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Vaccination with gun, Hecht's Revolver, 1942.



Vaccine production in the field, 1942.

Peasants in preindustrial Europe lived in a state of almost permanent hallucination, drugged by their very hunger or by bread adulterated with hallucinogenic herbs. This unexpected claim has been made by Piero Camporesi in his book *Bread of Dreams: Food and Fantasy in Early Modern Europe*. Especially the rye bread consumed by the poorer classes was often contaminated with ergot. Ergot (*Claviceps purpurea*) is a fungus that grows as a parasite preferably on rye, coating its seedheads with a black crust, or sclerotium. Bread made from ergot-infested rye led to epidemics of a disease traditionally known as St. Anthony's Fire and later described as *ergotism*. Its symptoms include seizures, skin lesions, psychotic disturbances and a dry gangrene that can cause fingers or toes to lose sensation and rot away. At the turn of the 20th century, ergot was transformed from a poison into a medicine, particularly for gynaecology. As it produces uterine contractions, it became used to stop postpartum haemorrhages, to speed up childbirth or trigger abortions. This gave it the German common name Mutterkorn — mother's corn.

Farmers did their best to suppress its growth, e.g. by breeding rye varieties that were less susceptible to ergot infestation. And if rye was infected by ergot, they collected it and delivered it to the Swiss pharmaceutical company Sandoz, which has been researching ergot and its potential in gynaecology since the 1920s. Most of the naturally grown ergot that Sandoz transformed into medical preparations stemmed from the Emmental valley in mid-Switzerland, where it infected rye in the relatively humid climate. At this point ergot was a scarce and expensive commodity. Its use in the Sandoz laboratories was closely controlled. Therefore, the chemist Albert Hofmann was instructed by his superior in the mid-1930s to adopt micro chemical procedures if he was to work with this costly fungus.

When Hofmann produced LSD-25¹ in 1938 for the first time starting from ergot, a small quantity was expended on animal testing. As it didn't demonstrate particular vasoconstricting properties on the uterus of rabbits, the new substance risked falling into oblivion. By the time of Hofmann's first trip in 1943 (triggered by an occupational accident), the situation had profoundly changed. This might have been the decisive reason for him resuming the trials with LSD-25. Since 1939, Sandoz had begun to systematise the production of lysergic acid and within a few years, they were able



Ein »LSD-Traktor«
Diese hochbeinige Spezialkonstruktion braucht man für die Produktion des Mutterkorns, zum »Impfen« und Ablesen dieses giftigen Parasitpilzes auf dem wachsenden Roggen. Mutterkorn wird in der pharmazeutischen Industrie in Medikamenten verarbeitet. Besonders bekannt ist das Mutterkorn-Derivat, dieses Rauschgift wird heute freilich auch synthetisch hergestellt. Die Aufnahme des »LSD-Traktors« entstand in Dietwil im aargauischen Oberfreiamt.

Stilt tractor modified as LSD tractor for selecting ergot, 1971.



Le Pain de la Mort. Front page of the magazine Point de Vue on the insane events caused by the enchanted bread in Pont-Saint-Esprit in September, 1951.

to produce it on an industrial scale. Ergot was not scarce anymore at Sandoz, suggesting that his discovery was more material bound than is commonly assumed. Even though the Second World War is remembered in the collective memory of Switzerland as the time of the *cultivation battle*, referring to a national agricultural multi-cropping plan with the aim of food autonomy, Sandoz' cultivation of large amounts of ergot made enormous quantities of rye inedible for humans. For this reason, Sandoz's ergot cultivation had to be approved by the Swiss War Food Administration. Sandoz cultured and selected the most productive spores of the ergot fungus and supplied their specially bred strains to the rye farmers in the Emmental and the Lucerne hinterland. And while the peasants had begun to inoculate rye with a special gun (Hecht's Revolver, see picture) or manually with vaccination boards, Sandoz managed within a short time — in cooperation with the machine manufacturer Bucher-Guyer — to produce a vaccination machine with about 16,000 needles for injecting the mycelium of the fungus.

Not only ergot was growing in enormous amounts in 1943 in the fields of the Swiss hinterland. Albert Hofmann, the father of LSD, which later would become his problem child, was in a field of sorts as well. Less well-known than his famous bicycle ride shortly after his first deliberate LSD self-experiment are three further self-experiments during his military service in Claro (Ticino).

But why was he conducting these experiments during his active service in World War II? Hofmann believed he had invented a new respiratory and circulatory stimulant similar to the then very well-known substance Pervitin. The methamphetamine Pervitin was the miracle pill of the German Wehrmacht, sometimes referred to as "National Socialism in pill form" (Norman Ohler).² But since LSD produced such tremendous effects despite almost negligible dosages, Hofmann began to believe that his almost non-matter acted on the *purely psychic* realms. Hence, the idea to test it in psychiatry came to his mind. At a time when psychiatry primarily used somatic cures directed at the body, it was an excellent coincidence that Arthur Stoll, Hofmann's superior, had a son, Werner Stoll, who worked at Burghölzli, now the Psychiatric University Hospital in Zurich. After his first self-experiment *in the field*, Hofmann suggested to Arthur Stoll that his son Werner should investigate LSD clinically "without waiting for further results of the animal test"³ Arthur Stoll then expressed ethical concerns to Hofmann, writing that "a certain pharmacological and toxicological basis"⁴ must first be established for clinical investigations — "if one does not want to risk too much".⁵ "Responsibility towards the patients"⁶ on whom the preparations would have to be tested would require this. Because of Stoll's concerns, Hofmann made two further self-experiments during his military service. But it wasn't until the substance had been tested on a whole series of Sandoz employees in 1945 that the head of the Sandoz pharmacological laboratory sent 20 vials of LSD-25 together with two pipettes to Werner Stoll at the Burghölzli psychiatric clinic.⁷

As can be seen from a preserved letter of reply from Werner Stoll to the head of the Sandoz pharmacological laboratory, secrecy or camouflage of the experiments seemed to be a central requirement: “The trial is disguised as a new shock procedure. It is also not to be discussed with colleagues for the time being”.⁸ At that time, it was common practice in psychiatry to require the consent of patients or their relatives for somatic cures such as electroshock or insulin shock in the treatment of schizophrenic and depressive patients. The use of pharmacological substances, however, did not normally require the consent of the persons concerned. Pharmaceutical substances were probably considered non-invasive, or perhaps a strong separation between body and mind was assumed here.⁹ In addition, somatic shock cures entailed much greater physical dangers. In contrast with those physiologically risky procedures, the almost non-material LSD, which seemed to work in purely psychic regions, was probably regarded as a low-threshold cure. In any case, LSD-25 was to be tested on individual, carefully selected patients. Along these twisted paths, LSD not only found its way into psychiatry, but was now also reinterpreted as a fantasy drug.¹⁰

LSD did not only lead to all kinds of phantasmagoria during the Cold War — be it as truth serum of the CIA and its MK-ULTRA project for mind control, be it as a door opener of perception or even as a new chemical warfare agent in a war apostrophised as *humane*, which the Swiss army investigated in a chemical weapons report. It also led Albert Hofmann back to bread. In August 1951, the otherwise tranquil southern French village of Pont-Saint-Esprit, where the Ardèche flows into the Rhône, suddenly became the focus of the international press. The boulevard media in particular reported strange events in the village of the Bridge of the Holy Spirit. People behaved extremely weirdly, suffered from nausea, vomiting, exhibited psychotic symptoms and reported hallucinations. Depending on the source, between five and seven people died, about 50 were admitted to psychiatric hospitals, and another 250 or so suffered from more or less severe symptoms of poisoning. The inhabitants of the city panicked and there was long-lasting and widespread speculation about the cause of it. The name of the event, *l'affaire du pain maudit*, roughly “the affair of the cursed or enchanted bread”, is strongly reminiscent of Piero Camporesi’s *Bread of Dreams*. We are well informed about the events in Pont-Saint-Esprit, of all places, because of a speakers’ evening jointly held by Albert Hofmann and Arthur Stoll. Incidentally, this lecture evening took place at the Burghölzli, where the first LSD experiments in psychiatry had been conducted by Stoll’s son. After samples of the incriminated bread had been sent to Hofmann for laboratory tests in Basel, he finally set off on a trip to Pont-Saint-Esprit with his wife. But even Hofmann did not succeed in solving the mystery of the cursed bread; and so later the suspicion arose that the affair of the *pain maudit* had in fact been a CIA field test with LSD.

On a more real level, ergot rye fundamentally ploughed up farmers’ fields. Sandoz also owned a farm, so the company engaged in rye breeding as well. The amount of work eventually leading to a new, tetraploid sort of rye was enormous. They grew for example 50,000 rye plants and selected the five most promising strains for further breeding. Sandoz kept extremely tight control of the operation and especially of their seeds. Long before the modern era of genetic patents, farmers were not allowed to use the Sandoz-bred rye for their own purposes, or to keep the seeds and reuse or sell them. Property rights in living organisms were to be inscribed in ergot rye, although there was no legal framework for this at all yet. In view of LSD’s transformation into a *fantastic*, the head of the agrarian-industrial ergot cultivation at Sandoz, Artur Brack, had been hired in 1935 precisely because a graphological report had attested to him a “recession of everything fantastic”.¹¹

1) The name ‘LSD-25’ derives from the fact that it was the 25th substance in Hofmann’s series of experiments on synthetic lysergic acid derivatives.

2) Norman Ohler, “Nationalsozialismus in Pillenform: Der Aufstieg des Stimulanzmittels Pervitin im ›Dritten Reich‹”, in Robert Feustel, Henning Schmidt-Semisch, Ulrich Bröckling (eds.), *Handbuch Drogen in sozial- und kulturwissenschaftlicher Perspektive*, VS Verlag für Sozialwissenschaften, Wiesbaden, 2019, pp. 71-79.

3) Novartis Company Archive, Sandoz, H 105.022 (1940-1947), letter from Werner A. Stoll to Albert Hofmann, Basel, October 29, 1943, own translation.

4), 5), 6) Ibid.

7) Archive of the Institute for the History of Medicine, University of Bern, Legacy of Hofmann 148.10: LSD LA 111, reports of self-experiments with d-lysergic acid diethylamide tartrate, 1943-1946, transcript of the letter from Dr. Werner Stoll, assistant at the Burghölzli Cantonal Sanatorium, to Prof. Ernst Rothlin, MD, head of the pharmacological laboratory of Sandoz A. G., Zurich, May 7, 1945, own translation.

8) Ibid.

9) Marietta Meier, Mario König, Magaly Tornay, *Testfall Münsterlingen. Klinische Versuche in der Psychiatrie, 1940-1980*, Zürich: Chronos Verlag, 2019.

10) Werner A. Stoll, *Lysergsäure-diäthylamid, ein Phantastikum aus der Mutterkorngruppe*, in “Schweizer Archiv für Neurologie und Psychologie”, Vol. 60, 1947, pp. 279-323.

11) Novartis Company Archive, Sandoz, C-203.001, Dr. Max Pulver, graphological report on the writing of Dr. Artur Brack, then 28 years old (ca. March 1935), p. 2f.



Ergot Emmental, right half vaccinated, 1954.