Foundation of the Deutsche Geophysikalische Gesellschaft ~~(DGG)~~ in its international context

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Abstract. The article describes the international seismological cooperation at the beginning of the last century and how this cooperation changed due to World War I. These changes were the direct reasons leading to the foundation of the *Deutsche Seismologische Gesellschaft* in 1922, which changed its name to *Deutsche Geophysikalische Gesellschaft* two years later. The second part of the article shortly describes the further development of the relationship between German geophysicists and their
10 international colleagues until the beginning of World War II.

1 Introduction

In 2022, we can celebrate the 100th anniversary of the formation of the *Deutsche Geophysikalische Gesellschaft* (DGG, German Geophysical Society). The DGG was founded as *Deutsche Seismologische Gesellschaft* (DSG, German Seismological Society), which changed its name to *Deutsche Geophysikalische Gesellschaft* two years later, in 1924. The 100th anniversary
15 of the DGG foundation opened for the opportunity to investigate its wider background. To understand this, one has to look back in the development of the international cooperation in seismology during the decades before World War I (WWI). The following text is the slightly altered, translated version of an article (Schweitzer, 2022) originally published in Germany by the DGG as part of a set of articles under the common title *Geophysik im Wandel* (Geophysics in Change).

2 The early roots of international cooperation in seismology

20 In 1895, shortly before his death, Ernst von Rebeur-Paschwitz (1861-1895, ~~see e.g.,~~ Davison, 1895~~; Kertz, 2002~~) published two path-breaking articles (Rebeur-Paschwitz, 1895a; b), in which he proposed the installation of a worldwide network of seismic stations with common instrumentation, to monitor the seismicity of the Earth and to investigate the Earth's interior. He also proposed the foundation of an international institute (bureau) that should be responsible for collecting and publishing all reports about felt and/or instrumentally observed earthquakes as completely as possible.

25 Rebeur-Paschwitz's ideas were taken up by Georg Cornelius Karl Gerland (1833-1919, ~~see e.g.,~~ Sapper, 1940~~; Kertz, 2002~~), who established the *Kaiserliche Haupt̲station für Erdbebenforschung* (Imperial Main Station for Earthquake Research) at the University of Strasbourg and could finally, in 1901, invite to the 1. Internationale Seismologische Konferenz (1st International

Seismological Conference) in Strasbourg, Alsace, at that time Germany. The main topic of this conference was to establish an institutionalized framework for the international cooperation in seismology. It took two additional International Seismological

30   Conferences and diplomatic negations before Belgium, Bulgaria, Chile, Congo, Germany, Greece, Hungary, Italy, Japan, Mexico, The Netherlands, Norway, Portugal, Romania, Russia, Spain, Switzerland and the United States of America signed an interstate convention for the following 12 years to form the *Internationale Seismologische Assoziation* (ISA, International Seismological Association). After some changes of the statutes, also Canada, France, Great Britain and Serbia became ISA members in 1907 and Argentina joined in 1913.

35   Following Rebeur-Paschwitz's idea, ISA established under the directorship of Gerland a *Zentralbureau* (Central Office) in Strasbourg, at Gerland's university institute, to organize the international seismological data exchange and to publish world-wide bulletins. With this, the global centre for the international cooperation in seismology was located in Strasbourg, Alsace. In 1910, after Gerland's retirement, Oskar August Ernst Hecker (1864-1938, see e.g.,; Kohlschütter, 1938, Jacobs & Börngen, 2019) became the second director of ISA's Central Office and of the Imperial Main Station. More details about the

40   establishment of ISA, its activities and the work of the *Zentralbureau* including many additional references can be found in Schweitzer (2003) and Schweitzer and& Lay (2019).

3 ISA becomes a victim of WWI

The political and social "earthquakes" in Europe because of WWI changed everything. Strasbourg, Alsace became again part of France and with this the ISA Central Bureau became part of the post-war problems between France and Germany. During

45   WWI and until the end of 1918, the Central Bureau and the Imperial Main Station in Strasbourg continued working as usual, to the extent possible, but as documented in its published Newsletters (ISA, 1913-1917) and the last activity report of Hecker (see Kövesligethy, 1922) with reduced staff. On 23 December 1918, all German employees of the Central Office in Strasbourg had to leave the Central Office, and were deported out of France on 6 January 1919, without any possibility of carrying their personal belongings still located in the Bureau with them (Hecker, 1924; Sapper, 1940). The Central Office and the Imperial

50   Main Station, most of the instrumentation, the scientific material and the libraries of both the Central Office and the Imperial Main Station became inaccessible for German seismologists; unfortunately, much of this material got lost for ever.
Already shortly before the end of WWI, in October 1918, the Royal Society in London had invited to an 'Inter-Allied Conference on International Scientific Organizations' with participants from eight countries, who excluded in a quite emotional resolution any future cooperation in international research organisations with colleagues from the Central Powers (Germany,

55   Austria-Hungary, Bulgaria and the Ottoman Empire) (Nature, 1918). This statement was the result of strong national feelings after four years of war in Europe with never-before-seen cruelties and loss of human lives. However, the statement had far-reaching consequences, because this exclusion of the Central Powers became part of the statutes of the *Conseil International des Recherches* (International Research Council, IRC), when it was newly founded together with its Unions (as e.g., the herein relevant International Union of Geodesy and Geophysics (IUGG)) in Brussels, Belgium, in July 1919. Even states, which had

60 been neutral during WWI, could only join the Council with support by a 2/3 majority of the members. With this construction, the IRC was, as Cock (1983) wrote, 'quite openly part of the general post-war policy'.

4 The foundation of the Deutsche Seismologische Gesellschaft (DSG) in 1922

The first General Assembly of IUGG was planned in Rome for May 19~~20~~22. But there was still an unsolved problem with ISA. The original convention from 1904 had been signed for 12 years. The last ISA meeting before WWI had been in

65 Manchester, UK, in 1911. The next meeting was planned for St. Petersburg, Russia, in 1914, but this meeting had to be cancelled because of the outbreak of the war. In 1916, when the contract period of the ISA convention officially ended, ISA member states were fighting on both sides of the WWI fronts and a new convention or a renewal of the expiring one was not possible. Also, because of the London 1918 resolution, there was no general interest to revitalize the ISA after WWI. To formalize the end of the interstate convention, a joint 3rd General Assembly and 5th Conference of the Permanent Commission

70 of ISA was organized in Strasbourg, France, on 24-25 April 1922. At the end of this final meeting, the ISA was dissolved (Köveslighety, 1922). Then, the delegates journeyed on to meet again for the 1st General Assembly of the IUGG in Rome, one week later, on 2-10 May 1922. There, during this Assembly, the new Seismology Section of IUGG was established (Rothé, 1922). However, based on the statutes of the IRC, IUGG membership was based on state memberships and the Central Powers were explicitly excluded from joining IRC as members and no German seismologists were allowed to participate in the

75 Assembly.

In summer 1922, the German seismologists were internationally isolated and needed a forum for meetings and discussions. Therefore, Emil Wiechert (1861-1928, see e.g., Mulligan, 2001; ~~Kertz, 2002;~~ Schweitzer & Ritter, 2012; Jacobs & Neunhöfer (~~,~~ 2013~~); Jacobs & Börngen, 2019~~) and Oskar Hecker invited German seismologists to a special meeting for the afternoon of 19 September 1922, during the yearly conference of the ~~Deutsche~~ *Gesellschaft Deutscher Naturforscher und Ärzte* (German

80 natural scientists and physicians), in Leipzig (Wiener & Bauschinger, 1923; Kohlschütter, 1938). During this meeting, Hecker proposed the foundation of the *Deutsche Seismologische Gesellschaft* (DSG) as new home for the German seismologists and in parallel a counterweight to the German hostile institutions founded by the IUGG (Hecker, 1922: '*zur gleichen Zeit ein Gegengewicht gegen die von der deutschfeindlichen Union géodesique et géophysique begründeten Landesinstitute*') and presented some drafted statutes. The 24 seismologists present spontaneously endorsed the idea and on 21 September they

85 founded this society by adopting its statutes (Jacobs & Börngen, 2019).

There were of course many more people in Germany interested in seismology than the 24 founding members present in Leipzig. Hecker, just elected *Geschäftsführende Vorsitzende* (acting Chair = Secretary) of the DSG, informed by letter colleagues not present in Leipzig about the new society and asked for their support by becoming DSG members (Hecker, 1922). Hecker's letters also contained a copy of § 2 of the DSG statutes with the objectives of the society (here translated from German; see

90 also Fig. 1):

"The German Seismological Society intends fostering theoretical and applied seismology and related topics. It tries to achieve this by

1. Supporting the scientific exchange of ideas between its members,
2. Supporting the scientific relations to related corporations,
3. If applicable, editing scientific publications or participating in already exiting publication projects,
4. Organizing scientific meetings,
5. Promoting all other seismological research and education related interests."

The news about the DSG foundation must have been distributed quite fast and a list of DSG members from 15 December 1922 contained already 46 members (Table 1) of which 7 were registered with addresses outside of Germany (Austria, Canada, Italy, Spain, Switzerland). During the following years, the membership list continued to slowly grow (Table 1).

5 The development during the following years

For 4-5 October 1923, Hecker had invited to the first meeting of the new society in Jena, where he had managed the foundation of the new *Reichsanstalt für Erdbebenforschung* (Imperial Institute for Earthquake Research) as successor to the former Imperial Main Station in Strasbourg (Hecker, 1924) and which had just officially started its work (1 October 1923). The exclusion of the German colleagues from all IUGG activities was of course also true for the other geophysical disciplines and following a proposal by Carl Mainka (1873-1943; Anonymous, 1944; Kertz, 2002) the DSG widened its focus by changing the statutes and renaming the society into *Deutsche Geophysikalische Gesellschaft* (DGG) during the 2nd DSG assembly in Innsbruck, Austria (Wiechert, 1925; Jacobs & Neunhöfer, 2013). During the same meeting, the DSG also decided to start the publication of anits own scientific journal for its members, the *Zeitschrift für Geophysik* (ZfG, Journal of Geophysics). Both changes resulted in a jump of DGG memberships after 1924 (Table 1).

In parallel with the negations about a German membership in the League of Nations in Geneva, the general scientific isolation of Germany, Austria, Hungary and Bulgaria became more and more questioned by former neutral states, but also by many colleagues from the Allied Nations. Common scientific interests between single German scientists became more important than 'old political' problems and German researchers were addressed with invitations for memberships in commissions of the different Unions and it looks like that in particular the IUGG was not belonging to the strong supporters of a German exclusion. This impression transpires from a 19 pages long report by Ernst Kohlschütter (1870-1942; Maurer, 1942) for the German *Reichsministerium des Inneren* (Imperial Ministry of the Interior), in March 1927, about his international contacts and experiences from participating in international conferences (Kohlschütter, 1927). Also, the increasing number of DGG members with foreign addresses show an improvement in international relations (Table 1). At the end of the 1920s, the DGG had become a quite international society, with more than 30 % of its membership residing outside of Germany (Table 1), contrary to the year 2022, when only 145 (12 %) of the 1202 members had an address outside of Germany. Even foreign

colleagues are documented to have participated the yearly DGG assemblies as e.g., by the entries in the guest book of the Taunus Observatory near Frankfurt am Main (Fig. 2).

However, due to the construction of the statutes, German scientists could officially participate in Unions of the IRC only after Germany becoames an IRC member. Even an individual participation in IUGG bodies as guests was not supported by the German government and the DGG, because the German government was focusing on solving the general problem of a German IRC membership for all adherent Unions together to conditions, which were politically acceptable for Germany. Such conditions were formulated by the DGG and adopted in a resolution during its 3rd assembly in Göttingen, in 1925. This resolution was then not only published in the assembly minutes (DGG, 1926), but also sent in March 1926 by Hecker, the DGG *Vorsitzender* (Chair), to (at least) the German *Reichskanzler* (Imperial Chancellor) and the Imperial Ministry of the Interior (Hecker, 1926).

From the correspondence of Beno Gutenberg (1889-1960; Schweitzer, 1989; Knopoff, 1998; 1999; Kertz, 2002; Jacobs & Börngen, 2019), as still stored in the Gutenberg Collection of the Caltech Archive, it is known that this problem was still unsolved in 1929. At the beginning of 1929, Gutenberg had been invited by Edmond Rothé (1873-1942; Perrier, 1942; Anonymous 1948) to become a member in one of the Commissions of the Seismological Section of the IUGG. This invitation initiated a longer correspondence between Gutenberg and the DGG *Vorstand* (Executive Board) with the result that Gutenberg followed the wish of the DGG Executive Board and kindly refused the invitation to become a Commission member in a letter to Rothé from 23 April 1929. But Gutenberg wrote also that he was willing to enter in private correspondence with the Commission members and that he would like to be informed about the work of the Commission since, somewhen, Germany would anyhow become a Union member ("… bin ich gerne zu persönlicher Korrespondenz mit deren Mitgliedern bereit und würde mich freuen, wenn ich über die Arbeit der Kommission auf dem Laufenden gehalten würde, da doch einmal Deutschland in die Union eintreten wird, …"). From the same year (1929), the Gutenberg collection also contains a longer correspondence between Gutenberg, Kohlschütter, Walter Davis Lambert (1879-1968; Whitten, 1973), who was influential in the Geodesy Section of the IUGG and the Geodesy Section of the American Geophysical Union, and the Secretary General of IUGG and of the IRC Henry George Lyons (1864-1944; Dale, 1944) with discussions on how to solve the persisting problem of a German membership.

6 Germany becomes an IUGG member

This blocked situation continued until 1930, when for the first time German researchers participated in the IUGG General Assembly in Stockholm, Sweden, as guests and the DGG Executive Board decided to prepare together with other disciplines a German IUGG membership. Also, the IRC had moved and already asked the Central Power states to become IRC members. In 1931, after long discussions within the IRC (Cock, 1983), the IRC adopted a major change of its statutes, which resulted in a larger independence of the Union with own rights to manage their memberships and a name change to International Council of Scientific Unions (ICSU), which existed in this form until 2018.

Reports about the ongoing negotiations regarding the German IUGG membership were on the agenda of the DGG membership meetings during the following years. The major issue to be solved was an internal one: the German government had to find a way to finance the yearly IUGG membership fee and the travel costs of the delegates to the IUGG General Assemblies. Therefore, in the following IUGG Assemblies in Lisbon, Portugal (1933) and Edinburgh, UK (1936), German scientists still participated as guests but became more and more involved in IUGG activities. The long-standing DGG Chair (1927-1929, 1930-1936) Kohlschütter was directly involved in the discussions and was installed by the German government as Chair of the *Deutsche Vereinigung für Geodäsie und Geophysik* (German Union for Geodesy and Geophysics). Finally, on 6 February 1937, Kohlschütter could inform the IUGG that Germany is joining the Union (Kohlschütter, 1937). Then, during the following IUGG General Assembly in Washington D.C., in September 1939, the few German scientists, who made it to the conference despite the start of a new war in Europe, could be specially welcomed as members and no longer guests of the International Association of Seismology (Naumann & Rothé, 1940, p. 226).

The reorganization of the international scientific landscape after World War II (WWII) was then no longer characterized by new exclusion rules for individual countries, but by the will to cooperate and communicate. A visible sign of this is e.g., the foundation of the Federation of European Seismologists in 1950, which as European Seismological Commission (ESC) was in 1951 incorporated into the now named International Association of Seismology and Physics of the Earth's Interior (IASPEI) and subsequently of the IUGG: the first ESC President (1951-1956) became the German Wilhelm Hiller (1899-1980; Schneider, 1980).

7 Outlook

Founded in the scientific isolation of Germany in the post-war years of WWI, the DGG has developed into a quite agile centenarian with around 1200 members. I am sure that the 24 founding fathers did not dream of such a successful development when the society was founded in 1922. The initial reasons for a separate national society described here have disappeared over time. What has remained, however, is the desire to have a formal framework for the coordination of joint scientific activities and for the exchange of scientific results. For many German early career scientists, a first oral or poster presentation during one of the yearly DGG assemblies was often the beginning of a long-lasting career in geophysics and, last but not least, the DGG offers the possibility of regular meetings between colleagues and friends.

However, what became already visible in the 1920s, was confirmed during the further development of geophysics: a self-chosen or forced long-term isolation of individual states from the international discourse leads to worse science for everyone involved. New scientific findings in geophysics depend on the (free) exchange of global observations and data. That is why it is important to maintain cross-border contacts and not to let them break off even when there are political differences between the states. The bridge-building function of scientific exchange in conflict situations has often been documented. The IUGG with its associations and the DGG have also repeatedly contributed to this over the past 100 years.

8 Additional information

Additional biographical information for Conrad, Gerland, Gutenberg, Lehmann, Mainka, Rebeur-Paschwitz and Wiechert can be found in the compilation of geophysicist biographies by Kertz (2022) and for Hecker, Gutenberg and Wiechert in Jacobs & Börngen (2019), who published a collection of biographies for all 24 founding members of the DSG/DGG.

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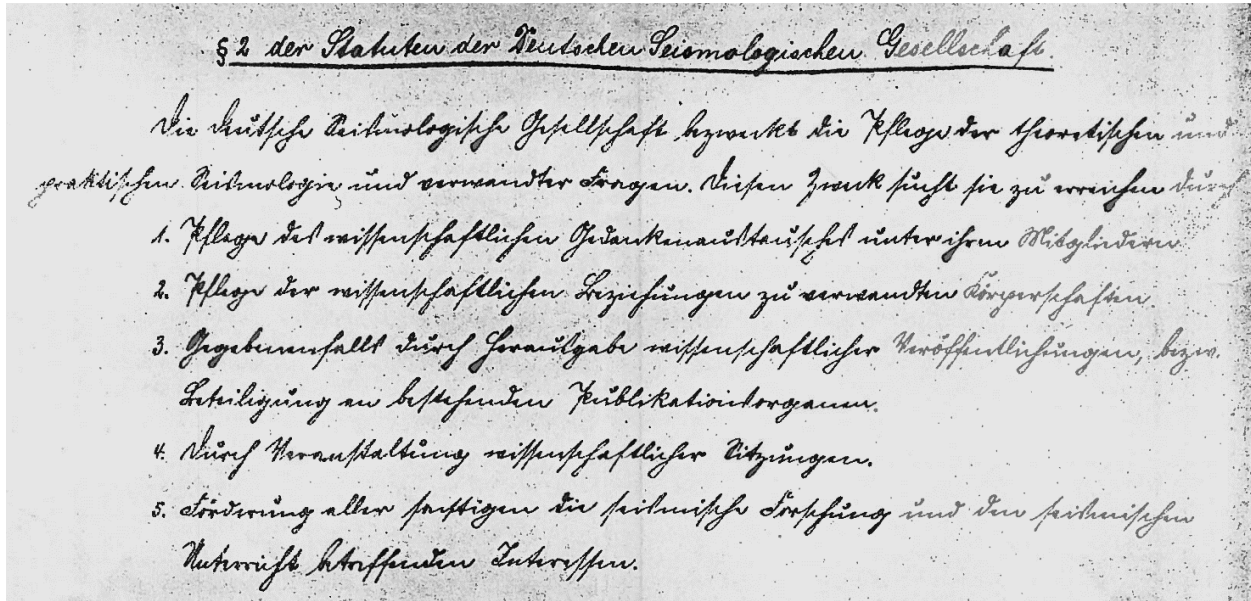
Figure 1: Facsimile of the attachment to Hecker's letter (Hecker, 1922) containing § 2 of the DSG statutes, written in old German handwriting, as adopted on 212 September 1922.

22-9-27   Uhlmann

Deutsche Geophysikalische Gesellschaft
28. Sept 1927.

V. Conrad, Wien   A. Defant, Berlin   A. Nippoldt

Schütt, Hamburg   O. Meisner, Jena   K. Willer

J. Prey, Prag   Wüst, Berlin

Leo Wenzl Pollak, Prag.   Weickmann, Leipzig

P. Nik-Zaroff, Leningrad.   Angenheister, Potsdam

E. Tams, Hamburg   Dr. Messerschmitt

H. Martin Jena.

Dr. Harry Schmidt, Potsdam   J. Bartels

Mary B. Lambert,   New York City.

Berger, Potsdam.   H. Hiller, New York.

Alexander Rudnick, Bln. Friedenau   R. Freissler

E. Kantzenbach Göttingen   Karl Jung   Potsdam

C. Leißig, Darmstadt   Heinrich Jung   Marburg

V. Schweydar   W. D. Lambert, Washington

Wetterhut (Seism. General anzeiger)   F. Errulat, Königsberg Pr

v Ludwiger. Potsdam.   F. Linberg Kassel

W. Hartmann   N. Opfzrea Kassel.

K. Roth   Schneider, Potsdam.

Eber Sprange   Hamburg

H. Balbey - Nordsee   Almstedt   Braunschweig

Figure 2: As an example of the international contacts of the DGG, a page from the guest book of the Taunus Observatory near Frankfurt am Main from 1927 (courtesy Seismology Group, Goethe University Frankfurt). This page not only documents the visit

295 **of the Danish seismologist Inge Lehmann (1888-1993; e.g., Emmerich & Schweitzer, 1988~~; Kertz, 2002~~) on September 22, 1927, but also some of the participants at the 5th DGG annual meeting in Frankfurt/Main, who visited the observatory as part of the conference program on the afternoon of September 28, 1927 (Schmidt, 1927). From this entry we know that at least five of the conference participants came from abroad (whether it was solely for the conference or another reason for staying in Germany is an open question): Victor Conrad (1876-1962; e.g. Hader, 1962~~; Kertz, 2002~~) (Vienna, Austria), Walter Davis Lambert (1879-1968)**

300 **(Washington D.C., USA) here together with his sister Mary B. Lambert (New York City, USA), Pavel Mikhailovich Nikiforov (1884-1944) (Leningrad, Soviet Union), Leo Wenzel Pollak (1888-1964; Kistermann, 1999) (Prague, Czechoslovakia) and Adalbert Prey (1873-1949; Ferrari d'Occhieppo, 1981) (Prague, Czechoslovakia)**

Table 1: DGG Memberships during the first 10 years, as regularly published as a separate list or as published in the DGG journal Zeitschrift für Geophysik (ZfG). * copy existing in the archive of the author.

Date	Source	Members (personal & institutional)	of which with an address outside of Germany
19 / 21 September 1922 (foundation)	See e.g., DSG membership list October 1923	24	1 (4 %)
15 December 1922	DSG membership list *	46	8 (17 %)
October 1923	DSG membership list *	62	13 (21 %)
1 March 1925	DGG membership list, ZfG **1**, 173-176	118	29 (25 %)
End of 1925	ZfG **1**, 222	131	29 (22 %)
End of 1926	ZfG **2**, 48; ZfG **2**, 160; ZfG **2**, 304	154	38 (25 %)
1 March 1927	DGG membership list, attachment to ZfG **3**	145	37 (26 %)
End of 1927	ZfG **3**, 200; ZfG **3**, 380	165	44 (27 %)
Spring 1928	ZfG **4**, 160	177	52 (29 %)
1 June 1928	DGG membership list, attachment to ZfG **4**	170	52 (31 %)
1 July 1929	DGG membership list, attachment to ZfG **5**	187	58 (31 %)
1 October 1930	DGG membership list, attachment to ZfG **6**	216	74 (34 %)
1 October 1931	DGG membership list, attachment to ZfG **7**	212	70 (33 %)
1 November 1932	DGG membership list, attachment to ZfG **8**	197	64 (32 %)

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