Justo Gonzalo Rodríguez-Leal and Karl Kleist (Frankfurt, 1934-1935)

A. García-Molina^{1,2,3}

¹Institut Guttmann, Institut Universitari de Neurorehabilitació adscrit a la UAB, Badalona, Spain.
 ²Universitat Autònoma de Barcelona, Bellaterra, Spain.
 ³Fundació Institut d'Investigació en Ciències de la Salut Germans Trias i Pujol, Badalona, Spain.

ABSTRACT

Introduction. Between 1907 and 1937, the Council for Study Extensions and Scientific Research (JAE, for its Spanish initials) implemented a system of grants (known as *pensiones*) to promote the training of Spanish researchers abroad. In this context, Justo Gonzalo Rodríguez-Leal was awarded a grant to further his medical training in Frankfurt. This article documents this period of his life based on two primary sources: the digital archive of the JAE and Justo Gonzalo's family archive.

Development. This article reviews the difficulties that Justo Gonzalo faced to win a grant, and his stay during the 1934-1935 academic year at Universitäts Nervenklinik under Karl Kleist. Details are also provided on the publication of the research he conducted in Frankfurt on the pathophysiology of the thalamus, as well as his relationship with Kleist after returning to Spain.

Conclusions. The documents included in the family archive of Dr Justo Gonzalo Rodríguez-Leal offer insight into the functioning of the JAE grants and into the personal relationship between Gonzalo and Kleist.

KEYWORDS

Justo Gonzalo Rodríguez-Leal, Karl Kleist, Council for Study Extensions, grant, Universitäts Nervenklinik, pathophysiology of the thalamus

Introduction

On 11 January 1907, a Spanish Royal Decree issued by the government led by Antonio Aguilar y Correa (1824-1908), marquess of Vega de Armijo, created the Council for Study Extensions and Scientific Research (JAE, for its Spanish initials).¹ Over the 30 years of its existence, the JAE gave a decisive push to Spanish research through such institutions as the Residencia de Estudiantes, the Spanish National Museum of Natural Sciences, and the Spanish National Institute of Sciences. The Spanish Civil War marked the end of the JAE, which was dismantled by the Nationalist government on 8 December 1937. Two years later, on 24 November 1939, General Francisco Franco Bahamonde issued a law creating the Spanish National Research Council (CSIC for its Spanish initials).

The JAE's objectives included promoting research and providing scientific training through a system of grants, known as *pensiones*, for the training of Spanish researchers abroad.^{2,3} The grants were usually awarded for an academic year, but were occasionally extended to a whole calendar year, allowing for the recipient of the grant to improve their foreign language skills over the summer. The funds provided by the JAE were often insufficient, however; hence the expression "hunger grants." José Castillejo (1877-1945), the secretary of the JAE between 1907 and 1935, who was responsible for managing the



Figure 1. A) Justo Gonzalo (1910-1986). B) Karl Kleist (1879-1960).

grants, regarded them as a financial support, rather than a "pretext to go travelling." Researchers who were awarded a JAE grant had to submit a life certificate on a monthly basis, as well as a summary of the work conducted during that period. At the end of the training period, the researcher had to submit a report of their activity at the host institution, which was published in the annals of the JAE.

Over its three decades of life, the JAE received around 9000 grant requests, but few more than 1400 were granted⁴; 287 of these were awarded for research on biology or biomedicine.⁵ In the 1934-1935 academic year, Justo Gonzalo Rodríguez-Leal (1910-1986) (Figure 1A) was awarded a grant to further his training in neurology at the Universitäts Nervenklinik in Frankfurt, under Karl Kleist (1879-1960) (Figure 1B). This article

documents Gonzalo's stay in Frankfurt based on two primary sources: the digital archive of the JAE and Justo Gonzalo's family archive.

Development

The protagonists

Justo Gonzalo Rodríguez-Leal was born in Barcelona on 2 March 1910. He studied medicine in Madrid, graduating in 1933. During the 1933-1934 academic year, he completed more specialised courses at the University of Vienna with Hans Hoff (1897-1969) and Otto Pötzl (1877-1962). Thanks to a grant awarded by the JAE, he furthered his training at the Universitäts Nervenklinik in Frankfurt, with Karl Kleist, in the 1934-1935 academic year.

Upon his return to Spain, he attended patients as a consultant neurologist at the Hospital General in Madrid and conducted anatomical and clinical research on the brain at the Cajal Institute. In the 1930s, the Cajal Institute was part of the Spanish National Institute of Sciences, which was regulated by the JAE. The Spanish National Institute of Sciences was made up of a constellation of laboratories, such as the Laboratory of General Physiology, the Laboratory of Normal and Pathological Histology, and the Laboratory of Nervous System Physiology and Anatomy. In May 1936, Gonzalo Rodríguez Lafora (1886-1971) requested that Justo Gonzalo be awarded a grant to work under him at the Laboratory of Brain Physiology, which he directed. In the summer of 1937, during the Spanish Civil War (1936-1939), Gonzalo was sent to the Republican front as a physician in the Communist battalion commanded by Enrique Líster Forján (1907-1994). Early in 1938, Lafora requested that Gonzalo be sent to work in the neurology department of the military hospital of Godella, in Valencia. There, he met renowned physicians who had joined the International Brigades, including Barney Malbin and the neurosurgeon Abraham Ettleson. In Godella, Gonzalo was able to examine patients with brain lesions.^A Many of them presented symptoms that made him question the dominant ideas of brain pathology of the time. After the war, he returned to Madrid and presented his preliminary findings to the CSIC. In 1942, Rodríguez-Leal joined the latter institution as the head of the Laboratory of Brain Pathophysiology, based at the Faculty of Medicine of Madrid. In addition to his research activity, he was also a lecturer in doctoral courses on brain pathophysiology between 1945 and 1966. His book Dinámica cerebral⁶ (Brain dynamics), based on his observations in people injured in the war, was published in 1945 (volume 1) and 1950 (volume 2). Gonzalo died in Madrid on 28 September 1986.7,8

Karl Kleist was born on 31 January 1879 in Mulhouse (Alsace). After completing his medical degree in Munich, he specialised in psychiatry and neurology at the University of Halle. There, he met Theodor Ziehen (1862-1950), Gabriel Anton (1858-1933), and Carl Wernicke (1848-1905). During the first two years of the First World War, he joined the Army Medical Service of a hospital on the Western Front as a military physician. From 1916 and 1920, he worked as a professor of psychiatry at the University of Rostock. Between 1920 and 1950, he directed the Universitäts Nervenklinik in Frankfurt. In 1934, Kleist published his monumental work *Gehirnpathologie: vornehmlich auf Grund der Kriegserfahrungen* (Cerebral pathology mainly due to war experiences).⁹ After retiring in 1950, he became director of the Research Centre for Brain Pathology and Psychopathology, until his death on 26 December 1960.^{10,11}

Gonzalo and the grant from the JAE

In autumn 1933, Gonzalo travelled to Vienna to further his training, at his own expense. He trained in clinical neurology and animal research with Hans Hoff, from November 1933 to January 1934,12 and in brain cytoarchitecture with Otto Pötzl, from January to April 1934.13 Lacking economic resources, Gonzalo was unable to continue with his training abroad, and wrote to the president of the JAE on 15 January 1934 requesting a grant "to study questions of general neurology, especially motor function, from a clinical and experimental viewpoint, and to link it with disorders of tone, statics, posture, striatal automatism, etc; this study would involve clinical, histological, and experimental techniques."14 In his letter, he requested to train under Karl Kleist in Frankfurt or, alternatively, under Otfrid Förster (1873-1941) in Breslau.^B The JAE initially rejected this request because Gonzalo was already training in Vienna. However, in June 1934, after his return to Spain, the JAE awarded him a grant to train in Frankfurt, with a monthly budget of 425 pesetas. A month later, he received 600 pesetas for travel expenses.

On 24 October 1934, Gonzalo wrote a letter to Kleist to thank him for accepting him as a trainee.¹⁵ In this letter, he told Kleist that he had experience in clinical neurology and that he was familiar with cytoarchitectonic techniques thanks to his stay at von Economo's Brain Research Institute in Vienna. He also asked whether he would be allowed to perform anatomoclinical research on brain pathology in parallel with his clinical activity. Kleist replied five days later¹⁶: "Dear colleague, at my clinic you shall have the opportunity to perform stud-

^AIn 1946, Gonzalo contacted the Eminent Body of War-Wounded with a view to examining more soldiers with brain lesions. Between 1951 and 1952, he selected around 200 cases among a total of 2400 belonging to the institution, as well as 20 from the military hospital of Godella (source: family archive).

^BJusto Gonzalo's family archive includes a letter from the psychiatrist Dionisio Nieto Gómez to Gonzalo (dated 19 October 1934), in which he asserts that "the best place to train in neurology undoubtedly is in Breslau under Förster."



Figure 2. Justo Gonzalo in the library of the Universitäts Nervenklinik (1935). Personal collection of I. Gonzalo Fonrodona.

ies on brain pathology, [...] and cytoarchitecture, an area that is brilliantly represented by Dr Beck, a former member of Professor Vogt's research team." Eduard Beck (1892-1976) trained in cytoarchitectonic techniques with Oskar Vogt (1870-1959) and his wife Cécile Mugnier (Cécile Vogt) (1875-1962) at the Neurobiologisches Laboratorium in Berlin.

Gonzalo began working at the Universitäts Nervenklinik on 9 November 1934 (Figure 2). A week later, he sent a postcard to his mother and sisters telling them that he worked from Monday to Saturday, from 9 o'clock in the morning to 8 o'clock in the evening. In another postcard, dated 27 November 1934, he recounts: "I still do not know when the JAE will pay me, but it does not seem like it will be any time soon."¹⁷ Delayed payment of the monthly allowance assigned by the JAE was a constant among grant recipients.² On 5 January 1935, he explained that he had spent Christmas with Professor Kleist and his family. On 8 June 1935, Gonzalo requested a 6-month extension of his grant, attaching a letter written by Kleist, in which the professor explains Gonzalo's work at the Universitäts Nervenklinik and urges the JAE to allow him to continue his training in Frankfurt (see Supplementary Material).¹⁸ The JAE's executive committee rejected this request on 2 July of the same year. Gonzalo's stay at the Universitäts Nervenklinik ended on 26 October 1935.

Research on the pathophysiology of the thalamus

The records of Gonzalo, held at the archive of the JAE, include a report of his work at the brain anatomy laboratory of the Universitäts Nervenklinik,19 where he studied the function of the thalamus and other subthalamic structures based on the anatomoclinical study of two patients. The first patient (Buchold) showed vascular softening in the external and upper part of the red nucleus, extending from the external nucleus of the thalamus to the border of the internal capsule. The second patient (Mandelbaum) presented softening between the claustrum and the putamen bilaterally. In the right hemisphere, he displayed softening of the head of the caudate nucleus; degeneration of the internal capsule, putamen, and globus pallidus; and diffuse atrophy of the thalamus, with complete disappearance of thalamic radiations. In the left hemisphere, he presented atrophy of the putamen and globus pallidus, as well as degeneration of the geniculate portion of the internal capsule. In 1935, Gonzalo published both cases in Archivos de Neurobiología.²⁰ Three years later, the journal Monatsschrift für Psychiatrie und Neurologie published an article by Kleist and Gonzalo with a similar title.²¹ Why does Gonzalo appear as the sole author of the first article, whereas the second is authored by both Gonzalo and Kleist (Figure 3)? The explanation is found in the letters exchanged by the two researchers.

On 1 April 1936, Kleist wrote a long letter to Gonzalo analysing his studies on the pathophysiology of the thalamus,²² and suggesting that he revise both the form and the content of the manuscript:

As it is not possible to talk this through in person, for reasons of distance, I myself made the necessary changes. However, during the process I had to add so many of my own ideas that I suggest submitting the manuscript with both of us as authors. I hope that it is irrelevant for your purposes whether the study is published in your country under your name alone or by both of us. De la Clínica de Neurología y Psiquiatría de la Universidad de Frankfurt a. Main. Director: Prof. Dr. Kleist.

Sobre la localización y fisiopatología del tálamo y del subtálamo (llanto espástico, trastornos motores y posturales e hiperpatía)¹

por

Justo Gonzalo (Madrid)

PRIMERA	PARTE
· · ·	ma alínias)

(estudio anatomo-clínico)	
	Páginas.
Introducción	. 626
CASO BUCHOLD:	
Clinica.	
Anatomía	. 629
Situación nosológica	. 633
CASO MANDELBAUM:	
Clínica	. 635
Anatomía	. 638
Situación nosológica	. 644
SEGUNDA PARTE	
(estudio crítico)	
LANTO FORZADO	. 645
TRASTORNOS MOTORES Y POSTURALES.	. 648

 (Aus der Nervenklinik der Stadt und Universität Frankfurt a. M. [Direktor: Prof. Dr. Kleist].)

Über Thalamus- und Subthalamussyndrome und die Störungen einzelner Thalamuskerne¹).

Von K. KLEIST und J. GONZALO.

Mit 17 Abbildungen im Text.

Die Kenntnis von den Störungen und Leistungen des Thalamus haben deutsche und englische Forscher wie Nothnagel, Edinger, Bonhoeffer, Head und Holmes dadurch gefördert, daß sie einzelne Krankheitserscheinungen herausarbeiteten und anatomisch deuteten, während man französischen Neurologen die Beschreibung bestimmter Thalamussyndrome und ihres Zusammenhanges mit dem Verschluß einzelner Sehhügelgefäße verdankt (Déjérine, Roussy, Foix, Hillemand).

Nach beiden Richtungen glauben wir durch die beiden folgenden klinisch-anatomischen Beobachtungen einer tieferen Einsicht dienen zu können.

Fall r. Buch 3, geb. 24. XI. 18_{51} . 1917 Schlaganfall, Lähmung der linken Seite, war 5 Monate im Krankenhaus und erholte sich fast vollständig. Im Januar 1919 2. Schlaganfall, seitdem Schwierigkeiten beim Gehen, linker Arm wenig brauchbar. In einer Nervenabteilung (29. I. 1919–18. XI. 1920) wies B. folgende Symptome auf: Beiderseits beginnender Star, arhythmischer Puls, Blutdruck 185. Parese des linken Facialis, Zunge nach links abweichend. Lähmung des linken Armes und Beines, geringe Steifigkeit im linken Arm. Bauchdeckenreflexe fehlen, PR links stärker, links Fußlklonus. Vorübergehend Schwellung der linken Hand mit spontaner Bläschenbildung. B. klagt über starke Schmerzen in der linken gelähmten Seite. Psychisch fehlt Krankheits-

¹) Mit Unterstützung der Deutschen Forschungsgemeinschaft und der Junta para Ampliación de Estudios, denen hiermit herzlich gedankt sei.

Figure 3. Left: first page of the article published in Archivos de Neurobiología (1935). Right: first page of the article published in Monatsschrift für Psychiatrie und Neurologie (1938). The acknowledgements in the footnote read: "With the support of the German Foundation for Research and the Council for Study Extensions, for which we would like to express our sincerest gratitude."

On 15 May 1936, Gonzalo replied to Kleist²³:

I am very grateful for the publication of the study you suggested. I would like to inform you that, many months ago, I presented both cases to the Swiss Society of Neurology. As you will recall, you gave me permission to do so. Furthermore, the institution that awarded me the grant also requested that I present the results of the work I conducted in Germany. [...] Therefore, I have published it here in Madrid, as the sole author.

At the end of the letter, he adds:

I have just published a new study about the thalamus.^C The case that I study clinically and anatomically has the exact same lesion as that observed in Mandelbaum; and I believe that these cases are the most relevant for the study of the lateral nucleus and the pathological relations between the cortex and the thalamus. Two years later, on 28 August 1938, Kleist sent Gonzalo a copy of the study published in *Monatsschrift für Psychiatrie und Neurologie*: "This is a special reprint of our study on the thalamic and subthalamic syndromes, which I submitted to the journal on the occasion of the 70th birthday of Prof Bonhoffer."

Beyond Frankfurt

In the summer of 1938, during his stay at the military hospital of Godella, Gonzalo was able to examine several patients with disorders of visual perception associated with parieto-occipital lesions.⁶ Among these, we should

^CIn April 1936, Gonzalo published the article "Nuevos estudios talámicos: síndrome talámico puro por degeneración secundaria" (New studies on the thalamus: pure thalamic syndrome due to secondary degeneration) in *Archivos de Neurobiología.* In this study, he described a patient with a left thalamic syndrome attended at Hospital General de Madrid.

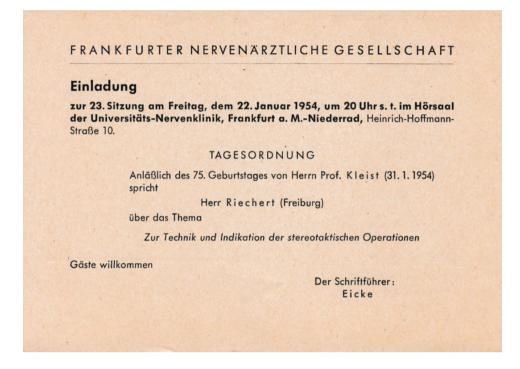


Figure 4. Invitation to the event organised by the Neurological Society of Frankfurt on the occasion of Kleist's 75th birthday. Source: family archive of Dr Justo Gonzalo Rodríguez-Leal.



Figure 5. Karl Leonhard reading the list of works dedicated to Karl Kleist, on the occasion of his 75th birthday. Source: family archive of Dr Justo Gonzalo Rodríguez-Leal.

highlight the cases of the patients M and T. The former was a 25-year-old man who in May 1938 had been struck by a projectile, causing a lesion in the left parieto-occipital region of the brain. The second patient, a 20-year-old man who had been wounded in January 1938, displayed similar injuries to those of patient M, although they were less severe and in a slightly superior localisation. A thorough analysis of both cases led Gonzalo to change his working theory to cerebral activity, designing an original model of brain function based on the laws of nerve excitability.^{24,25}

In this context, Gonzalo wrote to Kleist requesting his most recent studies on disorders of perception.^D On 19 April 1940, Kleist sent him the text of his lecture "Über Form und Orts Blindheit bei Verletzung des Hinterhauptslappen" (On the form and localisation of blindness in the context of occipital lobe lesions), presented five years earlier at a conference in Baden-Baden.²⁶ In June 1940, Kleist wrote another letter to Gonzalo indicating that, other than that lecture, he had not conducted any further research on agnosia in recent times. He ended his letter with the comment that "I will be very interested in your observations about the war."²⁷

Epilogue

On 21 October 1953, Karl Leonhard^E wrote to Gonzalo to remind him of Prof. Kleist's 75th birthday on 31 January 1954, attaching an invitation to an event organised by the Neurological Society of Frankfurt (Figures 4 and 5). He added that Kleist would be delighted if Gonzalo would be so kind as to dedicate a work to him.28 Gonzalo, grateful for such a distinction, replied that the work, entitled "Sobre las cápsulas de agitación: alogia, automatismos y almacenamiento psicomotriz" (On the capsules involved in agitation: alogia, automatisms, and psychomotor storage), would be based on his own observations, although it would take some time to be published and would be written in Spanish.²⁹ Nevertheless, he did not travel to Frankfurt to attend the event, and the family archive does not contain proof that this study ever came to be published.

Karl Kleist died on 26 December 1960 in Frankfurt. Gonzalo sent his condolences to Kleist's wife in a telegram³⁰: "My sincere condolences for the loss of your husband, my unforgettable master."

Acknowledgements

My sincerest gratitude to Dr Isabel Gonzalo Fonrodona for granting me access to Dr Justo Gonzalo's family archive.

Conflicts of interest

The author has no conflicts of interest to declare.

References

- 1. Puig-Samper Mulero MA. Tiempos de investigación. JAE-CSIC, cien años de ciencia en España. Madrid: Consejo Superior de Investigaciones Científicas; 2007.
- Gamero Merino C. José Castillejo y la Junta: pensiones en el extranjero. In: Sánchez Ron JM, coord. 1907-1987. La Junta para Ampliación de Estudios e Investigaciones científicas 80 años después. Volumen 2. Madrid: Consejo Superior de Investigaciones Científicas; 1988. p. 29-46.
- Formentín Ibáñez J, Villegas MJ. Las pensiones de la JAE. In: Puig-Samper Mulero MA. Tiempos de investigación. JAE-CSIC, cien años de ciencia en España. Madrid: Consejo Superior de Investigaciones Científicas; 2007. p. 95-101.
- Residencia de Estudiantes. Junta para la Ampliación de Estudios e Investigaciones Científicas [Internet]. [s.l.]: Ministerio de Ciencia e Innovación; [s.d.] [accessed 21 Nov 2022]. Available from: http://archivojae2.edaddeplata.org/ lista/personas/
- Baratas LA, Fernández J. Becas de ampliación de estudios en biología y ciencias básicas de la medicina en la España del primer tercio del siglo XX. Dynamis. 1993;13:247-63.
- 6. Gonzalo J. Dinámica cerebral. La actividad cerebral en función de las condiciones dinámicas de la excitabilidad nerviosa [Internet]. Santiago de Compostela: Universidad de Santiago de Compostela; 2010 [accessed 21 Nov 2022]. Available from: http://hdl.handle.net/10347/4341
- 7. García-Molina A, Peña-Casanova J. Fundamentos históricos de la neuropsicología y la neurología de la conducta. Teià: Test Barcelona Services; 2022.
- Gonzalo Fonrodona I, Porras Borrego MA. El neurocientífico Justo Gonzalo (1910-1986) antes, durante y después de la guerra civil española. In: González Redondo FA, coord. Ciencia y técnica entre la paz y la guerra. 1714, 1814, 1914. Madrid: SEHCYT; 2015. p. 431-8.
- 9. Kleist K. Gehirnpathologie vornehmlich auf Grund der Kriegserfahrungen. Leipzig: Barth; 1934.
- 10. Faust C. Karl Kleist 1879-1960. Deutsche Zeitschrift Für Nervenheilkunde. 1961;183:1-6.

^DIn *Gehirnpathologie* (1934), Kleist gathers several observations of patients with visuoperceptual alterations caused by brain lesions.

^EKarl Leonhard (1904-1988), a German psychiatrist and a student of Kleist's, proposed alongside his master a classification of psychoses (the Wernicke-Kleist-Leonhard phenotypes).

- Leonhard K. Karl Kleist zum Gedächtnis 31 Januar 1879
 26 Dezember 1960. Arch Psychiatr Nervenkr Z Gesamte Neurol Psychiatr. 1961;202:451-6.
- 12. Hans Hoff's certificate, 15 Jan 1934. J. Gonzalo family archive.
- 13. Otto Pötzl's certificate, 20 Apr 1934. J. Gonzalo family archive.
- 14. Justo Gonzalo record. Archive of the JAE.
- 15. Letter from Justo Gonzalo to Karl Kleist, 24 Oct 1934. J. Gonzalo family archive.
- Letter from Karl Kleist to Justo Gonzalo, 29 Oct 1934. J. Gonzalo family archive.
- 17. Postcard from Justo Gonzalo to his mother and sisters (Frankfurt, 1934-1935). J. Gonzalo family archive.
- 18. Karl Kleist's certificate. Expediente Justo Gonzalo. Archive of the JAE.
- 19. Sobre mi asistencia a la Nervenklinik (Prof. Kleist). Justo Gonzalo record. Archive of the JAE.
- 20. Gonzalo J. Sobre la localización y fisiopatología del tálamo y del subtálamo. Arch Neurobiol (Madr). 1935;15:625-68.

- 21. Kleist K, Gonzalo J. Über Thalamus- und Subthalamussyndrome und die Störungen einzelner Thalamuskerne. Monatsschr Psychiatr Neurol. 1938;99:87-107.
- 22. Letter from Karl Kleist to Justo Gonzalo, 1 Apr 1936. J. Gonzalo family archive.
- 23. Letter from Justo Gonzalo to Karl Kleist, 15 May 1936. J. Gonzalo family archive.
- 24. Barraquer-Bordas L. La "dinámica cerebral" de Justo Gonzalo en la historia. Neurología. 2005;20:169-73.
- 25. García Molina A. Justo Gonzalo's groundbreaking contributions to the study of cerebral functional organisation. Neurosci Hist. 2015;3:61 7.
- 26. Letter from Karl Kleist to Justo Gonzalo, 19 Apr 1940. J. Gonzalo family archive.
- 27. Letter from Karl Kleist to Justo Gonzalo, 18 Jun 1940. J. Gonzalo family archive.
- 28. Letter from Karl Leonhard to Justo Gonzalo, 21 Oct 1953. J. Gonzalo family archive.
- 29. Letter from Justo Gonzalo to Karl Leonhard, Jan 1954. J. Gonzalo family archive.
- 30. Telegram from Justo Gonzalo to Karl Kleist's wife. J. Gonzalo family archive.