSD Antidote Dangerous—MD," *San Francisco Examiner*, June 26, 1967, 12.
96. Eugene Schoenfeld, "HipPocrates," *Los Angeles Free Press*, July 7, 1967, 6.
97. "STP Again: Chron Censured for Scarepiece."

the Berkeley Barb's earlier correction, this article seemed to have no effect on the developing narrative surrounding STP.

An Associated Press story on July 23, 1967, contrasted the reality of STP with the hippie hoax of banana smoking, allowing local editors to editorialize or just have fun with their headlines. Most emphasized the "danger" of STP, despite the stated dangers mostly consisting of psychedelic effects and an inability to terminate these effects with a second drug. For example, the *Journal Times* of Racine, Wisconsin, wrote, "New Hallucinogenic Drug Branded as Dangerous"[98] and the *Arizona Republic* wrote "US Finds STP Dangerous: FDA May Outlaw It."[99] Other newspapers played up the contrast with banana smoking. The *Wichita Falls Times* ironically declared, "Bananas were a Hippie Fake, But STP Is for Real, Dad,"[100] and the *Democrat and Chronicle* of Rochester, New York, apologized, "Sorry! Bananas Won't Send You. But STP Real Thing."[101]

The Identification of DOM

The chemical identity of STP's active ingredient became clear by mid-July 1967. Samples sent to the FDA were found to contain DOM.[102] FDA officials showed admirable restraint in not drawing premature conclusions about the dangers of DOM. For example, a July 13 story in the *San Francisco Chronicle* quoted FDA officials linking the "extremely hazardous" nature of DOM to "lack of information about the effects of the substance," rather than any actual harms.[103] A July 23 story linking STP with bananas revealed that the FDA, rather than drawing conclusions, planned to "delve into the physical effects of the chemical on the human body and brain" over the course of "two to three months," an apparent reference to plans to study DOM in healthy volunteers.[104]

DOM's identification had been aided by the existence of the FDA-approved clinical research into DOET,[105] which helped the FDA realize that DOM was a Dow molecule. On August 2, another press release from the FDA announced the connection between DOM and Dow, leading to a *New York Times* article "U.S. Identifies STP as Chemical Developed by Dow."[106] In the article, which was

98. "New Hallucinogenic Drug Branded as Dangerous," *Journal Times* (Racine, WI), July 23, 1967, 13.
99. "US Finds STP Dangerous: FDA May Outlaw It," *Arizona Republic*, July 23, 1967, 11.
100. "Bananas Were a Hippie Fake, But STP Is for Real, Dad," *Wichita Falls Times*, July 23, 1967, 7A.
101. "Sorry! Bananas Won't Send You. But STP Real Thing," *Democrat and Chronicle* (Rochester, NY), July 23, 1967, 13.
102. Smith and Luce, Love Needs Care, 175.
103. "'Hazardous Component' in STP," San Francisco Chronicle, July 13, 1967, 1–2.
104. "Washington to Analyze Hippie Drug."
105. H. M. Schmeck Jr., "U.S. Identifies STP as Chemical Developed by Dow," New York Times, August 3, 1967, 24.
106. Schmeck, "U.S. Identifies STP."

carried by other newspapers via the *New York Times* news service, Dow reported that none of their DOM had been stolen and endorsed the theory that some underground chemist had learned the drug's formula. A similar story ran on the front page of the *San Francisco Chronicle* the next day with the headline "'STP' Drug—A Stolen Dow Secret," with a larger banner above the masthead proclaiming, "A NEW DRUG MYSTERY."[107]

Clinical Research on DOM and DOET

The identification of STP's identity at the FDA had two important consequences. First, Dow, horrified at the nationwide publicity that linked their chemical to drug abuse and toxicity, canceled their clinical research program on DOET.[108] Second, the FDA decided to contract a human study with DOM to understand if it should be made a controlled substance. Milton Joffe, a pharmacologist at the FDA's Division of Drug Studies and Statistics within the Bureau of Drug Abuse Control, was troubled by the uncertainty as to whether DOM, which seemed mescaline-like in structure,[109] was truly responsible for the severe adverse events reported in San Francisco, which seemed very unlike mescaline.[110] The only way to gain certainty was to study DOM in a controlled trial.

A logical person to conduct this research was Solomon Snyder, who was now experienced in studying DOET. Joffe accordingly offered Snyder "a generous contract, quadruple the size of [his] NIH grant" to conduct the study.[111] Snyder recruited five male students as participants through the office of financial aid at Johns Hopkins. The study's narrow ascending dose range, from 2.0 to 3.2 mg, suggests that Snyder consulted with Shulgin, with whom he had formed a friendship. Measures were generally similar to those he had used with DOET, and he enlisted his wife to take notes, as he had done with the DOET study.[112]

The FDA also provided DOM to psychiatrist Leo Hollister, who was associate chief of staff at the Veterans Administration Hospital in Palo Alto, California, and an assistant clinical professor of medicine at Stanford University. Hollister was well respected as a careful researcher who had conducted psychopharmacology research since the 1950s. Beginning in 1960, this had included investigations into the effects of LSD and other psychedelics, including a study in which

107. "STP Drug—A Stolen Dow Secret," San Francisco Chronicle, August 3, 1967, 1, 16.
108. Snyder interview.
109. "STP Mind Drug Sales in Decline as Hippies Learn of Real Danger," *Columbian* (Vancouver, WA), July 17, 1967, 6.
110. "The STP Mystery," *Science News* 92, no. 56 (July 15, 1967): 56–57.
111. Solomon H. Snyder, "Solomon Snyder," in *The History of Neuroscience in Autobiography*, ed. Larry R. Squire (Oxford: Oxford University Press, 2009), 420–78.
112. Snyder interview.

writer Ken Kesey participated, finding inspiration for his novel *One Flew over the Cuckoo's Nest*.[113] Hollister had personally experienced a feeling of rejuvenation from LSD, which he described as "a feeling like I'd been terribly ill, and now I'd recovered, and felt so vibrant to be back with the living."[114] Yet his research had not convinced him that psychedelics had reliable therapeutic value.[115]

While Snyder was awarded a contract to study DOM, Hollister's study was the result of chance. As Hollister later described it:

> I was at a meeting in Washington, one of the things where I used to go every fortnight, and Milton Jaffe, who was then with the FDA, I think, said, "We've got a problem with a drug out in San Francisco, called STP (2,5-dimethyl-4-methylamphetamine), and we don't know what in the hell is going on with it. We've given a contract to Sol Snyder to study it, but he says it's going to be a while before he gets the answer". So, I said, "Milton, have you got some of this stuff?" And he said, "Sure, I've got some in my desk drawer". I said, "Give it to me". This was about two hours before I caught the plane back on a Friday afternoon, and by Tuesday, we had the first subject run, because I had a protocol set up for something that we were going to do with lysergic acid diethylamide (LSD), and just worked this one into it.[116]

Hollister went on to administer 2–14 mg of DOM using an ascending dose, between-subjects design[117] with a separate study in two participants using repeated daily dosing to assess the development of tolerance.[118]

Snyder and Hollister combined their first studies for an initial publication in the prestigious journal *Science* on November 6, 1967.[119] Intense government interest led to an extraordinarily accelerated publication:

> The top brass at the NIH as well as at the Federal Narcotics Bureau wanted the results of our study promulgated widely and rapidly. They put me in touch with John Ringle, one of Science's senior editors, who said, "Dr. Snyder, if you provide a manuscript to me with a table but no figures I can guarantee publication in two weeks including referee evaluation." And, indeed, in about 2 weeks the paper was published.[120]

113. Leo Hollister, "From Hypertension to Psychopharmacology. A Serendipitous Career," in *The Psychopharmacologists, Vol. II*, ed. David Healy (Chapman & Hall, London, 1998), 215–36.
114. Leo Hollister, "Leo Hollister, Interviewed by Frank J. Ayd, Jr.," in *Recollections of the History of Neuropsychopharmacology through Interviews Conducted by Leo E. Hollister*, ed. Peter R. Martin and Thomas A. Ban (Córdoba, Argentina: International Network for History of Neuropsychopharmacology, 2014), 562–87.
115. Hollister, "From Hypertension to Psychopharmacology."
116. Hollister, "Leo Hollister, Interviewed by Frank J. Ayd, Jr."
117. Snyder, Faillace, and Hollister, "2, 5-Dimethoxy-4-methyl-amphetamine (STP)."
118. Leo E. Hollister, M. F. Macnicol, and H. K. Gillespie, "An Hallucinogenic Amphetamine Analog (DOM) in Man," *Psychopharmacologia* 14, no. 1 (1969): 62–73.
119. Snyder, Faillace, and Hollister, "2, 5-Dimethoxy-4-methyl-amphetamine (STP)"; "Potentially Fatal, LSD Antidote," 12.
120. Snyder, "Solomon Snyder."

Lower doses of DOM were found to produce mild to moderate euphoria, and doses above 5 mg produced effects the researchers considered hallucinogenic. Surprisingly, even doses up to 14 mg did not seem to produce an unusually long-lasting syndrome. Moreover, the effects appeared to be attenuated and not worsened by simultaneous administration of 200 mg oral chlorpromazine, with the combination producing lethargy and moderate hallucinations. Much later, research in rodents added evidence that chlorpromazine does not interrupt the DOM trip but adds new drug effects.[121]

To explain the discrepancy with the San Francisco chlorpromazine case, the scientists noted that giving chlorpromazine after DOM (as the emergency department physician had done) might have different effects than giving it simultaneously (as Hollister did in his study). It was also possible the patient had taken other drugs in addition to or instead of DOM, although there is no evidence of "fake STP" in mid-1967 San Francisco.[122] It would perhaps have been impolite to suggest that the clinicians had overinterpreted natural variation in drug effects.

The discrepancy in duration of effects could have been the result of STP patients taking higher doses of DOM than those used by Snyder and Hollister. The phenomenon of long trips from higher doses is unlikely to be a myth as it was robustly reported by many experienced drug users,[123] as well as in medical case reports.[124] In addition, other related drugs, such as DOM's brominated analogue, 4-bromo-2,5-dimethoxyamphetamine (DOB), are known to produce longer experiences at higher doses (e.g., Shulgin & Shulgin estimate an eight- to thirty-hour duration for DOB).[125] The lengthening of DOM effects with higher doses suggests that the metabolic pathways for the drug or its active metabolites can saturate, so that small increases in dose can produce large increases in effects.[126]

Rather than simply taking higher doses than study participants, some drug users may have had a genetic variation in metabolic enzymes that caused them to have increased effects. DOM is now known to be metabolized by the enzyme

121. D. Fiorella, S. Helsley, R. A. Rabin, and J. C. Winter, "The Interactions of Typical and Atypical Antipsychotics with the (−) 2, 5,-Dimethoxy-4-methamphetamine (DOM) Discriminative Stimulus," *Neuropharmacology* 34, no. 10 (1995): 1297–303.
122. Joffe speaking during discussion in Roger E. Meyer, Adverse Reactions to Hallucinogenic Drugs, with Background Papers: Conference Held at the National Institute of Mental Health, Chevy Chase, Maryland, September 29, 1967 (Rockville, MD: US National Institute of Mental Health, 1969), 10.
123. For example, Kleps, Millbrook, 200; Bill Kreutzmann and Benjy Eisen, Deal: My Three Decades of Drumming, Dreams, and Drugs with the Grateful Dead (New York: Macmillan, 2015), 58; Perry, "Owsley and Me."
124. For example, case III in Shick and Smith, "The Illicit Use of the Psychotomimetic Amphetamines."
125. Shulgin and Shulgin, PIHKAL.
126. J. R. Eckler, J. Chang-Fong, R. A. Rabin, C. Smith, M. Teitler, R. A. Glennon, and J. C. Winter, "Behavioral Characterization of 2-O-Desmethyl and 5-O-Desmethyl Metabolites of the Phenylethylamine Hallucinogen DOM," Pharmacology Biochemistry and Behavior 75, no. 4 (2003): 845–52.

CYP2D6,[127] which is genetically absent in some people and has lowered activity in others.[128] Lack of this enzyme would result in drug experiences that are longer and more intense than typical. Moreover, because chlorpromazine is partly metabolized by the same enzyme, the combination of these drugs could be expected to exaggerate the effects of both. This may have mainly increased risk of adverse effects from DOM rather than chlorpromazine, as a small study of Korean volunteers found only nonsignificant trends for increased chlorpromazine exposures in those who were heterozygous and homozygous for the low-activity CYP2D6*10 genotype.[129] Thus, genetic variations in liver enzymes that metabolize DOM may have contributed to the drug's bad reputation.

Despite inconsistencies with both the experience of clinicians and the reputation of STP, the controlled DOM experiments were considered adequate by the FDA to establish the identity of STP and DOM. The FDA accordingly moved to make the chemical a controlled substance, in the same category as LSD. This was announced on November 22, 1967.[130] On April 2, 1968, DOM accordingly became illegal to possess, sell, or manufacture except for personal use using the Drug Abuse Control Amendments to the 1938 Food, Drug, and Cosmetic Act.[131]

STP's Aftermath

While Shulgin was never implicated in the STP epidemic, his "problem child" brought him unwanted notoriety.[132] He was profiled as the creator of STP in the *San Francisco Chronicle*,[133] and he was asked to appear in front of the powerful Representative Claude Pepper's House Select Committee on Crime.[134] There, he was grilled about his relationship with Stanley and called the "father of

127. Andreas H. Ewald, Michael Puetz, and Hans H. Maurer, "Designer Drug 2, 5-Dimethoxy-4-methylamphetamine (DOM, STP): Involvement of the Cytochrome P450 Isoenzymes in Formation of its Main Metabolite and Detection of the Latter in Rat Urine as Proof of a Drug Intake Using Gas Chromatography–Mass Spectrometry," Journal of Chromatography B 862, nos. 1–2 (2008): 252–56.
128. Around 7.08 percent of Caucasian Americans in Adrián LLerena, Maria Eugenia G. Naranjo, Fernanda Rodrigues-Soares, Eva Penas-LLedó, Humberto Fariñas, and Eduardo Tarazona-Santos, "Interethnic Variability of CYP2D6 Alleles and of Predicted and Measured Metabolic Phenotypes across World Populations," *Expert Opinion on Drug Metabolism and Toxicology* 10, no. 11 (2014): 1569–83.
129. Y. E. Sunwoo, Jinsuk Ryu, Chang H. Jung, Wonku Kang, Kaylee Liu, Y.-I. Yoon, Soogeun Lee, and Johnghyun John Shin, "Disposition of Chlorpromazine in Korean Healthy Subjects with CYP2D6*10B Mutation," *Clinical Pharmacology & Therapeutics* 75, no. 2 (2004): P90.
130. "FDA Urges Controls Be Placed on STP Drug," *Los Angeles Times*, November 23, 1967, 49.
131. "STP Controlled," *MicroGram* 1, no. 7 (April 1968): 1.
132. Shulgin and Shulgin, *PIHKAL*, 109.
133. Peter Vogel, "The Creation of STP—Inside Story," *San Francisco Chronicle*, August 25, 1967, 1, 20.
134. Shulgin and Shulgin, *PIHKAL*, 109; US House Select Committee on Crime, "Statement of Dr. Alexander T. Shulgin."

STP."[135] Frederick Meyers, suspecting that Shulgin had a larger role in STP than he admitted to, attempted to have Shulgin terminated from his UCSF affiliation. The effort failed, in part because Meyers disparagingly called Shulgin "a Birkenstock-wearing hippie" in a meeting without looking under the table at how many of the gathered decision makers of the UCSF Psychiatry Department were also wearing sandals.

Despite the loss of support from Dow, Snyder remained interested in DOET. He presented his work with DOET at the 124th annual meeting of the American Psychiatric Association before publishing it in the *American Journal of Psychiatry*. At the low doses tested, DOET consistently produced "subjective feelings of enhanced self-awareness and mild euphoria, with no evidence of hallucinogenic or psychotomimetic actions and no intellectual impairment."[136] In follow-up studies, Snyder examined the effects of higher doses and compared the drug's optical isomers.[137] In one free association task, he and his colleagues had participants read from a list of twenty-five words and, after each word, say the first word that came into their mind.[138] Participants who had taken DOET were able to produce less obvious but still sensible words, suggesting it could alter and maybe even improve cognition without producing cognitive disorganization. Years later, Snyder remained "convinced that DOET offered a new type of psychopharmacology that would be an impressive adjunct to psychotherapy, enhancing self-awareness and enabling patients in psychotherapy to 'get in touch' with their deeper feelings."[139] If not for the unwanted publicity from DOM, Snyder felt Dow would have studied DOET as a potential medicine.[140]

Press coverage of STP had largely failed to convey why anyone would want to take it. There were even ongoing questions as to whether STP might not be a hoax. A July 13, 1967, *San Francisco Chronicle* story wondered whether the name

135. US House Select Committee on Crime, "Statement of Dr. Alexander T. Shulgin"; Jerry Belcher, "Lab Official Urges Tight Drug Control," *San Francisco Examiner*, October 25, 1969, 2; Charles Raudebaugh, "Linkletter Denounces the Beatles," *San Francisco Chronicle*, October 25, 1969, 1, 12.

136. Solomon H. Snyder, Herbert Weingartner, and Louis A. Faillace, "DOET (2, 5-Dimethoxy-4-ethylamphetamine), a New Psychotropic Drug: Effects of Varying Doses in Man," *Archives of General Psychiatry* 24, no. 1 (1971): 50–55, https://doi.org/10.1001/archpsyc.1971.01750070052006.

137. Snyder, Weingartner, and Faillace, "DOET, a New Psychotropic Drug"; Solomon H. Snyder, Sanford Unger, Robert Blatchley, and Charles F. Barfknecht, "Stereospecific Actions of DOET (2, 5-Dimethoxy-4-ethylamphetamine) in Man," *Archives of General Psychiatry* 31, no. 1 (1974): 103–6.

138. Herbert Weingartner, Solomon H. Snyder, Louis A. Faillace, and Herbert Markley, "Altered Free Associations: Some Cognitive Effects of DOET (2, 5-Dimethoxy-4-ethylamphetamine)," *Behavioral Science* 15, no. 4 (1970): 297–303.

139. Snyder, personal communication.

140. Snyder interview.

"Serenity, Tranquility, Peace" was intended as an ironic "hippie put-on."[141] Nonetheless, some learned to use and appreciate DOM. Examples included some who had overwhelming initial experiences yet went on to develop an appreciation for lower doses of DOM (e.g., Grateful Dead lyricist John Perry Barlow).[142] The Grateful Dead learned they could use small amounts as a stimulant, an effect they used extensively during the recording of the album *Aoxomoxoa* in 1968 and 1969.[143] The use of lower doses of DOM echoed DOET's "psychic energizer" effects and may be the first documented use of subpsychedelic doses of a psychedelic for cognitive enhancement, a practice that is now called microdosing.[144] More recently, DOM and related drugs have been found to produce clinically meaningful reductions in inflammatory processes after such low exposures, providing a novel potential therapeutic mechanism.[145]

Conclusions

STP may have represented a worst-case scenario for a psychedelic's introduction to society. LSD had received years of study and positive coverage, particularly in *Time* and *Life* magazines, before it became controversial.[146] In contrast, STP appeared on the streets in high-dose preparations without the benefit of either scientific studies to describe its properties or Leary-like advocates to explain its virtues. This created a need for expert voices who could explain the drug to newspaper readers and a need for methods for understanding the drug's effects.

The expert voices that were amplified by the media were disproportionately clinicians and government officials, whereas those who had actually taken STP were mostly overlooked. Controlled studies by Snyder, Hollister, and their colleagues provided another view of STP, one that was not entirely consistent with its reputation. Nonetheless, these studies allowed the FDA to ban DOM, contributing to the drug's disappearance and the freezing of its reputation as a strong,

141. "'Hazardous Component' in STP."
142. John Perry Barlow and Robert Greenfield, *Mother American Night: My Life in Crazy Times* (New York: Three Rivers Press, 2019), 64.
143. Jerry Garcia, Charles Reich, and Jann Wenner, *Garcia: A Signpost to New Space* (New York: Da Capo Press, 2009), 88; Kreutzmann and Eisen, *Deal*, 124.
144. Torsten Passie, *The Science of Microdosing Psychedelics* (London, Psychedelic Press, 2019); Vince Polito and Paul Liknaitzky, "The Emerging Science of Microdosing: A Systematic Review of Research on Low Dose Psychedelics (1955–2021) and Recommendations for the Field," *Neuroscience & Biobehavioral Reviews* (2022): 104706.
145. Thomas W. Flanagan, Gerald B. Billac, Alexus N. Landry, Melaine N. Sebastian, Stephania A. Cormier, and Charles D. Nichols, "Structure–Activity Relationship Analysis of Psychedelics in a Rat Model of Asthma Reveals the Anti-Inflammatory Pharmacophore," *ACS Pharmacology & Translational Science* 4, no. 2 (2021): 488–502.
146. Stephen Siff, "Henry Luce's Strange Trip: Coverage of LSD in *Time* and *Life*, 1954–68," *Journalism History* 34, no. 3 (2008): 126–34; Siff, *Acid Hype*.

toxic drug. Rather than adjudicating truths about STP, the controlled studies seemed to primarily allow the federal regulatory system to determine which chemical structure to regulate.

Hartogsohn argues that psychedelics have been shaped by the cultural moment in which they emerged.[147] Behaving like pharmacological chameleons, they were able to change their "psychoactive pigmentation in relation to the cultural set and setting."[148] On one level, STP suggests limits on cultural set and setting's ability to color psychedelic effects. DOM was pulled out of obscurity to be an LSD replacement, with apparently little attention to how the experience might vary from that of LSD or other known psychedelics (which would have primarily been mescaline, psilocybin, and DMT).[149] Yet STP never comfortably fit into its LSD replacement role. Not only did the relationship between dose and timing differ from that of LSD, but DOM's side effects at high doses resembled those of an amphetamine. Thus, when Stanley attempted to create a legal alternative to his potent LSD, he instead produced a public health crisis.

It is also true that the high dose selected by Stanley was part of STP's cultural set and setting. Stanley must have chosen it based on his familiarity with LSD's dose-response properties. In a different cultural set and setting where LSD was not the standard, Stanley might have followed Shulgin's careful approach of beginning experiments with low doses and slowly escalating them. These lower doses might have revealed the desirable properties that Barlow and the Grateful Dead eventually found. In the absence of alarming headlines, Dow might have continued to study and develop their "psychic energizer" DOET as the cornerstone product of a pharmaceutical division of the company.

Acknowledgments

Erik Davis, Earth Erowid, Hank Harrison, Reddit user HallelujahHatrack, Charles Perry, Tim Scully, David E. Smith, Solomon H. Snyder, and especially Keeper Trout provided helpful conversations, information, and correspondence. Scarlet Masius provided editorial assistance.

147. Ido Hartogsohn, American Trip: Set, Setting, and the Psychedelic Experience in the Twentieth Century (Cambridge, MA: MIT Press, 2020).
148. Hartogsohn, American Trip, 7.
149. Bess, "What the Hippies Are Really Like"; Anne C. Gay and George R. Gay, "Haight-Ashbury: Evolution of a Drug Culture in a Decade of Mendacity," Journal of Psychedelic Drugs 4, no. 1 (1971): 81–90; Ernest Hamburger, "Contrasting the Hippie and Junkie," International Journal of the Addictions 4, no. 1 (1969): 121–35; Edward A. Suchman, "The 'Hang-Loose' Ethic and the Spirit of Drug Use," Journal of Health and Social Behavior 9, no. 2 (1968): 146–55.