

# Spas, Mineral Waters, and Hydrological Science in Twentieth-Century France

By George Weisz\*

## ABSTRACT

This essay examines the survival of waters therapy in twentieth-century France with a view to understanding the conditions that make a therapy convincing in one national context and not in another. Part of the explanation for this survival has to do with the size and power of the spa industry. Where this industry was strong and economically powerful—as it was in France—its survival became a national priority. Of equal importance, however, was the role of the medical elite. In twentieth-century France, a small but influential group of elite physicians served as the chief architects of the continued survival and development of water cures. The primary mechanism for this process was a massive and successful campaign to introduce hydrology into the curriculum of medical schools. Once this was achieved, a large corps of academic hydrologists were in a position to produce significant amounts of convincing hydrological science that seemed to demonstrate the varied physiological effects of mineral waters. By the 1940s mineral waters had enough scientific visibility to ensure their inclusion without controversy in the national health insurance system that was being set up.

THE THERAPEUTIC UTILIZATION OF MINERAL WATERS is an area of contemporary medicine where differences between Europe and the English-speaking world are especially striking. In 1992, some 2,730,000 Germans visited spas in order to drink, bathe in, or otherwise be soothed by mineral waters; about half of them were reimbursed to some extent by the national health insurance system.<sup>1</sup> The number of Italians entering

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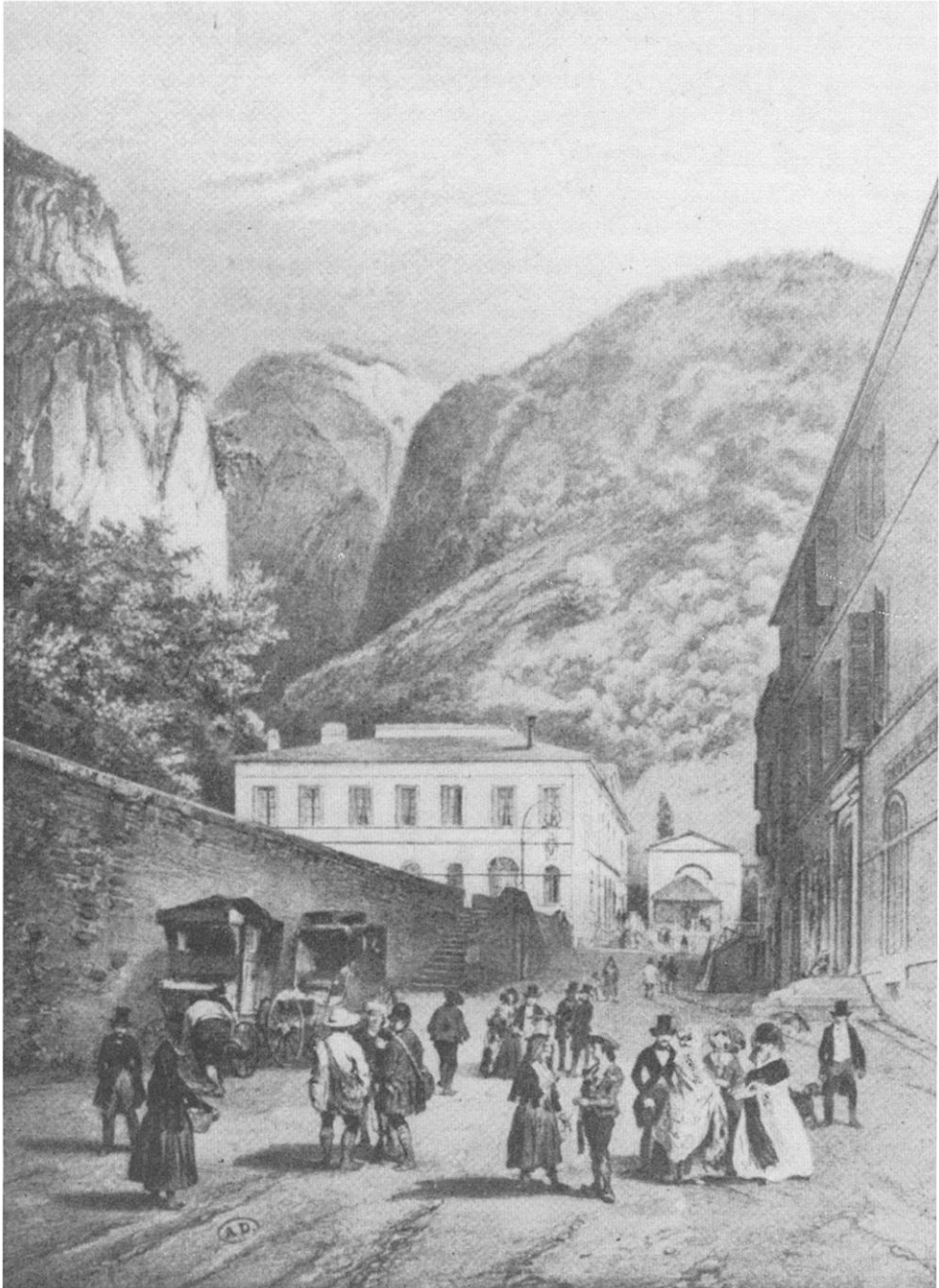
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<sup>1</sup> The following figures (except those on the United States), the most recent available, are from *Cours des Comptes, Les interventions publiques dans le domaine du thermalisme: Rapport au Président de la République suivi des réponses des administrations, collectivités et organismes* (Paris: Cours des Comptes, 1995), p. 231. For somewhat earlier figures that are very similar see Christian Jamot, *Thermalisme et villes thermales en France* (Clermand-Ferrand: Institut d'Études du Massif Central, 1988), p. 71. In this essay I simplify considerably the status, both historical and contemporary, of mineral waters outside France. In the next stage of this ongoing project, I intend to examine the spas and hydrological science of other nations in much more detail.

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*Eaux Bonnes in the nineteenth century. From P. Négrier, Les bains à travers les ages (1925).*

spas in that year was 1,800,000, with about two-thirds covered by health insurance; however, Italian cures tended to be very short, suggesting that they were not quite so seriously medicalized. At the other end of the spectrum, the small waters industry of the United Kingdom—despite the international fame of Bath—has shrunk to near insignificance.<sup>2</sup> Only 5,500 individuals took cures in British spas in 1992, and none were covered by the National Health Service; some of the nation's most famous thermal establishments have become, quite literally, museums. American mineral waters are hardly on the map. Most of the numerous spas that existed a century ago have disappeared. It is maddeningly difficult to find hard data about those that remain, but a European observer suggests that about twenty American "health resorts" are still in existence. In most, however, mineral waters therapy is a secondary activity; it certainly does not generate any visible scientific literature.<sup>3</sup> Water therapy of the nonmineralized variety is utilized in some limited medical situations—as an adjunct to physiotherapy, for instance. But when Americans today talk about "spas" they are likely to mean places where they go for diet and exercise regimens (if not beauty treatments) rather than for medical therapy.

France corresponds to neither of these two models. The number of spa-goers is considerably smaller than in either Germany or Italy; in 1992 the figure was 640,000. On the other hand, the vast majority—90 percent—were sent by the national insurance system for a lengthy stay of twenty days, on average, under close medical supervision. Whereas the German spa seems a curious mixture of mainstream medical activity and "alternative" treatments aimed at health "tourism" and "wellness," its French counterpart is emphatically medicalized.<sup>4</sup>

No single historical factor can explain such variation. Spa therapy everywhere has faced the same problems. Changing patterns of leisure and tourism have provided many vacation alternatives to the traditional "cure." Similarly, there are now many ways of pursuing good health. In the medical sphere, the appearance of many new drugs and therapies that compete with waters, as well as the acceptance of random clinical trials—almost impossible to conduct in the spa milieu—as the authoritative test of clinical efficacy, has seriously challenged thermalism (as it is now termed in France). The different national responses to such challenges can tell us a great deal about the nature of medical judgment and perhaps about scientific judgment as well.

<sup>2</sup> William A. R. Thomson, *Spas That Heal* (London: Black, 1978), pp. 23–31. On the effect of this decline on spa towns see J. A. Patmore, "The Spa Towns of Britain," in *Urbanization and Its Problems: Essays in Honor of E. W. Gilbert*, ed. R. P. Beckinsale and J. M. Houston (Oxford: Blackwell, 1970), pp. 47–69; David Cantor, "The Contradictions of Specialization: Rheumatism and the Decline of the Spa in Inter-war Britain," in *The Medical History of Waters and Spas*, ed. Roy Porter (*Medical History*, Suppl. 10) (London: Wellcome Institute for the History of Medicine, 1990), pp. 127–144; and Phyllis M. Hembry, *British Spas from 1815 to the Present: A Social History*, ed. and completed by Leonard W. Cowie and Evelyn E. Cowie (London: Athlone, 1997).

<sup>3</sup> I am referring to literature cited in such standard sources as *Medline* or *Index Medicus*, where one finds considerable evidence of scientific activity outside the United States. On American spas see Janet Valenza, *Taking the Waters in Texas: Springs, Spas, and Fountains of Youth* (Austin: Univ. Texas Press, 2000); and A. V. Benedetto and L. E. Millikan, "Mineral Water and Spas in the United States," *Clinics in Dermatology*, 1996, 14:583–600. For the suggestion of the European observer see Jamot, *Thermalisme et villes thermales* (cit. n. 1), pp. 87–88.

<sup>4</sup> The average stay at a German spa was seventeen days, that at an Italian spa only nine days; Jamot, *Thermalisme et villes thermales*, p. 231. On German spas see Thomas Maretzki, "Cultural Variation in Biomedicine: The Kur in West Germany," *Medical Anthropology Quarterly*, 1989, 3:22–35; Maretzki, "The Kur in West Germany as an Interface between Naturopathic and Allopathic Ideologies," *Social Science and Medicine*, 1987, 24:1061–1068; Maretzki and Eduard Seidler, "Biomedicine and Naturopathic Healing in West Germany: A Historical and Ethnomedical View of a Stormy Relationship," *Culture, Medicine, and Psychiatry*, 1985, 9:383–421; and Paul Unschuld, "The Issue of Structured Coexistence of Scientific and Alternative Medical Systems: A Comparison of East and West German Legislation," *Soc. Sci. Med.*, 1980, 14B:5–24.

Among many factors behind these divergent national responses, two seem to me to stand out. The first has to do with the size and power of the spa industry. Where this industry was large and economically powerful, it may be argued, its survival became a national priority. Where this was not the case, the industry lacked the allies necessary to flourish in the twentieth century. This argument would go some way toward explaining why the traditionally weak spa industries of Britain and the United States were allowed to become marginal to mainstream medicine.

But it cannot explain everything. The French case, especially, complicates matters because we need to explain not just the spa industry's survival but its overwhelmingly medicalized character. This suggests a second critical factor: the nature of the relationship between organized medical professions, especially their academic elites, and the institutions and science of thermalism. It can be argued that in Britain and the United States there was little connection between medical elites and spas, which were regarded by doctors as places of tourism at best and charlatanism at worst. This attitude was particularly prevalent in the United States, where spas were largely unregulated, giving rise to both outrageous claims of miracle cures and instances of outright fraud that provoked sporadic intervention from the American Medical Association and the skepticism of most doctors.<sup>5</sup> During the interwar period, the popularity of European spa medicine produced some changes. An establishment created in Saratoga, New York, was organized along European lines to include a research institute. The AMA became somewhat more favorable, setting up a committee on American health resorts in 1938 to establish standards in the field. Henry Sigerist wrote in 1941 that most American doctors believed that spas were "a swindle or at best a dignified medical superstition." Five years later, he could refer to a "renaissance of the American spa."<sup>6</sup> But this "renaissance" did not run deep and could not survive the shifting medical attitudes of the 1950s and 1960s.

If the United States represents one extreme, France represents another. Here the medical elite was deeply implicated in both the administrative and scientific aspects of spa therapy. The links between spas, the French state, and elite medicine have been particularly close since the early seventeenth century, when Henry IV appointed his First Physician as Superintendent of Baths and Mineral Fountains. Certainly the state's economic interest in and responsibility for waters has remained substantial. During the nineteenth century, as I have argued elsewhere, the medical elite in the form of the Academy of Medicine played a predominant role in the administrative supervision and scientific study of mineral waters.<sup>7</sup> (The even more prestigious state inspectorate of mines was responsible for the mechanical

<sup>5</sup> Gene Fowler, *Crazy Water: The Story of Mineral Wells and Other Texas Health Resorts* (Fort Worth: Texas Christian Univ. Press, 1991), pp. 29, 225. An added factor may have been the association with hydrotherapy, a popular movement of the nineteenth century that made use of cold nonmineralized waters and challenged medical orthodoxy. See Jane B. Donegan, "*Hydropathic Highway to Health*": *Women and Water Cure in Antebellum America* (New York/Westport, Conn.: Greenwood, 1986); and Susan E. Cayleff, *Wash and Be Healed: The Water-Cure Movement and Women's Health* (Philadelphia: Temple Univ. Press, 1987). The overlap between hydrotherapy and thermalism is well illustrated in Patricia Spain Ward, "Simon Baruch: Rebel in the Ranks of Medicine, 1840-1921" (Ph.D. diss., Univ. Wisconsin-Madison, 1990), pp. 344-425 (a version of this thesis was published by Univ. Alabama Press in 1994).

<sup>6</sup> Henry Sigerist, "American Spas in Historical Perspective" (1941), in *Henry Sigerist on the History of Medicine*, ed. Feliz Marti-Ibañez (New York: MD Publications, 1960), pp. 66-79, on p. 73; and Sigerist, "Towards a Renaissance of the American Spa" (1946), in *Henry E. Sigerist on the Sociology of Medicine*, ed. Milton I. Roemer (New York: MD Publications, 1960), pp. 248-255. The *Journal of the American Medical Association* also published a series of articles on spas during the late 1930s and 1940s. A half-dozen are included in the bibliography in Valenza, *Taking the Waters in Texas* (cit. n. 3), pp. 231-237.

<sup>7</sup> George Weisz, *The Medical Mandarins: The French Academy of Medicine in the Nineteenth and Early Twentieth Centuries* (New York/Oxford: Oxford Univ. Press, 1995), pp. 137-158.

means by which waters from a source flowed and circulated.) In so doing, the academy was following in the wake of earlier institutions, most notably the Société Royale de Médecine, which had briefly played a similar role in the eighteenth century. The academy not only lent its professional stature and legitimacy to waters but gave water therapy an emphatically medical orientation—as opposed to one focusing on leisure or tourism—that made it easier for doctors to take such treatments seriously.

This elite medical role was significant but hardly determinant. At the turn of the twentieth century, only a handful of elite physicians were actively interested in waters. And these frequently made reference to existing medical skepticism about spa treatment. There was widespread agreement that research in this area was of low quality, pursued primarily by spa physicians who celebrated uncritically the virtues of the waters they worked with. It is hard to imagine that this limited elite involvement, buttressed as it was by dubious research, could have effectively protected medical thermalism from the challenges posed by twentieth-century medicine.

It is here that economic and political influences came into play. In the twentieth century, a much expanded and reorganized spa industry, allied with a powerful tourism industry and enjoying considerable political support, set out to develop mineral waters along lines consistent with the values of scientific medicine. That is, the demands of the official spa lobby reflected predominantly medical views of spa development, focusing on the specialized use of each water for specific ailments, rigorous medical supervision, and, above all, the presence of thermalism within medical schools, hospitals, and research institutions; the explicit goal was to create an imposing body of scientific literature that would validate thermalism. This effort, I will contend, was remarkably successful, at least in the short term, and conferred scientific legitimacy on thermalism just at the point when momentous changes were being introduced into French medicine. Its institutional and scientific visibility allowed thermalism to be included as a matter of course in the national health insurance system established just after World War II and thus assured its continued development. Acceptance by the insurance system has in turn further intensified the highly medicalized character of thermalism in France.

### CONQUERING INSTITUTIONS

Though the world of French spas was small during the first half of the nineteenth century, ownership of and jurisdiction over thermal institutions was a complex matter. The French state owned a handful of spas but fully administered only one, Aix-les-Bains. It farmed out management of the others—Vichy was the most famous—to private companies under a variety of formulas. The majority of spas were owned either by local authorities or by private companies.<sup>8</sup>

Statistics about spa use in the nineteenth century are imprecise. The best estimates I have found suggest that just over 30,000 people took water cures each year in the 1830s. By the end of the century over ten times as many individuals were visiting French spas.<sup>9</sup> But for many of these the water cure—if there was one—was unsupervised and episodic;

<sup>8</sup> François Françon, “Vers un statut des stations hydro-climatiques françaises,” *Presse Thermale et Climatique*, 1946, 87:15–17.

<sup>9</sup> Weisz, *Medical Mandarins* (cit. n. 7), p. 138. There are no reliable statistics about spa visitors during this period. Douglas Peter Mackaman, *Leisure Settings: Bourgeois Culture, Medicine, and the Spa in Modern France* (Chicago: Univ. Chicago Press, 1998), pp. 43, 66, gives a figure of 800,000 visitors to spas in 1900, but this seems rather excessive.

the number of individuals taking serious water cures was certainly far lower. Some spas developed the profitable sideline of selling their water in bottles; this practice had virtually nothing to do with medicine, however—despite the occasional bit of misleading advertising—because it was axiomatic to French hydrologists that waters were therapeutically effective only at their source. They were considered too chemically and physically unstable to maintain their original composition if moved any distance.

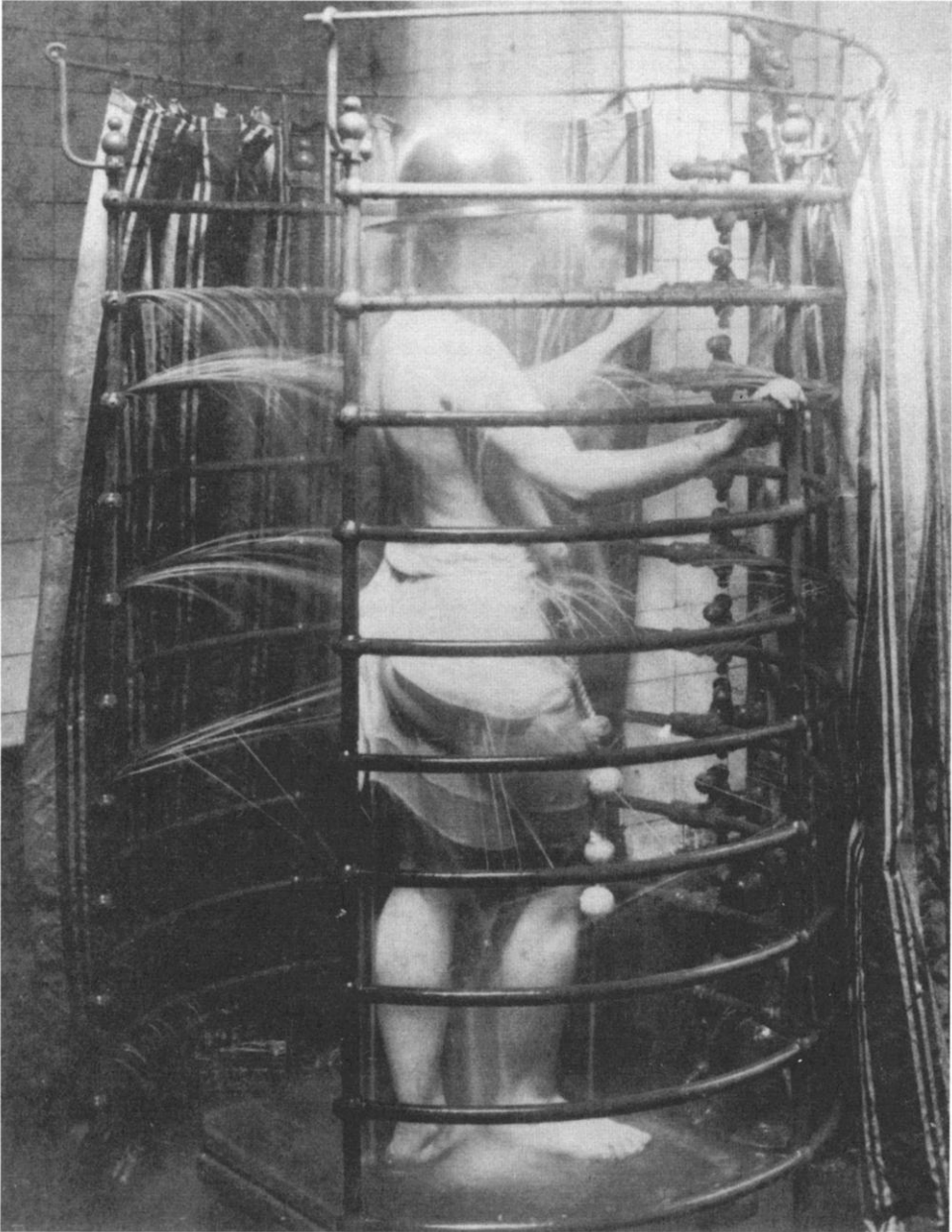
The popularity of French spas grew dramatically during the interwar period. Christian Jamot estimates a little over 500,000 spa visitors, including significant numbers of foreigners, in 1938. The rise of new forms of bourgeois tourism was certainly central to this expansion, as both Jamot and Douglas Mackaman have argued; but recognizing the significance of tourism should not obscure the highly medicalized (and rather uncomfortable) character of much of spa life. Many of those who visited spas put up with considerable unpleasantness because they believed or hoped that the waters would cure their ills.<sup>10</sup>

This medicalization appears to have started early. Though a few eighteenth-century spas like Vichy were patronized by the rich and famous, they did not for the most part achieve the fashionable status or level of conspicuous consumption attained by watering holes like Bath or Baden-Baden. On the other hand, they could boast a degree of medical supervision that was unusual for the period. Both the academic elite and spa doctors sought throughout the nineteenth century to extend this shaky medical authority. The annual surveys of spas by the Academy of Medicine insisted regularly on the need to subject the utilization of waters to medical supervision. The properties of certain waters were too powerful, they argued, and the modalities of treatment too complex, subtle, and individualized, to allow individuals to take cures without medical direction. And some spas actually implemented rules to this effect. However, no French government in the nineteenth century would accept the identification of waters with dangerous medicines. In 1860, in fact, the government of the Second Empire officially proclaimed the principle of unrestricted use of waters, forcing certain spas to abandon the medical controls that had been introduced. This situation was a continuing source of discontent for hydrologists in the academy, who regularly reminded the government of the dangers presented by the lack of regulation.<sup>11</sup>

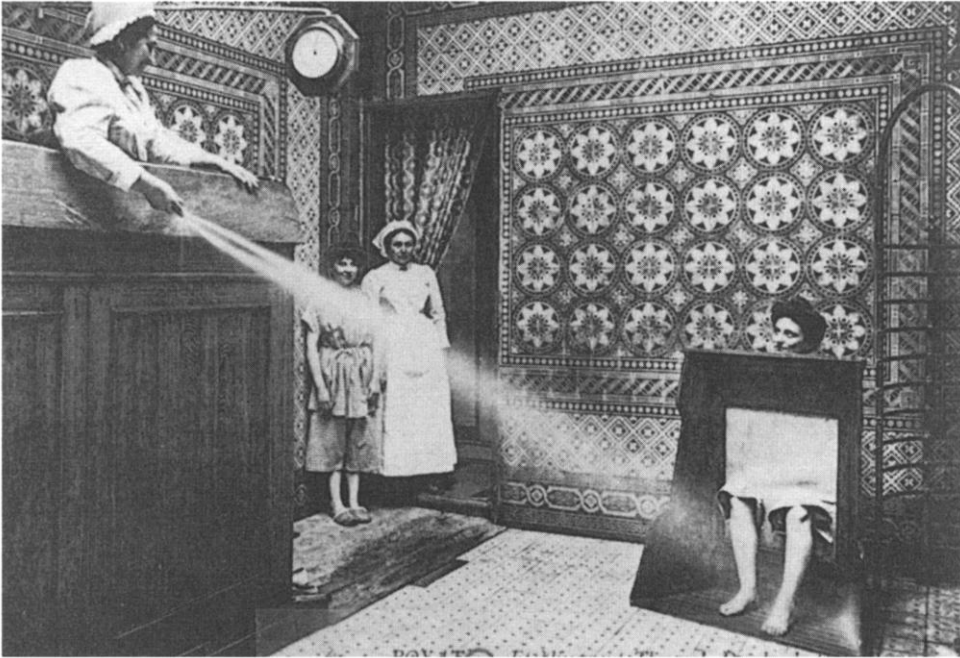
Individuals took water cures for a wide variety of ailments: arthritic, digestive, respiratory, dermatological, circulatory, and nervous. While surgery was revolutionized by anesthesia and antisepsis in the latter half of the nineteenth century, internal medicine was less dramatically transformed. Water cures undoubtedly provided as much if not more symptomatic relief for many of these ailments as other remedies then available. While drinking and bathing were the primary modes of delivering this medication, numerous other modalities were developed: showers directed at specific body parts or orifices, mud baths, wrapping in wet sheets, inhalation of vapors or waters that were mechanically “pulverized,” and subcutaneous injection. (See Figures 1–4.) As time went on “auxiliary” modalities like massage were also introduced. Taking the waters was of course not just about having unpleasant things done to the body. The more fashionable spas like Vichy

<sup>10</sup> On numbers of visitors see Jamot, *Thermalisme et villes thermales* (cit. n. 1), pp. 20–21, 39–41. On the role of tourism see *ibid.*, p. 35; and Mackaman, *Leisure Settings*, p. 4. Jamot distinguishes between the larger spas, which had a more touristic orientation, and the smaller ones, which had a largely medical character (p. 33). Even in the large spas, however, therapy was important; in those where drinking was the main modality at least half the guests took the cure.

<sup>11</sup> On medical supervision see L. W. B. Brockliss, “The Development of the Spa in Seventeenth-Century France,” in *Medical History of Waters and Spas*, ed. Porter (cit. n. 2), pp. 23–47, esp. pp. 26–27, 34–39. Weisz, *Medical Mandarins* (cit. n. 7), p. 143, discusses the hydrologists’ views on lack of regulation. On British spas during this period see Phyllis Hemby, *The English Spa, 1560–1815: A Social History* (London: Athlone, 1990).



**Figure 1.** The cage shower. From Institut Français d'Architecture, *Villes d'eaux en France* (Paris: Hazen, 1985).



**Figure 2.** Foot shower in Royat. From *Institut Français d'Architecture, Villes d'eaux en France* (Paris: Hazen, 1985).

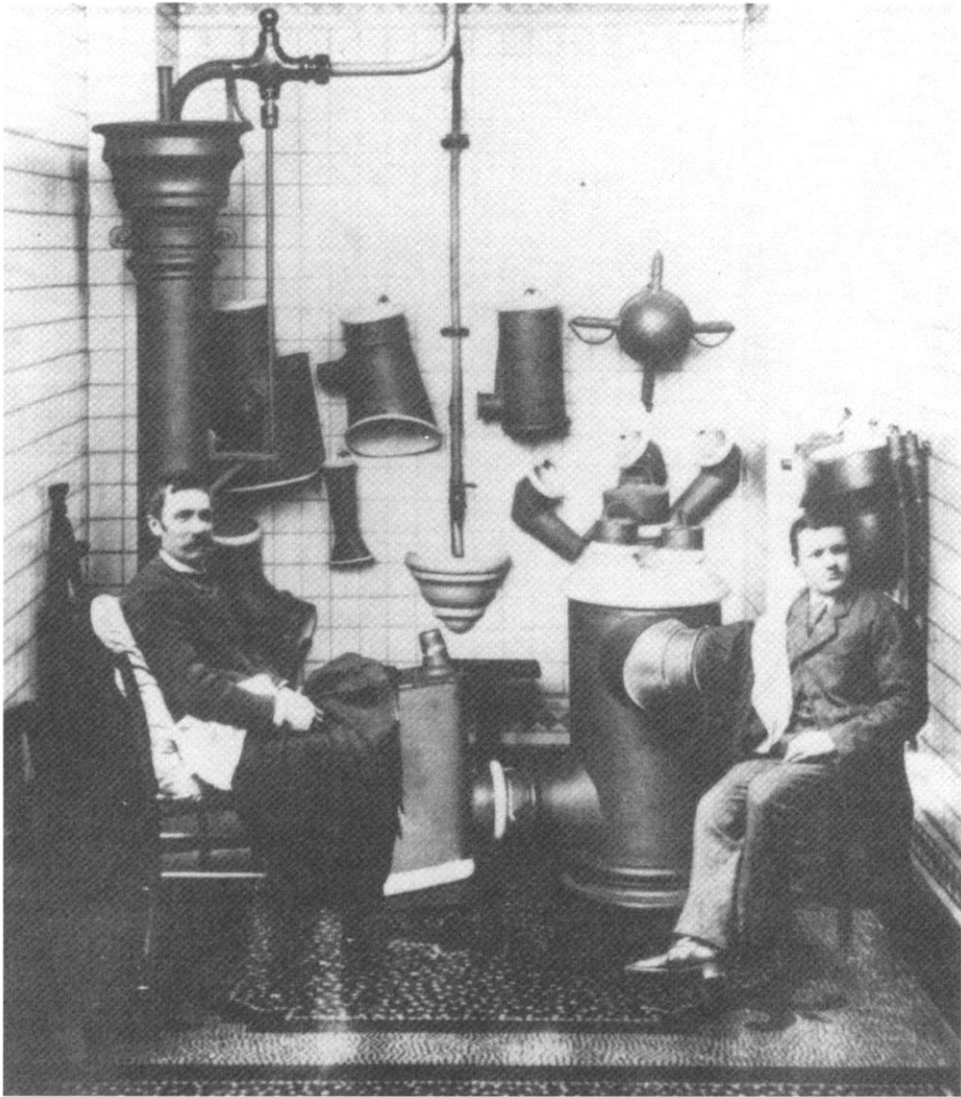
and Aix-les-Bains also provided expensive hotels, restaurants, casinos, theaters, parks, and other forms of leisure and diversion, including the possibility of rubbing shoulders with or at least getting close to the wealthy and influential and, sometimes, royalty.<sup>12</sup> (See Frontispiece.) But therapy remained the declared purpose of the thermal enterprise.

This therapy could be conceptualized in a variety of ways, but essentially it boiled down to a choice of two perspectives. Waters could be seen as transforming the chemical composition of the internal fluids or organs, or they could be thought of as a stimulus to the body's natural tendency to heal itself. Everyone recognized that rest and relaxation in a bucolic setting promoted both these reactions. But what is most striking is how little conceptualization of this sort one finds in hydrological writings. The ultimate justification of the water cure was that it was observed empirically to work. Explaining the mechanisms of this action, we shall see, was the concern of scientists, rarely of patients or even most doctors.

Starting late in the nineteenth century, and accelerating with great rapidity after World War I, French thermalism created for itself a very elaborate system of regional and national institutions closely coordinated with the tourism industry. In 1894 the medical academic Albert Robin organized French spa physicians into a professional trade union group, the *Syndicat des Médecins des Stations Balnéaire et Climatique*. After the turn of the century, stimulated by patriotic rivalry with German spas, French thermalism developed a variety of other institutions designed to promote its development and profitability. The Union des

<sup>12</sup> The wife of Napoleon III, the Empress Eugénie, famously attended several different spas; see A. Wallon, *La vie quotidienne dans les villes d'eaux (1850–1914)* (Paris: Hachette, 1981), pp. 47–49.





**Figure 3.** Vapor therapy for the limbs in Aix-les-Bains. From *Institut Français d'Architecture, Villes d'eaux en France* (Paris: Hazen, 1985).

Établissements Thermaux and the *Chambre Syndicale des Eaux Minérales* shared offices in Paris where they represented the commercial side of the industry—rather unsuccessfully, according to one observer. The *Congrès des Villes d'Eaux* was established in 1905 and brought all components of the industry together at irregular intervals.<sup>13</sup> In that same year the Ministry of Interior created a permanent commission to deal with issues relevant

<sup>13</sup> The congress met in 1909, 1911, and 1920. See “Assemblée générale de l’Union des Fédérations de Syndicats d’Initiatives, 1923,” *Presse Therm. Clim.*, 1923, 64:593–595, on p. 594. For an observer’s critical view of thermalist institutions see Victor Gardette, “Projet de création d’un office central des villes d’eaux et stations climatiques,” *Annales de la Société d’Hydrologie Médicale de Paris*, 1910, pp. 210–216, on p. 211.



**Figure 4.** Vapor therapy for the respiratory system at Saint-Amand-les-Eaux. From *Institut Français d'Architecture, Villes d'eaux en France* (Paris: Hazen, 1985).

to spas. The industry began to organize itself regionally, bringing together for the first time all the various groups and institutions involved locally in its activities. The first regional agency to be established, in 1909, was the *Fédération Thermale d'Auvergne*; in 1913 similar federations were organized in the Centre and Pyrénées regions.

After the war this process accelerated. In 1923 a more broadly based institution, the *Fédération Nationale Thermale et Climatique Française*, was created to bring together and represent the many different economic, political, and medical interests associated with the industry. Meanwhile, thermalism was finding its place within a rapidly developing tourism industry that was also in the process of reorganizing and asserting its vital economic importance. A *Conseil Supérieur de Tourisme* set up at the Ministry of Public Works included a thermalism section. The *Touring-Club de France*, a major tourism pressure group, also had a special committee to deal with thermal and climatic stations. The *Office National du Tourisme*, set up by the Ministry of Public Works to centralize advertising in this growing sector, also bridged the worlds of tourism and thermalism: one-third of its administrative council represented the spa sector. Even this degree of coordination was deemed insufficient, and in 1926 a more formal union between the tourist and thermalism industries was inaugurated through the *Confédération Nationale du Tourisme, du Thermalisme et du Climatisme Français*.<sup>14</sup>

I will not go into the details of this exceedingly elaborate institutional apparatus and the problems and conflicts that it tried to resolve and in some cases provoked, but three points need to be emphasized.

<sup>14</sup> Jean Sellier, "Le thermalisme et le climatisme en France," *Presse Therm. Clim.*, 1923, 64:557–559 (federation); M. Fanechon, "Thermalisme et tourisme," *ibid.*, 1922, 63:45–46; and "Confédération Nationale du Tourisme, du Thermalisme et du Climatisme Français," *ibid.*, 1926, 67:437, 1927, 68:215–217.

First, economic nationalism, and especially the perceived need to compete economically against Germany, was a major rhetorical resource for the thermalism and tourism industries and explains much of the support they received from French politicians. This support was considerable: by 1928 a *Groupe du Tourisme et des Stations Thermales* in the National Assembly claimed 240 legislators as members.<sup>15</sup> It served in fact as the political arm of the thermalism-tourism lobby.

Second, closely allied with tourism though they were, and in spite of the fact that many if not most spa-goers of the period were clearly on vacation, spokesmen for the thermalism industry always insisted on its essentially medical character and orientation. The goal was not merely to attract visitors to France's thermal stations but to attract patients making use of a powerful therapeutic resource. That thermalism was to a considerable degree also a form of tourism and leisure was acknowledged; but an exclusive emphasis on tourism was thought to be an unstable basis for the continued development of the industry. The rise in foreign, nonmedical tourism in spas during the 1920s was greeted with alarm and skepticism in many quarters; both of these responses appeared to be vindicated by the sudden and dramatic decline of such tourism during the Depression years.<sup>16</sup>

Finally, the organized spa industry pursued many goals: establishing or upgrading therapeutic facilities, hotels, urban infrastructures, and even casinos in spa towns; creating and disseminating advertising that would counteract foreign advertising and attract foreign curists; lobbying the government for resources and advantages. But the heart of the industry's efforts had to do with introducing hydrology as a full-fledged discipline into the curriculum of the medical schools. The rationale for developing hydrological education was expressed many times and in a variety of ways during the twentieth century and usually proceeded as follows.

For medicalized thermalism to prosper in France, its virtues needed to be known internationally. However, the target audience for this information could not be the general public but, rather, doctors who would send patients to spas. The creation of chairs of hydrology in medical faculties would act directly to shape the views of new generations of French doctors. More generally, the staff around those chairs would demonstrate "the value of the inestimable richness of our country in the hydromineral and climatological domain" by creating a body of scientific literature that would be convincing to foreign doctors—who would then send patients to French spas.<sup>17</sup> This body of data, it went without saying, could not be mere propaganda but had to be scientifically impeccable.

The effort to teach hydrology in medical schools was not new. Throughout the nineteenth and early twentieth centuries thermalism had been actively supported by a number of powerful faculty professors who included it in their courses. There was a tradition of such interest going back to Armand Trousseau and other figures of nineteenth-century internal medicine such as Adolphe Gubler, like Trousseau a professor at the Paris Faculty of Medicine. The most powerful exponent of thermalism in the early twentieth century was certainly Louis Landouzy, professor of therapeutics and, at the time, dean of the Paris Faculty of Medicine. Landouzy was one of the organizers from 1899 of the VEM (*Voyages d'Études Médicales*) that took students and doctors on annual pedagogical tours of thermal

<sup>15</sup> "Fédération thermale et climatique française," *Presse Therm. Clim.*, 1928, 69:814–815.

<sup>16</sup> Victor Gardette, "A propos de la publicité de nos stations thermales et climatiques," *Presse Therm. Clim.*, 1934, 75:773–774; and Dr. Matton's comments in "Fédération Médicale, Thermale et Climatologique Pyrénéenne," *ibid.*, 1931, 72:808.

<sup>17</sup> Archives Nationales, AJ 16 6269, Conseil de la Faculté de Médecine, 26 Jan. 1911, p. 40. (Here and elsewhere, translations into English are mine unless otherwise indicated.)

stations. Another major figure was Albert Robin, the leading hydrologist in the Academy of Medicine and the founder of the Syndicat des Médecins de Stations Balnéaire et Climatique, of which he remained president until 1922. In 1905 Robin was named to a chair of clinical medicine at the Faculty of Medicine, from which he continued to play a leading role in French hydrology. If such figures were rather exceptional, they were not alone within the Parisian medical elite.<sup>18</sup> Among the prominent supporters of hydrology were the Paris hospital physician Henri Huchard and professors like Georges Hayem and Augustin Gilbert, who had preceded Landouzy in the chair of therapeutics.

Although lectures were already being devoted to thermalism in courses on therapeutics, it was argued that the field needed to be more visibly represented in the curriculum if it was truly to advance. Since the 1870s, leading hydrologists had argued for the creation of chairs and courses devoted exclusively to hydrology; for many years Max Durand-Fardel taught an unofficial *cours libres* at the Paris faculty. The spa industry in the region of Toulouse was the first to recognize the desirability of more formal teaching. In 1891 local funds sponsored a chair that in 1903 was taken over by the state budget. The first incumbent was Félix Garrigou, whose tenure seems to have been rather stormy. In 1912 it was decided to create an Institute of Hydrology in Toulouse, directed by Garrigou and funded by local subventions. It was to bring together the many disciplines relevant to hydrology—geology, chemistry, and physics as well as clinical subjects. But the institute does not seem to have been set up, and even the chair disappeared after Garrigou's death. In 1912, as well, a semi-official course of studies was set up at the faculty of Bordeaux under the future professor Jean Sellier.<sup>19</sup>

For an emerging medical discipline, the ultimate prize, the sign of true academic success, was Paris.<sup>20</sup> The leading medical hydrologist of the era, Albert Robin, believed that hydrology required a fully autonomous presence at the Paris Faculty of Medicine, and he enjoyed powerful support from the spa industry and its parliamentary supporters. In 1911, through the Ministries of Interior and Public Instruction, the Paris Faculty of Medicine was offered a chair of hydrology, to be supported financially for a period of ten years by the association representing French spas. As in so many other domains during these years, competition with Germany seemed to be forcing the issue. Robin argued that France had lost its natural advantage over Germany because the government of the latter had established a cure tax that provided spas with necessary resources, supported courses of hydrology in medical faculties, and established an Institute of Balneology in Frankfurt. With the spread of thermalism to nearly all medical schools, "the professors responsible for this teaching can be considered as veritable commercial travelers for German waters." As a result, Robin argued, all German medical graduates now knew about waters therapy, while foreign students were spreading the reputation of German spas abroad. German spas, Robin claimed, earned about 400 million francs annually, whereas French spas earned only about 120 million. The French were doing their best to compete, but results would be meager

<sup>18</sup> See Raymond Durand-Fardel's brief remarks upon Landouzy's death: "Société d'hydrologie médicale de Paris," *Gazette des Eaux*, 1919, 60:9–11, on p. 11.

<sup>19</sup> Félix Garrigou, "L'enseignement de l'hydrologie à Toulouse: La création d'un Institut d'hydrologie," *Gaz. Eaux*, 1911, 54:101–104; Thermos, "Création d'un institut d'hydrologie à Toulouse," *ibid.*, 1912, 55:397; and Maurice Chiray, "Leçon d'ouverture: Chaire d'hydrologie thérapeutique et de climatologie," *Presse Médicale*, 1938, 46:250–251 (Paris).

<sup>20</sup> Although provincial universities were becoming increasingly important, particularly in the sciences, during this period, medical education remained to a large extent dominated by the Paris faculty, which dwarfed all the provincial medical schools. See George Weisz, *The Emergence of Modern Universities in France, 1863–1914* (Princeton, N.J.: Princeton Univ. Press, 1983), pp. 237–238.

without the creation of a faculty chair in the subject. In association with this chair, a new Institute of Hydrology would also be established to focus on research and on training future specialists. Robin assured his colleagues that funding for this institute was already guaranteed.<sup>21</sup>

Most of Robin's colleagues at the faculty supported the creation of an institute or laboratory—which had no claim on the core medical curriculum—but voted against accepting a full chair. Many reasons were expressed. Some felt that a ten-year guarantee of funding was insufficient and were not satisfied by an offer increasing it to twelve years. Others objected to accepting money from the association of spas, funds seen as both unreliable and undignified because they were in part the product of gambling revenue. But the real issue was that the faculty was going through a period of crisis provoked by the need to respond to the recent scientific revolution in medicine. At a time when organizing a manageable curriculum was a major and deeply problematic preoccupation, when key scientific disciplines like bacteriology were not yet represented by a chair or an institute, and when students and junior personnel were demonstrating violently against their professors, a chair of hydrology seemed frivolous and unjustified by the scientific stature of the discipline. At the very least, it would add one more to the forty-five or so chairs already battling for a piece of the core medical curriculum—and at a time when many new disciplines were also demanding faculty chairs. Even some of the most vocal supporters of thermalism felt this way. The internist Paul Carnot, a lifelong advocate of thermal therapeutics, argued that while an institute could usefully train a cadre of specialists in hydrology, there was simply no room to increase the role of hydrology in the core curriculum aimed at general practitioners and thus no justification for a chair in the subject.<sup>22</sup>

There were clearly some faculty professors who did not think much of water therapy and viewed establishing a chair in the field as a capitulation to commercial interests. But no one questioned the need to teach the subject in some form. It was in fact pointed out that the topic was already scattered throughout various different courses. One of the faculty votes suggested that the hydrology that was already being taught in the chairs of therapeutics, chemistry, and pharmacology might be consolidated not by a professorial chair but, rather, in a course given by a junior faculty member, a *chargé de cours*, who would also be responsible for operating a laboratory.<sup>23</sup> This compromise was indicative of elite medical attitudes toward thermalism and hydrological science: academic physicians were reasonably well disposed but clearly regarded the field as far from the scientific center of medicine.

Despite the faculty's willingness to accept an institute, Robin—in the academic equivalent of picking up his marbles and going home—chose instead to locate his institute at the Ecole des Hautes Etudes and associated it with the College de France. In 1913 the Institut d'Hydrologie opened its doors, with six laboratories under the direction of eminent

<sup>21</sup> Albert Robin, in "Commission permanente des stations hydrominérales et climatiques," *Gaz. Eaux*, 1914, 57:540 ("commercial travelers"); and Robin to Conseil de la Faculté de Médecine, Archives Nationales, AJ 16 6269, 26 Jan. 1911, pp. 40–43.

<sup>22</sup> Arguments against accepting a chair appear in Archives Nationales, AJ 16 6269, 26 Jan. 1911, pp. 46–51, 16 Feb. 1911, pp. 52–58, 30 Mar. 1911; and AJ 6270, 7 Dec. 1911, pp. 10–17, 11 Jan. 1912, pp. 23–25. For Carnot's view see Paul Carnot, "La création d'un institut d'hydrologie à la Faculté de Paris," *Paris Médical*, 1911, 33(2):257. While this debate was going on the faculty received a proposal from the Ministry of Labor for a new chair of industrial hygiene; this too received little support from professors: Archives Nationales, AJ 16 6269, 30 Mar. 1911, pp. 67–69. On the crises of the period more generally see Weisz, *Emergence of Modern Universities* (cit. n. 20), pp. 356–368.

<sup>23</sup> Archives Nationales, AJ 16 6270, 7 Dec. 1911, p. 14.

scientific figures like the physicist Arsène d'Arsonval, the physical chemist C. Moureu, and the analytical chemist Georges Urbain. Nonetheless, there was little money for the institute before the war, certainly not enough to begin Robin's ambitious plan for a comprehensive reanalysis of France's mineral waters using the very latest techniques. (Moureu was known for studies of radioactivity in waters, Urbain for his spectrochemical analyses.) Consequently, the institute in its first years concentrated on teaching. In 1914 it began its first program of courses, with eighteen students registered. Aside from justifying the autonomy of hydrology against those who saw it simply as a branch of clinical medicine or, like the Germans (it was claimed), as a subfield of physiotherapy, the institute provided the "scientific consecration" to the field that Robin saw as vital to the production of that high-level "scientific publicity which, in our epoch, can be considered as absolutely necessary to the development of all our [thermal] stations." Only through such publicity would foreigners learn that "our country possesses the waters that are the most efficacious and the most varied in their action."<sup>24</sup>

Reacting to the founding of the institutes in Paris and Toulouse, local authorities in Clermont-Ferrand in 1913 announced plans to fund the creation of an Institut Hydrologique to serve the Auvergne region. The rationale was that foreigners addressing themselves for information to the institute "of a far-away city, [only] vaguely interested in the success of our dear region," would not receive information about the benefits of Auvergne waters. "The absence of any place where scientific information can be obtained distances numerous foreign doctors from our region, and this creates a more active movement toward the regions that have had the good idea of creating these centers of education and popularization." A year later, in spite of the distaste of many professors for taking spa industry funds, the Paris faculty accepted an annual subvention of 4,000 francs from a group of thermal towns to put on a yearly program of eighteen to twenty lectures on practical hydrology.<sup>25</sup>

After World War I the institutional structure of French thermalism expanded even more quickly and dramatically. The postwar course of French thermalism was set by a law passed in 1919.<sup>26</sup> It created a juridical framework that allowed towns or communes to assume special status as either thermal, climatic, or tourist stations. These stations were given certain financial powers, the most significant of which was the right to collect from visitors a special *taxe de séjour* that could be used for capital development. They could also borrow funds for this purpose. Furthermore, an added tax was introduced in the stations, and 25 percent of it was earmarked for the scientific activities of the Institut d'Hydrologie—which until then had been largely moribund owing to lack of funds.

In the years that followed, new councils, commissions, chambers, and federations proliferated and pursued a wide range of objectives. But the teaching of hydrology continued to be the most fundamental aim. The finance law of 1920 set aside 200,000 francs annually from the proceeds of a gambling tax for the purpose. The Paris Faculty of Medicine once

<sup>24</sup> Albert Robin, "L'Institut d'Hydrologie et de Climatologie," *Gaz. Eaux*, 1913, 56:714–716, on p. 715. On the institute's first program of courses see "Institut d'Hydrologie," *ibid.*, 1914, 57:73–74, 131–132. Robin claimed that in Germany hydrology was a subfield of physiotherapy: Robin, "Leçon inaugural du cours d'hydrologie et de climatologie," *ibid.*, pp. 95–100, on p. 99.

<sup>25</sup> "Fédération Thermale d'Auvergne," *Gaz. Eaux*, 1913, 56:889–890; Dr. Levadoux, "La création d'un institut hydrologique à Clermont-Ferrand," *ibid.*, pp. 1173–1174 ("far-away city"); comment by Dr. Mazeran, *ibid.*, p. 1174 ("centers of education and popularization"); and "L'enseignement de l'hydrologie à la Faculté de Médecine," *ibid.*, 1914, 57:235 (lectures on practical hydrology).

<sup>26</sup> "La loi portant création de stations hydrominérales, climatiques et touristiques . . .," *Gaz. Eaux*, 1919, 60:214–220.

again refused to create a chair in this subject, despite Robin's patriotic appeal on behalf of France's spas. As in the past, the refusal was motivated not by opposition to hydrology itself but, rather, by unhappiness over the establishment by private donors of more and more chairs in the already overcrowded faculty. But in 1922 new chairs of hydrology were established in Bordeaux and Toulouse, and a chair of hygiene at the medical faculty of Algiers was transformed to include hydrology and climatology. A year later the medical faculty at Lyon created an Institute of Hydrology and Climatology attached to the chair of therapeutics.<sup>27</sup> Pressure on more recalcitrant faculties intensified when in 1927 the annual finance laws granted another 250,000 francs in new credits for chairs of hydrology and a leading parliamentarian called on the various industry groups to "unite in order to exert the necessary pressure." The Minister of Public Instruction immediately formed a special committee to plan the creation of chairs in hydrology. In 1928 chairs were established and professors named at the three major faculties in Paris, Lyon, and Montpellier. Soon thereafter chairs were also created in Lille and Nancy.<sup>28</sup> Only Strasbourg continued to refuse to accept a chair, on the grounds of financial crisis and its urgent requirement for funds directed at more pressing needs. But in the face of overwhelming pressure, its professors too finally capitulated and voted to accept a chair in hydrology.<sup>29</sup> With all the chairs filled, the industry immediately began campaigning for a special *agrégation* in hydrology that would allow aspiring members of the medical elite to specialize in the subject early in their careers.

#### CREATING HYDROLOGICAL SCIENCE

By the 1930s every faculty in France and several secondary schools of medicine had professorial chairs as well as junior personnel in hydrology. It was unquestionably the fastest-growing medical field in the universities of that period. In striking contrast, Germany, long held up as a model of enlightened academic activity in hydrological science, had in the early 1930s only a single extraordinary professor, in Giessen, though courses in the subject were offered in a half-dozen medical faculties. Professors of hydrology in Paris and Lyon set up *centres de triage* within the hospital system to pick out and follow up patients to be sent to spas, giving the field further cachet. The new corps of French professors directly influenced students and doctors by teaching courses in hydrology and leading tours of spas. They "placed at the service of [scientific] propaganda, in France and

<sup>27</sup> On the funds from the gambling tax see "L'organisation de l'enseignement de l'hydrologie devant le Parlement," *Presse Therm. Clim.*, 1920, 61:456. For the Paris faculty's refusal see Archives Nationales, AJ 16 6276, Conseil de la Faculté de Médecine, 3 Feb. 1921, pp. 4–5 (each meeting is separately paginated); and "Encore la chaire de hydrologie," *Presse Therm. Clim.*, 1921, 62:106–107. The chairs at Bordeaux and Toulouse are noted *ibid.*, 1922, 63:183; on the institute at Lyon see Marius Piéry and M. Milhaud, "L'enseignement de l'hydrologie et de la climatologie à la Faculté de médecine de Lyon," *ibid.*, 1925, 66:146–149.

<sup>28</sup> "Fédération Thermale et Climatique Française: Conseil d'administration, 14 fev. 1927," *Presse Therm. Clim.*, 1927, 68:150–151 ("unite to exert pressure"); undated typewritten *procès-verbaux*, Archives Nationales, AJ 16 6707 (committee to plan creation of chairs); and "Fédération Thermale et Climatique Française: Rapport de Victor Gardette, secrétaire générale," *Presse Therm. Clim.*, 1928, 69:259–261, on p. 260 (Paris, Lyon, Montpellier). The Chamber of Deputies voted to raise the subsidy for chairs of hydrology from 450,000 to 650,000 francs in order to create the chairs in Lille and Nancy. The increase was based on revenues from gambling. See "Les chaires d'hydrologie et de climatologie devant la Chambre," *ibid.*, 1929, 70:28–29.

<sup>29</sup> For Strasbourg's refusal see Archives Nationales, AJ 16 6706, ministerial commission meeting, 31 May 1927, 22 June 1928. For the eventual acquiescence see Archives Nationales, AJ 16 6707, ministerial commission meeting, 12 Dec. 1929; and Victor Gardette, "A propos de l'enseignement d'hydrologie dans les facultés," *Presse Therm. Clim.*, 1929, 70:793. Money for the chair became available only in 1931. "A la Chambre des Députés," *ibid.*, 1931, 72:847–849, on p. 848.

abroad, the weight of their authority in matters clinical, or biological, or physiological, and the prestige of their university or hospital credentials [*titres*]." But perhaps the most significant consequence of these new institutional developments was to allow research and publication in hydrology to serve as a career path to the medical elite. The number of books and articles, which appeared regularly both in specialty journals and in more general medical and scientific periodicals, was very substantial. The total number of French publications in hydrology and climatology cited in the bibliographical sections of the journal *La Presse Thermale et Climatologique* rose by 151 percent between 1911 and 1936. Simultaneously, the status of hydrology within French medicine rose considerably. Whereas in 1900 only a single member of the Société d'Hydrologie de Paris had been a member of the Academy of Medicine, fifty years later six members of that society were academicians.<sup>30</sup>

Like virtually all hydrologists during the previous century, the professors of hydrology began with the premise that waters constituted an effective and powerful therapeutic modality. The goal of their science was to advance and develop this modality. As one of them put it, the new knowledge that had recently been developed "permits us to lift in part the veil of mystery that surrounded mineral waters and climates and entitles us to have in their beneficial virtues not just confidence, but a confidence that is legitimate and reasoned." It was freely admitted that developing hydrology and spas more generally would also have important economic benefits for the nation. Consequently, another mission of French hydrology was to promote French waters against foreign competition "by proving, in a rational and scientific manner, the sovereign efficacy of French waters."<sup>31</sup>

It would be naive to think that these goals and assumptions did not shape the development of hydrological science. It is true that doctors and medical scientists, individually and in groups, frequently are invested in a given therapy; but it is rare for an entire community of researchers to share such a view. On the other hand, it must be emphasized, this belief in the efficacy of hydrology held at a very general level and did not imply that specific waters were necessarily useful in any specific case. And since the therapeutic usefulness of waters in general was never and could never be the subject of manageable research, there was no necessary contradiction between belief in the overall potency of waters and claims to rigorous scientific objectivity in evaluating the effect of a specific water for a specific illness. Furthermore, hydrologists actually welcomed demonstrations that discredited the use of a particular water for a particular condition because these, it was thought, would promote a more finely specialized utilization of waters.

Throughout the nineteenth and twentieth centuries, the basis of French hydrological science and thermal practice has been "specialization," the notion that each water caters to a relatively narrow range of complaints: Vichy was devoted primarily to digestive problems, Royat to cardiovascular maladies, Mont-Dore to asthma, La Bourbole to skin conditions, and so on. This specificity was thought to be the defining characteristic of French waters, the one that distinguished them from the hated German rival waters that, it was claimed, were applied indiscriminately to many different conditions. (French writers

<sup>30</sup> "Société d'Hydrologie et de Climatologie Médicale: Allocution du Président Pasquier," *Presse Therm. Clim.*, 1951, 88:30–32, on p. 31. On the situation in Germany see Johannes Müller, *Statistische Untersuchungen über Vorlesungen und Dozenten der medizinischen Fakultäten der deutschen Universitäten in den Jahren 1927 bis 1931–32* (Berlin: Struppe & Winckler, 1933), p. 76.

<sup>31</sup> Louis Merklen, "L'orientation actuelle de l'hydrologie et de climatologie," *Presse Therm. Clim.*, 1938, 79:333–338, on p. 334; and J. Schneider, "De la nécessité de créer des laboratoires dans les stations hydrominérales," *ibid.*, 1921, 62:28–29.



seemed unaware that certain German waters were associated with specific maladies—Bad Nauheim for heart and circulatory problems, for instance.) This specialization served various functions. It was first of all a visible sign of the wealth of French hydrological resources, particularly as compared to the “monotony and banality of the composition” of German waters. This wealth and richness also justified the refusal to see physiotherapy as anything but an adjunct to water therapy, in contrast to the poverty-stricken waters across the Rhine that had—or so it was charged—been absorbed and reduced by physiotherapy. Specialization made rigorous clinical observation possible because it grouped together and made accessible to the clinician large numbers of patients suffering from the same maladies. It also transformed doctors into experts in certain diseases. Above all, the specialization of waters conformed to contemporary norms of scientific belief. While there were undoubtedly many doctors who still believed in panacea medications, these were firmly rejected by an academic elite whose members considered themselves to be committed to science. Raymond Durand-Fardel complained in 1911 that too many doctors were reporting positive results from intracellular injections of mineral waters for virtually every malady: “It is perhaps the very excess of these successes that awakens our mistrust to some degree.”<sup>32</sup> Specialization reduced therapeutic claims to more restricted and scientifically acceptable dimensions.

Specialization was not narrowly understood, and it was accepted that in addition to its primary function a spa might have one or more secondary vocations.<sup>33</sup> Further, it was an ongoing process, both because greater precision in pinpointing a particular water’s benefits was always possible and because of the tendency of proprietors in many spas—despite the prevailing orthodoxy—to seek to attract the widest possible range of clients to their establishments.

Specialization was implemented scientifically on the basis of empirical clinical experience. Spa physicians reported regularly on their medical experiences, often mindlessly touting their waters. Leading hydrologists and others frequently warned that such practices bred skepticism and advised spa physicians to report rigorously and objectively on indications and contraindications of water cures.<sup>34</sup> (This was actually quite complicated, since there were many distinct modalities for administering each water and different springs within the same spa might differ chemically.) They argued that showing that a water should not be utilized for a particular condition or type of patient was not an admission of its inefficacy but, rather, a way of refining therapeutic specialization and advancing scientific hydrology. Local reports submitted to the Academy of Medicine or to one of a growing number of medical journals might or might not quantify therapeutic results (usually they did not), but in either case the reasoning was based on observation, experience, and common sense. Although easily accessible physiological measures might be taken and could be used speculatively to “explain” the mechanisms of cure, these were clearly secondary to clinical observations using notions of “cure” or “improvement” that were rarely objectified. The national hydrologists or experts in therapeutics who attempted to synthesize hydrological knowledge then made wider judgments based on the local literature and

<sup>32</sup> Raymond Durand-Fardel, “Les travaux de la Société d’Hydrologie en 1910: Rapport annuel,” *Ann. Soc. Hydrol. Med. Paris*, 1911, pp. 9–24, on pp. 12–14, 19 (quotation). On the centrality of specificity for the Société d’Hydrologie de Paris see Ch.-E. Macé de Lépinay, “Cents ans d’hydrologie (1853–1953),” *Presse Therm. Clim.*, 1953, 90:21–25; the inferior German waters are criticized on p. 23.

<sup>33</sup> Macé de Lépinay, “Cent ans d’hydrologie,” p. 23.

<sup>34</sup> See, e.g., J. Noir, “Un effort nécessaire pour l’organisation des stations thermales et climatiques françaises,” *Presse Therm. Clim.*, 1922, 63:34–36, on p. 35.

utilizing similar modes of reasoning. For much of the nineteenth century this process had been formalized in the annual reports of the mineral waters commission of the Academy of Medicine, which were based on materials that it had received during the year. In the twentieth century the process became less formal.

I will cite just one example. In 1912 the journal *Paris Médical* devoted a special issue to waters. Various “experts,” usually *agrégés* of the Paris faculty, pronounced on the “indications” for water cures in various sorts of ailments. In one, the cardiologist and future professor Henri Vaquez, in collaboration with P. Ribière, discussed water cures for circulatory and blood problems.<sup>35</sup> They presented virtually no data but only practical therapeutic advice. Vaquez and Ribière began by noting that applying the same cure to the entire category of maladies discussed could only engender skepticism. They thus made several key distinctions. For cardiopathies following infections (notably rheumatic), immediate therapy was bathing in one of several waters like Bourbon-Lancy or Bagnols de Lozères. Once a lesion became established, the waters of Royat (or, outside France, Nauheim or Spa) were most effective to counter cardiac insufficiency. If there were liver complications (usually due to alcoholism), the waters of Brides or Salins-Moutiers might be indicated.

According to the authors, there were three other categories of maladies in this domain. The first were the results of arteriosclerosis. In the earliest phase of hypertension, there were two therapeutic possibilities: the diuretic cures of Contrexville, Vittel, or Evian; or a bathing cure in the carbonated waters of Royat, Nauheim, or Spa. The former lowered blood pressure through the elimination of liquids (and were potentially dangerous); the latter acted through vasodilation. Once a circulatory insufficiency appeared, the diuretic cure was indicated for those evolving toward renal insufficiency, while the bathing cure was indicated for other cases. Water cures were ordinarily contraindicated for arterial localizations of syphilis. The second category of venous diseases, including ailments like phlebitis and varicose veins, was simpler to treat: they prescribed either a mixture of balneotherapy and massage at Bagnole-de-l’Orne or the mudbaths of Barbotan or Saint-Amand. The third category, “blood disorders,” did not ordinarily respond to waters, with the exception of anemic states: here the therapy depended on the cause of the anemia, and I shall not go into all the variations and permutations involved in this very lengthy discussion. The fundamental reasoning is clear enough.

In addition to efforts constantly to refine the specialized indications and contraindications for each water, clinical hydrology was preoccupied with the development and evaluation of new modes of water therapy; at different times, inhalation of “pulverized” waters or vapors emanating from waters, subcutaneous injection, and vaginal irrigation—among many other techniques—were discussed at meetings and in the hydrological literature. Like knowledge of specialization, this was a form of practical therapeutic knowledge that was predominantly the result of clinical practice and observation.<sup>36</sup>

There was some question about whether the results of such clinical observation should be categorized as empirical or “scientific”; but some aspects of hydrology were widely recognized to be scientific because they relied on laboratory expertise. The problem was that their relevance to therapeutics was not always clear. For much of the nineteenth

<sup>35</sup> Henri Vaquez and P. Ribière, “Indications des eaux minérales dans les maladies de l’appareil circulatoire et du sang,” *Paris Méd.*, 1912, 6:448–462.

<sup>36</sup> Raymond Durand-Fardel, “L’assistance sociale en rapport avec les stations hydrominérales et climatiques,” *Presse Therm. Clim.*, 1931, 72:121–125, on p. 121.

century, chemistry served as hydrology's main link to experimental science. The process by which the Academy of Medicine authorized the exploitation of waters involved chemical analysis in order to judge whether they were chemically complex enough to have possible therapeutic virtues. As time went on, methods of chemical analysis became increasingly sophisticated and capable of identifying trace elements in waters. It was difficult to know what to do with such chemical knowledge, however. Certainly it was useful to know what was in waters, if only to dispel ignorance. The view that chemical composition was totally irrelevant to the therapeutic efficacy of waters (since all waters had pretty much the same effects) gradually declined in the nineteenth century. By midcentury chemical composition was the chief means of classifying waters and promoting their specialized use. But though chemical composition remained a crucial classificatory tool, even the hydrologists most sympathetic to chemistry eventually came to admit that chemical composition could not account adequately for the action of waters, since chemically similar waters frequently had different therapeutic effects while chemically different waters sometimes behaved similarly.<sup>37</sup> Even if one admitted that specific mineral properties that could be analyzed chemically gave waters their therapeutic powers, chemical analysis still brought little understanding of therapeutic effects beyond provoking speculation about how certain waters might conceivably work physiologically.

By the early twentieth century, hydrologists were no longer dependent on simple chemistry. A variety of new procedures based on physics and physical chemistry had revealed the extraordinary complexity of many waters. At various sorts of ceremonial occasions, hydrologists could point to an impressive list of findings that might potentially account for the healing power of waters. The discovery that many waters contained radioactive elements was particularly suggestive, as was identification of rare gases like argon, neon, krypton, helium, and xenon. Spectroscopic analyses by well-known scientists like Armand Gautier and Georges Urbain found infinitesimal amounts of various rare and heavy metals. The electric charge of ions in water, pH balance, catalytic properties of colloids, new understanding of osmotic action to explain the penetration of waters—all suggested possible mechanisms of water cure. As one hydrologist put it: "we are far from the simple mixture of salts that seemed to constitute mineral water only several years ago."<sup>38</sup>

Despite regular warnings against using such discoveries as the basis for speculative and premature efforts at explaining therapeutic mechanisms, discussions of all the new elements discovered in waters during the past half-century were repeated with ritual regularity on public occasions. Even if these discoveries did not provide definitive explanations for the action of waters, they served other purposes. First, citing well-known and even famous scientists like Pierre Curie, Svante Arrhenius, Armand Gautier, and others who had done work in these areas served to situate hydrology and spa medicine within mainstream or even leading-edge contemporary science. Second, the fact that there were so many possible mechanisms of therapeutic power, even if these were poorly understood, made it seem likely that waters really were therapeutically effective and that definitive explanations for this effectiveness would eventually be found. Finally, the metaphorical power of some of these physical elements lent to waters the aura of primal forces. Added to the considerable metaphorical power of water itself was the almost miraculous transformative force of

<sup>37</sup> For this reason, hydrologists eagerly seized on the discovery of electrical charges and, later, radioactivity in some mineral waters to explain therapeutic effects.

<sup>38</sup> Robin, "Leçon inaugurale du cours d'hydrologie" (cit. n. 24), p. 98. On the identification of radioactive elements and rare gases see "La leçon inaugurale du Professeur Lepape," *Presse Therm. Clim.*, 1932, 73:75.

radioactivity. Rare gases were characterized as “witnesses to the *la nébuleuse primitive*.” Likewise, the geological theories of Armand Gautier to the effect that mineral waters originated in the deepest core of the earth from the condensation of vapor produced by heat identified waters with the forces of “subterranean fires.”<sup>39</sup>

Neither clinical observation leading to ever-finer specialization of waters nor the study of the physical forces and elements within waters evolved dramatically as a result of the spread of chairs of hydrology and the expansion of hydrological research in the 1920s and 1930s. New analytical procedures for analyzing secretions and measuring physiological processes were now available and were frequently used. But they often produced lists of physiological measurements rather than direct demonstrations of therapeutic efficacy.<sup>40</sup> Even then, the duration of these physiological effects was almost never determined. To some extent this reflected traditional difficulties. How did one measure quantitatively changes in highly individualized chronic conditions? Patients were frequently not well supervised or closely followed during their cures; even when they were, they disappeared from medical oversight once they returned to their homes. The triage centers were conceived as potential loci of rigorous clinical research because a largely captive hospital population could be examined and analyzed in various ways before, during, and after their cures. However, for reasons that are not entirely clear, little clinical research emerged from them in the years before and after World War II. One possible reason was suggested by Marius Piéry, professor at the faculty of Lyon. He noted that French professors of hydrology, unlike some of their counterparts in Italy and the Soviet Union, lacked facilities for direct clinical observation in the spas. They worked with secondhand reports and data and came up with generalizations. This was traditional and useful work, but not very exciting or original; Piéry went on to add that professors could do much more innovative work in laboratories by studying the physiological action of waters directly.<sup>41</sup>

There are two other possible reasons for the absence of clinical testing. The first is that while laboratory experimentation had enormous cachet among academic clinicians in interwar France, even serving as a badge of scientificity for emerging domains, clinical testing had no such status. Almost everywhere, clinical judgment remained a matter of empiricism and common sense, even when large numbers of cases were quantified. There was thus little to be gained from investing time and effort in this realm. Second, the scientific rhetoric of hydrology, both in France and abroad, emphasized that the clinical effects of water cures were already clear—or at least as clear as they needed to be in a medical culture where developing new forms of clinical testing was not a major preoccupation.<sup>42</sup> Waters had proven their value through centuries of experience. The problem

<sup>39</sup> For warnings regarding premature explanations see Dr. Bardet, “Les questions nouvelles en hydrologie: Ionisation, radioactivité, gaz rares, éléments rares, collides,” *Paris Méd.*, 1914, 13:449–452; and Merklen, “Orientation actuelle de l’hydrologie” (cit. n. 31), p. 336. On the metaphorical power of water see Gaston Bachelard, *L’eau et les rêves: Essai sur l’imagination de la matière* (1942; Paris: Corti, 1976). For “*la nébuleuse primitive*” see Maurice Chiray, “Leçon d’ouverture: Chaire d’hydrologie thérapeutique et de climatologie,” *Presse Méd.*, 1938, 46:249–254, on p. 254; “subterranean fires” is in Robin, “Leçon inaugural du cours d’hydrologie,” p. 99.

<sup>40</sup> For good examples see Henri Paillard and René Fauvert, “Quelques modifications biologiques pendant la cure de diurèse de Vittel,” *Paris Méd.*, 1937, 102:343–349; and Prof. Rimmattei, “Deux stations d’eaux sulfurees calcaies de Provence,” *ibid.*, 1939, 111:313–317.

<sup>41</sup> Maurice Villaret, “Les grandes étapes de l’hydro-climatologie,” *Presse Therm. Clim.*, 1929, 69:182–193, on p. 191 (triage centers); and Marius Piéry, “Une chaire d’hydrologie et de climatologie au XXe siècle,” *ibid.*, pp. 101–111, on p. 111.

<sup>42</sup> I have found little evidence in France of the kind of efforts to develop new forms of clinical testing documented for the United States in Harry M. Marks, *The Progress of Experiment: Science and Therapeutic Reform*

of credibility rested, in the rhetoric of hydrologists, in the inability to explain the mechanisms of action. This made things both easier and harder for supporters of water therapy. They did not have to demonstrate clinical efficacy, because this was taken for granted. But they did have to come up with plausible explanations for that efficacy—and here the experimental physiological work mentioned by Piéry assumed its full significance.

The most significant result of the establishment of hydrological chairs was the rapid spread of experimental laboratory research that examined the effect of mineral waters on animals. Some attempt was made to do laboratory research on the humans undergoing cures, but even when it was possible to observe patients directly the new orientation focusing on metabolic changes would have been very intrusive and difficult to implement. It was one thing to request regular urine samples from curists, another to take blood at regular intervals.<sup>43</sup> Some efforts at animal experimentation in hydrology had been made in the nineteenth century, but these had not been notably successful because the pertinence of experiments on animals to human physiology more generally had yet to be established and because there was a generalized skepticism about medical reliance on laboratory data, which had been “the source of a number of therapeutic disappointments, medications marvelously supported by experimental proof, lamentably dead in their practical powerlessness.” In any case, few hydrologists had the skills necessary for serious laboratory work. In the late 1880s Albert Robin promoted a program of hydrological research based on notions of cell nutrition that yielded almost no practical results; by the second decade of the twentieth century he had abandoned all talk of it. But the large influx of new personnel and resources that resulted from the institutional expansion of the interwar years led to widespread experimental physiological research. In 1938 the majority of papers read before the Société d’Hydrologie Minérale de Paris, the major scientific association in the field, were based on physiological experimentation with animals (thirteen papers) or human physiological responses to waters (nine papers). Only nine papers were along traditional clinical lines, while four others focused on the newer field of climatology.<sup>44</sup>

Animal research was practiced under the auspices of all the chairs of hydrology in France, but its theoretician and most eminent practitioner was Maurice Villaret, first holder of the chair of hydrology at the Paris Faculty of Medicine. In 1935 he and his assistant (and eventual successor) L. Justin-Besançon published a particularly clear theoretical statement on “pharmacodynamic hydrology.”<sup>45</sup> Their method, borrowed from experimental pharmacology, worked by testing substances in rigorously measurable doses on isolated organs or on an entire experimental animal. Three years later, Villaret would move into one of the faculty’s prestigious chairs of clinical medicine, giving his pharmacodynamic method even greater status. As applied to hydrology, this method had several aims.

The most traditional—the authors could point to a half-dozen precursors who had followed this research path—was to objectify the biological effects of specific waters through various sorts of measurement, often using controls. Another was to compare the biological

*in the United States, 1900–1990* (Cambridge/New York: Cambridge Univ. Press, 1997). For an example of the attitude toward laboratory experimentation among French cancer specialists during this period see Patrice Pinell, *Naissance d’un fléau: Histoire de la lutte contre le cancer en France* (Paris: Métaillié, 1992), pp. 98–101.

<sup>43</sup> This point is made in Michel Polonovski, “Les bases scientifiques de la thérapeutique thermale,” *Annales de l’Institut d’Hydrologie*, 1949, 20:78–95, on p. 95.

<sup>44</sup> Durand-Fardel, “Travaux de la Société d’Hydrologie en 1910” (cit. n. 32), p. 20. On Robin’s research program see Weisz, *Medical Mandarins* (cit. n. 7), p. 150; for the data on papers see J.-J. Sérané, “Rapport annuel,” *Ann. Soc. Hydrol. Méd. Paris*, 1938–1939, pp. 149–158.

<sup>45</sup> Maurice Villaret and L. Justin-Besançon, “La pharmacodynamie hydrologique: Ses buts ses techniques ses résultats,” *Presse Méd.*, 1935, 43:17–20.

effects of different waters, thus advancing the specialization of spas. The physiological effects of waters could also be compared with those of drugs. A crucial task was to establish the mechanism or “physiological point of attack” of a water. The best example given came not from hydrology, but from Villaret’s earlier research showing that different substances giving relief from asthma acted in different ways. Certain phenolethyl compounds, for instance, acted not on isolated bronchial muscles but through the central nervous system. Adrenaline, in contrast, seemed to act through the sympathetic system, while papaverine acted directly on bronchial muscles. Such knowledge could establish synergies and antagonisms between waters and other therapeutic substances. Similar studies examined the effects of waters. Research showed, for instance, that when the sympathetic system was stimulated by ephedrine, which stopped movement in an isolated intestine and provoked a loss of tonus, the waters of Châtel-Guyon raised tonus and restored movement in exact proportion to the amount of water added to the solution.<sup>46</sup> Pharmacodynamics, finally, was to establish which were the active biological elements in medicinal waters. It would “harmonize” the results of chemistry and those of therapeutics by determining how waters with different chemical elements nevertheless had similar effects.

Pharmacodynamic experimentation could focus either on isolated organs or on the entire animal organism. The Paris hydrologists did some systemic studies—for instance, measuring the effect of sulfurous waters on arterial pressure and cardiac rhythm. But Villaret’s team was best known for developing techniques to study the effects of waters on isolated organs. These would be placed in a thermostatically controlled solution. After the introduction of rigorously measured amounts of mineral water, contractions and variations in internal pressure were carefully plotted on cylinder graphs. Teams around other chairs usually combined localized and systemic research approaches. But one group in Nancy, led by Daniel Santenoise and, later, Louis Merklen, took an uncompromising systemic position. On the basis of the parallelism and regularity of effects produced by many different waters, they insisted that waters must act on the regulatory systems coordinating organic life—and especially the nervous and endocrine systems. This meant that research had to focus on the whole animal. The goal was to explore the physiological mechanisms of therapeutic effects that were well documented for humans by administering waters to animals in ways and doses corresponding as closely as possible to those used in human therapeutics. The results they took most pride in had to do with differentiating the effect of waters that lowered arterial tension on the basis of different types of mechanisms affecting the nervous systems. This tradition of systemic experimentalism became very powerful when it was taken up during the 1940s at the Institut d’Hydrologie, then under the direction of Michel Polonovski, a close collaborator of the Nancy group.<sup>47</sup>

One of the reasons for the success of this tradition was that living animals bore a much closer resemblance to humans taking the cure than did isolated organs suspended in a solution. Such research was thus less distant from therapeutic practice, and the Nancéens were not hesitant to make therapeutic deductions on the basis of their physiological research. The discovery of different mechanisms for lowering blood pressure, for instance, was used as the basis for deciding the most appropriate treatment in a given case. Similarly, Polonovski claimed that laboratory tests now allowed doctors to determine which of the

<sup>46</sup> *Ibid.*, p. 20.

<sup>47</sup> Merklen, “Orientation actuelle de l’hydrologie” (cit. n. 31), pp. 336–337; D. Santenoise, Louis Merklen, *et al.*, “Action hypotensive de quelques eaux minérales de l’est de la France,” *Paris Méd.*, 1938, 107:322–328; and Polonovski, “Bases scientifiques de la thérapeutique thermale” (cit. n. 43), p. 86.

major spas devoted to asthma would be most effective in any given case. In 1949 he declared that animal experiments had “confirmed, on objective and measurable bases, the efficacy of the Bourbonne cure on the sensory-motor function.”<sup>48</sup>

The Parisian experimentalists, in contrast, played down this practical aspect of their laboratory work. As part of their experimental reductionism, Villaret and Justin-Besançon insisted on the therapeutic limits of their research. Taking up a traditional line of argument usually associated with clinicians hostile to experimentation, they insisted on the primacy of clinical observation for determining therapeutic indications. They were particularly concerned to avoid the worst speculative excesses associated with the simplistic application of laboratory results to water cure and therapeutics more generally. Experimental results, they argued, could not fully explain but only suggest therapeutic results. Above all, they should not be used to “deduce” therapeutic usage. For one thing, pharmacodynamics did not necessarily measure therapeutically relevant effects. Studying convulsions in mice given insulin or the vomiting in pigeons given digitalis might help determine physiological effects and establish proper units for dosage but could do little to explain those effects or determine therapeutic modalities. This attitude was common to many hydrologists. The secretary of the Société d’Hydrologie ended a review of the society’s work in 1937–1938 with the following conclusion: “Let us persist certainly with experimental effects on animals, so fruitful for the scientific point of view, but let us be interested just as much in the study of the patient at the the spa, . . . in summary, let us leave to clinical and therapeutic experience its preponderant role.”<sup>49</sup>

For the Nancy school, the relevance of laboratory experimentation was clear. But what exactly was its significance for clinical hydrology according to the Parisians? Villaret and Justin-Besançon supplied one answer when, on no fewer than three occasions in their short presentation of pharmacodynamics, they pointed out that pharmacodynamic research irrefutably demonstrated that waters had significant physiological effects. This did not mean that their therapeutic efficacy was proven. But by demonstrating biological effects that could not be dismissed as psychosomatic, hydrologists made the clinical efficacy they observed empirically far more plausible; their results offered the prospect that the physiological mechanisms of this clinical efficacy could soon be determined. They also disposed of the common argument that it was not the waters themselves but the rest and relaxation associated with water cures that were responsible for the therapeutic benefits that patients seemed to experience. In a sentence that might have been produced by a sociologist discussing “inscription devices,” Villaret and Justin-Besançon wrote that examining the tracings of the effects of the waters of Contrexville on the contractions of an isolated ureter or those of Vichy on the movements of an intestine paralyzed by adrenaline left no doubt of the powerful physiological properties of these waters. The systematists of Nancy and the Institut d’Hydrologie also provided evidence of this kind when, for example, they discussed research that suggested that certain waters afforded animals protection against anaphylactic shock and even poisoning.<sup>50</sup> This was not knowledge that had much practical

<sup>48</sup> Merklen, “Orientation actuelle de l’hydrologie,” p. 337 (Nancéens’ therapeutic deductions); François Françon, “Le Premier Congrès International du Thermalisme Social,” *Presse Therm. Clim.*, 1947, 84:226–231, on p. 228 (Polonovski’s claim regarding asthma); and Polonovski, “Bases scientifiques de la thérapeutique thermale,” p. 87 (1949 results).

<sup>49</sup> Sérané, “Rapport annuel” (cit. n. 44), p. 158. On avoiding speculative excesses see also Piéry, “Chaire d’hydrologie” (cit. n. 41), p. 107.

<sup>50</sup> Villaret and Justin-Besançon, “Pharmacodynamie hydrologique” (cit. n. 45), p. 19; and Polonovski, “Bases scientifiques de la thérapeutique thermale” (cit. n. 43), pp. 90–91 (protections afforded by waters).

effect in treatment, but it reinforced belief in the powerful physiological effect of waters. (See Figure 5.)

Until its decline in popularity in the 1950s, animal experimentation in hydrology thus fulfilled many roles. It established hydrology as a rigorous, objective, and scientific discipline and water cures as biologically active. It appealed to those whose point of reference was precise, reductionist, and localized physiological research. But at the same time it could appease rising holistic sentiments by emphasizing systemic effects, as the Nancy school did. Experimental research could be cast in an even more thoroughgoing and ideological holistic vocabulary that characterized waters as a form of "natural" therapy that acted on the individual's constitution or "terrain" in a variety of complex ways. One writer in 1927, for instance, characterized mineral waters and climatology as part of "*le groupe Naturaliste*" of classical medicine.<sup>51</sup>

The emerging view of waters as living "synthetic" substances whose total, almost unanalyzable organization of elements accounted for their effects could explain how almost identical waters might have different effects. But it also expressed and in many ways symbolized the drive toward synthesis and holism that was so pervasive in many circles from 1930 to 1950. Michel Polonovski wrote in 1949: "It is only in the *total* chemical constitution of water that we can search for the origins of its efficacy. Because efficacy results from a synthesis where, much more than the specific action of each ion or each molecule or even of each micelle, there intervenes the synergic or antagonistic equilibrium of these elements from which flow the modifications imprinted on the neuro-vegetative system of the organism."<sup>52</sup> Here waters exemplified some of the contemporary aspirations for medicine captured by such keywords as "total" and "synthesis."

The language of this statement underlines one of the important resources of the new hydrology. It spoke in many scientific idioms, expressed many current medical views and ideological positions. Some of its spokesmen utilized rigorous and often reductionist research techniques; others based their therapeutic reasoning on very traditional medical notions, like "constitution" and "terrain," which had lost some of their luster following the bacteriological revolution but were now enjoying a revival. Rather than pointing to external etiological agents as the cause of disease, these terms were vehicles for viewing the organism itself as the chief agent of its own diseases. At the beginning of the twentieth century, such reasoning had a strong humoralist tinge due largely to the work of Charles Bouchard, perhaps the leading theorizer, outside bacteriology, of pathology in France. In this humoralist context, imagining the action of waters was particularly easy because one could represent the encounter as between two complex liquids, with one adding to or drawing from the other specific elements.<sup>53</sup> In the words of the second professor of hy-

<sup>51</sup> Gaston Sardou, "Médications thermales et médications climatiques," *Presse Therm. Clim.*, 1927, 68:593–598, on p. 593. On rising holistic sentiments in France during this period see George Weisz, "A Moment of Synthesis: Medical Holism in France between the Wars," in *Greater than the Parts: Holism in Biomedicine, 1920–1950*, ed. Christopher Lawrence and Weisz (New York: Oxford Univ. Press, 1998), pp. 68–93. The predominance of animal research diminished substantially in the papers presented before the Société d'Hydrologie de Paris during the 1950s as more traditional clinical studies once again became more common. See "Société d'Hydrologie . . . : Rapport moral de la Société par Jean F. Porge," *Presse Therm. Clim.*, 1954, 91:27–29, on p. 28; *ibid.*, 1955, 92:76–77, on p. 76. See also Roger Glénard, "Rapport scientifique," *ibid.*, 1953, 90:13–15.

<sup>52</sup> Polonovski, "Bases scientifiques de la thérapeutique thermale" (cit. n. 43), p. 84. More broadly, see Weisz, "Moment of Synthesis."

<sup>53</sup> On Bouchard see Paul Le Gendre, *Un médecin philosophe: Charles Bouchard, son oeuvre et son temps, 1837–1915* (Paris: Masson, 1924). Andrew Mendelsohn suggests that this humoral view of pathology was far more characteristic of French than of German medicine: J. A. Mendelsohn, "Medicine and the Making of Bodily



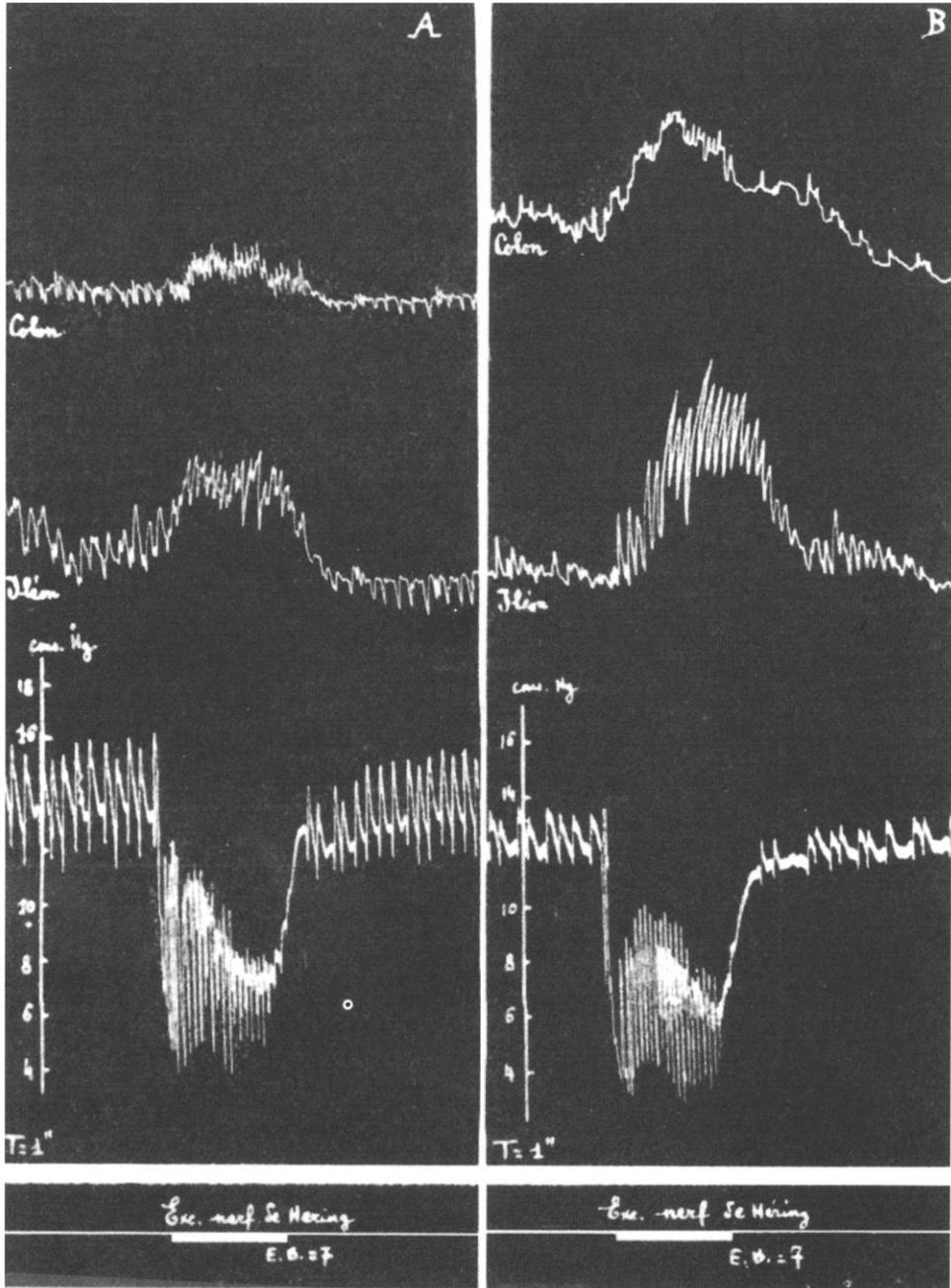


Figure 5. Tracings of parasympathetic activity before and after ingestion of Vittel-Hépar water. From Paris Médical, 16 April 1938, page 107.

drology at the Paris Faculty of Medicine, Maurice Chiray, “mineral waters are, like the liquids of the organism, a complex electrolic milieu, and the infinitely small [elements] of one can act on the infinitely small [elements] of the other, either by way of the exchanges of certain elements, or by way of the addition of others which the humors are partially or totally lacking.” As the century progressed, interpretations centering on the nervous system as the regulator of terrain became more common, as the remark by Polonovski quoted earlier suggests; interactions could be imagined as the stimulation of nerve endings by the complex vibrations of waters or even as a form of direct imprinting.<sup>54</sup>

If holistic rhetoric appeared occasionally in mainstream hydrology, it thoroughly permeated the field of climatology. The effect of climate on illness and healing was a traditional medical subject that had always played a small and subsidiary role in French spas traditionally devoted to water. But climate became increasingly important to hydrology at the turn of the century. The Institut d’Hydrologie founded and equipped twenty climatological stations between 1923 and 1933. There were a number of reasons for this new interest: the success of solar and fresh-air therapy in treating the varieties of tuberculosis; the development of colonial and tropical medicine, with their emphasis on the health problems associated with specific climates; governmental recognition of the legal status of climatic stations, alongside that of mineral water spas; the linking of the two fields in the titles of many of the new chairs and institutes that were created. Perhaps most striking was the fascination during this period with physics and physical phenomena ranging from radioactivity to solar storms to magnetism. For the spokesmen of the new climatology, the essence of the field was not weather conditions, as had been the case in the past, but physical conditions, many of them astral. (The link with ancient astrology was not lost on leaders of the field.) Climatology was, in comparison to hydrology, small, still new, and highly speculative, and it enjoyed much lower scientific standing. A practitioner admitted in 1927 that one could not demand from climates the same precision that one could expect from waters. Nor could one expect the same degree of specialization; rather than specific illnesses, climates dealt with more general functional problems.<sup>55</sup> The central notion of this developing domain—that illness emerged from the organism’s effort to adapt to an immensely complex and ever-changing environment and that this environment could be utilized both to heal and to head off incipient illnesses—harked back to traditional forms of thinking that had dominated medicine until the middle of the nineteenth century.

In spite of the strong push to measure physical phenomena as well as physiological responses to these phenomena, practitioners of climatology were particularly susceptible to language that was holistic, vitalistic, and sometimes even mystical. One of the pioneers

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Inequality in Twentieth-Century Europe,” in *Between Heredity and Infection: Historical Essays on Disease Transmission in the Twentieth Century*, ed. J. P. Gaudillière and Ilana Löwy (Amsterdam: Harwood, 2001), pp. 21–79. As the century progressed, this humoralism was increasingly expressed in the language of “colloids,” a term that had “kabbalistic” significance for physiologists, according to one researcher in the field: Prof. Kocaczewski, “L’eau vivante,” *Presse Therm. Clim.*, 1925, 66:617–620, on p. 617.

<sup>54</sup> Chiray, “Leçon d’ouverture: Chaire d’hydrologie” (cit. n. 39), p. 253. For an interesting look at the use of these terms in hydrology see Jean Galup, “La notion de ‘terrain’ à la Société d’Hydrologie au cours de ses cent années d’existence,” *Presse Therm. Clim.*, 1953, 90:16–20.

<sup>55</sup> Sardou, “Médications thermales et médications climatiques” (cit. n. 51), p. 593. On the work of the Institut d’Hydrologie see G. d’Arsonval, “Préface,” in *Traité de climatologie biologique et médicale*, ed. Marius Piéry, 3 vols. (Paris: Masson, 1934), pp. xiv–xv (twenty stations). The new focus of climatology is particularly evident in Piéry’s introductory essay to the *Traité de climatologie*, esp. pp. xxx–xxxv; on the links with ancient astrology see p. xxxii. For eighteenth- and nineteenth-century traditions of mechanistic and environmental astrology see Mark Harrison, “From Medical Astrology to Medical Astronomy: Sol-Lunar and Planetary Theories of Disease in British Medicine, c. 1700–1850,” *British Journal for the History of Science*, 2000, 33:12–48.

of this field, Gaston Sardou of Nice, wrote in 1931: "The multiple agents—physical, chemical, dynamic, even psychic—which Thermal and Climatic Therapeutics furnishes render it particularly powerful due to their Natural origin, thus more directly suited to the restoration of the living being [*l'être vivant*], this other materialized expression of the same Universal Force."<sup>56</sup>

Within the world of academic medicine, climatology was dominated by the medical faculty in Lyon, where the movement for medical holism in the 1930s was especially powerful. It was the holder of the Lyon chair, Marius Piéry, who directed the first comprehensive treatise in the field of climatology, three hefty volumes that acknowledged the significance of cosmobiology—the study of astral forces—for human health. His successor in the chair was Pierre Delore, the leader of the neo-Hippocratic movement that most successfully represented the drive toward medical synthesis and holism in France. Delore, in fact, brought the naturist sensibility of climatology into mainstream thermalism. In the mid 1950s, for instance, going far beyond the gentle chemotherapy that was the ideal of most other hydrologists, he argued that water cures should become the occasion for a patient's total reconnection with nature:

One must give credit to spas [*stations*] for the fact that, whether through the elements of climate, and above all the sun, vector of universal energy, whether through thermal waters, the vector of telluric energies, man finds in the spa the beneficial influence of a dynamism of cosmic nature which we know today represents the fundamental mode of action of cure. We know its equilibrating, normalizing and renewing influence, and also its influence on the temperament and terrain of the individual.

Thermalism thus had to become a "synthetic therapeutics. It addresses itself to the entire man, spirit and body, and answers well to the Hippocratic conception of illness; the latter cannot be considered as local; illness concerns the entire being and every individual presenting himself in the spas ought to be considered as a totality [*un tout*]."<sup>57</sup>

#### APOTHEOSIS

The new hydrological science produced during the first half of the twentieth century lacked a unified approach and can be perceived as seriously conflict ridden. But the existence of contending perspectives may well have been advantageous insofar as it reflected the conflictual reality of French medicine. Each one of the approaches I have described enabled hydrology to appeal to a different medical constituency. The laboratory work it produced satisfied the most stringent demands for scientific rigor and objectification. Other research fit in well with a new emphasis on "terrain," which could be understood either humorally or in terms of the nervous system. Its more radical naturist and holistic currents were generally less visible in the scientific literature but spoke to equally powerful values and motivations. Its biggest and most acknowledged failure, to be sure, was its inability to come up with the widely accepted explanations for the action of mineral waters that its proponents had hoped for. In 1949 Michel Polonovski, director of the Institut d'Hydrologie, spoke in terms that were little different from those of fifty years before:

<sup>56</sup> Gaston Sardou, "Milieu cosmique: Air, synergies et dystonies des agents thermaux et climatiques," *Presse Therm. Clim.*, 1931, 72:289–297.

<sup>57</sup> Pierre Delore, "Un conception synthétique des stations thermales et climatiques—hauts-lieux de santé—une éthique des cures," *Presse Therm. Clim.*, 1957, 94:161–163, on pp. 161–162. See also Weisz, "Moment of Synthesis" (cit. n. 51), pp. 72–73.

Let us admit that crenotherapy [as scientific thermalism was now called] seems very often on the margins of real scientific disciplines, to the point of sometimes provoking a mocking skepticism that insinuates that it is related rather to “psychological” therapeutics, not to use a term that is more pejorative and less courteous vis-à-vis our colleagues in thermal spas.

The unjustified doubt that hovers still in the spirit of certain clinicians regarding the virtues of this time-honored therapeutics has its origins uniquely in the manifest opposition that subsists still between the evidence for the effects [of waters] and the lack of knowledge of their mechanisms of action.

Whatever its long-term effects, this explanatory failure mattered little in the short term. Polonovski himself followed the statement just quoted with many pages describing the numerous things that were in fact already known about waters; he summarized the many research results that demonstrated the powerful physiological effects of waters on humans and animals and advanced possible explanations for these effects.<sup>58</sup> Whatever it failed to do, hydrological science did repeatedly confirm widespread belief in the efficacy and scientificity of water cures. And the sheer quantity and ubiquity of published papers on mineral waters probably did more to locate hydrology within mainstream medicine than did any specific results. It is thus hardly surprising that, confronted by this torrent of publications filled with line graphs and tables demonstrating the biological activity of waters, French doctors—especially younger doctors trained in faculties where chairs of hydrology were prominent—voiced few doubts about the therapeutic efficacy of waters. Skepticism, as Polonovski and others reiterated, was far from dead; but there was little to be gained by publicly taking on the hydrological establishment.

That doctors—at least some very influential ones—saw hydrology as integral to modern medicine after World War II is made clear by the fact that it was recognized in two of the most important developments in the postwar reorganization of French medicine. In 1947 a new system for regulating medical specialties recognized thermalism as one of the officially acknowledged partial specialties or *compétences*. The issue of specialty regulation had been debated for nearly two decades, and a consensus had gradually emerged from the deliberations of medical associations and the *Ordre des Médecins* created under Vichy and reorganized after the Liberation. The new postwar system created two types of specialty units that required training and certification: full-time specialties that had to be practiced exclusively, and *compétences* that could be practiced either exclusively or in combination with general practice. Thermal medicine was one of twenty or so fields recognized as a *compétence*.<sup>59</sup>

Even more significant was the expansion of medical insurance that occurred just after World War II as part of the creation of a comprehensive social security system. The rather restricted insurance system that had begun to function in 1930 did not formally include spa therapy. No administrative decrees or legislative documents had listed water cures among the practices to be reimbursed, and the local insurance authorities (*caisses*) were initially reluctant to provide this expensive form of therapy for the less affluent social groups covered under the existing system. Nonetheless, the academic legitimization of hydrology was beginning to have an effect, and some *caisses* began modest subsidies of spa cures. The *caisse* responsible for Paris and the surrounding Seine region agreed in 1935 to provide a small subsidy of 400 francs for each water cure, a modest sum that covered

<sup>58</sup> Polonovski, “Bases scientifiques de la thérapeutique thermale” (cit. n. 43), pp. 78–95, on p. 78.

<sup>59</sup> This regulation of specialties is discussed in George Weisz, “Regulating Medical Specialties in Twentieth-century France,” *Social History of Medicine* 15(2002), forthcoming. This measure, it should be noted, had little practical effect. The economics of practice meant that spa physicians had little incentive to take on specialty status.

from one-quarter to one-third of the estimated costs.<sup>60</sup> But it was a considerably higher sum than that usually paid out for spa cures, and its symbolic significance was considerable. Furthermore, the small numbers of the “socially insured” among spa patients, estimated at only 2 to 3 percent of all curists, was beginning to attract attention from spa physicians and insurance administrators. In 1935 the national association bringing together local insurance agencies appointed a technical committee, composed mainly of doctors and chaired by Jacques Parisot, professor at the medical school at Nancy, to study ways to integrate spa therapy into the insurance system. The committee met several times with the doctors of Aix-les-Bains in order to work out concrete details. An offer of collaboration from the committee inspired the association representing spa physicians to establish an insurance committee. (The major decision reached during these deliberations was that spas would offer thermal treatment at a significantly reduced cost to insurance patients outside the peak summer season.) In 1938 the medical trade union of Vichy signed the first-ever collective agreement with the regional insurance board concerning thermal cures; this convention would be the basis of postwar labor negotiations.<sup>61</sup>

Following the Liberation, a new law introduced in October 1945 extended health insurance to all salaried employees (causing great consternation within the French medical profession). As an almost automatic extension of prewar trends, water cures were from the very beginning included in the list of reimbursable procedures, the *Nomenclature*, promulgated on 19 October 1945. Spas were classified into four categories, each with a specific formula governing reimbursement. Ministerial circulars of 15 January and 21 March 1947 provided further administrative foundations for the inclusion of spa medicine within the health insurance system.<sup>62</sup>

Representatives of thermal medicine hoped to retain the affluent private patients of the prewar years—and particularly the foreigners among them—but they were pleased that health insurance brought new categories of clients, most notably children, to spas. And insurance funding was not ungenerous, although it never fully satisfied the demands of spa doctors. It covered honorariums for spa doctors (based on a convention signed annually between their labor union and the central insurance agency), the costs of the different kinds of water treatments, and some of the costs of lodging. Travel was not initially covered, but within two years patients were being reimbursed up to the cost of third-class rail travel. Nonetheless, the costs of cure were so high that they remained, in large measure, the responsibility of patients, which suggests that the new system did not so much bring the very poor to spas as subsidize the middle classes. Individuals like Pierre Delore who were truly committed to social thermalism were deeply concerned to make spa treatment more readily available to the poor.<sup>63</sup>

<sup>60</sup> On initial reluctance to fund spa therapy see M. Du Pasquier, “Cures thermales et assurances sociales,” *Bulletin du Syndicat National des Médecins des Stations Thermales*, Dec. 1935, pp. 22–25, on pp. 22–23. On modest subsidies see Dr. Hilaire, “Le remboursement des cures thermales par les caisses d’assurance-maladie,” *Presse Therm. Clim.*, 1936, 73:125–126. On the 400-franc reimbursement see Robert Merklen, “Cures thermales et Assurances sociales,” *Bull. Syndicat Nat. Méd. Stations Therm.*, Mar. 1936, pp. 9–14, on p. 9.

<sup>61</sup> Spa physicians discussed their concerns about the low level of insured patients in *Bull. Syndicat Nat. Méd. Stations Therm.*, Mar. 1936, pp. 13–16. On the establishment of the insurance committee see “Cures thermales et Assurances sociales,” *ibid.*, Jan. 1936, p. 6; and Robert Merklen, “Rapport de la Commission des Assurance Sociales,” *ibid.*, pp. 7–14. On the collective agreement see Dr. Roubeau, “Syndicat National des Médecins Thermalistes: Historique,” *Médecin de France*, 1954, 25:7906–7913, on p. 7911.

<sup>62</sup> “Syndicat National des Médecins des Stations Thermales,” *Presse Therm. Clim.*, 1946, 83:63 (classification scheme); and “Congrès de Thermalisme Social,” *ibid.*, 1947, 84:228–231, on p. 229 (ministerial circulars).

<sup>63</sup> Pierre Delore, “Considérations sur le thermalisme social,” *Presse Therm. Clim.*, 1946, 83:88–91, on pp. 88 (retaining foreign patients), 90–91 (coverage and concerns about availability); and “Congrès de Thermalisme Social,” pp. 230 (reimbursing travel costs).

What is perhaps most remarkable about the postwar acceptance of thermalism by the insurance system is that it occurred without argument or public discussion. To be sure, many aspects of the new social security system were exceptionally controversial, and one can imagine that there was little energy for what was a minor side issue. But it is also likely that it inspired so little comment because it was so totally expected. Postwar conditions allowed the insurance system to introduce quickly measures that had been under serious consideration during the prewar years. We can be fairly certain that political pressure by the spa industry and its political representatives again came into play. While such pressure was hardly new, the political conjuncture was almost certainly decisive. The postwar years were characterized by political and social instability and crisis; in response, the two major parties of the era, the Communists and Gaullists, achieved an unprecedented social compromise. One of the declared motives for reforming the insurance system was to encourage social solidarity by guaranteeing "the equality of all before medicine"; it would thus have been difficult if not politically dangerous to ignore thermalism, which was more closely associated with affluence than many other forms of therapy.<sup>64</sup> Furthermore, the fact that the reformed insurance system was no longer geared exclusively to the poor meant that many of its new subscribers were already consumers of thermal medicine who would have been shocked had it been excluded from coverage.

Nonetheless, equality in treatment would have meant little in the absence of the perception that spa therapy was in some way beneficial. And everything said by representatives of the insurance system suggests that they had few doubts on this score. Certainly they were well aware that many curists went to spas as a form of vacation and that many doctors prescribed spa treatments in cases where they were ineffective. But they also seemed not to doubt that there existed a large zone of medical efficacy to which, as good public servants, they sought to ensure that state funds were confined. The system that was set up required anyone with a doctor's prescription for a spa cure to be examined by a medical controller representing the insurance system, who would authorize it or not. In the first two years, about 17 percent of those applying were rejected. In 1950 the insurance system introduced a follow-up visit to monitor the success of thermal cures but applied it inconsistently. Representatives of the insurance system sometimes expressed the desire to impose even more stringent conditions on thermal treatments.<sup>65</sup> But the intent was to prevent abuses of the system. Insurers' requirements were predicated on faith in the medical virtues of the water cure, and this faith, as I have suggested, can best be understood as a consequence of the interwar emergence of an academic and scientific hydrology.

Such faith in thermal cures was not inevitable, as the British counterexample suggests. Britain's postwar National Health Service initially covered the thermal treatments that were

<sup>64</sup> "The equality of all before medicine" was the phrase used by the minister of health, Robert Prigent, as well as the director of the health insurance system, Pierre Laroque, in speeches quoted in Françon, "Premier Congrès International du Thermalisme Social" (cit. n. 48), p. 226. On the creation of the social security system see Henry C. Galant, *Histoire politique de la Sécurité Sociale Française* (Paris: Colin, 1955); and Stephen S. Cohen and Charles Goldfinger, "From Permacrisis to Real Crisis in French Social Security: An Essay on the Limits to Normal Politics," Working Paper No. 250, Institute of Urban and Regional Development, Univ. California, Berkeley, 1975.

<sup>65</sup> For instance, Pierre Delore reported to the trade union of spa doctors that the insurance agencies were trying to impose rigid conditions on reimbursement, including proof that other therapies had failed and medical certainty that the proposed cure would be effective. See "Syndicat National des Médecins des Stations Thermales, IV: Pourparlers avec la F.N.O.S.S.," *Presse Therm. Clim.*, 1948, 85:153-154. For the views of representatives of the insurance industry on thermalism see esp. the remarks of those who spoke at the Congress of Social Thermalism cited in Françon, "Premier Congrès International du Thermalisme Social." On the follow-up visit see Henri Diffre, "Le thermalisme social," *Presse Therm. Clim.*, 1950, 87:197-199, on p. 198.

available on prescription in certain spas. But in the absence of medical interest in utilizing these modalities, spas attracted few patients. As a result, the NHS gradually abrogated its contracts with thermal establishments, leading to the closing of most of the nation's spas. In striking contrast, insured thermalism in France—initially meant to supplement traditional private spa treatments—grew so quickly that French spas became almost totally dependent on the Sécurité Sociale. In 1938 there had been about 115,000 registered curists in France, nearly all of them self-financed. In 1947, the first year of operations for the new system, 20,000 requests for spa treatment were received by the insurance administration; the following year the number rose to 50,000. About 40 percent of those authorized went to four major spas. The largest group of “social” curists was treated for respiratory problems like asthma and emphysema at La Bourboule and Mont-Dore, the next largest was treated for digestive insufficiencies at Vichy, and the third largest was bringing arthritic complaints to Aix-les-Bains.<sup>66</sup> By 1950 there were 198,000 curists in French spas; over 68,000 individuals received reimbursements costing the health insurance system over 1.5 billion francs. Two years later, the total number of individuals receiving spa treatment had risen to over 250,000 (including 31,000 foreigners); the cost to the government for the more than 97,000 of them that it subsidized had risen to approximately 3.3 billion francs.<sup>67</sup> A year later, 120,000 individuals were undergoing thermal cures through the insurance system. This was, as hydrologists pointed out, a tiny proportion of the total health budget (under 1 percent), but it significantly stimulated the growth of French spas during these and subsequent years. Insurance gradually came to finance an overwhelming proportion of all spa cures. The influx of new patients to certain spas was so large that spa physicians began complaining in the early 1950s about overcrowding and a decline in services.<sup>68</sup>

### CONCLUSION

Medicalization on this level has clearly been a mixed blessing for the spa industry. The rich private patients and foreigners who came in large numbers during the interwar years seem largely to have deserted French spas. Instead, medicalized thermalism has become almost entirely dependent on government funding, with all the uncertainty that entails. As more and more patients flocked to spas in the 1950s, representatives of a financially overburdened social insurance system became increasingly inclined to cut back on nonessentials. Things came to a head in 1958, when the government tried and failed to eliminate insurance benefits for thermal cures but succeeded in drastically cutting back its funding of them. It had to retreat several years later, after having done serious damage to many spas. The financial crisis has if anything become worse with time, and, despite the fact that patients self-finance nearly three-quarters of the total costs of their cures, the insurance system has sporadically relaunched efforts to offload financial responsibility for thermalism. And it has gradually dispensed with such extras as housing and travel allowances for

<sup>66</sup> Cours des Comptes, *Interventions publiques* (cit. n. 1), p. 9 (1938 figures); and Diffre, “Thermalisme social,” pp. 197, 198. On the closing of British spas see Hembry, *British Spas from 1815 to the Present* (cit. n. 2), p. 244; and Jamot, *Thermalisme et villes thermales* (cit. n. 1), pp. 76–77.

<sup>67</sup> These figures combine data in Berlioz *et al.*, “Bilan financier du thermalisme social,” *Presse Therm. Clim.*, 1954, 91:195; and Henri Diffre, “Le médecin thermal et la Sécurité Sociale,” *ibid.*, 1955, 92:250–252.

<sup>68</sup> Henri Diffre, “Médecine thermale et thermalisme social,” *Presse Therm. Clim.*, 1956, 93:30–32, on p. 32 (figures); and Diffre, “Problèmes thermaux de la Sécurité Sociale,” *ibid.*, 1952, 89:29–32 (physician complaints).

those above a minimum income level.<sup>69</sup> In 1999 insurance authorities announced that they would henceforth reimburse cures for only a handful of conditions where thermalism was recognized to be effective. Soon after, however, the minister in charge announced that she would not implement this measure but would instead convene a special inquiry into the future of thermalism. A report prepared by the Inspector General of Social Affairs appeared half a year later and was made available on the internet. Government support for the science of hydrology has also been reduced; in the 1950s and 1960s several chairs, notably that in Marseille, disappeared and research funds began drying up.<sup>70</sup> A required course in hydrology in the medical curriculum was eliminated in 1968. This lack of government support has had an effect on the number of spa-goers, which in the late 1990s was about 15 percent lower than it had been a decade earlier.

Thermalism is not an inexpensive therapy, but it actually looks much less extravagant today, in an era of CT scans and high-technology medicine, than it did thirty years ago; it also accounts for well under 1 percent of the total budget of the French health insurance system. If its status is declining perceptibly, it is for other reasons. Thermalism is an obvious target for the sporadic efforts of health administrators to save money, I suspect, because it is still perceived as a form of paid vacation and because thermal practices and their costs are remarkably variable, something that clearly troubles the bureaucratic mind. Nor does it help that the system of medical control and authorization seems to have broken down in the face of the huge number of requests for spa cures. Whereas the rate of rejection of requests fluctuated between 15 and 30 percent annually during the 1950s and 1960s and varied from 10 to 15 percent during the 1970s, it declined to less than 5 percent during the 1980s.<sup>71</sup> But two more profound difficulties have been decisive.

The development of many new surgical and medical therapies that work more rapidly and apparently more directly than waters has called into serious question the utility of thermalism. And the arguments made in response to such challenges—that the results of these new treatments are often ephemeral or that they have serious side effects, that waters work more gently and have longer-lasting effects and can in any case be combined with the new therapies—have not always been convincing to the unconverted. One result is that thermal practice has narrowed considerably. Once utilized to treat a very wide variety of ailments, it is becoming increasingly dominated by arthritic and rheumatological conditions, which now account for nearly 60 percent of all cures; respiratory conditions account for another 20 percent. (Strangely, the attempt in 1999 to limit spa usage did not recognize arthritic complaints as conditions where therapeutic success warranted reimbursement. It did, however, recognize respiratory, dermatological, and throat maladies.) As a result the specialization of spas, which already appears to modern medical sensibilities as impossibly vast and imprecise, is being eroded, as more and more of them, whatever their traditional medical orientation, begin to take in rheumatological patients.<sup>72</sup>

<sup>69</sup> Cours des Comptes, *Interventions publiques* (cit. n. 1), pp. 23, 26 (1958 cuts); and Jamot, *Thermalisme et villes thermales* (cit. n. 1), pp. 62–70. On the financial difficulties of the social insurance system see Cohen and Goldfinger, “From Permacrisis to Real Crisis in French Social Security” (cit. n. 64); and Georges Dorion and André Guionnet, *Le sécurité sociale*, 7th ed. (Paris: Presses Univ. France, 2000), esp. pp. 82–90.

<sup>70</sup> *Le Monde*, 14 July 1999, p. 11; *ibid.*, 27 Sept. 1999, p. 11; M. Delomenie, *Rapport de l’Inspection Générale des Affaires Sociales sur le thermalisme français* (Oct. 2000), p. 22 (the version I consulted was on the internet: [www.sante.gouv.fr/htm/actu/thermal](http://www.sante.gouv.fr/htm/actu/thermal)); and Jean Peiri et al., *La thérapeutique hydro-climatologique en pratique médicale* (Paris: Librairie des Facultés, 1967), pp. 33, 36 (loss of chairs and funds).

<sup>71</sup> Cours des Comptes, *Interventions publiques*, p. 318; and Delomenie, *Rapport de l’Inspection Générale des Affaires Sociales*, p. 14.

<sup>72</sup> For some defenses of water therapy see Macé de Lépinay, “Cent ans d’hydrologie” (cit. n. 32), p. 25; and



An even more serious problem is that most doctors (one cannot know the exact number) no longer believe in the efficacy of spa cures. And the reason is not that hydrology has been unable to provide a convincing account of the mechanisms of thermal cure, as its leading spokesmen once feared. Rather, what has come into question is the traditional assumption that the efficacy of waters is self-evident. Some of this has to do with the competing therapies now available, which have transformed the playing field. But the criteria of evaluation have also changed dramatically. Even if the random, double-blind clinical study does not have quite the authority in France that it has in North America as the ultimate measure of efficacy, the French medical establishment no longer accepts personal or even collective experience as a legitimate mode of evaluation. And hydrology has been notably unsuccessful in making a strong (i.e., statistical) case for the efficacy of waters. A single large-scale study, published in 1987, has shown significant benefits of thermal cures for certain conditions; it is widely cited in thermal publicity but has been criticized on methodological grounds.<sup>73</sup> The lack of a medical consensus about its efficacy was cited as a major reason for removing thermalism from the medical curriculum in 1968—and for subsequent refusals to bring it back—and certainly contributes as well to the lack of effort by state authorities to resolve a wide variety of critical problems affecting the crumbling infrastructure and regulatory framework of spas. It is thus not surprising that numerous reports on the reform of French thermalism during the past decade have insisted that the further government support and funding on which the future of the industry depends must be based on a significant effort to produce better data evaluating the clinical effects of cures. Some general suggestions for implementation have been offered, while the most recent report by the Inspectorate of Social Affairs has proposed more concretely that a special fund to finance such research be set up.<sup>74</sup>

At the other end of the spectrum, the most informed and lucid academic writer on French spas, Christian Jamot, has vigorously condemned the medicalization of water therapy because it has fostered a competition with surgical and chemotherapeutic forms of treatment that thermalism cannot hope to win: "Its definition as a therapy, in competition with the other methods of medical care, is a profound error, a poisoned gift, attained by the medical corps of the spas. In wanting a monopoly over control of the cure, it has above all obtained its sclerosis." Like others, Jamot looks to German and Italian spas as a model for a different kind of thermalism based on "health tourism." In this vision, the justification of spa cures is not that each offers a "medicine" for a specific illness; rather, spas receive financial support from health insurance systems precisely because they provide rest, relaxation, and leisure along with waters and a variety of other health-promoting techniques; through all these modalities, they complement conventional medicines by preventing illness in the healthy, promoting convalescence, and helping individuals cope with chronic diseases for

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Pierre Baillet, "La médecine thermale face aux progrès de la médecine et de la chirurgie," *Presse Therm. Clim.*, 1955, 92:90–91. On the current distribution of spa patients see Cours des Comptes, *Interventions publiques*, pp. 20, 37; for the 1999 limitations see *Le Monde*, 14 July 1999, p. 11; on modern views of spa specialization see Delomenie, *Rapport de l'Inspection Générale des Affaires Sociales*, p. 12.

<sup>73</sup> This point is emphasized in Cours des Comptes, *Interventions publiques*, pp. 19, 24–25. Regarding randomized double-blind studies see François Isambert, "La bio-éthique à travers ses écrits," *Revue de Métaphysique et de Morale*, 1987, 92:401–421.

<sup>74</sup> Cours des Comptes, *Interventions publiques*, pp. 200, 318; A. Bonrepaux, *Rapport d'information déposé par la Commission des Finances de l'Économie Générale et du Plan sur la situation du thermalisme en France*, Assemblée Nationale, 1996, No. 2995, esp. pp. 25–27; and Agence Nationale pour le Développement de l'Évaluation Médicale, *Principes méthodologiques d'évaluation des orientations thérapeutiques d'un établissement thermal* (Dec. 1996). On the establishment of a special fund see Delomenie, *Rapport de l'Inspection Générale des Affaires Sociales*, pp. 37–40.

which medicine has no solutions. French spas have taken some steps to emulate their European neighbors but appear to have met with only limited success thus far.<sup>75</sup> It is not hard to see why: Jamot's vision has been excoriated by representatives of French spa medicine for the past 150 years.

In sum, the 1930s and 1940s may well have represented the apex of French thermalism and scientific hydrology. But because this apex occurred during such a critical period for French medicine, thermalism found a place in the health structure from which it cannot easily be dislodged. For one thing, an industry that employs 60,000 people, directly or indirectly, and does an annual gross business of 6 billion francs tends to have powerful defenders.<sup>76</sup> The rhetoric of spa medicine has since the early 1980s emphasized the ongoing crisis of the water cure, and the problems cited appear to be real and pressing. But unlike its counterparts in the English-speaking world, French spa medicine is still around and is, in many ways, still going strong.

<sup>75</sup> Jamot, *Thermalisme et villes thermales* (cit. n. 1), p. 91. On efforts to emulate other models see *ibid.*; Christian Labenne, "Stratégie thermale et fréquentation," *Espaces*, 1984, 67:8-9; and P. Viceriat, "Un thermalisme à la française?" *ibid.*, pp. 5-7. On the lack of success to date see Cours des Comptes, *Interventions publiques*, p. 197. The situation in Germany turns out not to have been quite so rosy as it appeared to Jamot in the 1980s. In 1997 German authorities, alarmed by rising costs, restricted reimbursed spa cures to three weeks (down from four) every four years (rather than every three). As a result, in that year the number of those taking spa cures through the health insurance system declined by a third from the preceding year. See "Annexe 9: Les cures en Allemagne," in Delomenie, *Rapport de l'Inspection Générale des Affaires Sociales*.

<sup>76</sup> For the figures see Cours des Comptes, *Interventions publiques*, p. 7.