

# The Sainte-Anne hospital in Paris: a key institution in the development of clinical neuroscience

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## ABSTRACT

Today's Hôpital Sainte-Anne in Paris was born when the old hospital of the same name was merged with the neighbouring Hôpital Henri-Rousselle in 1941, and since 2019 has been part of a large university hospital complex specialising in psychiatry and neuroscience (Groupe Hospitalier Universitaire Paris psychiatrie & neurosciences). The current name honours a longstanding tradition, as Sainte-Anne was the home of France's first university chair in psychiatry, and can be considered the birthplace of modern neuropsychology, through the work of Lhermitte, Ajuriaguerra, and Hécaen. It was also at Sainte-Anne that the antipsychotic effect of chlorpromazine was first observed by Delay and Deniker, marking the beginning of psychopharmacology and the consequent revolution in psychiatric care. The centre housed one of the city's first neurosurgery services (Puech, David), and it was there that Talairach pioneered the development of stereotactic procedures, particularly stereo-electroencephalography and epilepsy surgery (in collaboration with Bancaud). Furthermore, in the 1930s and 1940s, there was close collaboration at the centre between psychoanalysis and art, particularly surrealism, which gave rise to a rich cultural atmosphere.

## KEYWORDS

Sainte-Anne, Henri-Rousselle, André-Thomas, Lhermitte, Ajuriaguerra, Delay, Talairach, Bancaud, Laborit, chlorpromazine

## Introduction

The monumental contributions of Charcot, Vulpian, and their disciples (Babinski, Pierre Marie, Bourneville, Dejerine, Foix, etc) to the birth and development of neurology and other branches of neuroscience at the Salpêtrière and Bicêtre hospitals overshadowed the very noteworthy achievements of other Parisian schools and institutions.<sup>1-3</sup> Among these is Hôpital Sainte-Anne, the scene of pioneering developments in neurology, psychiatry, and various other branches of clinical neuroscience.<sup>4-7</sup> Sainte-Anne has a long history of psychiatry, but its influence on neurological research and care is also outstanding.

This article aims to raise awareness among neurologists of some of the significant developments at Sainte-Anne, from the creation on Charcot's initiative of the first chair of mental and brain diseases (the term psychiatry did not yet exist)<sup>3</sup> in 1876 to the installation of the centre's first neurology service in 1974.

## Material and methods

This historical review is based on studies published in the literature and some personal recollections of the author. The life and scientific work of each of the main protagonists is summarised, and comments are made on the aims of their work. Most of the main characters in this story produced work of an extraordinary quality



Figure 1. Hôpital Sainte-Anne. Magnan pavilion. In the foreground, “Daphne,” one of the many statues adorning the centre’s gardens.

and quantity; therefore, the works cited in this article represent just a small part of their output, although they may be considered sufficiently representative.

## Development

### *Historical background of Hôpital Sainte-Anne*

Hôpital Sainte-Anne stands on land that was purchased by Louis XIII’s wife, Anne of Austria, to install a farm with beds prepared for the event of an outbreak of infectious disease.<sup>5</sup> It first became associated with mental disorders when, in 1833, Dr G. Ferrus, who was responsible for the insane ward at Bicêtre, decided to use that land to occupy his patients who were still fit for work.

At the time, few places were available at Parisian hospitals for insane patients, and they often had to travel to other provinces, far from their families. The law on the insane of 1838 stipulated that each department must have specific resources allocated, and avoid pa-

tient transfers. Thus, Sainte-Anne became a truly local psychiatric institution, inside the city.<sup>5</sup> For more than 30 years, the Sainte-Anne asylum was at the centre of the debate on the organisation of care for the mad (*les fous*), the convenience of specific pavilions for wealthy patients and for criminals, etc, with a range of architectural plans.<sup>5-7</sup> The main buildings, which remain in place today, were constructed on the initiative of Baron Haussmann during the empire of Napoleon III, in 1867.<sup>3</sup>

Valentin Magnan (1835-1916) joined the hospital that same year,<sup>8</sup> eventually becoming chief physician. A pavilion at today’s hospital (“the clock pavilion”; Figure 1) bears Magnan’s name. He was interested in a range of subjects, from neurosyphilis to acute and systematic chronic delusion. He was a leader in the fight against alcoholism and, in particular, in the prohibition of absinthe, a scourge that had become the “national drink.” He advocated against the use of mechanical restraints, and particularly the straitjacket; this is alluded to by the

Latin motto on the bronze plaque installed in his memory at today's hospital: *malvit lenitatem quam vim adhibere* ("he prefers to use sweetness before force"). For many years, Magnan offered excellent clinical instruction, with patient presentations, but was unjustly accused of using them for exhibitionist purposes, therefore, his famous lessons (the Sunday sessions, in particular, were very popular) were suspended for several years. The falsehood that he exploited his patients, his having opened a private clinic, and other political and religious reasons seem to have played a determinant role in his losing out on the chair of mental and brain diseases, created in 1876 on the initiative of Charcot and with his friend Vulpian as dean: the chair was awarded to B. Ball, a disciple of the all-powerful master of the Salpêtrière.<sup>9-11</sup> With Ball's arrival, Magnan was displaced and the division of the centre's pavilions had to be reorganised to house his clinic, the first university psychiatric care centre in France, which was successively occupied by A. Joffroy (who also later became chief physician) and G. Ballet, both of whom were students of Charcot, and subsequently by other famous physicians.

#### *Hôpital Henri-Rousselle*

Another centre was built beside the Sainte-Anne, within the walls of the same complex, at which Édouard Toulouse inaugurated the first open consultation in 1922, a landmark in sector psychiatry.<sup>12</sup> Toulouse was a reformer, ahead of his time. As well as introducing experimental psychology, he fought against the confinement of patients and for the humanisation of treatment; promoted free consultation; replaced the horrendous term "insane asylum" with "psychiatric hospital"; founded several associations, including the League for Mental Hygiene and the Association for Sexological Studies; and advised several cabinets of ministers, always from a progressive perspective.

The centre was named Hôpital Henri-Rousselle, after a counsellor for the Seine department; its resources were considerably increased, with dispensaries, social services, a paediatric clinic, and clinical and experimental research laboratories, as well as a mental prophylaxis department. The hospital's staff included such noteworthy neuropsychiatrists as Ajuriaguerra; the centre was definitively linked with Sainte-Anne in 1941.

#### *Dispersion of the Dejerine school and the figure of André-Thomas*

The rivalry between Pierre Marie and Dejerine is well known. The former was one of Charcot's favourite and most brilliant students; the latter was a favoured protégé of Vulpian. Though these great masters arrived at the Salpêtrière the same year (1862), and were close friends, their schools fought for dominance over neurology. The clash between the leading disciples of each school, Pierre Marie and Dejerine, was so brutal that it nearly resulted in an armed duel.<sup>13,14</sup>

Charcot's first official successor was his eldest collaborator, F. Raymond, in 1893; upon the death of the latter, the chair was expected to be awarded to another member of the same school. However, Dejerine skilfully played his cards at the university, and was named as chair in 1911, displacing Pierre Marie, who took refuge at the Bicêtre. After Dejerine's death in 1917, Marie exacted bitter revenge, taking over Charcot's chair and unhesitatingly expelling Dejerine's widow Augusta Klumpke and his entire school (collaborators, archives, histological collection, library, etc). Klumpke created a foundation to preserve what she could of her husband's legacy, which was eventually deposited at the Musée Dupuytren.

Dejerine's school was dispersed. André-Thomas took refuge at Hôpital Saint-Joseph, where he worked until 1932, training famous disciples including Jean Lermite, Guillain, Alajouanine, Mollaret, and Garcin.<sup>1-3</sup> Although André-Thomas did not work at Sainte-Anne, he had an extraordinary influence on some of the figures who developed their careers there, including Lhermitte, Ajuriaguerra, and Hécaen.

During his time under Dejerine, André-Thomas published extensively in the classical clinical-pathological tradition; for instance, he wrote an excellent text on diseases of the spinal cord,<sup>15</sup> and published the first description of olivopontocerebellar atrophy.<sup>16</sup> Due to his interest in the cerebellum, he dedicated his doctoral thesis to the subject,<sup>17</sup> as well as another fundamental text published with Dejerine and Durupt,<sup>18</sup> establishing the basis of the relationship between clinical signs and lesions to various cerebellar systems. Later, his focus broadened to the semiological study of the body axis and muscle tone<sup>19,20</sup>; this research had a great influence on Ajuriaguerra, who collaborated with him on both monographs (Figure 2).



Figure 2. The young Ajuriaguerra alongside his master André-Thomas.

But the most extraordinary part of André-Thomas' work began after he retired from Saint-Joseph. As the story goes, he was called to a maternity hospital to examine an anencephalic neonate; this was the starting point for his original contribution on the neurological examination of neonates and neurodevelopment in infancy.<sup>21,22</sup> This subject later became a key focus of Ajuriaguerra's scientific work.

*Jean Lhermitte and the birth of neuropsychology at Sainte-Anne*

The key figure in the origin of neuropsychology at Sainte-Anne was Jean Lhermitte (Figure 3), who, despite his extraordinary virtues and numerous merits, was unable to access a place at the Salpêtrière.<sup>23-26</sup>

Jean Lhermitte's first masters included F. Raymond, Pierre Marie, and G. Roussy. He had an excellent foundation in anatomy and neuropathology, and later directed the laboratories at Salpêtrière and Bicêtre with Pierre Marie. He and Roussy shared a special friendship,

and the pair published a fundamental work together on neuropathological technique.<sup>27</sup> During the First World War, he worked with H. Claude at the neurological centre of the 8th military region (Bourges), carrying out in-depth studies of patients with spinal cord and brain injuries. He was also interested in war psychoneuroses (on which he worked in collaboration with Roussy).<sup>28</sup> An indirect victim of the conflict mentioned above between the schools of Dejerine and Pierre Marie, he was never appointed to any senior position in neurology, and later went to work at Hôpital Paul-Brousse in Villejuif, which thanks to Roussy gradually became one of France's leading oncological hospitals. H. Claude appointed J. Lhermitte as an associate professor under his chair at Sainte-Anne in 1923, where he greatly influenced Ajuriaguerra and Hécaen. Lhermitte refused to accept the position left vacant by Lévy-Valensi, whose whereabouts were unknown after his arrest and deportation. When the latter's death came to light, Lhermitte was not appointed due to his advanced age; instead, he was named an honorary professor.



Figure 3. Jean Lhermitte. National Library of Medicine Digital Collections.

We may assert that Jean Lhermitte wrote about “all of neurology,” given the exceptionally broad focus of his work (his biographers calculate that he published over 800 articles and 16 books), although his main contributions were in the fields of neuropsychiatry and neuropsychology. Ajuriaguerra<sup>29</sup> meticulously described his master’s neurological works, from classical clinicopathological studies of tumours, strokes, haemorrhages, and lymphomatosis, to his experimental studies on nervous system disease due to deficiency or toxicity. He made semiological contributions on various spinal cord lesions, cerebellar atrophies, pontine vascular syndromes, diencephalic and thalamic syndromes, and particularly alterations to higher and symbolic functions,<sup>30</sup> hallucinations, disorders of body image or sleep, dementia, etc. He was profoundly religious, and studied miracles and demonic possession, as well as the relationship between psychiatry and mysticism. His extraordinary body of work resulted in several

eponyms: dysplastic ganglioneuroma of the cerebellum, or Lhermitte-Duclos disease,<sup>31</sup> Lhermitte peduncular hallucinosis,<sup>32</sup> and the Lhermitte sign (a misnomer, as it is actually a symptom), observed in patients with lesions to the dorsal columns of the cervical spine, particularly in multiple sclerosis.<sup>33</sup>

*Julián de Ajuriaguerra (1911-1993) and Henry Hécaen (1912-1983), the two successors of Jean Lhermitte in the origin of neuropsychology at Sainte-Anne*

These two extraordinary neurologists/psychiatrists were contemporaries, and shared a close friendship and collaboration (they were known as Lhermitte’s “Siamese twins”), which may partly have been due to the shared nationalist sentiment that they openly professed (Ajuriaguerra was from the Basque Country, and Hécaen from Brittany), as well as the mutual support they lent one another during times that were very trying for both of them in the rigid French hospital system.

The vast oeuvre and complicated life of Ajuriaguerra are addressed in several articles<sup>34-36</sup> and books,<sup>37</sup> and in a doctoral thesis.<sup>38</sup> The complicated journey of his life can be divided into several stages. The first was his years of study, training, and hard (but fruitful) work between 1933 and 1950. The second was from 1950, when he took French citizenship and regularised his situation, to 1959. The third, between 1959 and 1975, coincides with his position as chair of psychiatry in Geneva; and the fourth was his time as a professor at the Collège de France between 1976 and 1981. After this, he retired to his home, “Hegoa,” in Villefranche, where he died in 1993, as fate would have it, due to degenerative dementia, a disease he had studied for so much of his life. For the purposes of this article, focusing on the Sainte-Anne hospital, we shall only address the first two stages, before he left for Geneva, where he carried out excellent work as an instructor and in the organisation of modern psychiatric care, without overlooking his foundations in neurobiology and neurochemistry (he witnessed the introduction of levodopa by the Swiss pharmaceutical laboratory Roche, and the role of catecholamines both in neurological disease and in psychosis).

On the advice of a well-educated family member, young Julián was sent to Paris to study medicine in 1927 (his brother Juan went to Germany). He took open examinations in Salamanca and Valladolid during the summers to obtain a degree in Spain, although this did not come

to fruition due to the outbreak of the Spanish Civil War, in which he fought on the side of the Republicans.

He began his internship in 1933, hoping to study psychiatry. In 1936, he presented his doctoral thesis on pain in central nervous system lesions. From 1938 to 1946, he worked as an assistant at the neuropathology laboratory of Jean Lhermitte, his principal mentor in neurology, alongside André-Thomas. In 1946 he was designated an associate professor of neurology and psychiatry “of foreign qualification.” As a result of this status, he could not be paid to work as a physician, and survived in precarious conditions, working on-call shifts and in other jobs, and living in an attic at Hôpital Henri-Rousselle. He married in 1945. During this period, he also received extraordinary training in psychiatry, both with Guiraud and Marchand under the chair of H. Claude, and with other figures outside academic psychiatry, such as Clérambault and Pierre Janet. The influence of Pierre Janet and André-Thomas sparked an interest in one of his favourite subjects, child neurodevelopment, muscle tone, relaxation techniques, and psychomotricity in general.<sup>39</sup> As if this were not enough, he also became interested in psychoanalysis (he was analysed by S. Nacht), surrealism (he had contact with Michaux, Breton, and Éluard), and the effects of hallucinogenic drugs.

In 1950, he applied for French citizenship, and validated his baccalaureate (1950), medical degree (1951), and doctorate (1954), with a new thesis directed by J. Delay on the neuropsychiatric manifestations of brain tumours.

During his time at Sainte-Anne, Ajuriaguerra produced extraordinary scientific work, particularly reflected in several monographs that remain classics in his field; for instance, he published works on vision disorders with Lhermitte<sup>30</sup> and on epilepsy with Marchand.<sup>40</sup> Collaborating with Hécaen, in 1949 he published *Le cortex cérébral*,<sup>41</sup> considered by many to be the inaugural text of neuropsychology, which was not yet known by that name. He published another two monumental works with André-Thomas, on the body axis and muscle tone.<sup>19,20</sup> Strongly influenced by André-Thomas, he created a multidisciplinary team dedicated to psychomotor and language disorders.<sup>39</sup> He remained in contact with this group during his time in Geneva, and resumed his research upon his return to the Collège de France in 1975, dedicating his courses and activities to develop-

mental neuropsychology. Ajuriaguerra did not conceal his pride in the two key achievements of his professional career, his appointment to the chairs in Geneva and at the Collège de France, which he was awarded based on merit, without the intrigue that so often characterised other types of contests and competitive examinations.

Very influenced by Piaget’s ideas on the stages of childhood neurodevelopment, he argued that cognitive and behavioural disorganisation in “senile” dementia followed these stages in reverse. Against the evidence from neuropathology research, he defended the dichotomy between Alzheimer disease and senile dementia, which may also involve a process of “Alzheimerisation.”

Henry Hécaen (1912-1983) (Figure 4), born in Brest, studied medicine in Bordeaux and served as a physician in the navy before beginning training at Sainte-Anne in 1942, studying neurology under Jean Lhermitte and psychiatry under Henri Ey. He also collaborated with Jean Lhermitte in Villejuif, and the pair developed an extremely close relationship, almost that of father and son. He worked in several different hospitals, eventually coinciding with Ajuriaguerra and Talairach in Marcel David’s team at Hôpital Paul-Brousse. The whole team transferred to Sainte-Anne in 1950. In 1952, Hécaen visited Montreal, working in Penfield’s team at McGill University; this experience played a decisive role in his career, particularly in terms of his international influence.<sup>42-46</sup> Upon returning from Montreal he rejoined Sainte-Anne, where he spent most of the remainder of his career, first with a team at the Centre National de la Recherche Scientifique (1964) and later directing a neuropsychological and neurolinguistic research unit at the Institut National de la Santé et de la Recherche Médicale (1970). He was director of studies at École Pratique des Hautes Études, but was never appointed to a senior position within the rigid university/hospital system of the day.

In 1951, he promoted an international symposium with a group of leading international figures including Oliver Zangwill and Hans Hoff, which led to the creation (later, in 1963) of the journal *Neuropsychologia* (which Hécaen edited until 1981). This publication was the first in the specialty that, in 1972, Hécaen defined as “the study of the mutual relationships of mental functions and cerebral structures.”<sup>42</sup>



Figure 4. Henry Hécaen. National Library of Medicine Digital Collections.

It may be asserted, without exaggeration, that Hécaen's oeuvre (comprising more than 20 books and 300 articles) addresses neuropsychology in its entirety.<sup>25,45,46</sup> With his inseparable friend Ajuriaguerra, he published an enduring monograph on hallucinations and illusions of body image.<sup>47</sup> In this vast body of work, three articles in particular may be considered fundamental: those on Bálint syndrome<sup>48</sup> (an eponym coined by Hécaen himself), on the concept of apractagnosia due to lesions of the "minor" hemisphere,<sup>49</sup> and on prosopagnosia.<sup>50</sup> All of these were landmark achievements in the field. Other noteworthy contributions were his studies on the problem of hemispheric dominance (addressed extensively in a monograph, *Les gauchers*,<sup>51</sup> published with Ajuriaguerra), the role of the right hemisphere, perceptual and cognitive disorders, topographical disorientation, dressing and constructive apraxia,

acalculia, aphasias and agraphia, body schema alterations, etc. His vast knowledge is condensed in a treatise that marked the beginning of a new era.<sup>52</sup>

*The chair of psychiatry at Sainte-Anne, chlorpromazine, and the birth of psychopharmacology*

As mentioned in the introduction, on the initiative of the highly influential Charcot, the first chair of mental diseases was created at Sainte-Anne in 1876; it was first occupied by Charcot's disciple Ball (1877-1893), and subsequently by Joffroy (1894-1908), Ballet (1909-1916), Dupré (1916-1921), Claude (1822-1839), Laignel-Lavastine (1939-1942), Lévy-Valensi (1942-1943), and Delay (1946-1970). Lévy-Valensi's tenure was very brief, truncated by his deportation for being Jewish and his subsequent death at Auschwitz. All the other chairs made important contributions to psychiatry, which are beyond the scope of this study. One of Ball's major contributions was the creation in 1881 of the journal *L'Encéphale*, in which a significant proportion of scientific research at Sainte-Anne was published, almost becoming the hospital's official publication; the journal remains active today. These were decades of enthusiastic work on the organic, psychological, and social basis of psychiatric disease, the emergence of psychoanalysis, the relationship between neurology and psychiatry, care models with the role of outpatient and community psychiatry, etc.

A highly influential figure, although he never became chair or even head of the department at Sainte-Anne, was Henri Ey (1900-1977), who was trained at the same hospital with H. Claude. An outstanding psychiatrist, and the author of a highly successful treatise on psychiatry, Ey was a contemporary of Jean Delay, although their personal relationship was less than ideal. He was director of the Bonneval hospital, but continued training for years through a series of famous seminars and lectures ("les mercredis de Sainte-Anne"). He stood out for his attempts to bring psychiatry together with neurology and psychoanalysis through a concept he called "organodynamism." A key work on the subject was *Les rapports de la neurologie et la psychiatrie*, which he published with the inseparable friends Ajuriaguerra and Hécaen.<sup>53</sup> He was awarded all manner of medals and distinctions, enjoyed enormous social and economic success, and amassed an exceptionally valuable library, which is preserved at Sainte-Anne.

Jean Delay (1907-1987) (Figure 5) was highly intelligent and exceptionally well trained.<sup>1,3,54,55</sup> He studied psychology and medicine, specialising in neurology at the Pitié-Salpêtrière with a thesis on astereognosis, underwent psychoanalysis (although he later distanced himself from the discipline), trained in psychiatry with Henry Ey at Sainte-Anne, and even studied philosophy, earning a doctorate at the Sorbonne with a thesis on “les dissolutions de la mémoire.” In addition to his successful career in psychiatry, he found the time and had the literary talent to write several novels and other works, such as a well-regarded psychobiography of André Gide, which was very successful and led to his admission to the Académie Française. In 1942 he was appointed as an associate professor and in 1946, after the premature death of Lévy-Valensi, he took on the chair and leadership of the service, where monotherapy with chlorpromazine was tried for the first time in psychiatric patients,<sup>56,57</sup> after a series of initiatives and coincidences with Henri Laborit as the protagonist.

Henri Laborit (1914-1995) (Figure 6) was a navy surgeon; he was born in Hanoi, which may explain his somewhat adventurous personality.<sup>58</sup> After settling in Paris (Hôpital Val-de-Grâce), he became very interested in finding drugs to use for pre-anaesthesia, seeking to reduce the consequences of surgical stress, cause sedation, and induce hypothermia, a sort of artificial hibernation. These ideas were a constant throughout his life, and he coined a term and inaugurated a specialty with a journal named *Agressologie*. Laborit was a multifaceted figure,<sup>58</sup> interested in biology, urban planning, ethology, psychology, and psychoanalysis, among other disciplines; he enjoyed great popularity, which today has been lost, and left a vast body of written work.

The first drug he trialled for pre-anaesthesia was an antihistamine, promethazine, which yielded promising results. He convinced the Rhône-Poulenc laboratory to continue researching similar compounds, and they synthesised chlorpromazine (4560RP), which Laborit tested on his patients, confirming that it caused sedation without somnolence<sup>59</sup>; he suggested to colleagues in psychiatry that they test it on agitated patients. This treatment was trialled for the first time on Saturday 19 January 1952, on a manic patient with psychotic symptoms. The results were astonishing, although the drug was administered in combination with barbiturates and opiates.



**Figure 5.** Jean Delay. Source: Science History Institute: Museum & Library [Internet]. Philadelphia: Science History Institute; ©2023. Paul Charpentier, Henri-Marie Laborit, Simone Courvoisier, Jean Delay, and Pierre Deniker; [accessed 8 Sep 2023]. Available from: <https://www.sciencehistory.org/education/scientific-biographies/paul-charpentier-henri-marie-laborit-simone-courvoisier-jean-delay-and-pierre/>

Pierre Deniker (1917-1998) (Figure 7), the chief of the men’s ward at Sainte-Anne, learned of this experience by coincidence, from a family member, and asked Rhône-Poulenc for some samples so that he may try the drug in monotherapy in psychotic patients, initially administering it intramuscularly (dosed at 15-100 mg). Together, Delay and Deniker published articles describing their results (sedation, reduced motor activity, affective and emotional indifference).<sup>56,57</sup> Delay coined the term “neuroleptic,” encompassing all drugs that reduced psychomotor activity. Chlorpromazine was marketed in Europe as Largactil (apparently an idea of Laborit’s, an





Figure 6. Henri Laborit. National Library of Medicine Digital Collections.

abbreviation of “large action”); Laborit incorporated the drug in his famous “lytic cocktail,” administering it in combination with promethazine and pethidine.

The introduction of chlorpromazine revolutionised the treatment of psychosis and psychiatric care itself, as well as bringing about the beginning of psychopharmacology. Delay, who had been president of the first World Congress of Psychiatry in 1950, presented the first classification of psychopharmaceuticals at the 1961 Congress.

#### *The role of Sainte-Anne in the development of neurosurgery in Paris*

The origin of neurosurgery in Paris (and indeed in France) is bound to the names of Clovis Vincent (1879-

1947) and Thierry de Martel (1875-1940).<sup>60</sup> Both men trained as neurologists at the Salpêtrière, and De Martel had subsequently followed the path of general surgery. However, thanks to the influence of Babinski (now at the Pitié, having left the Salpêtrière), they both turned towards neurosurgery, establishing the first neurosurgery unit. De Martel regularly visited Victor Horsley, the pioneer of neurosurgery in Britain, and also visited Cushing several times.

Marcel David (1898-1986) trained with Vincent and De Martel. In 1927, Vincent, David, and Puech made a study trip to the United States to visit Cushing’s department; Vincent was “amazed” by the experience. Back in Paris, they continued developing the specialty, under very trying circumstances. Patients were examined and neuroradiological tests were practised at the Pitié, but procedures were conducted at De Martel’s clinic. Vincent quickly learned neurosurgical technique, and a schism soon formed between the two. De Martel continued operating in private clinics (at the American Hospital, among others), until his tragic suicide in 1940, after German troops entered Paris.

In turn, Vincent’s efforts led to the official recognition of the neurosurgery service at the Pitié in 1933, and the creation of the first chair of neurosurgery in 1938. However, there was a great crisis at the centre in 1939; Puech was sacked and transferred to Sainte-Anne, and David resigned in order to be able to work at several hospitals.

After Puech’s premature death in 1950, David transferred to Sainte-Anne, working there until 1960, when he was appointed to the chair at the Pitié. This decade of Hôpital Sainte-Anne’s history is the most relevant to this article. During this time, David showed a great capacity to integrate other disciplines (with the noteworthy exception of classical neurology) into neurosurgical practice. He promoted neuroradiology as an independent specialty, with a department including Giovanni Ruggiero, who travelled there from Sweden. He was also a driving force in the development of examinations using isotopes, electroencephalography (EEG), and neuropathology. Above all, he promoted neuropsychology, working with Ajuriaguerra and Hécaen.

However, David’s greatest contribution to the field of neurosurgery was through his work with Jean Talairach (1911-2007) (Figure 8), who began his career at Sainte-Anne as a psychiatrist with Henri Ey, his cousin, and eventually became chief clinician under Delay.<sup>61,62</sup> After

discovering neurosurgery with David in around 1942, he followed him to various hospitals, until he was appointed as associate professor of neurosurgery at Sainte-Anne in 1950. In addition to conventional neurosurgery, he also performed frontal lobotomies, a highly popular procedure at the time (around 80 patients in the period 1949-1954), with unsatisfactory results, considering the aggressiveness of the procedure.

In 1954, he designed his first stereotactic device for use in transsphenoidal approaches to the pituitary gland, which he subsequently modified for use for other indications.<sup>63</sup> Of all these procedures (tumour biopsy, implantation of radioactive seeds for local radiotherapy, functional surgery for psychiatric disorders, pain, or movement disorders), the most original and enduring was the implantation of deep electrodes for EEG or stereo-EEG recording in patients with refractory epilepsy.<sup>64-68</sup> This fundamental contribution was made possible by the collaboration of Jean Bancaud, with whom he developed a protocol called the “*méthode Sainte-Anne*,” which inspired epilepsy surgery programmes worldwide. After his retirement in 1978, Tailarach remained an active researcher, publishing two new editions of his anatomical brain atlas for stereotactic surgery.

Jean Bancaud (1921-1993) studied medicine and philosophy in Paris.<sup>69</sup> He undertook training in neurology at the Salpêtrière and in EEG at the Pitié, with Fischgold. He focused nearly exclusively on the study of epilepsy, and collaborated with the neurosurgeons Mazars and Guillaume in the first electrocorticography-guided procedures. Later, he began working closely with Talairach, with whom he refined stereo-EEG through the use of deep electrodes; from 1962, this revolutionised understanding of seizure onset, propagation, clinical manifestations, and surgical options.<sup>70-76</sup> By 1974, they had operated on over 200 patients, and the Sainte-Anne protocol was an inspiration for many other centres worldwide. Bancaud never held a senior hospital or university position, working throughout his career at a unit belonging to the Institut National de la Santé et de la Recherche Médicale, where he eventually became director of research in 1975.

#### *Some other relevant figures*

In this atmosphere of neuropsychiatry, neuropsychology, and neurosurgery, other disciplines also reached great heights, with some outstanding figures. To name

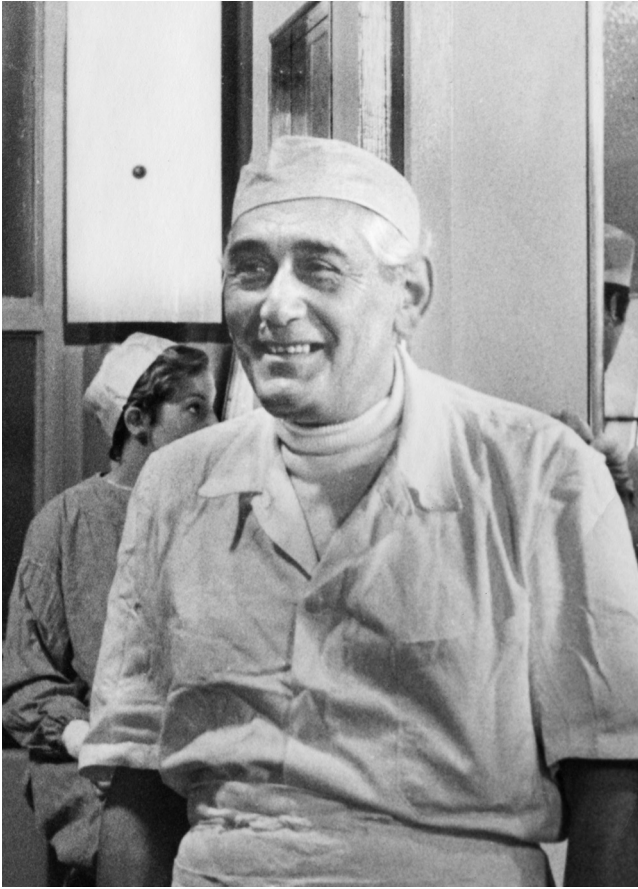


**Figure 7.** Pierre Deniker. Collection: Images from the History of Medicine (IHM). National Library of Medicine.

just a few, we should mention G. Ruggiero, who practised neuroradiology before the advent of computed imaging, and Catherine Daumas-Duport, a modern neuropathologist.

Ruggiero was trained in Sweden, and subsequently transferred to Sainte-Anne. He modified the gas encephalography (“fractionated” encephalography) technique, publishing a highly successful monograph on the subject in 1957. After returning to Italy, he became a leading figure in promoting the recognition of neuro-radiology as a medical specialty.

Dr Daumas-Duport was a proficient general neuropathologist, although due to the neurosurgical setting in which she worked, her two main areas of interest were the morphological basis of refractory epilepsy and the



**Figure 8.** Jean Talairach. Library and Documentation Service, Muséum de Toulouse.

neuropathology of tumours. In this field, she gained international recognition for describing dysembryoplastic neuroepithelial tumours, and for her fundamental contributions to the histological and molecular classification of gliomas and other brain tumours.

#### *The first neurology department at Sainte-Anne*

This historical review ends at the creation (as late as 1974) of the first neurology department at Hôpital Sainte-Anne, an institution with a longstanding psychiatric and neurosurgical tradition. The department was led by Prof Pierre Rondot, a great general neurologist and renowned expert in Parkinson's disease and movement disorders. Prof Rondot named the new centre, which today brings

together neurology, neurosurgery, neuroradiology, neurophysiology, and associated clinical specialties, after his master Raymond Garcin, another of the great *patrons* at the Salpêtrière. The centre's historical pavilions now provide all aspects of psychiatric care.

#### **Discussion**

After the many vicissitudes of the 17th, 18th, and much of the 19th century,<sup>6</sup> it can be said that the modern history of Hôpital Sainte-Anne and its focus on psychiatry began with Magnan and was consolidated with the creation of the first chair of mental and brain diseases at the centre, with B. Ball as its first occupant.<sup>9-11</sup> Charcot is frequently described as a psychiatrist (due to his dedication to hysteria), and the specialty of psychiatry is often said to have preceded neurology, both institutionally and academically. However, out of respect for history, we should insist that the reverse is true. Charcot trained and practised for years as an internist, until he eventually specialised in neurology, establishing the clinicopathological underpinnings of many neurological diseases. His interest in hysteria was induced, and occurred late in his career,<sup>77</sup> and was completely unrelated to mental illness, which was the ambit of the alienists. It was Charcot who promoted the creation of the first chair and clinic for mental illness, and established some of the foundations of modern psychiatry (a term which did not yet exist).<sup>78</sup>

The fact that both Ball and his two successors (Joffroy and Ballet) were disciples of Charcot probably had a strong influence on the neurological slant of psychiatric practice at Sainte-Anne, which we may describe as neuropsychiatry. Indeed, several of the protagonists of this story were at the centre of debates on the nature of and the reciprocal relationships between neurology, psychiatry, neuropsychology, and neuropsychiatry.<sup>53,79</sup> However, Henri Claude, despite his training in neurology at the Salpêtrière under Bouchard and Raymond, was one of the first to introduce psychoanalysis and psychotherapy. Thus, the scientific atmosphere and the opportunity for debate at Sainte-Anne in the period 1920-1940 had all the necessary ingredients.

Besides these conceptual considerations, it is surely easier to find unanimous consensus on the notion that Sainte-Anne became, to a great extent, the birthplace of modern neuropsychology. This was partly due to the extraordinary influence on Ajuriaguerra and Hécaen of

Jean Lhermitte, without a doubt the most neuropsychiatric of the neurologists of the day, further reinforced by a very solid foundation in neuropathology. Without exaggeration, we may characterise Ajuriaguerra's interests as encyclopaedic: particularly after he left for Geneva, they encompassed many fields beyond his primitive first steps in neuropsychology with Hécaen at Sainte-Anne. Influenced by his master André-Thomas, Ajuriaguerra focused on paediatric patients; he was interested not only in pathology, writing one of the first texts on child psychiatry,<sup>80</sup> but also in the normal development of psychomotricity,<sup>39</sup> eventually giving courses on neurodevelopmental neuropsychology during his time as a professor at Collège de France. Fascinated by the early responses of neonates and infants and their relationship with the mother, he famously quipped that "after the first year, everything else is geriatrics."

On the contrary, Hécaen never shifted his focus, dedicating his entire career to studying the effects of brain lesions on higher or symbolic brain activity, a discipline that he himself named neuropsychology (the term had existed previously, but did not include this meaning). According to those who knew him, Hécaen struggled to express himself and was a man of few words, but was very cordial in the privacy of his own home and with his friends, who describe his personality in glowing terms ("elegant," "sensitive," "passionate," "quiet and modest," "warm and generous," etc).<sup>43-45</sup> These positive qualities, among others, probably facilitated his international relationships, particularly with Penfield and Brenda Milner after his time in Montreal, as well as the creation and consolidation of the research group at Sainte-Anne, which won praise from Penfield ("maybe the best staff in the world").<sup>45</sup> They were also highly important in his inspiring and leading the heterogeneous international group that culminated in the creation of the International Neuropsychology Symposium and the birth of the journal *Neuropsychologia*. According to Zangwill's<sup>81</sup> detailed account of his recollection of these events, it all began when Hécaen invited a small group of attendees of an international psychiatry conference to an informal meeting at his home in Paris, and proposed his idea of creating a symposium to address the subjects that he considered to be at the frontier of neurology, psychiatry, and psychology.

In 1977, he spoke to the Société de Neuropsychologie de Langue Française in his inaugural address,<sup>82</sup> detailing his ideas about neuropsychology and its relationships with other branches of psychology and neuroscience; some consider this an intellectual testament, required reading for anybody interested in the subject.

A critical moment in the development of psychiatry at Sainte-Anne occurred after the turbulent years of the Second World War and the German occupation of Paris. Some of the protagonists of this story, including Hécaen, Talairach, Bancaud, and Deniker, were highly active in the resistance, whereas others were less so, as Ajuriaguerra admitted of himself, not without a degree of humour. Sainte-Anne served as a refuge for several individuals persecuted by the Gestapo. After the deportation and murder of Lévy-Valensi, Jean Delay was appointed to the chair of mental and brain diseases.

As mentioned previously, Delay, together with Deniker and inspired by Laborit, played a decisive role in the introduction of chlorpromazine in the treatment of psychosis<sup>83</sup>; as an aside, this was probably carried out without any respect whatsoever for the ethical standards governing clinical trials today, possibly even without obtaining written consent, and certainly without the prior phases analysing safety and dosing.

The drug had an immediate and all-encompassing impact, transforming psychiatric care almost overnight. As an example, Jean Delay organised the first World Congress of Psychiatry in Paris in 1950, with all the lectures delivered focusing on the traditional and controversial shock therapies (insulin coma, cardiazole, electroshock therapy), the only treatments available at the time. But just two years later, at the second congress held in Zurich in 1952, the star subject was psychopharmaceuticals, which were received with undisguised enthusiasm worldwide, and particularly in the United States, despite the adverse effects that soon came to light (parkinsonism, dyskinesia, metabolic and hormonal disorders, etc). Statistics showing the dramatic reduction in numbers of institutionalised mentally ill patients obscured the evidence on the adverse effects of Thorazine (the commercial name of chlorpromazine in the United States).



**Figure 9.** *L'arbre à mains*. Frédéric Delanglade, 1936. Source: GHU Paris: psychiatrie & neurosciences [Internet]. Paris: GHU Paris; [s.d.]. Les 3 fresques de la salle de garde: 1936, 1945 et 1964; [accessed 8 Sep 2023]. Available from: [https://bibliotheques.ghu-paris.fr/index.php?lvl=cmspage&pageid=6&id\\_rubrique=297](https://bibliotheques.ghu-paris.fr/index.php?lvl=cmspage&pageid=6&id_rubrique=297)

However, the human story around chlorpromazine did not end happily. The prestigious Lasker Foundation awarded its 1957 Clinical Medical Research Award (considered by some to be the American Nobel Prize) to Laborit, Deniker, and Lehmann, marginalising Delay, possibly because the foundation considered his prominence to be the result of his position as *patron*, with the merit belonging to the others. The same three men were also nominated for the Nobel Prize, but Delay, who sat on the committee and aspired to win the prize for himself, voted against them. Laborit seems to have held a lifelong grudge against Delay and the psychiatric establishment at Sainte-Anne.

The final years of Delay's career were unpleasant. It is easy to understand how, during the student revolts of May 1968, he became a target for the youth's rage against the "mandarins" and *patrons*, sharpened in this case by the "antipsychiatry" ideas originated and disseminated by David Cooper.<sup>84</sup> Delay's offices were attacked by the students, and he never recovered from the moral blow. Citing the reform of the medical school, which was decentralised with the creation of several universities in

Paris, and the legal division of neurology and psychiatry he resigned, retiring to his private activities and reading.

In addition to neuropsychology, the other great vocation at Sainte-Anne was neurosurgery, which had truly been born at the Pitié. Babinski was decisive in promoting neurosurgery in academia, mirroring Charcot's role in psychiatry. There is a well-known anecdote about a conversation between Babinski and his friend Darier.<sup>60</sup> The great neurologist of Polish descent, now old and infirm, was in a low mood and sought consolation in the conviction that he would leave behind some lasting memory. "What do you think I will leave behind after I die?" he asked Darier. The latter responded "Your sign, that is for sure." "No, my greatest achievement was showing the way to neurosurgery to De Martel and Vincent," replied Babinski.

One disciple of these pioneering neurosurgeons was Marcel David, who played a vital role in the development of the neurosurgery department at Sainte-Anne in the 1950s; furthermore, he transformed it into a platform for interdisciplinary cooperation with neuropsychiatry.

chology, neuropathology, neuroradiology, etc. Through his support, Talairach was able to develop his extraordinary talent in the design of stereotactic frames and the brain atlases needed to use them. I mentioned above that of all the possible applications of these devices, the most original was the implantation of deep electrodes for stereo-EEG recording, which revolutionised the understanding of refractory epilepsy and its surgical treatment, and constitutes one of the most significant contributions of Hôpital Sainte-Anne to clinical neuroscience.

This historical overview of Sainte-Anne, focusing on the centre's contributions to clinical neuroscience, would not be complete without a few short paragraphs addressing the hospital's past as a meeting point between psychiatry, psychoanalysis, and art, particularly surrealism. Psychoanalysis had a strong tradition at Sainte-Anne, promoted initially by Claude and subsequently, in the 1930s, by Jacques Lacan,<sup>85</sup> who was not a member of the hospital staff but held seminars there for many years. This distinctive personality, a controversial character in the history of psychoanalysis who created his own school, had close links with the surrealist movement, for instance with such figures as Breton and Dalí, who defended hysteria and paranoia as supreme forms of expression. Lacan psychoanalysed Dora Maar, a famed photographer and painter who visited the on-call room at Sainte-Anne. Pablo Picasso's lover and muse, she was mentally traumatised by the way the great painter treated her and had to be admitted to hospital. By all accounts, the on-call room at Sainte-Anne was the scene of vigorous debate on the relationship between art, mental disorders, and psychoanalysis, and even the effects of hallucinogens.

This connection is famously exemplified by the murals painted on the walls of the interns' on-call room. A longstanding tradition at French hospitals is that these on-call rooms are a closed environment, exclusively to be used by medical interns, that *patrons* and professors were prohibited from entering. They are libertarian islands within the hospitals, one of the most rigid and authoritarian places imaginable. In addition to the *tonus* (parties at which alcohol flowed freely), a traditional way of reinforcing this special environment, where interns unburdened themselves of the pressures of care and hierarchy, was to cover the walls with irreverent murals, which were transgressive, critical of authority, and often sexually explicit. A singular phenomenon that occurred at Sainte-Anne was that, in 1936, Frédéric



**Figure 10.** Street signs within Hôpital Sainte-Anne, dedicated to famous artists, many of whom had general or mental health conditions.

Delanglade and other professional artists painted extraordinary surrealist scenes, such as “*L’arbre à mains*” (Figure 9), in the on-call room, which at the time was in the Mangan pavilion.<sup>86,87</sup> Unfortunately, the German occupiers found in that decadent artwork an allusion to the Nazis, a horse bearing a swastika, and destroyed the paintings.

After the liberation of France, in 1945, a group of artists including Delanglade as their leader held an impromptu session to paint new murals, an exercise of improvisation that he himself defined as “collective surrealist method” (wrongly characterised as “automatic”), producing a series of equally extraordinary murals, with “*L’oiseau icarien*” standing out in particular. However, this singular work of collective art, bringing together painting and the experience of dream, was also demolished when renovation works were carried out to expand the room’s library in 1963. In 1964, Delanglade once more offered his services, reproducing a second version of “*L’arbre à mains*,” which again lasted less than a year.

There is also another extraordinary facet of painting at Sainte-Anne.<sup>88</sup> In 1946, the first exhibition of paintings

by psychiatric patients was held, and 1950 saw the first International Exhibition of Psychopathological Art. These were the origins of a collection of works by “patient-artists” with diagnostic and psychotherapeutic intentions. Works by “artist-patients” institutionalised at Sainte-Anne are also preserved. The first exhibitions of this collection had a strong focus on psychopathology, aiming to identify the characteristic manifestations of one or another disease in the works; in some way, this created a stigma towards the work, its author, and his/her disease. Over the years, the focus shifted towards assessment of artistic creation. Donations have grown exponentially and a modern collection has now been established that contains over 70 000 pieces; the collection is managed by the Centre d’Étude de l’Expression and by the hospital itself, and all manner of exhibitions have been held. Both collections represent a great scientific and artistic legacy that, together under the name “Musée d’Art et d’Histoire de l’Hôpital Sainte-Anne,” have been attributed the status of “Museum of France.”

But beyond these figures and honours, we must reflect on the following observation from A.M. Dubois,<sup>88</sup> equally valid for “patient-artists” and “artist-patients”:

“Pour les uns comme pour les autres, au détour de l’épisode aigu, la reprise d’une activité de création, ou la découverte d’un potentiel ou d’un plaisir de cette nature, est un facteur qui a pu largement participer à leur guérison, à leur amélioration, à leur goût de vivre, à leur qualité de vie” (For the one and the other, upon returning from a crisis, the recovery of creative activity or the discovery of a capacity or pleasure of this type is a factor that may have contributed broadly to their being cured, to their improvement, to their enjoyment of life, to their quality of life).

We should make two final comments on the relationship between Sainte-Anne and art. Many of the wide streets within Sainte-Anne are named for famous artists (Figure 10), some of whom had severe physical or mental health problems, including Van Gogh, Artaud, Camille Claudel, Verlaine, Apollinaire, Beaudelaire, Utrillo, Schumann, Kafka, Ravel, etc; this is a special tribute to these individuals, from a hospital with a long history in psychiatry. These names include those of artists who played a decisive role in the Surrealist movement, such as Breton and Michaux. Furthermore, the hospital gardens, exquisitely cared for, contain an extraordinary collection of statues. Together, they contribute to a very

special atmosphere, perfect for a stroll on a grey, rainy afternoon in Paris, on the verge of an attack of melancholy, which is agreeable as it is fleeting. It also serves as a reminder for those enjoying the pleasures of the big city to honour the professionals who care, day and night, for these unfortunate people.<sup>89</sup>

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