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Eclectic Medicine, Liberal Politics: Cholera Crises and the Making of a Federal Health Policy in Switzerland, 1830–1886

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Abstract
In nineteenth-century Switzerland, the medicine and the politics of cholera were made together. Drawing on cantonal ordinances and the medical reports of Basel and Zurich, this article shows that Swiss authorities neither chose between contagionism and miasmatism nor followed a single doctrine, but acted on an evolving eclecticism that stabilised around Max von Pettenkofer's seed-soil theory. That medical pluralism was the counterpart of a distinctively liberal and federal crisis politics. In place of cordons, the *Tagsatzung* improvised in the 1830s open traffic combined with federal financial compensation for affected cantons, eventually consolidated, after the 1867 Zurich crisis and the 1874 federal revision, in the federal Epidemics Law of 1886. The Swiss case thus invites a rereading of the Ackerknecht thesis on contagionism and liberalism. Beyond that rereading, the Swiss case opens a second question. A liberalism committed to individual freedom and a lean state had to convert that freedom into a collective, tax-funded responsibility for the health of all, and the costliest test of this conversion was the modern sewer. The conversion required, in turn, that the liberal night-watchman state of the 1830s reinvent itself as a tax-raising and provident state capable of mobilising the public investment that the Pettenkoferian sanitary programme demanded. Where direct-democratic rights of co-determination allowed propertied electorates to vote the expense down, as in Basel, the translation was slow and contested. The article shows, in conclusion, how the conjunction of three factors carried the translation through: the epidemic shock of 1867, the democratic mobilisation that followed, and a partial federalisation of the financing of epidemic response, anticipated in the Tagsatzung's reimbursement decisions of 1837 and consolidated in the cost-sharing provisions of the federal Epidemics Law of 1886.

Keywords: Cholera · Contagionism · Crises · Miasma · Pettenkofer · Liberalism · Federalism · Public health · History of medicine · Sanitary reform

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Introduction

Between the first cholera pandemic to reach the European continent in 1830 and the adoption of Switzerland's federal Epidemics Law in 1886, Swiss authorities responded to three successive cholera pandemics, which touched the country in five distinct outbreaks (1836, 1849, 1854, 1855, and 1867), reaching only its peripheral regions and rarely persisting beyond a single year (Teuber 1947: 166–168). Of those responses, almost none involved the instruments that the disease was supposed, on contagionist premises, to require: border cordons, military quarantines, mandatory isolation hospitals along the frontier. Instead, the Swiss Confederation and its cantons, the member states in which nearly all governing power then resided, developed an unusual repertoire: a refusal to obstruct intercantonal traffic even at the height of an epidemic; federal financial compensation for cantons that bore the costs of epidemic defence; pragmatic urban sanitary measures; and, above all, an eclectic medical doctrine that refused to align itself unconditionally with either of the period's two competing aetiologies.

Medical eclecticism, as I use the term, is more than the absence of doctrinal commitment. It denotes a deliberate compounding of incompatible aetiological frameworks (contagionism, miasmatism, and, after 1855, Pettenkofer's seed-soil synthesis), with each treated as a partial instrument rather than as a candidate for the truth. Its political affinity with mid-nineteenth-century liberalism lies precisely in this second-order stance: liberal politics, likewise, refuses to legislate from a single first principle and governs by negotiated accommodation between property and the common good, individual freedom and collective responsibility, federal solidarity and cantonal autonomy. Doctrinal incompleteness was not a defect to be overcome but the condition of practical government.

How was it possible for Swiss medicine to remain eclectic while Swiss policy remained liberal, and what happened when this accommodation between an eclectic medicine and a liberal politics reached its limit? I argue three connected theses. The first is *wissenschaftshistorisch* in focus. Swiss cholera medicine between 1830 and 1886 was characterised not by the victory of contagionism over miasmatism, nor by the reverse, but by an evolving eclecticism that combined elements of both within a sanitary framework. This eclecticism stabilised after the mid-1850s around the seed-soil synthesis associated with Max von Pettenkofer, and was extended after 1883 by a soft integration of Koch's bacteriological findings. My second thesis is political. Swiss medical eclecticism was both an effect and a precondition of a federal health policy that emerged before the federal state itself. As early as 1831 the *Tagsatzung* (the assembly of delegates from the cantons, and before 1848 the Confederation's only standing political organ) rejected a continuous cordon sanitaire; in 1832 the federal *Vorort* (the canton presiding over the Confederation, which conducted its executive business) committed itself to disturbing trade and traffic as little as possible even in epidemic times; and in 1837 the Confederation reimbursed Ticino and Graubünden for cholera-related expenses, establishing a precedent of federal coordination and solidarity that the 1848 Constitution and the 1886 Epidemics Law would inherit and codify. My third thesis identifies the moment when this regime came closest to collapse, the Zurich epidemic of 1867. Under *Bezirksarzt* (district medical officer) Carl

Zehnder the medical response intensified into a contagionist-administrative regime of house quarantine, latrine sealing, and forced evacuation that functioned by consent in bourgeois quarters but broke down in the rapidly grown working-class suburbs, Aussersihl and Oberstrass above all, both then still independent communes outside the city, incorporated into Zurich only in 1893. The ensuing democratic revolution did not return Switzerland to a less interventionist past. It recalibrated the regime by adding direct-democratic legitimation to its eclectic medical and federal-financial inheritance, producing the institutional form codified in 1886.

The three theses are connected because each presupposes the others. The eclecticism of Swiss cholera medicine was sustainable only because Swiss politics demanded no single doctrinal commitment; and Swiss politics could remain liberal-federal because Swiss medicine supplied no doctrine that required coercive intervention. The Zurich crisis tested this dependency: when the medical authority turned more interventionist, consent-based liberal governance wobbled. The settlement of 1869–1886 then re-established the balance under altered political conditions.

Historiographically, the argument revisits Erwin Ackerknecht's classical thesis that anticontagionism was the medical face of nineteenth-century liberalism (Ackerknecht 1948) in the light of the revisions proposed by Baldwin (1999), Hamlin (2009a, 2009b), and Worboys (2000). These have shown that the contagionism / anticontagionism dichotomy fits the practice of epidemic response only loosely: contagionist and environmental reasoning were routinely combined (Worboys 2000), the boundary between bacteriology and environmentalism remained porous (Mendelsohn 2002: 3–6, 9–11), and the language of contagion served a range of scientific, professional and political purposes (Goldstein 1984: 181–184). The Swiss case sharpens the point: Swiss anti-quarantinism rested less on a doctrinal commitment to anticontagionism than on a pragmatic eclecticism in the service of a federal-political programme. The article also draws on Condrau 1996, Yersin 2024, Von Wyss 1929, and Crook 2007, and treats liberalism not as a fixed doctrine but as the evolving political vernacular within which Swiss physicians and officials negotiated the unfamiliar disease that arrived in 1830 (Rosenblatt 2018).

That frame deserves specification. Between 1830 and 1890 Switzerland was the most radical laboratory of liberal and, increasingly, democratic politics in Europe: the cantonal Regeneration of 1830–31 (the wave of liberal constitutional revisions in the cantons) installed liberal constitutions with elected assemblies, press freedom and freedom of trade; the federal state of 1848 made these the basis of a republic without a monarch or a continental-style standing bureaucracy; and the democratic movements of the 1860s pressed beyond representative liberalism to direct-democratic rights of initiative and referendum. The dominant force throughout was the *Freisinn*, the radical-liberal current that, under leaders such as Alfred Escher, fused free trade, anticlericalism, railway and banking capitalism, and an activist but non-bureaucratic state. Two senses of *bürgerlich* run through this story: 'bourgeois', denoting the propertied class, and 'civic', denoting the citizen and the ordinary conduct of public life. Swiss liberalism fused the two, treating the propertied citizen as the model citizen and the 'regular conduct of civic life' as a value to be preserved through any crisis. Those who fell outside this fusion, the propertyless industrial workers, were precisely

those for whom, as 1867 would show, the liberal management of cholera did not work.

This liberalism brought with it a distinctive understanding of crisis, which is the article's analytical thread. Where authoritarian regimes met cholera with cordons and the suspension of civic life, Swiss liberals approached the epidemic with the conviction that free societies guided by liberal values had substantial crisis resilience: an open polity could absorb the shock without the coercive instruments of monarchical sanitary regimes. They held, second, that crises, despite their human cost, offered occasions for the correction of misdevelopments and the accelerated removal of grievances. The German economist Wilhelm Roscher in 1854 defined as crises those moments in which 'changed content seeks to form a changed shape', adding that such crises 'are called reforms when carried out on the peaceful path of positive law' (cited in Nützenadel 2012: 49–50). Each cholera outbreak between 1830 and 1886 was, on this view, both hazard and reform occasion, and Swiss federal cholera policy is the institutional sediment of half a century of crises taken in this sense.

Cholera Between Contagion and Miasma: The Plural Reception of a Contested Disease

In the early 1830s, Asiatic cholera arrived in Europe as a disease whose aetiology no medical authority could specify with confidence. Contagionism (the doctrine that an animate or material contagium passed from person to person) had been the dominant framework for managing plague since the late medieval Italian city-states (Stevens Crawshaw 2012), and it underpinned the quarantine regimes that the Habsburg monarchy, Russia, and Prussia immediately mobilised in 1830–31 (Dettke 1995; Baldwin 1999: 37–67). But cholera resisted the contagionist script. It moved unevenly; it spared physicians and nurses whose exposure to the sick was constant; it broke out in places to which no infected person could be traced. These features lent support to the alternative tradition, itself older than contagionism, that traced epidemics to local miasmatic emanations: putrid soils, stagnant water, decaying organic matter, and the smells associated with all of them (Hamlin 2009b: 152–159).

Both traditions were unstable on their own terms. Strict contagionism could not account for the spatial clustering of cholera in particular urban quarters; strict miasmatism could not account for its correlation with the movement of trade and traffic. The very dichotomy contagionism / miasmatism, popularised in retrospect by Ackerknecht (1948), is, as Hamlin has argued, more a polemical artefact of contemporary controversy than an accurate description of medical practice (Hamlin 2009a: 24). Most working physicians of the 1830s–1850s were 'contingent contagionists' who acted on both registers simultaneously. The 'seed-soil' metaphor that came to dominate the second half of the century was precisely a device for holding both registers together, allowing physicians to admit a specific cholera 'seed' while making local conditions (drainage, ventilation, water, the constitution of the host) the targets of intervention (Worboys 2000: 6, 248–249).

'Contagion' in the nineteenth century was neither a stable nor an exclusively medical concept: the term circulated across criminology, psychiatry, early sociology,

and political theory, describing phenomena from criminal imitation to revolutionary enthusiasm (Goldstein 1984: 181–184), and bacteriology narrowed but did not extinguish this breadth (Mendelsohn 2002: 3–6; Hamlin 2009b: 196–216). When Swiss authorities used the term in their cholera reports, they mobilised one of several available causal idioms, calibrated case by case.

The Swiss reception of this debate was almost exemplary in its eclecticism. In September 1831 the canton of Basel issued a *Verordnung in Betreff der orientalischen Brechruhr* (Ordinance concerning the Oriental Vomiting Sickness, as cholera was then called), modelled closely on existing plague legislation, that defined a fully contagionist regime: travellers from infected regions were required to present legalised health certificates demonstrating either a thirty-day clean transit or a 'cleansing stay' at the border; and an explicit list of goods deemed 'carriers of the contagious matter' (raw wool, cotton, silk, hemp, flax, manufactures thereof, paper, furs and pelts, hair, felt, feathers, raw and worked hides, packaging of all kinds, bast and straw) was subjected to control by a *Sanitätsrath* (board of health) and the customs *Kaufhaus-Inspektion* (Verordnung Basel 1831: arts. 1–8). This was classical mercantile contagionism in the style of the eighteenth-century plague catalogues. Yet less than a year later, the city's detailed regulations for an actual outbreak, establishing four quarter-based cholera hospitals staffed by physicians serving 'freely, without salary', framed the internal response in terms that owed as much to miasmatic urban hygiene as to contagionist isolation (Reglementarische Bestimmungen 1832).

Federal practice was equally eclectic. In October 1831, the *Tagsatzung*'s medical advisory commission rejected the proposal of a continuous cordon militaire from Lake Constance to the Piedmontese border. Its grounds, as Séveric Yersin has shown, were medical, financial, and political at once: the cordon would be 'if not impossible, then extremely difficult' to maintain; it would entail 'great expense and would disrupt the circulation of the commercial class'; and it would in any case prove futile because cholera appeared to develop 'spontaneously' among 'foreign journeymen' (Yersin 2024: 46–47). The commission did not therefore deny contagion; it doubted the practicability of the prophylactic instrument appropriate to it. When in 1832 the federal *Vorort* enacted its definitive *Beschluss* (decree) against the Asiatic Cholera, the preamble formulated a balancing clause that was as close to a doctrinal statement of liberal sanitarianism as nineteenth-century Europe would produce: measures were to be adjusted to changing circumstances 'in the interests of public health police as well as of the most unhindered possible course of trade and industry' (Vorort Beschluss 1832: preamble).

By 1849 the doctrinal balance had visibly shifted toward the miasmatic-environmentalist pole, although without ever explicitly disavowing contagion. The *Belehrung über das Verhalten beim Ausbruch der Cholera* (Instruction on Conduct in the Event of an Outbreak of Cholera) issued by the canton of Bern in September 1849, the first cantonal cholera instruction of the new federal era, did not mention contagion at all. It taught instead a doctrine of predisposing causes: 'Those who are most fearful, and entirely give themselves over to sorrow and worry, are most easily attacked by cholera' (Belehrung Bern 1849: I.1). Clean air, dry rooms, prudent diet, avoidance of cold and overexertion, moderation in spirituous drinks, and the calm composure of the well-ordered citizen were the recommended prophylactics. The instruction sheet

of 1849 was the perfect citizen-text of liberal Switzerland: the state taught, and the citizen self-disciplined.

The Pre-federal Liberal Cholera Policy: Open Traffic and Federal Compensation, 1831–1849

The political consequence of Swiss medical eclecticism took shape over the course of the 1830s through a sequence of *Tagsatzung* decisions that together amounted to a federal cholera policy a decade and a half before the federal state existed. None of these decisions was the product of coherent constitutional design; each emerged from a specific moment of deliberation. They are best understood as built on principles that the political reality of the pre-1848 Confederation did not yet possess. There was as yet no general freedom of internal movement, no federal customs union, and no federal taxing power; the cantons levied internal duties, policed settlement, and managed their own borders, and Séveric Yersin, drawing on Cédric Humair, has shown that the ordinary working of the tariff-encumbered road network was barely functional in normal times (Yersin 2024: 47). Yet it was precisely the absence of these institutions that lent the cholera response its programmatic charge: by refusing to add epidemic cordons to the existing traffic, by improvising a federal financial solidarity in lieu of one, and by treating the Confederation as a single sanitary space in spite of its political fragmentation, the *Tagsatzung* of the 1830s anticipated in practice the integrated polity that the Federal Constitution of 1848 would only later codify.

The opening move was negative. In autumn 1831 the federal *Sanitätskommission* (health commission) proposed a continuous military cordon along the entire eastern frontier of the Confederation. The Tagsatzung's cholera commission, composed largely of physicians, reported against it on 21 October 1831 (Yersin 2024: 46–47). Their reasoning combined cost-of-policing arguments with substantive medical scepticism: the cordon was administratively unworkable; it would damage the 'commercial class'; and the experience of Prussia and Austria suggested that the disease developed 'spontaneously' among working-class labourers and journeymen, defeating the topographic premise on which any cordon must rest. On 28 October 1831 the *Tagsatzung* followed its commission and declined to order the cordon; on 23 December 1831, at Bern's request, it lifted all sanitary restrictions in the interior and confined them to the border cantons (Tagsatzungsabschied 1831: 339–348).

The October decisions are significant on two counts. It was not an anti-contagionist decision, for the advisory commission accepted contagion as a working hypothesis and rejected only one prophylactic instrument, the cordon, on practical grounds. And in doing so it foregrounded the cost-and-circulation argument in a way that does not align neatly with Ackerknecht's classical equation of anticontagionism with mercantile liberalism (Ackerknecht 1948; for the revision, Baldwin 1999: 201–204; Hamlin 2009a). The Swiss commission did not say that quarantines were unnecessary because cholera was not contagious; it said that even if cholera were contagious, the available means of cordon would not stop it. This is the structural shape of the Swiss liberal-eclectic position throughout the period.

The next move, positive in form, was codified in the federal *Vorort*'s *Beschluss* of 29 April 1832. The preamble's balancing clause has already been quoted. The body of the decree relaxed the regime considerably: border travellers required only general health certificates; local cross-border traffic in necessities was exempted from restriction; the catalogue of goods subject to control was narrowed to used bedding, rags, human hair, wool waste from manufactories and second-hand clothing, while newly made woollen and cotton clothing from infected regions was admitted after five days in a 'healthy region' and thorough airing (Vorort Beschluss 1832: arts. 1, 6, 7). This was not the abolition of all sanitary control but the surgical removal of the cordon and the mercantile-quarantine apparatus that had defined the Habsburg response.

The *Beschluss* of 1832 also disclosed the unspoken counterpart of this liberal priority on circulation: a sharpened police of the itinerant poor. Article 3 stipulated that 'foreign journeymen, servants, and all who belong to this class' would be admitted only if they could produce regular wander-books (Wanderbücher, the booklets recording a journeyman's successive employments) or passports, could demonstrate that they had not been 'unemployed and roving' during the previous two months, were free of any contagious or skin disease, and could show 'travel-money of at least six Swiss francs' (Vorort Beschluss 1832: arts. 3–4). Those who could not were to be turned back at the border, those who had crossed by clandestine routes were to be apprehended and handed over to the police of the border canton nearest their home country. The liberalism of free trade rested, from its inception, on an illiberal sorting of the moving poor. This stratification was a structural feature of liberal sanitary regimes elsewhere too, and not a Swiss peculiarity; what is distinctive in the Swiss case is that it was codified at the federal level as the very condition of unimpeded circulation for everyone else.

The most consequential development came from the cholera outbreaks of 1836 in Ticino (Tagsatzungsabschied 1836: 213–215). Ticino and neighbouring Graubünden applied to the *Tagsatzung* for reimbursement of the expenses they had incurred in warding off cholera in 1836. After substantial deliberation, the *Tagsatzung* granted 13,720 francs in 1837, a sum that, as Yersin has calculated from the federal accounts of the year, amounted to roughly twenty-seven per cent of non-military expenditure of the federal treasury in the second half of 1837 (Yersin 2024: 50–51, citing Tagsatzungsabschied 1838: 367–369). The principle was thereby established: where the federal authorities required cantons to act, the federal authorities would share the cost. Federal financial solidarity was the constitutive innovation of Swiss liberal cholera policy.

Federal compensation was the fiscal correlate of federal abstention: the cantons most exposed to cholera in the 1830s (Ticino, Graubünden, later Geneva and Basel) were precisely those whose border position made them indispensable to unhindered traffic, and the Confederation paid for what it refused to prohibit. The structural pattern, the refusal of central command in favour of central financing, is familiar from later Swiss federal policy, but the cholera precedent is strikingly early: the railways remained private until 1898/1902, and the first federal social insurance was adopted only in 1912. In public health, the Confederation acted as a financially solidaristic federal polity two generations before it did so in almost any other field. The Constitution of 1848 did not invent this federalism but ratified it: Articles 29 and 59 empow-

ered the Confederation to take temporary sanitary-police measures in epidemics and to intervene in the event of epidemic crises; the new Federal Council inherited the *Tagsatzung*'s reluctance to mobilise even this authority, in what Yersin calls a policy of consolidation rather than transformation (Yersin 2024: 51–66).

This regime should not be romanticised. The division it codified between the freely 'circulating' and the closely 'policed' was the silent counterpart of Swiss medical eclecticism, and it would set the terms of the crisis to come in 1867.

Pettenkofer in Switzerland: The Eclectic Synthesis at Work, 1855–1866

If the period 1830–1849 established the political form of the Swiss cholera regime, the period 1855–1866 supplied its mature scientific articulation. The decisive event was the cluster of Swiss outbreaks of 1854 and 1855 (Aargau in 1854, Basel and Geneva in 1855, with smaller outbreaks in Zurich and Ticino; Teuber 1947: 167, 170–176) and the parallel theoretical work of Max von Pettenkofer in Munich. Pettenkofer's seed-soil theory was first systematically articulated in his *Untersuchungen und Beobachtungen über die Verbreitungsart der Cholera* (Investigations and Observations on the Mode of Propagation of Cholera) of 1855, the very year of the Basel and Geneva outbreaks; it cannot, therefore, have guided the measures of 1854 and 1855, which were improvised, eclectic crisis management. What the theory supplied was not a programme of action but a retrospective scientific foundation for a sanitary practice Swiss authorities had already adopted on pragmatic grounds, a foundation that the Cholera-Ausschuss already invoked in 1856, appending Pettenkofer's cholera treatises of 1855 to its report, and that the Basel commission of 1858 made the explicit doctrinal basis of policy (Cholera-Ausschuss 1856: 35, 159; Commission 1858: 7–8). The theory was fitted to the practice rather than the practice to the theory; its content explains why it fitted so well. It posited a specific cholera germ (Cholerakeim), inactive on its own, that became dangerous only when it fell upon a particular *Boden* (a porous, organically saturated, humid soil) and within a particular *Zeit* (time), defined by groundwater level and meteorological conditions (Locher 2007: 238–243). The germ travelled with persons; its activation depended on local conditions; its prevention required not cordons but sewerage.

The political utility of this synthesis for the Swiss regime was immediate. Pettenkofer's theory was scientifically ambitious and politically convenient in equal measure (Locher 2007; Hamlin 2009b: 196–216): it explained the geographic spread of cholera through human movement without authorising the prohibition of that movement, and it explained the spatial selectivity of outbreaks within cities through soil, water, and waste, redirecting policy from the border to the urban environment. Cholera prevention was thereby converted from a question of police into a question of engineering. For Swiss liberal authorities determined to preserve free circulation, this was the optimal frame, and Pettenkofer himself had redirected the older tradition of 'medical police' toward an experimentally grounded science of the urban environment (Locher 2007: 238–240). As Worboys has emphasised for Britain, the seed-soil metaphor was a flexible bridge between contagionism and environmen-

talism, accommodating new pathological findings without forcing a doctrinal break (Worboys 2000: 4–9, 38–43).

Pettenkofer's own eclecticism determined how the Swiss received John Snow. In Locher's reading, Pettenkofer took it as 'a personal challenge to overcome the existing contradictions' between contagionism and miasmatism and to fold them into a single, multi-causal aetiology (Locher 2007: 243). The seed-soil theory was therefore not a third doctrine alongside the other two but a deliberate synthesis: a specific cholera germ travelling with persons (contagionist), a local soil condition required to activate it (miasmatic), and a host susceptibility supplied by individual constitution (Hippocratic). Snow published the second edition of his study of waterborne cholera in 1855, precisely during the Swiss cluster of 1854–55 (Snow 1855); his thesis persuaded Continental observers only slowly, and over the next decade and a half its diffusion ran principally through Pettenkofer, who read Snow attentively but reinterpreted the London evidence within the seed-soil frame. Pettenkofer 'in contrast to English experts of hygiene' like John Simon and John Snow, believed 'that it was not drinking water itself that could trigger a cholera epidemic, but rather the huge amounts of water used domestically and industrially, which contaminated the urban soil' (Locher 2007: 243). Snow's epidemiological correlations were retained as evidence of a soil-mediated process; his strict water-as-vehicle thesis was set aside. As Tom Koch has shown for the wider reception, contemporaries who accepted Snow's maps regularly reinterpreted them within the miasmatic or seed-soil frame (Koch 2017: 111–123). The Swiss medical experts took up Snow, if at all, at second hand and on Pettenkoferian terms.

The Basel epidemic of 1855 affords the clearest Swiss case study of the eclectic medical regime in operation. When the disease reached the city in late July 1855, the Cholera-Commission and the Cholera-Ausschuss, both appointed in the summer of 1854, took charge; the Commission entrusted operational leadership to the experienced physician Ludwig de Wette, and adopted measures that drew indistinguishably on contagionist and miasmatic premises. Patients who could not be isolated at home were transferred to dedicated cholera wards in existing hospitals; the healthy inhabitants of infected houses were lodged at cantonal expense in the Klingental barracks; their dwellings were fumigated with chlorine and washed, the latrines disinfected with iron vitriol and chloride of lime, and the local environmental conditions investigated case by case. De Wette's own report records that the outbreak struck Kleinbasel (the smaller, right-bank part of the city) far harder than Grossbasel in proportion to its population, with the Rheingasse along the Rhine in the Riehen quarter as 'the principal seat of the disease'; in Grossbasel (the larger, left-bank part) he placed most affected houses on the slopes rather than in the Birsig valley itself, whereas the case register, as mapped by Inga Birkhölzer, locates most cases low in the valley, close to the Birsig and the parallel Rümelinbach canal (Birkhölzer 2023: 52, 56, 63). He granted the poverty of Kleinbasel's inhabitants and its low rents 'some influence', but identified the soil as the principal cause: a gravel layer on the Wiese delta, kept waterlogged by the high Rhine and saturated with the effluent of latrines and slurry tanks (De Wette 1856: 38–41).

De Wette's report of 1856 documented this eclecticism without theorising it. House evacuations were justified on the premise that the disease was 'spread in part

by infection', while the disinfection of latrines and cesspools aimed to remove 'harmful vapours from contaminated soil' (De Wette 1856: 13, 41). The Cholera-Ausschuss also condemned a public well on the Rheingasse after chemical analysis revealed contamination from higher-lying latrines (Cholera-Ausschuss 1856: 96). This last step would later look like an anticipation of the waterborne theory, but it owed nothing to John Snow, whose study had only just appeared and was as yet unknown in Basel; it followed instead from the committee's own chemistry of contamination. At no point did de Wette declare himself a contagionist or a miasmatist. The commission acted as though three causal channels (direct person-to-person infection, miasmatic emanation from soil and water, and contaminated drinking water) could be addressed at once, justifying each measure by the channel it best fitted.

The aftermath of the 1855 outbreak in Basel also exposed the political-economic strain that the Pettenkoferian programme placed on liberal governance. The *Cholera-Ausschuss* (cholera committee) of 1856 and the *Begutachtungs-Kommission* (expert review commission) of 1858 jointly recommended a comprehensive reform of the city's sewage and water systems, with the central insight that 'the sewers, although until now mostly private property, must be conceived as an object of public administration' (Cholera-Ausschuss 1856: 45, translation mine). Yet the implementation of this reform stalled. The *Cholera-Ausschuss* returned to the cantonal government (Kleiner Rat) in 1856 with a sharply worded complaint about 'passive resistance' to the Birsig correction, a resistance that 'can be found everywhere and nowhere' and that meant that 'although the Small Council wishes the correction, the *Stadtrath* equally agrees on its necessity, the Building Office also wishes it, everyone in the entire city sees that a decisive step must finally be taken — and yet nothing happens' (Cholera-Ausschuss 1856: 35). The *Stadtrath* (the city council) formally declined to assume municipal responsibility for street cleaning, returning the burden to the *Hauseigenthümer*, the house-owners, in 1857 (Commission 1858: 16). Bourgeois property-owners refused both to pay individually and to be taxed collectively for the urban infrastructure that the Pettenkoferian programme required.

If the politics of the Basel programme stalled, its science did not. The permanent municipal chemist that the 1858 commission had demanded was duly installed, and the expertise worked squarely within the Pettenkoferian frame. When a severe typhus epidemic swept Basel in 1865–66, the Sanitäts-Collegium commissioned both a quarter-by-quarter statistical analysis of the outbreak (Streckeisen 1868) and a chemical survey of the city's water by Friedrich Goppelsröder, the health authority's 'standing expert', who found the drinking water contaminated where it ran through soil saturated by the city's 'infection foci' (Goppelsröder 1867: 6–9). Here the seed-soil theory became laboratory and statistical routine: the contamination of the urban subsoil, Pettenkofer's decisive variable, was now something a salaried expert measured. And it was the typhus epidemic, not cholera, that finally broke the fiscal deadlock: the city acquired a piped water supply in 1866, in the wake of the very outbreak these experts anatomised (Von Wyss 1929: 96–97).

The problem disclosed here is structural. Liberal prevention identified the urban infrastructure as the principal medium of disease, demanded its socialised reconstruction, and depended for legitimation on a propertied constituency whose immediate financial interest opposed both. Recurrent epidemic shocks were the mechanism by

which the political stalemate was eventually broken, if only partially. The modernisation of Basel's water supply was carried out in the first instance not by the municipality but by a private joint-stock company, the *Basler Wasserversorgungsgesellschaft* (the Basel Water Supply Company), which began supplying the city in 1866; only after a decade of controversy was the company municipalised in 1875, in the same year that a constitutional revision abolished the separate bourgeois *Stadtbehörde*, the city authority of Basel's burghers (Haefliger 1984: 131–132). The comprehensive sewer system fared worse: the Basel electorate twice rejected the canalisation proposals; 'after the sovereign [the male electorate] had rejected the "canalisation", the word fell into disrepute'. As a result, the authorities resorted to the ploy of pushing ahead with the new sewerage network under the old name 'Dolen' until a sewerage law finally passed in 1896 (Von Wyss 1929: 96–98). The contradiction is internal to the liberal sanitarianism, which Crook has described in the British case: a 'broad culture of governance committed to both actively securing a moralized, pluralistic and healthy society and respecting society's capacity to govern itself, free of intervention' (Crook 2007: 371). The healthy society demanded sewers; the self-governing society refused to pay for them; only the repeated shock of disease resolved the tension in favour of intervention.

Behind these local stalemates lay a difficulty that was, in the strict sense, constitutional. A liberalism built on individual freedom and a lean, low-spending state had to convert that freedom into something it did not obviously contain: a collective, tax-funded responsibility for the health of all, including those whose dwellings, habits and incomes the propertied citizen would rather not subsidise. Sewerage was the costliest and most conspicuous form of that conversion, and it forced upon the Swiss polity a deeper structural change: the liberal night-watchman state of the 1830s had to reinvent itself as a tax-raising and provident state, equipped to mobilise long-term public investment on behalf of preventive ends. As Baldwin observes, only polities with substantial tax revenues could afford such alternatives to the cheap expedient of the cordon (Baldwin 1999: 529–534); and the Swiss cantons, having forsworn the cordon, had no cheaper option left. What made the conversion peculiarly hard in Switzerland was the very feature that made it the Continent's most advanced liberal polity, its far-reaching rights of popular co-determination. Where an autocratic administration could simply decree the works and levy the tax, the Swiss sovereign could vote the expense down, and in Basel twice did. Direct democracy, so often cast as the hero of the sanitary story, here first delayed the reform that it would, from 1867 onwards, be the means of carrying through.

Zurich 1867: Carl Zehnder and the Limits of Liberal-eclectic Medicine

The Zurich epidemic of 1867 was the worst cholera outbreak in Swiss history, the heaviest of all the cantonal epidemics in the later judgement of Ilse Teuber (Teuber 1947: 180–181), claiming 481 lives in the Zurich district alone over some three months from late July. It followed an administrative preparation unusually thorough by the standards of the day, whose centre of gravity was the cantonal *Bezirksarzt* Carl Zehnder, in whose person medical expertise and liberal political elite converged.

As Yersin has noted, Carl Zehnder was the son of Ulrich Zehnder, the long-serving Bürgermeister and Regierungspräsident of Zurich (the titles then borne by the head of the cantonal government), a member of the cantonal Council of State and the Grand Council (Yersin 2024: 56). Carl Zehnder was not an outsider expert mobilised against the *Freisinn* but a member of the *Freisinn* governing class in its medical-bureaucratic incarnation. This makes his role in 1867 the more diagnostic of the regime's internal stresses.

In August 1866, with cholera reported in northern Germany and a cantonal *Cholera-Commission* already convened, Zehnder published a memorandum on 'the manner of the disease's spread and the measures against it', in which he set out a comprehensive programme for cantonal and communal action (Zehnder 1866). Theoretically Zehnder positioned himself within the Pettenkoferian seed-soil framework: cholera was contagious in principle but its propagation required favourable local conditions. Practically, however, Zehnder pushed the regime in a more contagionist direction than Basel had done a decade earlier. He held it 'necessary to isolate, so far as possible, every family in which even a single member has contracted cholera, and to forbid any unnecessary contact with that family' (Zehnder 1866: 59–60). He also demanded 'the necessary powers' to instruct the police directly during an outbreak, without time-consuming consultations up and down the chain of command, claiming for himself the role of a temporary medical expertocrat (Zehnder 1866: 70).

The cantonal *Cholera-Commission* took up several of the measures Zehnder advocated (Zehnder 1871: 88), delegating in advance to a single medical expert an emergency authority that went beyond the competences accorded to physicians in 1855. When the epidemic broke out in late July 1867, four interventions defined the response. Every house in which a cholera case had been confirmed was placed under sequestration for at least nine days, its door marked with a yellow tablet and its confinement checked by police visits (Zehnder 1871: 92–94); the latrines of such houses were sealed and their residents issued portable buckets emptied and disinfected daily by communal employees; densely overcrowded houses were to be evacuated where local capacity allowed; and every case was to be notified to the district physician and the communal police.

House sequestration and the sealing of latrines went beyond the notification, hospital isolation and evacuation of healthy residents already practised in Zurich and Basel in 1855 (Von Wyss 1929: 39–40; De Wette 1856: 13–16). And yet this intensification did not require a doctrinal rupture: following Pettenkofer, Zehnder still treated the cholera 'poison' as active only under local conditions, but he gave greater weight to asymptomatic carriage and to household contact, holding that outwardly healthy persons could transmit the disease through their excretions and that the latrines of infected houses were local incubators of contagious matter (Zehnder 1866: 24–28). From the seed-soil framework Zehnder retained the soil and intensified the seed, bringing his intervention targets (bodies, excreta, dwellings) closer to the contagionist tradition than the Basel commission had ventured.

Zehnder's own 1871 report defends the response while recording its limits. The order, he wrote, 'which so deeply interfered with individual rights, encountered resistance nowhere'; the inhabitants of cholera houses 'willingly submitted to the imposed quarantine', induced to do so by the provisions and the 'fair compensation for lost

working time' that the commune supplied (Zehnder 1871: 92–93). The district physician himself classified the measures as a deep interference with individual rights, and compliance, on his own telling, was bought through the fiscal-liberal device of compensation, practised between cantons since 1837 and now operated at the level of the household. Liberal consent had a price, and where Zurich could pay it, the regime held. Yet the record shows how fragile this compliance was: Von Wyss noted in 1929 that the house quarantine was abandoned on 30 August 1867, barely a month after the first case, 'because it was difficult to carry out and not accompanied by the favourable effects that had been expected of it' (Von Wyss 1929: 60–61), and Condrau's archival reconstruction shows sealed houses without confirmed cases, infected houses left open, residents breaking the cordons, and portable buckets standing for days in entrance halls (Zehnder 1871: 93; Condrau 1996: 213). The repressive instrument failed within four weeks.

The fallback measure, the evacuation of the healthy from infected houses, failed for a different reason: it came too late and on too small a scale. The accommodation it required was ready only on 16 September, more than a month after the outbreak began, and even then it sufficed at best for the residents of the city proper; the suburban communes could provide no rooms of their own (Condrau 1996: 213). Zehnder himself recorded that in Aussersihl the old schoolhouse was fitted out for evacuation on 13 September, that the government supplied the beds 'after some reluctance', and that these rooms soon proved insufficient, so that part of the old hospital had to be requisitioned (Zehnder 1871: 111).

The geography of this failure does not only show a contrast between rich and poor quarters. By Zehnder's own counts the heaviest concentration lay outside the city: of the 684 cases in the district, 219 fell on Zurich itself, where the Niederdorf (the dense, poor core of the old city) became the worst quarter, and 187 on Aussersihl alone, which also recorded the highest number of cases per focus of infection (Zehnder 1871: 22, 24). The city was not spared the shortfall, for the rooms opened in the Tonhalle for the Niederdorf soon proved insufficient; but it could press the cantonal government into releasing the empty wards of the old hospital (Zehnder 1871: 111). It was in the rapidly grown suburban communes beyond the city, above all Aussersihl and Oberstrass, that the regime broke down, because these communes lacked the means to run it: they had not even enough physicians to treat their cholera patients, so that the cantonal hospital had to send out junior assistants (Condrau 1996: 213–214). Aussersihl, with the largest, poorest and most transient industrial workforce, was the extreme case. There, Zehnder reported, overcrowding made hospital transfer more often necessary; fear of it led residents to conceal their sick; and the disease therefore 'continued after it had been extinguished everywhere else, until nothing remained but to evacuate entire houses' (Zehnder 1871: 111). Aussersihl was thus marked out twice over, by the intensity of the outbreak and by the weakness of the means to meet it. Zehnder himself praised the zeal of its communal council and of the volunteers who worked, as he put it, in far more difficult circumstances than elsewhere (Zehnder 1871: 110); what was wanting was not the effort of the local authorities but the rooms, the physicians and the dwellings in which isolation could be asked of anyone. Nor could the infrastructural arm of the eclectic regime do any work in the acute phase: the city's electorate had approved the sewer reform only

a few months before the epidemic, and construction had not begun when cholera arrived; the eighty kilometres of sewer that would answer the Pettenkoferian diagnosis were laid between 1868 and 1873, after the dead were buried (Condrau 1996: 215–217). Both arms of the regime were unavailable: the repressive arm because it was unenforceable and class-asymmetric, the infrastructural arm because it had not yet been built.

Zehnder's 1871 report is, in this light, an interested document as much as an informative one, and the self-portrait shaped the historiography: Von Wyss in 1929 took Zehnder as his principal source and reproduced his judgements, endorsing even Zehnder's contention that the open cesspools had exerted no direct influence on the disease (Von Wyss 1929: 24). Against Zehnder's expertocratic interventionism stood, within the same cantonal administration, an older and more classically liberal understanding of the crisis. When rural communes demanded to seal themselves off against traffic from infected places, the Regierungsrat (the cantonal executive council) refused: its proclamation of 21 September 1867 warned against 'the aberrations to which exaggerated fear could lead', declared that 'any real impediment' to circulation would be opposed 'as an unlawful proceeding', and praised the communes 'which allowed themselves to be least disturbed in the regular conduct of civic life' (Von Wyss 1929: 61–64, 70). The proclamation articulates the liberal crisis concept introduced above: the epidemic was a trial to be endured without abandoning civic life, and the claim of liberal crisis resilience that had underwritten the regime since 1832 was reasserted in its very testing. The two faces of liberal crisis politics stood side by side: an expertocracy intervening in the households of the poor, an executive refusing to impede the circulation of the propertied.

The 1867 crisis was therefore not a defeat of medical eclecticism (much of what Zehnder ordered was, by later lights, epidemiologically reasonable) but the exposure of its class-stratified application. The regime of consent and compensation worked for those who could afford to be compensated and broke down where they could not. In the workers' suburbs this limit showed itself to be constitutive of the regime rather than incidental to it: a politics of consent could reach only those it had the means to consult, a politics of compensation only those it could afford to pay. The limit was as old as the settlement of 1832, in which unimpeded circulation for the propertied had been secured by a police of the itinerant poor; what the epidemic of 1867 changed was that it could no longer be treated as a marginal defect of an otherwise working order.

The political response of the *Demokratische Bewegung* (Democratic Movement) was swift and uncompromising, though its line on the epidemic ran less through the dead of Aussersihl than through the wider social condition the outbreak had laid bare. On 23 October 1867 the democratic *Landbote* (the leading democratic newspaper, published in Winterthur) commented that the cholera had 'opened deeper glimpses into our common life' and that 'many of our fellow citizens are so placed that with the best will it is impossible for them to feed themselves properly', urging the authorities to fulfil their duty in improving the lot of the working classes (Landbote, 23 October 1867, cited in Condrau 1996: 215). The argument was directed not at the disease as such but at the *Freisinn* 'system' behind it: the oligarchic network around the railway and banking magnate Alfred Escher, of which Carl Zehnder's father Ulrich was a

charter member. Karl Bürkli, in the Landsgemeinde (a mass open-air popular assembly) of 15 December 1867, articulated the metaphorical fusion of disease and politics that would carry the constitutional revision:

'By system I understand the pernicious influence of vested interests, foremost the North-Eastern Railway Company, the *Kreditanstalt* [Escher's Zurich credit bank], many large industrialists, the officials' mutual-insurance clique and Freemasonry. The system, like cholera, cannot be grasped with the hands, but it can be felt in all the limbs' (Bürkli, in Aktenstücke 1868: 11, translation mine).

The failure of the liberal-eclectic cholera regime was thus redescribed as the failure of the *Freisinn* polity as such. On 26 January 1868 seventy-eight per cent of the cantonal electorate voted for a constitutional revision. The new constitution of 1869 introduced the right of initiative and referendum, popular election of officials and judges, free primary education, and a progressive wealth tax. At almost the same moment the city of Zurich began work on the sewer system that the city's voters had approved just a few months before the start of the epidemic; eighty kilometres of sewer were laid in five years (Condrau 1996: 215–217). The democratic majority did with public funds what the liberal majority had been unable to do without them: it socialised the cost of the Pettenkoferian programme, and in doing so endorsed the eclectic medical doctrine that underwrote it. There was no return in 1869 to an environmentalist refusal of contagionist measures, nor any turn to a contagionist regime of cordons; the democratic revision preserved the medical synthesis of the *Freisinn* while replacing the political class that had failed to translate it into infrastructure.

From the Zurich Crisis to the Federal Epidemics Law of 1886

The two decades between the Zurich crisis and the federal Epidemics Law completed the institutional arc of the Swiss cholera regime. Its course is best followed not as a list of measures but as a single movement: the new bacteriology was absorbed into the old liberal-Pettenkoferian frame rather than overturning it, the coercion that 1867 had directed at the patient was relocated to the duty of the physician, and the whole was codified, on a democratic basis, in 1886.

The bacteriological discoveries of the early 1880s (Koch's isolation of the cholera vibrio in 1883) did not produce in Switzerland the contagionist revanche they permitted elsewhere (Hamlin 2009a: 23). The St.Gallen physician Jakob Laurenz Sonderegger's 1883 brochure *Zum Schutze gegen die Cholera* (On Protection against Cholera), commissioned by the Federal Department of the Interior and distributed to the cantonal governments, articulated a synthesis that absorbed bacteriology into the established Pettenkoferian frame. Cholera was, Sonderegger wrote, 'bound to the smallest organic structures' (the bacterial reading), but its development depended also on 'the condition of the soil upon which it falls' (the Pettenkoferian reading) and on 'the personal disposition' of the host (Sonderegger 1883: 4). On cordons he was emphatic: 'The military cordons against cholera have been abandoned by all civilised peoples' (Sonderegger 1883: 6). Open traffic had become, by 1883, a mark of civilised modernity.

If bacteriology left the doctrine intact, it sharpened one instrument within it. The synthesis was now coupled to a stronger emphasis on mandatory notification. 'Without the duty of notification, indeed without a duty of notification enforced with the strictness of military law, everything else is play-acting,' Sonderegger declared (1883: 14). The shift is significant: coercion was redirected from the body of the patient (border quarantine, personal isolation) to the conduct of the physician (mandatory reporting), where it could be embedded in professional duty rather than imposed by police. As Worboys observed of Britain, notification, isolation and disinfection became the core of late nineteenth-century preventive medicine, given new bacteriological rationales (Worboys 2000: 234–276); Mooney 2015 traces the parallel growth of notification and the surveillance of domestic space in England. What Zehnder had tried in 1867 to impose on the householders of Aussersihl (that they declare every case of diarrhoea) could now be imposed instead on the canton's physicians, who had the incentive and the standing to comply: the expertocratic moment of 1867 was generalised and depersonalised by the federal regime of 1886.

The institutional turn ran through the total revision of the Federal Constitution in 1874. Carried by the democratic momentum that the Zurich crisis and its analogues in other cantons had supplied, the new constitution empowered the Confederation 'to legislate the sanitary-police measures to be taken against epidemics and epizootics presenting a general danger' (Art. 69; Yersin 2024: 148). Without this foothold the federal Epidemics Law of 1886 would not have been possible: the 1882 draft fell in referendum (78.9 per cent against), and only the revised second draft, disencumbered of compulsory vaccination, passed under the new competence (Yersin 2024: 84, 169–175). For cholera policy in particular, the 1874 revision converted the *Tagsatzung* practice of the 1830s into a settled federal jurisdiction.

These currents converged in the federal Epidemics Law of 1886, which codified what the *Tagsatzung* had improvised in 1832 and 1837: federal authority to coordinate cantonal responses, federal participation in the costs of epidemic control, mandatory notification of designated diseases, and federal oversight of the sanitary border. The second draft was pared down before it reached parliament: its authors dropped compulsory vaccination and any provision 'smacking of a police state', and parliament passed it with a single amendment; confined by Article 69 to 'epidemics presenting a general danger', the statute reserved most operational authority to the cantons (Yersin 2024: 148, 169–172). The 1886 Law was thus not the triumph of medical expertise over democratic resistance but the formula of their reconciliation: federal action triggered by a politically defined threshold, exercised by cantonal organs, co-financed by the Confederation. The *Tagsatzung*'s improvisations of 1831–1837 had become, half a century later, the operational architecture of a federal sanitary state.

Conclusion

Switzerland, the most radical laboratory of liberal and democratic politics in nineteenth-century Europe, affords a sharper view than the British or German cases of how cholera medicine and political liberalism mutually constituted one another. Swiss medical eclecticism and Swiss federal-political liberalism each presupposed

the other; the Zurich crisis of 1867 showed the regime's structural limit when the consent-and-compensation device broke down in the industrial suburbs, prompting the democratic recalibration without which the underlying compromise could not be codified.

The Ackerknecht thesis, with its neat correlation between anticontagionism and liberalism, captures only a part of this story. The richer description is one in which medical eclecticism and political liberalism evolved together, sustained one another, and survived their joint crisis through democratic adaptation rather than scientific or constitutional rupture. The Swiss authorities of the 1830s refused cordons because they doubted the cordons' effectiveness, anticipated heavy costs, and feared damage to the circulation on which their nascent liberalism rested. They adopted Pettenkofer's seed-soil theory in the 1850s because it offered the optimal scientific framing for a sanitary politics they had already pragmatically embraced. And they codified the federal Epidemics Law of 1886 not because Koch had identified the cholera vibrio in 1883 but because, on their reading, the political shock of 1867 and the subsequent democratisation had supplied a popular mandate for what had earlier been the ad hoc improvisations of the pre-1848 *Tagsatzung*.

One difficulty outlasted every doctrinal accommodation, and the Swiss case states it most plainly. A liberalism founded on individual freedom and a lean state had nonetheless to underwrite a collective responsibility for the health of all, and the costliest test of that responsibility was the modern sewer. The liberal commitment cut both ways: the refusal of heavy-handed intervention that spared citizens the cordon also disinclined the lean state from the large preventive works of quiet years. Switzerland, having renounced the cheaper coercion of the border, could not escape the bill; yet its far-reaching democratic rights meant that the propertied electorate could, and in Basel twice did, decline to pay it. Only the conjunction of epidemic shock and democratic mobilisation, most sharply in Zurich in and after 1867, converted bourgeois freedom into a willingness to be taxed for the health of unknown fellow citizens. That conversion, achieved slowly and against resistance, is the deepest sense in which cholera helped to make the Swiss liberal-democratic state.

Swiss federal health policy thus emerged from the interweaving of an uncertain medicine with an uncertain politics. Its institutional achievements (free intercantonal circulation, federal financial solidarity, mandatory notification, sanitary infrastructure) were the sediments of a series of pragmatic settlements, codified in 1886 as the record of a fifty-year negotiation between physicians, cantonal governments, federal commissioners and democratic voters. In each generation, cholera supplied the occasion and set the agenda.

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