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The XIV International Geological Congress of 1926 in Spain

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The XIV IGC was held in Spain in 1926, marking a recovery trend in the Congress after the First World War in terms of the number of participants and the number of represented countries. It was Spain that benefited most from the XIV IGC and probably never again there has geology received so much public and official attention. This paper is one of a series of articles on the history of the International Congress.

Antecedents and Organization

The XIV International Geological Congress (IGC) of 1926 was the second one to be held after the First World War (WW I). It was still a colonial world, with most of Africa and important areas of Asia living as colonies of various European countries. WW I had divided the most advanced countries, and the injuries had not yet healed: Germany and Austria had not been invited to the XIII IGC held at Belgium on 1922, and the neutral countries did not attend in an official way. This was not a new situation; for there was no German representation at the first IGC, held at Paris in 1878, due to the recent Franco–Prussian War of 1870 (Ellenberger, 1978).

Spain—a neutral country in WW I had shown its willingness to organize an IGC at the Congress in Sweden (1910), in Canada (1913), and in Belgium (1922), where the offer was eventually accepted. According to the President of the XIV IGC, César Rubio (1930), President of the Mining Council in 1926 and former Director of the Geological Institute of Spain (*Instituto Geológico de España*, IGE): "The fundamental purpose of this acceptance ... was to minimize as far as possible, the moral hurt felt between geologists of different countries produced by the war".

In 1926, Spain was a country in the process of transition to industrialization. During the 1920s, the agricultural population was still almost fifty percent of the whole. The country already had important metallic and non-metallic mining activities: pyrites and copper in the southwest (Rio Tinto, Tharsis); lead–zinc in Murcia and Jaén; zinc in Santander; iron in Bilbao and Spanish Morocco (Rif); and potash deposits in Catalonia. But most of the metal mines were owned by foreign capital: English, French, German, or Belgian. Spain was a monarchy under King Alfonso XIII, who, to avoid political responsibility for a defeat involving more than 20,000 Spanish deaths in the war against the Rif population in Morocco, had allowed a military dictatorship ruled by General Primo de Rivera to come to power.

The IGC sessions were held in Madrid from 23 to 31 May, 1926. The official Congress languages were English, French, German, Italian, and Spanish. The language used for the final edition of the *Proceedings* was French, which at that time was a major international scientific language.

The sixteen field trips started on 10 May (by the Strait of Gibraltar) and finished on 12 June (Catalonia, the Pyrenees, and Majorca). They had guides, published by the IGE, in English (4), French (14), German (2) and Spanish (21). There were also complementary tourist guides and two geological guides for railway routes, similar to those produced previously in the US. The Spanish IGC represented a major operation for an underdeveloped country like Spain: from 1922 to 1926 for the Congress preparation, and then up until 1930 when the *Proceedings* were finally published.

The IGC was organised by the IGE, with the Congress President being the Director of the IGE, Cesar Rubio, and with Enrique Dupuy de Lôme of IGE as Secretary-General. The Madrid scientific sessions were held at a new building in Ríos Rosas Street, constructed specially for the event, which is now the head office of the Spanish Geological Survey and the adjacent Mining School.

The key man in the organization of the Congress was Cesar Rubio. In 1876, he began his studies at the School of Mines of Madrid and graduated three years later. Rubio entered the Mining Engineers Corps and was initially assigned to the phosphorite exploitation of Aldea Moret (Cáceres). As a result of his growing reputation, the leading Spanish mining districts sought his advice and expertise: for example in relation to the coal basins in Asturias, the lead districts of Linares and La Carolina, the lead–silver mines in the Alcudia valley, and the Jerez Lanteira copper mines (where he introduced an innovative form of furnace). He also worked in the lead and silver mines in the Sierra Almagrera district and the copper field of Huelva Province (Marín, 1931). Due to his efforts, the United Alkali Company was established in Huelva. According to Agustín Marín (1931):

> *Rubio was an all-round engineer, due to his multidisciplinary knowledge. He could develop a whole mining process from initial prospecting to operation and production. He planned the exploration and first mining activities, supported by his geological background, and he was also able to develop a complete extraction scheme based on the art of mining. He could also study the most economically efficient method for the processing of the ore, on the basis of metallurgical principles. Wherever he went, he made his mark by his mining genius.*

On 23 April, 1902, Rubio had joined the Commission for the Geological Map of Spain. Between 1922 and 1925 he served as Director of the Geological Survey of Spain, having for several years previously been a member of the Executive Committee. In 1922, the 13th meeting of the International Geological Congress was held in Belgium. Rubio attended as the Spanish delegate and was invited to organize the next Congress, to be held in Madrid in 1926. He was elected President of the Spanish Congress, not only because of his mining and geological knowledge but also because of his sympathetic personality and his extensive language skills. According to Marín (1931) Rubio "was enthusiastic from the very beginning to the conclusion of the event. When pusillanimous pessimists and sceptics prognosticated a downfall of the enterprise, he continued, thanks to the inspiration of an apparent eternal youth, with optimism and confidence".

Although he was not sufficiently and appropriately recognized in Spain, Rubio was a member of a number of international societies, such as: The Geological Society of London, the *Kaiserlich Leopol-*

dinische Deutsche Akademie der Naturforscher zu Halle, Germany, and honorary member of various other scientific societies. He died on 21 February, 1931, aged 72.

There was support from the King, who attended the Opening Session and held a reception in the Royal Palace. He was also present at a theatre play, specially written for the IGC. For Spain, with its limited scientific development, an international scientific congress was an important and rare event.

The Congress fee was 30 pesetas (0.18 Euro today in nominal value), which covered attendance at the sessions and the cost of the *Proceedings*. The field trips cost from 40 pesetas (Guadarrama Range, 1 day) to 800 pesetas (Canary Islands, 17days).

Figure 1 César Rubio, the key man in promoting and organizing the Congress Meeting in Madrid (Gallery of the Directors of the Instituto Geológico y Minero de España).

Scientific Sessions and Field Trips

The scientific topics covered by the IGC sessions were as follows:

Economic Geology
Session 1 (World reserves of pyrites and phosphates) and Session 8 (Modern theories in metallogeny)

World Geology
Sessions 2 (Geology of the Mediterranean region) and Session 4 (Geology of Africa and its relationship with European geology)

Paleontology
Sessions 3 (Cambrian fauna), Session 5 (Tertiary vertebrates), and Session 7 (Tertiary foraminifera)

Tectonics and Volcanology
Sessions 6 (Hercynian folding) and Session 9 (Volcanoes)

Geophysics, Pure and Applied
Session 10

Miscellaneous topics
Session 11.

The field trips were as follows:

Pre-Congress

A-1 Gibraltar Strait, northern Morocco, Spanish Morocco (12 days), directed by Marín, Gavala, Miláns del Bosch, and Fernández Iruegas

A-2 The Ronda mountain range, Andalusia (8 days), directed by P. Hernández Sampelayo and E. Rubio

A-3 Metallic ore bodies and mines of Linares (Jaén) and Huelva (10 days). directed by C. Rubio, Hereza, and Alvarado

A-4 Guadalquivir River Valley tectonics (7 days), directed by Hernández-Pacheco, Carbonell and Novo

A-5 Betic mountains, Andalusia (12 days), directed by Hernández-Pacheco, Carbonell, Novo, Carandell, and Gómez de Llarena

A-6 Continental Tertiary of Burgos and Old Castille (2 days), directed by J. Royo Gómez

A-7 Canary Islands (17 days), directed by Fernández Navarro, Fernández Aguilar, and Mendizábal

During the IGC

B-1 Almadén mercury mine (1 day), directed by P. Hernández Sampelayo

B-2 The Guadarrama mountain range (1 day), directed by Obermaier and Carandell

B-3 Aranjuez: Continental Tertiary of New Castille (1 day), directed by E. Hernández-Pacheco and F. Hernández-Pacheco

Post-Congress

C-1 Asturias: Carboniferous and Palaeozoic (6 days), directed by Sancho, Ruiz-Falcó, Cueto, P. Hernández Sampelayo, and I. Patac

C-2 Bilbao iron ore bodies and mines (3 days), directed by Sampelayo and Rotaeche

C-3 Potassic salt basin of Catalonia and Central Pyrenees (11 days), directed by Faura and Marín

C-4 Potassic salt basin of Catalonia and East Pyrenées (10 days), directed by M. San Miguel de la Cámara, Bataller, Marín, Marcet, and Larragán

C-5 Balearic Islands (11 days), directed by Darder, Faura, and Cincúnegui

A-X Despeñaperros (Sierra Morena), directed by Hernández-Pacheco and Puig de la Bellacasa (Figure 2)

During the IGC there were meetings to do with the next International Commissions, and 'workshops' on:

a) The Geological Map of Africa (eventually published in 1952 and 1958)
b) Isostasy
c) International Stratigraphic Lexicon (eventually published on 1958 in France, by the CNRS)
d) *Paleontologia Universalis*

Figure 2 A picture showing the use of a horse for geological fieldwork in Sierra Morena from a field-guide for the XIV IGC.

A quantitative analysis of the Congress

Quantitative analysis in history of science can be a powerful auxiliary tool when correctly applied and interpreted (Kragh, 1987). As may be seen in Figures 3 and 4, the Congress marked a clear recovery of the trends before WW I in the number of participants and number of represented countries. (Both trends are statistically significant at a confidence level of 95 %.) This represents, from the first IGC, held in France in 1878, an annual growth rate of 1.5% in the number of participants and 2 % in the number of countries officially present.

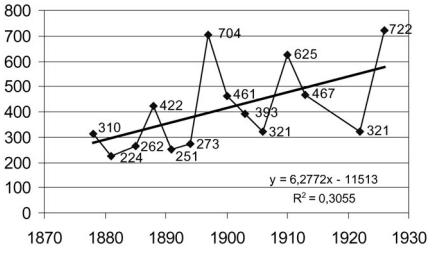

Figure 3 Number of persons attending the congresses, showing a clear recovery after WW I.

The number of participants shows a periodic fluctuation from 1878 to 1926 with mean periods of 10 to 13 years, with

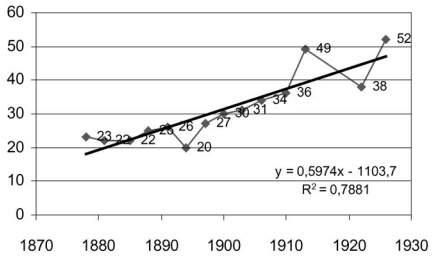

Figure 4 Development of the number of officially represented countries, showing a clear recovery after WW I.

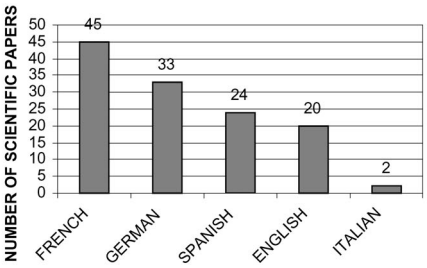

Figure 5 Languages used in the scientific papers in the XIV IGC, French and German being the dominant ones.

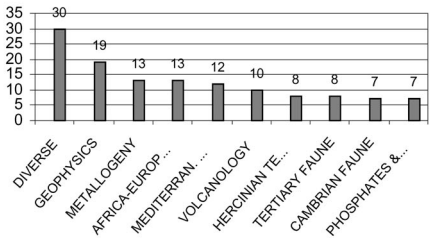

Figure 6 Papers at the XIV IGC by topic.

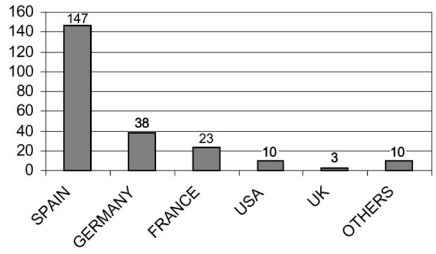

Figure 7 Publications induced by the Congress, with Spain being the country receiving the greatest impact.

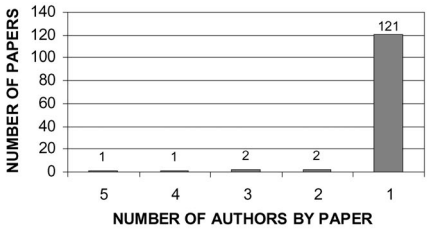

Figure 8 Number of authors per paper in the XIV IGC, showing that individual work was clearly dominant.

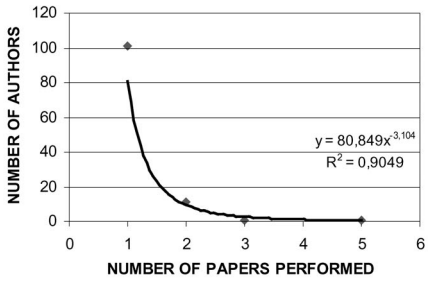

Figure 9 Scientific productivity in the XIV IGC.

maxima for the IGC in France (I) (1878), United Kingdom (IV) (1888), Russia (VII) (1897), Sweden (XI) (1910), and Spain (XIV) (1926). This last IGC had the greatest number of participants up till that time: 722.

The languages used for the Madrid papers are shown in Figure 5. They were mainly in French and German, with a significant number of Spanish papers due to Spain being the organizing country. The English papers were only about a quarter of the sum of the French and German ones. English was not yet the international scientific language, as it became after WW II.

In Madrid, a total of 127 scientific papers was presented—a low figure compared with the number of attendees (722) (1 paper to 5.7 persons). The I IGC in Paris had 41 papers and 312 persons registered (Ellenberger, 1978) (1 paper to 7.6 persons). This means that for the Spanish Congress there was only one paper per six participants, or approximately five auditors for each author. The small number of papers may be seen when compared with the annual number of papers published on North American geology in the mid-1920s: about 1,800 (Cailleux, 1961). The number of geologists then in the world was, according to the same author, around 8,000. So about a tenth of the world's geologists attended the Congress.

The distribution of papers by topic is shown in Figure 6. There were 26 papers on economic geology, 25 on regional and continental geology, 19 on geophysics, and 15 on palaeontology. The number of papers on volcanology was 10 and 8 on Hercynian tectonics. It seems the main concerns in 'normal' geoscience at that time were economic geology, geophysics and volcanology, and also the geological knowledge of world, especially for Africa and the western Mediterranean. Palaeontology also attracted interest.

The XIV IGC induced an 'echo': the publication from 1926 to 1930 of a total of 231 publications external to the Congress (Rubio, 1930), with 137 scientific papers and 94 about the IGC as an event. Figure 7 shows the distribution by countries. It is obvious that the main 'echo' was in Spain, with almost the 60 % of the total.

It is interesting to analyse the distribution of papers presented in the IGC by number of authors. As may be seen in Figure 8, 95 % of papers were presented by only one author. This suggests that geology in the 1920s was mainly an individual activity, not team work.

Figure 9 shows the scientific productivity measured by the number of papers produced by each author at the XIV IGC. According to the work of Lotka (1926), published in the same year as the Congress, the number of authors making n contributions is about $1/n^a$ of those making one contribution, where a is often approximately 2. But in the Madrid case, a was approximately 3. Moreover, according to De Solla Price (1963), the square root of the number of authors ($\sqrt{122}$, or approximately 11) should be expected to produce half the papers. But at the Madrid Congress, the 'top' eleven authors together produced only 20% of the papers. Evidently, productivity at congresses does not necessarily reflect actual productivity, because scientists have alternative places to publish. A person who is very productive overall may only give a small number of papers at a congress.

The Congress's place in the history of geology

After the conclusion of the Neptunist–Plutonist debate, the nineteenth century firmly established the foundations of geology as a natural science through the uniformitarianism of Lyell, and developed mainly in the direction of biostratigraphy and palaeontology. Also, the main stratigraphic features of the most advanced countries became known through the compilation of their first systematic national geological maps, generally with limited tectonic content: 1815 in England and Wales by William Smith (1769–1839) and by Brochant de Villiers (1778–1841), Duffrénoy (1792–1857) and Êlie de Beaumont (1798–1874) in France in 1840. But modern geological science was not yet fully established. The main geological contributions of the twentieth century were to be in tectonics, though certainly problems of mountain building were already addressed in the nineteenth century.

The main geological concept under discussion and debate during the first half of the twentieth century was the hypothesis of Continental Drift proposed and defended by Alfred Wegener (1880–1930). The precursors of continental drift date back to the Spanish chroniclers of America, especially José de Acosta (1540–1600), who in 1590 noted the similarities between the American and the European coastlines. In the seventeenth century, Francis Bacon in his book *Novum organum* (1620) and Jean de la Placette (1658) suggested that these similarities could not be accidental and attributed them to the excavation of the Atlantic Ocean by the bibli-

cal deluge. In the nineteenth century, Antonio Snider-Pellegrini (1858) was the first to consider the similarities of the fossil assemblages with the same ages in Europe and America. In the twentieth century, Frank Taylor (1910) developed the first coherent hypothesis about continental drift (Tarling & Tarling, 1971).

Wegener first presented his idea of continental drift at a conference in 1912 and in the same year he published two papers on the topic. In 1915 an extended version of his hypothesis appeared in book form, *Die Entstehung der Kontinente und Ozeane*, of which revised editions were published in 1920, 1922, and 1929. Wegener hypothesized that a large single continent existed at the beginning of the Mesozoic, which he called 'Pangea'. This supposedly broke apart and the fragments moved away from one another until they reached their present positions, giving today's distribution of continents and oceans. This hypothesis was based on the continuity of tectonic structures and rock types on opposite sides of the Atlantic Ocean, in the study of the fossil distributions and ancient climates, and also in geodesic data.

At the XIII session of the International Geological Congress, held in Brussels, Émile Argand (1922) proposed a synthesis of global tectonics, and discussed the evolution of the crust in mobilist terms, and in the light of Wegener's hypothesis. However, at a meeting of the Royal Geographical Society (Great Britain) in 1923, Phillip Lake and Harold Jeffreys sought to refute Wegener's ideas and pointed to the theory's difficulties and the imperfection of the proposed evidence. Jeffreys, a pioneer of the mathematical geophysics and defender of an ultra-solid model for the earth (Jeffreys, 1924), led the strong opposition to Wegener's hypothesis in Great Britain and the US.

In 1924, the third German edition of Wegener's book was translated into English, French, Spanish, and Russian, and in 1926 the American Association of Petroleum Geologists held an International Symposium entirely devoted to this issue. Its *Proceedings* were published two years later (Waterschoot van der Gracht, ed., 1928). At the symposium, at which Taylor and Wegener were present, only the organizer Willem Waterschoot van der Gracht and the originators of this theory were convinced of continental drift. Chester Longwell, Charles Schuchert, Bailey Willis, William Bowie, and Thomas C. Chamberlin raised many tectonic, geophysical, palaeontological, and palaeogeographical objections and Edward Berry questioned Wegener's reliability as an investigator.

In line with the prevailing opinion, then, at the Madrid Congress only the Norwegian Olaf Holtedalh, in his presentation 'Tectonics of the Arctic Regions', mentioned Wegener's ideas, in relation to the opening of the North Atlantic Ocean. The virtual absence of discussion of the mobilist theory in the XIV IGC is noteworthy, given that, at almost the same time, the American Association of Petroleum Geologists organized a specific symposium on the topic.

Following the classic works of Leopold von Buch (1774–1853) on Italian and Canary Island volcanoes, volcanology as a distinct branch of geoscience, really began in the second half of nineteenth century, with, for example, the works of Ferdinand Fouqué and Grove Karl Gilbert (Cailleux, 1961). In 1922, the IUGG (International Union of Geodesy and Geophysics) established a Volcanology Section — then the IAVCEI, the International Association of Volcanology and Chemistry of the earth's interior — with Alfred Lacroix, author of the classic research on the Mount Pelée eruption of 1903 in Martinique, as its first President. There were seven volcanology papers in the Congress, but none by leading volcanologists, the volcanologists having recently started their own specialization. There were also three papers on seismology.

The twentieth century greatly expanded the study of microfossils, and Session VII was devoted to this topic: Tertiary Foraminifera, with four papers.

In the field of economic geology, the main area of interest in the 1920s was the origin of ores. The dominant theory was the magmatic origin, the 'igneous theory' or 'ascensionism', established by Élie de Beaumont, Phillips, Sandberger, Posepny and Vogt in the nineteenth century and later Van Hise, Kempt, Lindgren, Emmon and Spurr (Crook, 1935). The igneous theory known in 1919 a new contribution from Carsten and Ohashi with the so-called the 'hot spring school'—the current submarine-exhalative theory—concerning the origin of laminated sulphide deposits, as proposed by Van Hise and Leith for the banded iron formations of Lake Superior in 1911 (Stanton, 1972).

Spain had large complex sulphide deposits, such as the ones of Huelva, similar to the Portuguese ones, of exhalative origin. But the main authors of the 'hot spring school' did not present papers: neither did Spurr, author of the recent book *Ore Magmas* (1923), nor Schneiderhohn, who in 1932 proposed a general genetic classification. But authors such as Alan Bateman, who in the 1940s published *Economic Mineral Deposits*, the zenith of magmatism (Stanton, 1972), and Wilhelm Petrashek, also author of a well-known text, were present and Petrashek presented a paper on the '*Metallogenetische Zonen in den Ostalpen'*. The previous IGCs of Sweden (1910) and Canada (1913) had made world inventories of iron and coal respectively. One of the main publications coming from the Madrid IGC was a world inventory of pyrites, published in French in 1927. There was only one paper on oil geology, and nothing about the geology of potash, then a fast-growing mining industry in Spain, from the first mines of Suria (visited during one of the field-trips), started in 1913.

Geophysics, as usual a group of 'border' sciences, was an emergent field in the 1920s and progress in applied geophysics was important. Conrad Schlumberger was developing geoelectrical methods from 1913 in the field of resistivity, and Sven Lundberg had developed inductive methods at the time of the XIV IGC. In 1922, gravity prospecting methods—first developed by the Hungarian Leránd Eötvos from 1890 to 1902— were applied in California and Texas, first for oil exploration in the discovery of salt domes; and, in the same year, Everette de Golyer first applied the refraction seismic method, also for oil. Clarence Karcher had previously applied the reflection method in Oklahoma, with his own type of seismograph, (Dobrin, 1960). The geophysical papers at the XIV IGC were mainly applied (10), theoretical (6) and instrumental (3). None of the aforementioned leading researchers in applied geophysics were present at the IGC.

According to Ellenberger (1978), in reference to the I IGC, it "[d]id not succeed as a mechanism for methodologically confronting the work and problems then facing the geological community". Probably, these words could also be applied to the XIV IGC.

The Congress in the history of geology in Spain

It was Spain that benefited most from the XIV IGC and probably never again there has geology received so much public and official attention. It was only the second international scientific congress held in the country, following the XIII International Congress of Medicine in Madrid (1903). There would be only two other International Scientific Congresses in the country before the Civil War (1936–1939): IX Chemistry in 1934 (Sánchez Ron, 1999), and the International Congress of Entomology, in 1935.

The effort devoted to the preparation of the IGC was really substaintial from 1922 to 1926 for a country like Spain with limited resources. The IGE was then a small geological survey—in 1933 it had a scientific staff of 29— and it was necessary to mobilize the whole geological community of the country to achieve success. This community was composed of two groups. The mining engineers and geologists were in the IGE, a branch of the General Direction of Mines, with its own journal, the *Boletín de la Comisión del Mapa Geológico*. The naturalists–geologists were in the *Museo Nacional de Ciencias Naturales* (MNCN) and the universities and also had their journal, shared with biologists, the *Anales de Historia Natural*, published by the Royal Society of Natural History. The XIV IGC provided the opportunity for a cooperative effort between the two branches of the geological community, and, despite the offi-

cial representation by the IGE and the dominating position of mining engineers in the organization, the response of the naturalists–geologists was generous.

The IGE had been created in 1849 under the title of 'Commission for the Geological Map'. By 1889, after forty years of field work by a small team of mining engineers, some of them trained in Freiberg (Germany), with a little collaboration from some naturalists, they had completed the first national geological map of Spain on a scale of 1: 400,000 (Ayala-Carcedo, 1999). From 1889 to 1926, the IGE whose name was adopted in 1910 did not have a national systematic mapping programme, and chiefly devoted itself to applied geology. Following the IGC, the IGE changed its name in 1927 to *Instituto Geológico y Minero de España* (IGME), the name still used today. In 1928 it issued its first five sheets at the scale 1: 50,000 (forty-eight by 1933), and formulated a programme of systematic geologic mapping, with a total objective of 1,131 sheets (IGME, 1980), probably too ambitious for a small survey (Ayala-Carcedo, 2000). The XIV IGC, stimulated the systematic programme, but it was only completed in 2003, being from 1972 carried out mainly by contractors external to the Geological Survey of Spain. One of the benefits of the IGC for the IGE was the new building constructed for the Congress, which became its head office and remains so to the present.

The IGC's Organizing Committee had a total of ten members besides the President and Secretary, most of them belonging to institutions outside the IGE: universities, academies and so on. It was composed of six mining engineers, three geologists, and the royal commisioner of tourism. The editing of the field-guides and the organizing of field-trips required the effort of sixteen geologists, eighteen mining engineers, and one civil engineer.

Spain had previously been the object of geological studies by foreign geologists during the nineteenth and twentieth centuries (Mallada, 1897; Fallot, 1949). But the IGC was the occasion for a significant increase in the knowledge of the riches of Spanish geology, especially as a result of the field trips led by the previously-mentioned geologists. The years after the IGC saw new publications such as those of the Frenchman Paul Fallot on the Betic Ranges or the German Walter Schriel on the Sierra of Demanda and the Obarenes Mountains (1929). Also, geologists of several European countries such as the Netherlands (Leiden University) were to work intensively in Spain after the WW II in Galicia, the Cantabric and Pyrenees Mountains (Floors & Arps, 2004), and some of them married Spanish women. The contacts with these geologists benefited the development of Spanish geology as nineteenth-century geologists had benefited from the contacts with French geologists such as Êdouard de Verneuil and Êdouard de Colomb, who had produced the third geological outline of the country in 1864 (Ayala-Carcedo, 2000).

Probably the main benefit for Spain was in the field of geological studies of individual geological units, a field poorly studied by the Spanish Geological Survey, working on the basis of sheets. Tectonics, a field previously underdeveloped in Spain, benefited from the presence of tectonicists such as Fallot, Stille, and Staub. From 1926 to the beginnings of the Civil War in 1936, at least thirty-six foreign geologists were working in Spain and publishing papers on Spain: twenty-four Germans (mainly from the school of Hans Stille), and ten from France. Geologists such as Franz Lotze (1903–1971), started his work in Spain as a result of the IGC (Schroeder, 2003), at a time when the international experience and training of Spanish geologists, by contrast with the first half of the nineteenth century, was lagging. However, analysis of publications shows that the new geologists working in Spain had rather little collaboration with Spanish geologists, with the exception of Fallot and Darder in Majorca.

After the IGC, it was necessary to edit and publish the *Proceedings,* in four volumes, issued between 1927 and 1930. Up to 1930, the XIV IGC induced 147 publications by Spaniards, many of them scientific ones. The publications resulting from the IGC, in the weakened Spanish scientific and cultural situation from 1936 to the mid-1950s, under the Franco dictatorship, served as important reference works for the geological community.

With twenty-four papers published in the *Proceedings*, Spain was the third scientific contributor country, after France and Germany—a position very different from, for example, the International Congress of Mathematics in Cambridge of 1913, where there was only a single Spanish paper (Sánchez Ron, 1999). The main contributor, and the most productive at the international level, was Antonio Carbonell, a mining engineer/geologist working in Andalucía, who was not a member of the IGE. He produced five papers and two field-guides, A-4 and A-5. Second came José Royo (1895–1961), who was then a young geologist working in the MNCN (Sequeiros, 1995), with two papers and the field-guide for excursion A-6, and then Colonel Inglada, a seismologist, also with two papers. Next to the contributiors from Madrid, Catalonian geologists (many of them associated with the *Institut d'Estudis Catalans*, a prestigious scientific institution) were the main contributors, with thirty-seven publications outside the IGC (only one in the IGC), written in the Catalonian language.

Epilogue

The XIV IGC reflected the state-of-art and progress of 'normal' science, and was specially useful for economic geology, geophysics, and African and Western Mediterranean geology, but without much emphasis on the main theories then under discussion, such as continental drift. Evidently, the cutting edge of geoscience was located outside the XIV IGC and in this respect the intended scientific function of the International Congress was not accomplished. However, in terms of science politics, and the social functions of the International Congress, the XIV IGC was undoubtedly successful. Perhaps this was the main significance of the Congress.

For Spain, then a country with limited international scientific collaborations, the meeting was especially useful in terms of new links with foreign colleagues and numerous publications. But this return to 'normality' after WW I, was only apparent: under the surface, there were deep waves of instability in the world and in Spain. Five years after the Congress, the Spanish king who opened the Congress left the country after the defeat of monarchist parties in 1931, the day before to the proclaimation of the Second Republic (1931–1939). Ten years after the Congress, Spanish geologists, were divided by the Civil War (1936–1939), triggered by the failed military *coup d'état* of July, 1936, and prolonged by a three-year war that ruined the country. The two main Spanish contributors to the Congress, Antonio Carbonell and José Royo, were in opposite factions: Carbonell, a rich man, sided with the fascists, while Royo was with the legal Republican Government. After the war, he died in the exile in Venezuela, but also produced work in Colombia that is remembered. Thirteen years after the IGC, the geological community was again divided by WW II, and many of the works undertaken by German geologists in Spain after the IGC were utilized for the mineral supply policy of the Third Reich through the mining company Montana, created by Herman Göering (Schroeder, 2003).

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Hutchison 'Young Scientist' Fund

William Watt Hutchison, "Hutch" to his many friends around the world, was a Scots-born Canadian geologist who served Canada and the IUGS in myriad dynamic and creative ways. Most notably, he served as the IUGS Secretary General (1976–1980) at a pivotal time in its history, and as IUGS President (1984–1987). The same boundless energy, enthusiasm, skill in communications, and ability to foster teamwork that characterized his work with the IUGS also carried him to preeminent scientific administrative positions in the Canadian Government, where he served as Director General of the Geological Survey of Canada and as Assistant Deputy Minister of Earth Sciences. His distinguished career was terminated in 1987 by his untimely death at the age of 52, following a painful struggle with cancer.

One of Hutch's last wishes was to establish under IUGS auspices a memorial foundation intended to promote the professional growth of deserving, meritorious young scientists from around the world by supporting their participation in important IUGS-sponsored conferences. The first 3 beneficiaries of the ***Hutchison "Young Scientist" Foundation*** attended the 28th International Geological Congress (IGC) in Washington, D.C., in 1989.

Initially, earned interest on the funds available to the Hutchison Foundation were insufficient to sustain comparable grants every four years without seriously eroding the principal. For that reason, the IUGS made no grants from the Foundation for the 30th IGC (1996), preferring instead to strengthen the fund by allowing it to earn interest for a longer period of time and by appealing for donations from the international geologic community. Grants from the Foundation again supported deserving young scientists beginning with the 31st IGC (2000), and should continue for future Congresses. The IUGS would like to expand the resources of the Foundation to make it possible also to offer support to deserving young scientists to attend other important IUGS-sponsored scientific meetings. The ***Hutchison "Young Scientist" Foundation*** is a worthy cause that honors a fine, caring man and a distinguished, public-spirited scientist and administrator. The foundation also celebrates and promotes those things that gave Hutch the most professional satisfaction: geology, international scientific collaboration, and stimulating young minds.

The IUGS welcomes contributions to the ***Hutchison "Young Scientist" Foundation***. Please send donations to:

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