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# The First International Oceanography Congress held in Spain (Seville, 1929)

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ABSTRACT - Numerous scientists and technical experts from the Atlantic (ICES) and Mediterranean (ICSEM) areas came together at the 1<sup>st</sup> International Oceanography Congress held in Spain (Seville, May 1-7, 1929). In the course of its sessions, the “Oceanography Section of the International Geodesy and Geophysics Union” (IGGU) and the “International Commission for Standardising the Methods and Instruments Used in Oceanographic and Hydrologic Research Work” also came together. The meeting had the unique privilege of using, as its venue, the Palacio de la Plaza de España, built expressly for the 1929 Ibero-American Exhibition at Seville, which was inaugurated for the occasion. IGGU’s General Assembly, held in Prague (1927), designated the *Instituto Español de Oceanografía* (Spanish Institute of Oceanography, IEO) as the hosting organisation for the *International Oceanography, Marine Hydrography, and Continental Hydrology Congress*. Under the leadership of Dr. Odón de Buen (1863-1945) from IGGU’s Oceanography Section as arranged with ICES’s Council, whose Chairman, H.G. Maurice since 1920 was a member of the British delegation, an attendance by 129 scientists hailing from 35 countries comprising the Americas, central Europe and such distant countries as Australia, China and Japan was achieved. On the oceanographic side, the most significant contributions were in the field of physics, notably, general oceanic flow, seasonal oceanic temperature variations, plus the first world-wide-presentation of the valued Helland-Hansen method (the Temperature Anomaly Method). Particularly brilliant at the scientific exhibition of apparatuses and instruments were the presentations by Charles Louis Florisson, Pierre Marti, Pierre Idrac, and by Otto Pettersson (ICES founder) on innovative apparatuses. The Seville Oceanography Congress, together with the immediately preceding (April 1929) plenary meetings of ICSEM’s General Assembly held at Málaga, consolidated Spain’s status in the area of international oceanographic cooperation, which was subsequently strengthened vis-a-vis the Americas with the *1<sup>st</sup> Ibero-American Oceanography Conference* (Madrid-Málaga, April 1935), encompassed within the 1925-1940 period termed by G. Wüst as the “age of national systematic and dynamic oceanic surveys”.

## Introduction

The plan for an international oceanography congress is unquestionably attributable to Prince Albert of Monaco (1848-1922), because in April 1906, the Director of the *Musée océanographique de Monaco*, Jules Richard, suggested such a gathering in a circular letter sent to oceanographers throughout the world (Carpine-Lancre 1980). Within a few weeks, hundreds of favourable letters were received. Some of these contained the question of a possible paper or a preliminary listing of subjects that should be approached during the congress. Richard identified the subdivisions of oceanography as: physics, chemistry and biology of the Sea. Prince Albert added marine meteorology.

Otto Pettersson,<sup>1</sup> from Stockholm, enthusiastically encouraged in May 1906 that the Congress be organised. A Hungarian professor proposed the inclusion of limnology, while Portuguese contributors pointed out the law of the Sea. From Berlin, economic aspects of oceanographic research were proposed. Overall, as Max Weber suggested (Carpine-Lancre 1980, 160), there was an existing trend of opinion in favour of standardising instruments, methods and presentation of results, as well as advocating an increased international cooperation.

However, Prince Albert was unsuccessful in convening a simultaneous 8<sup>th</sup> International Zoological Congress and an Oceanic Congress in Monaco at Easter 1910. And the desired results in terms of international cooperation were to be reached by means of a more restricted framework than that of international congresses. As such, the day after the opening of the *Musée*, on 30 March 1910, an Atlantic and a Mediterranean Commission chaired by Prince Albert met in Monaco. After Prince Albert's demise, the two vacant chairmanships thereon were filled by Spanish oceanographer Dr. Odón de Buen (elected in 1924 as Chairman of the Oceanography Section of the International Union of Geodesy & Geophysics) and by Italian professor Vito Volterra (Chairman of the International Commission for Scientific Exploration of the Mediterranean Sea, ICSEM).

It should be borne in mind that, within the scope of the oceanographic and fishing researches in Europe, the coastal countries of the Atlantic and the Mediterranean went their own ways upon creating separate International Councils (International Council for the Exploration of the Sea, ICES and ICSEM), the latter having been definitively formed in Madrid in 1919. This situation changed when both Councils independently decided to participate in an international meeting organized to be held in Prague (September 1927) by the Oceanography Section of the International Union of Geodesy & Geophysics (OS IUGG). Under resolutions of the 1927 Prague meeting and the IUGG General Assembly, the organization of a Congress and Exhibition to be held in Spain, in the Spring of 1929, was unanimously assigned to the *Instituto Español de Oceanografía* (IEO).

<sup>1</sup> Pettersson was ICES Vice-President (1902-1915; 1920-1932) and President of the Council (1915-1920).

Lastly, the International Oceanography Congress in Spain (Seville, May 1-7 1929) was to be complemented by inclusion of marine hydrography and continental hydrology. The Congress included a comprehensive Exhibition of Apparatuses and Instruments (1 May-15 June), with inventors and manufacturers in attendance, and also two sectional meetings involving (1) the OS IUGG (May 1) and (2) a Commission for the Standardisation of Instruments and Methods (May 2).

Participants came from all over: 35 nations sent delegates; 129 scientists attended the meeting (of whom 55 were official delegates of their countries and 5 were ICES's Vice-Chairmen<sup>2</sup>). The scientists hailed from the Americas, central Europe, and such distant countries as Australia, China and Japan. Both the Congress and the Exhibition were held in the *Palacio de la Plaza de España*, a superb building, the conference halls of which still embellish the city, which was designed by architect Aníbal González for the *Exposición Iberoamericana* (1929-1930).

This important Spanish achievement, which encompassed numerous activities that took place on an international level at the IEO venue, led to Spain's admittance to ICES (1924) and to offering the Málaga Oceanographic Centre as a new site for the International Hydrographic Office (1926).<sup>3</sup> The holding of both the plenary meeting of ICSEM's General Assembly (Málaga, April 1929) and the 1929 International Congress consolidated Spain's status in the area of international oceanographic cooperation. This was subsequently strengthened vis-a-vis the Americas with the founding of the Ibero-American Oceanographic Council and the formation of the Spanish Committee (1929; Anonymous 1930b), the publication of a journal (February 1930) and the holding of the 1<sup>st</sup> Ibero-American Oceanography Conference (Madrid-Málaga in April 1935; Anonymous 1935).<sup>4</sup>

<sup>2</sup> H.G. Maurice from the United Kingdom, Vice-President between 1912-1920; Théodore Tissier, official delegate of France and Vice-President in 1921-1944; Carl Heinrici, president of the German delegation and 1927-1944 ICES Vice-President; Martin Knudsen, Vice-President for 1933-1947 and official delegate of Denmark (although he finally did not travel to Seville), and Harald U. Sverdrup, Vice-President in 1951-1954 and official delegate of Norway.

<sup>3</sup> The 1<sup>st</sup> International Hydrographic Conference took place in London in 1919. During the Conference of 1926, Odón de Buen offered the possibility to transfer to Málaga the site of the International Hydrographic Office, although this one ended by inaugurating its new premises in Montecarlo (14/1/1931) (Anonymous 1931).

<sup>4</sup> 18 delegates from foreign countries and 5 representing International Commissions. 4 Sections: General oceanography and Hydrography, Problems and statutes reforms, continental Hydrology, and Biology and fishery. A meeting day was especially dedicated to the *Bureau Hydrographique International* (Málaga, 27/4/1935) (Anonymous, 1935) and the work carried out by that international Office was exposed by J.D. Nares (Nares 1935).

As an outcome of the 1<sup>st</sup> Pan-Pacific Science Conference (1920)<sup>5</sup> the American, Australian and Japanese oceanographers from the Pacific Coast undertook coordination of their researches. In addition, the international oceanographic community made preparations for a Second International Polar Year in 1932-33 (the first such Polar Year had been commemorated in 1882-83). In these years, after 1918, the times were characterised by the imperialistic need to concentrate on the exploitation of limited areas while preparing for an eventual redistribution of naval supremacy (Tomczak 1980). In parallel with such increase in international cooperation in oceanographic research, 1925 marked a new era in Spain's national research effort. Specifically Georg Wüst (1964), the official German delegate to the 1929 Seville Congress, identified the 1925-1940 period as the "era of national systematic and dynamic ocean surveys".

International cooperation on a large scale continued and thirty years after the Seville Oceanography Congress had convened, a further gathering was held. The 1<sup>st</sup> International Oceanography Congress held in New York (31 August – 12 September 1959) was followed by a 2<sup>nd</sup> Congress held in Moscow in 1966 (with 1,767 participants from 57 countries, one of its Sub-Sections having been chaired by Spanish Professor Ramón Margalef).

The driving force of the 1929 Seville Oceanic Congress was the need for international cooperation as a follow up on advances in the role of instruments (Hendershott 1980). Frequently, new instruments gave rise to an internationally-shared knowledge, whereas such information had oftentimes been previously kept secret, as was the case with wind systems, currents and bathymetry (Hempel 1999). A significant instance of a "new" instrument that caused world-wide studies to be essential was that of the magnetic compass, which made geomagnetism research crucial. This was one of the motivations for the global expeditions accomplished in the last quarter of the 19<sup>th</sup> century and for the First International Polar Year (1882/83).

### **Inter-institutional relations in Spain**

The Spanish generation of 1914 was perhaps the first to receive an intellectual flavour from science. The alliance between a republican and free-thinker like biologist Odón de Buen and a monarchist General Primo de Rivera who ruled the country as a dictator (1923-30) would remain unaccountable should we not refer to modernisation. In fact, early ties between both men were revealed by de Buén himself in his memoirs (Buen O. de 2008)<sup>6</sup> and by other

<sup>5</sup> International symposiums like the Pan-Pacific Congress were later convened (the 2nd in Melbourne in 1923, the 3<sup>rd</sup> in Tokyo, 1926 [Vaughan 1930]) or the Congress of Sciences of the Pacific (the fourth in Batavia, 1929; Anonymous 1930c).

<sup>6</sup> The dictator was 6 years younger than de Buen and both cultivated their personal friendship for more than 40 years: they started this friendship "since they were almost children and lived together" in a private School of Madrid.

sources (Pérez-Monte 2006).<sup>7</sup> The guarantees obtained in terms of autonomy for the JAE (Board for Extended Studies), to the inclusion of IEO (founded by O. de Buen in 1914) as its main related institution, were to cover scientific research leading to the progress of oceanography in Spain.

The Spanish Association for the Advancement of Science (AEPC) was founded in 1908 by Segismundo Moret, Cabinet minister and leader of the Liberal party, with a membership of 300. This Association was ideologically eclectic, although Darwinism was a constant item for discussion at its assemblies and, incidentally, one of the charges levelled against Odón de Buen when he was arrested in 1936. Prior to the 1929 Seville event, the Association had met in Barcelona that same year and at Cádiz in 1927. A massive collection of scientific instruments exhibited by AEPC in all their Congresses became symbolically the flagship of their political modernisation drive (Glick 1993). Nevertheless AEPC lent no support to the idea of holding an international congress on Oceanography in Spain. However, ICES's Council agreed to consider the presence of their Chairman at the May 1929 Seville Congress as "an Exhibition of oceanographical and hydrographical instruments" (Went 1972).

### *The IUGG and the National Committee of Spain*

The *Section d'Océanographie Physique* became one of IUGG's constituent sections at its 1<sup>st</sup> General Assembly held in Rome (1922). Likewise, a *Section d'Hydrologie Scientifique* became a constituent IUGG section in 1922. After the General Assembly held in Madrid (September-October 1924), O. de Buen was designated Chairman of the Section, as successor to Prince Albert (1919-1922), a position which was filled by him until 1930. He was the second Spaniard, after military engineer Carlos Ibáñez de Íbero who had been Chairman of the *Internationale Erdmessung* (1886-1891), to be involved in IUGG's activities. In 1925, de Buen, as Section President, received a tribute from the *Institut de France*. When a 3<sup>rd</sup> IUGG General Assembly met in Prague (29 August – 10 September, 1927), IEO was, by unanimous decision, invited to organise an International Congress on Oceanography, Marine Hydrography and Continental Hydrology.

At the Seville 1929 Congress the interests of two IUGG Sections converged, for it was attended by the Chairmen of both the Oceanography and the Scientific Hydrology Sections. Bruce Wade, from Switzerland, who was Chairman of IUGG's Scientific Hydrology Section since 1922 (until 1933), conducted the proceedings of the Continental Hydrology Section at the Seville Congress. And because the Exhibition and the Congress were due to Odón de Buen, who was the Chairman of IUGG's Oceanography Section. This interaction at the Seville Congress is also noticeable from the fact that Giovanni Magrini, who was Gen-

<sup>7</sup> de Buen was the private teacher of young Primo de Rivera, according to this author. Also other scientists like the medical doctor Ángel Pulido (1878-1970) profited from their relationship with the dictator to promote policies, like the return of sefarad jews to Spain.

eral Secretary of the Oceanography Section since 1919 and of the Hydrology Section since 1922, attended the Congress. He contributed to this international event with a standard in view of an “Annual bibliography of Sea Sciences” publication as adopted at the Mediterranean International Commission, International Oceanography Section (Madrid, November 1919). Jan Smetana, who was to be Chairman of IUGG’s Scientific Hydrology Section (1933-36), also attended the Seville Congress.

The Seville Congress disseminated an awareness of IUGG’s interests, which were also revealed by the fact that all the participating countries, with the exceptions of Germany (1951), Guatemala (1957), Hungary (1930), Monaco (1967), Romania (1930) and USSR (1954), were associated to the Union in 1929.

The three subsequent Chairmen of IUGG’s Oceanography Section from 1930<sup>8</sup> to 1951 were also invited to present papers at the Congress’s sectional meetings. Two Norwegian participants, Helland-Hansen (1936-1946) and Sverdrup (1946-1951), presented papers, but the Danish participant, Knudsen (1930-1936), did not attend the summit meeting.

#### *Initiatives and Preparations for the 1929 Congress in Spain*

At the beginning of 1927, initial steps were taken towards holding, two years later, the Oceanographic Congress and Exhibition in Seville. The process started with a national call announcing an International Exhibition of Oceanographic and Hydrographic Instruments to be held in Prague, at the headquarters of the Geographic Society, in the autumn of that year. The International Geodesy and Geophysics Union (IUGG), Oceanography Section, taking advantage of the planned IUGG’s 3<sup>rd</sup> General Assembly to be held in that capital city (4-11 September 1927), would organize the Exhibition. One of the major targets of the Exhibition was to allow a Commission of experts to make a proposal on “new instruments and methods for use in international oceanographic and hydrographic researches.” CIESM-ICSEM (Paris, 8-2-1927) and ICES (Copenhagen, 1927) were very early in deciding their participation in the event. In the case of CIESM, “so as to establish the closest possible relations”, Mediterranean delegates advanced that a meeting of CIESM-ICSEM’s Executive Committee, as proposed by professor Magrini, would be simultaneously held in Prague.

At IUGG’s General Assembly in Prague (September 1927), an unanimous resolution was passed to the effect of requesting the Spanish Government to hold in Seville (in the spring of 1929) an International Exhibition of Oceanographic and Hydrographic Instruments and an International Congress to frame the bases for standardising methods and procedures in those branches of science. Finally, per a Royal Order of 1927, Spain assumed the commitment

<sup>8</sup> The Section of Oceanography of the International Geodesy and Geophysics Union met in Stockholm in August 1930 (Buen R. de 1930).

of organizing such a Congress and Exhibition in Seville in 1929; and a call to both events was published (Anonymous 1927).<sup>9</sup> That Royal Order additionally specified the Government Agencies<sup>10</sup> charged with implementing the decision. Membership of the Organizing Committee<sup>11</sup> was given and an additional appropriation of funds was made to carry out the project. The Organizing Committee proceeded to draw up a set of rules, including aims, for the Congress and the Exhibition, which were published in 1929 (Anonymous 1929).<sup>12</sup>

After the end of the Seville Congress, IEO published a report entitled *Congreso Internacional de Oceanografía, Hidrografía Marina e Hidrología Continental. Sevilla, 1-7 mayo 1929*, including numerous discourses,<sup>13</sup> in two volumes.<sup>14</sup> Furthermore, detailed descriptions of all the unfolded sectoral activities were in 1930 included by Rafael de Buen in the three first issues of the *Revista del Consejo Oceanográfico Ibero-Americano* (Nº 1 for February 1930 [Anonymous

<sup>9</sup> Summary: Royal Order convening an Oceanography and Hydrography Instruments Exhibition and an international Congress to unify the methods and procedures of both branches of science, to be celebrated in Seville in 1929. Organization of the exhibition and the Congress.

<sup>10</sup> The organization of the Exhibition and Congress was conferred to the IEO, that would be supported by the San Fernando Naval Observatory and by the National Committee of Geodesy and of Geophysics (CNGG, with its Sections of Oceanography and Hydrology).

<sup>11</sup> An Organization Committee of 21 persons was nominated (13 with full name + 8 occasional members: the tourism delegate, the Seville Mayor, etc.), in which the members of the referred CNGG Section of Oceanography occupied the most outstanding place. This section was composed of 9 members belonging to the IEO (4), Marine Observatory (2), university professors (2) and civil engineers (1): Odón de Buen (the president, IEO), J. Galbis (vice-president), Rafael de Buen (secretary, IEO) and six more members (H. de Castro, M. Becerra, M. Martínez Risco, F. Graiño, J. Giral [IEO] and F. de Buen [IEO]).

<sup>12</sup> It includes the 1) regulations of the *Exposición Internacional de Oceanografía, Hidrografía marina e Hidrología continental de Sevilla durante el mes de Junio de 1929*, aims of the exhibition (unification of the methods and procedures employed in the works), organization and participation. 2) Regulation of the *Congreso Internacional de Oceanografía, Hidrografía marina e Hidrología continental*, (celebrated in Seville in May 1-6, 1929), aims, organization, participation and subjects to discuss along the Congress.

<sup>13</sup> Numerous speeches were published, being outstanding those by Odón de Buen and Otto Pettersson, as well as the ones pronounced by other famous professors: Heinrici (Germany), A.R. Hinks (England), general Fichot (France), engineer Mr. Jan Smetana (Czechoslovakia), D. Enrique González Martínez (Mexico), Duke Thaon di Revel (Italy), G.W. Littlehales (USA), Jose María Peralta (El Salvador), Defant (Germany), Donald J. Matthews (England), Michel Siedlecki (Poland), A.D. Lewis (Union of South Africa), S. Kolupaila and Jose Gabriel Navarro (Ecuador).

<sup>14</sup> Volume 1 included information on the Congress in general and on the "Oceanographic and Marine Hydrography Section" (Madrid, 1929; Vol. 1, 554 pp.). Volume 2 (Madrid, 1931) included "Sección de Hidrología continental" (pp. 1-269) and "Exposición de Instrumentos" (pp. 271-319 + 10 photopages). From the *Catálogo de los instrumentos y documentos expuestos* there is also an independent publication in 1931 (print independent: 49 pp. for text and 10 pp photos).



1930d],<sup>15</sup> N° 2 for June 1930 [Buen R. de 1930a]<sup>16</sup> and N° 3 for October 1930 [Buen R. de 1930b]).

The massive Italian participation at the Congress was condensed in a specific publication issued by the Italian National Research Council (Congresso 1929).

*The International Exhibition of Oceanographic Apparatuses and Instruments (1 May – 15 June 1929)*

An International Exhibition of Oceanographic Apparatuses and Instruments was organised by the Spanish Government upon acceptance of the unanimous decision adopted at IUGG's General Assembly held in Prague (September 1927). The catalogue of apparatuses and instruments, together with documents, on exhibit ran into 59 pages. The material was offered by France, Italy, Germany, Denmark, Egypt, the United States, Finland, Great Britain, Monaco, Russia, Sweden and Switzerland. Spanish documents mostly dealt with biological specimens related to the surveys for which IEO was responsible.

Arthur Robert Hinks (Crone et al. 1945), Secretary to the British Royal Geographic Society since 1915, published a first report on the Seville Congress in 1929 in *The Geographical Journal* (Hinks 1929); a second one, concerning the evolution of the Congress between the 1929 and the 1931 events, was published in 1934 (D.J.M. 1934). Hinks had already attended IUGG's General Assembly held in Madrid in 1924. As Vice-Chairman of the Oceanography Section at the Seville Congress, he was in close contact with the Spanish officials in charge of the Exhibition, including Commander Ernesto Caballero y Lastres, as well as with Hydrographic Engineer G.W. Littlehales from the U.S. He emphasised that these Congresses offered the opportunity to consider new apparatuses and to have discussions with their inventors and manufacturers.

“Human” geography vs acceptance of mere “physical” papers was at the base of a controversy. Hinks's insistence on the instrument exhibition, a most valued particular of the meeting, is to be read within the context of “standardised

<sup>15</sup> The first issue included: “Trabajos de la Sección de Oceanografía e Hidrografía Marina” (11-15); “Trabajos de la sección de Hidrología continental” (15); “Sección de Oceanografía e Hidrografía marina” (15-17); “Sección de Hidrología continental” (17-19); “Distribución de los instrumentos y material científico expuestos” (33); three speeches by Odón de Buen “in the opening session” (21-23), “in the plenary session, presided by the President of the Cabinet General Primo de Rivera” (23-25), and “in the ending banquet” (29-31); 13 photos: N° 1: “S. A. el infante D. Carlos, después de la sesión de apertura” (p. 8); N° 2: “Mesa de la sesión presidida por el presidente del Consejo de ministros, Excmo. Sr. General Primo de Rivera” (p. 10); N° 3: “Banquete de clausura” (p. 12); N°s 4-13: “Detalle de la Sala general” (3 different views: pp. 14, 16 & 18). “Documentos y publicaciones de la Oficina Hidrográfica Internacional” (p. 20); “Detalle de la Sala francesa” (2 views: pp. 22 & 24); “Detalle de la Sala italiana” (2 views: pp. 26 & 28); “Detalle de la Sala española” (2 views: pp. 30 & 32).

<sup>16</sup> Included in this issue: the (1) Meeting of the Executive Committee of the Section of Oceanography of the International Union of Geodesy & Geophysics, May 1, 1929 (98-107); (2) The Meeting of the International Commission for the Unification of the Methods and Instruments employed in the oceanographic and hydrological researches, May 2, 1929 (107-111).

equipment and analytical methods” (Brosco 1989). As science was on the point of predicting catches, the way for issuing regulations on overfishing was therefore opened. Precisely in 1929 scientists made first successful predictions of haddock and herring catches (Rozwadowski 2004), and sonic depth finders had become a major tool for both hydrographers and oceanographers. Spain, with her long littoral and the possibility of predicting catches, saw a very practical reason for inter-governmental cooperation. The Langevin apparatus associated to wireless telegraphy and wireless telephony was being extensively fitted on board French trawlers. Hinks considered this too complicated for ordinary navigational purposes and even for hydrographic survey work. Such a scientific innovation based on this early sonar technological development would appear to cause a discussion on the research signatures of the laboratories involved (Mukerji 1992). However, it was possible at Seville to meet Charles Louis Florisson who was “responsible for developing the high-frequency sounding apparatus and to study the unit under his guidance” (Hinks 1929, 71). Florisson patented this ultra-audible sounding apparatus in 1926 and 1933, under the acronym SCAM (*Société de Condensations et d'Applications Mécaniques*)-Touly. The 1933 patent specifically stated “applicable to biology, therapeutics, and laboratory mensuration work”. Echo-ranging sonar was not available on U.S. Navy destroyers until the mid-1930s.

Attention was drawn to two other relevant French exhibits; namely, (i) a continually recording apparatus from P. Marti for the supersonic sounder on which he submitted a paper to the Congress, investigating its use in plotting nautical charts; and (ii) an underwater meter for measuring sea currents, from P. Idrac, who also contributed a related paper to the Congress.

The exhibits, including photographs and drawings, were distributed over four halls set aside for French, Italian, Spanish, and General Instruments. Participants included manufacturing firms and scientific Institutes from Germany, Denmark, Egypt, the United States, Finland, Spain, England, Italy, Monaco, Russia, Sweden and Switzerland. Publications and reviews with contributions were sent by the *Bureau Hydrographique Internationale* (Monaco), the International Commission for the Exploration of the Mediterranean Sea, and the International Council for the Exploration of the Sea (Denmark).

Although Hinks reported that “no section was as well staged” as the French one, he also emphasised “Pettersson’s very interesting and important collection of new oceanographic instruments” (Hinks 1929, 71). In another respect, it was well known that Germany did not wish to attend IUGG’s international meetings. However, through the good offices of O. de Buen via diplomatic channels (Anonymous 1935), Germany was exceptionally at Seville in 1929 and exhibited a “formidable-looking current meter”.

The categories applied in classifying the exhibited instruments and methods were:

- \* Representation of the underwater relief
- \* Lithological studies of the Sea Floor (chemical aspects)

- \* Thermal, acoustical & optical instruments & methods
- \* Study of tides (oceanic & inland)
- \* Observation & study of waves & currents
- \* Marine meteorology & the researches associated with oceanography
- \* Chemicals in water (such aspects as water sampling, gases, &c.)
- \* Plankton studies
- \* Researches in continental hydrology
- \* Photos, models, documents, &c. (Institutes & ships involved in research, maps, &c.)

Documents and publications from the *Bureau Hydrographique Internationale* were duly shown in exhibitor cabinets in the working ambiance resulting from the *Section d'Océanographie* publishing policies on the General Encyclopedia of the Oceans, and General Bibliography on the Sea Sciences. The Encyclopedia was planned to appear in serialised parts, the first of which, on Crude Water by the Spanish oceanographer José Giral, was presented at Seville. The Table of Contents, as released in advance, included: Tidal Theory (observation, measurement and estimation of tides), Tidal Currents, Tidal Prediction, Mareography, Regular Analyses of Phenomena, Applications of Oceanography, Current Meters, Marine Erosion, Icebergs, Determination of Oxygen Content in Sea Water, and Quantitative Observation of Plankton. A *General Bibliography on the Sea Sciences* was published by the *Section*<sup>17</sup> and the International Commission for the Exploration of the Mediterranean Sea. It was announced in the course of the meeting that the 1928 volume was to be distributed at the forthcoming 4<sup>th</sup> IUGG's General Assembly to be held in Stockholm, Sweden, the following year. The level of bibliographical description in this work included: (a) surnames and forenames of authors; (b) title in the original language; (c) number of pages and size, (d) journal, price, &c., in which the article was published. As far as possible an abstract and a table of contents was added to each contribution (in German, Spanish, French, English, Italian). The classificatory table of the "Bibliography" is:

Generalities  
 Physical Oceanography – Hydrography  
 Biological Oceanography  
 Limnology – Potamology – Freshwater Biology  
 Fishery  
 Navigation and Harbours

Two more publications from the *Section* were announced. A *Manual of Oceanographic Observations in the Sea*, which required that an international oceanographical vocabulary in English, Spanish, Italian, Dutch, French, German and Japanese be compiled. The first volume was to be published within

<sup>17</sup> At the Assembly (Seville, 1929) the "Section of Physical Oceanography" became the "Association of Physical Oceanography".

the last few days of 1929. It consisted of five parts: (i) Numerical Data and Methodology, by Professor G. Magrini; (ii) Scheduling of Oceanographic Surveys, by Dr. O. de Buen; (iii) Morphology and Nomenclature of the Underwater Relief, by Professor E. de Martonne; (iv) Determination of the Sea Floor, by Engineer P. Marti; and (v) Observation and Study of Marine Sediments, by Dr. O. de Buen. The second volume dealt with Physics of the Sea and Chemical Contents. The third volume dealt with Maritime Dynamics and Meteorology. And the fourth volume dealt with Biology. It was resolved, after much discussion, that the Compilation of International Treaties and Conventions, as taken up at IUGG's General Assembly in Prague in 1927, be published.

### **An International Congress in Spain**

The International Oceanography, Marine Hydrography and Continental Hydrology Congress was divided into three scientific sections, Oceanography, Marine Hydrography and Continental Hydrology, and included:

- I – Sectoral Meetings
  - (A) Oceanography Section of the International Union of Geodesy and Geophysics, (IUGG), (1 May)
  - (B) Commission on Standardisation of Instruments and Methods (2 May)
- II – Comprehensive Exhibition of Apparatuses and Instruments (1 May – 15 June), having inventors and manufacturers in attendance

The meeting of the Executive Committee of IUGG's *Section d'Océanographie* and the proceedings of the Continental Hydrology Section of the Congress were intense and the results were clearly encouraging. Interest in the Seville event was focused on the "International Commission for Standardisation of the Instruments and Methods Used in Oceanographic and Hydrological Researches" under the interim chairmanship of Odón de Buen. The Commission designated 35 specialists in charge, with 11 research subjects clustered into six essential areas: physical-chemistry, lithology, tides, hydrography, biology and scientific hydrology (Buen R. de 1930). In the physicochemical area, consideration was given to Copenhagen standard water used for the researches in the sundry areas, acceptance of a margin of error in oceanographic physicochemical determinations, and determination of density. In lithology, methods to explore the sea floor were considered. In the waves field, attention was paid to the methods for determining the influence of disrupting elements on tides and tidal currents. Hydrographical sounding methods in pursuit of definite research aims were studied. In biology, general methods for collecting plankton were investigated. Three areas were subject to research in scientific hydrology: standardisation of nomenclature, methods for estimating water volume and evaporation. The original formation of this Commission had been established

at the Executive Committee meeting of the *Section d'Océanographie* held in Stra (Venice) in July 1926. On that occasion, H.G. Maurice, Chairman of ICES, proposed that, as standardisation of the instruments used in oceanography was so important, at least a benchmarking exercise between the various countries should be observed. At Seville, Maurice and Magrini were designated Permanent Chairman and Secretary of the Commission, respectively.

### *Oceanography Section*

As to the framing of a detailed scientific programme for the Oceanographic Section at the 1929 Seville Congress, it must be borne in mind that Odón de Buen was endeavouring to schedule a series of world-wide meetings. Accordingly, upon presiding IUGG's Oceanography Section, he won over a large German delegation to Seville (Parrilla 2005), although, as mentioned above, Germany did not desire to adhere to IUGG, or even attend their international meetings. It should also be recalled that the Congress was held after and in close relation with the *Première Conférence Hydrographique Internationale Extraordinaire* held in Monaco in April 1929.

From the *Commission Thalassographique Hellénique*, G. Athanassopoulos reported on mullet parasitology, with a study of a Myxinoid (*Myxine* and *Bdelostoma*) infection.

Luis Bellón Uriarte (1897-1954), from the Spanish Royal Society of Natural History and oceanographer at the IEO, presented a Bibliography of Marine Algae collected in Spain, Portugal, Balearic Islands, Canary Islands, and Northern Morocco, covering the 1553-1928 period.

The Director of the Fisheries Economy Section, under the National Institute of Agriculture, Bydgoszcz, Poland (who became in 1931 Director of the Baltic Institute, Gdynia) considered the influence of the River Vistula on the gulf of Gdansk, indicating changes in the hydrographical conditions in Baltic waters, emphasising varying influence of salinity on Sprat fisheries. In the second volume of the proceedings, he analysed the regular recurrence of fluctuations in the Vistula's outflow within the 1910-1928 period and emphasised a link between the lunar constellation and climatic changes.

Rafael de Buen (1891-1966), Vice-Director of IEO, with data coming from IEO's oceanographic cruisers and other sources, reported on dynamic phenomena in the Strait of Gibraltar.

The doyen of English Channel geology, Professor Louis Dangeard, presented Léon W. Collet (1879-1951), who held the chair of Geology and Palaeontology at the University of Geneva from 1918 to 1944 and in this 1928-29 academic year was Visiting Professor at Harvard University. The oceanography and underwater geology of the English Channel was presented via the work *Observations de géologie sous-marine et d'océanographie relatives à la Manche*, authored by Dangeard and published in Lyon and Paris in 1928. In the second volume of the proceedings another contribution by Collet reported on different European

river deposits.

André Courtier (1877-1958), general Hydrographic Engineer at the Marine Hydrographic Service in Paris, described the sounding methods used to explore the underwater relief and sea depth. Soundings taken by means of a fish-lead (Marti 1926); manometric tubes; and acoustic sounding methods. He provided a brief background of research in the field of echo-sounding by referring to the works of Professors Behm (1912), Fessenden (1914) and Langevin (1917). In a second contribution on *Carte du Monde au Millionième* as raised at the 11th International Geographic Congress (Cairo, 1-5 April 1925), contended in favour of holding a second edition for a discussion on Prince Albert's *Carte générale bathymétrique des océans*. He provided an analysis of the first edition, pointing out that "of the 2,642 sheets in the Index to the I/M Map, no less than 1,786 relate entirely to the Sea, and [that] there was little likelihood of more than very few of these sheets being ever be published by the organisations responsible for the sheets relating to the nearest adjacent lands" (Pérez-Monte 2006).<sup>18</sup> He recommended that the data be centrally located in the *Bureau Central de la Carte au Millionième*, at Southampton. Dr Alfred Merz's successor at the Berlin *Institut und Museum für Meereskunde* and the Secretary to this Congress, Oceanography Section, Austrian Professor Albert Defant, contributed to the Congress a paper on General Ocean Circulation. He also made remarks on Courtier's and Marti's papers regarding criteria for estimating velocity of sound propagation in sea water. Defant published in this same year his work *Dynamische Ozeanographie*, in which the Helland-Hansen (1903) formula is used in determining ocean currents.

The vessel *Carnegie*,<sup>19</sup> owned by the Carnegie Institution, Washington, USA, was the subject of a paper on her 7<sup>th</sup> cruise. Her first six cruises from 1909 to 1921 had been almost entirely devoted to an investigation into geomagnetism

<sup>18</sup> Hinks thought that the 1929 Seville Congress Oceanographical Section raised very appropriately the question of what shall be done to provide for the Ocean an equivalent to the *Carte du Monde au Millionième*. On Courtier's intervention and subsequent discussions, he added: "The invention of echo-sounding has complicated the problem, by providing minute detail on a few routes or in a few places, out of all proportion to the detail which can be obtained in any reasonable time or at any possible expense for the ocean at large. To aim at publishing 1786 sheets on the scale of I/M is out of the question, but one may envisage a general chart of the ocean on I/5M or I/4M, though even for those small scales the material will be very deficient for many years. Since there is special interest nowadays in polar oceanography it is desirable to provide for a better transition from sheet to sheet than that given by the awkward junction of the polar quadrants with the *Mercator* charts of the Prince of Monaco's map, and the choice of projection demands serious study. For the heavy task of compilation and publication the German delegates demanded the creation of a new international organization, but others deprecated a hasty resolution to this effect which would have certainly remained as sterile as the many unofficial resolutions in favour of the I/M map. So the subject was held over for consideration during the weekend, and a long Sunday excursion to Jerez de la Frontera gave opportunity for inspiration and informal conversation, leading to the safe and possibly fruitful decision on the Monday to invite the International Hydrographic Bureau at Monaco to study the subject" (Hinks 1929, 70).

<sup>19</sup> "... that had been roaming the oceans to chart variations in the earth's magnetism" (Burstyn 1980, 63).

and atmospheric electricity. The 7<sup>th</sup> cruise included an extensive oceanography programme and was intended to last three years (D.J.M. 1932). Unfortunately, the ship was destroyed by an explosion and fire at Apia, Western Samoa, on 29 November 1929 (Sverdrup et al. 1957b), and Captain James Percy Ault, one of the authors of this paper, died in the disaster. The paper, with many photographs, was presented by Professor Littlehales, US Navy Hydrographic Officer, on behalf of Professor Fleming and Captain James P. Ault.

Charles Louis Florisson, engineer from the *Société de Condensations et d'Applications Mécaniques*, Paris, who built, with the collaboration of Professor Paul Langevin, a supersonic echo sounder and who studied this apparatus under the latter's guidance, briefly set forth the background of ultrasonics (1915-1922). He also showed Professor Langevin's early efforts, described the combined *Langevin-Florisson* apparatus, pointed out that French Hydrographic Engineer Pierre Marti introduced modifications to it, and referred to the new S.C.A.M. version based on the original model. Also in 1929, the *Langevin-Florisson* echo-sounder (Belloc 1929) was for the first time described to the ICES community.

Bjørn Helland-Hansen (1877-1957) responded with enthusiasm by contributing to the Congress on the temporal variations in the ocean's temperature and presented the first version of a new method in order to be certain that observed temperature variations are related only to heating and cooling processes, i.e., a method "that is applicable in areas in which it is possible to establish a definite relation between temperature and salinity" (Sverdrup et al. 1957a, 132),<sup>20</sup> and will reduce "to a common standard subsurface temperatures observed in the open sea in different years" (D.J.M. 1934, 243). The following year, 1930, inside the *Michael Sars* North Atlantic Deep-Sea Expedition (a cruise starting in April 1910 extending from Europe to Newfoundland) Report, he published this methodology. The data from one of the three areas in the eastern North Atlantic where he applied his method, the Bay of Biscay, were used by Professor Sverdrup to explain the annual variation of temperature in the surface layers. Harald Sverdrup presented the contribution.

Pierre Idrac (1885-1935) was to present a submarine current recorder (Sverdrup 1957c) with which he had been studying the Gulf Stream. However, in the end he did not attend the Seville meeting.

Raffaele Issel (1878-1936), author of the handbook *Biologia marina, forme e fenomeni della vita del mare illustrati dalla scogliera mediterranea* (Milan, 1918), former Director (1920-1923) of the Marine Research Station at Rovinj (now Croatia), was Professor of Zoology at Genoa University (1923; Laboratorio marino di Quarto dei Mille) and a neoplanktonologist. He presented a contribution on the relationships between oxygen and sea vitality (Congresso 1929).

James Travis Jenkins (1876-1959), delegate of the Lancashire and Western Sea Fisheries Committee, Great Britain, who authored works on fisheries (Western Sea) and whaling, presented a paper on Oceanography and Sea Fisheries.

<sup>20</sup> H.U. Sverdrup refers (Helland-Hansen 1930).

George Washington Littlehales, US Navy Hydrographer from 1885 to 1932, president (1929-1932) of the American Geophysical Union Meteorological Section and a world-renowned authority on oceanography and cartography, spoke on the configuration of the oceanic basins.

V.E. Liakhnitsky, an important contributor on the dynamical theory of tides, like Shuleikin, presented a paper on *The Study of Ocean and Sea Straits in General and in Particular the Mouth of the White Sea and the Kerch Strait between the Azov and the Black Seas*. He was a member of the USSR State Hydrology Institute in Leningrad but did not attend the meeting.

Giovanni Magrini, Secretary-General to the *Consiglio Nazionale delle Ricerche*, Vice-Chairman of the *R. Comitato Talassografico Italiano* (1922-33), member of the International Association of Hydrological Sciences (IAHS), Secretary-General to the International Association of Oceanic Physical Sciences (IAPSO; 1919-30), referred to the Annual Bibliography of Publications on Sea Science Standards, under the Agreement of the International Commission for the Exploration of the Mediterranean Sea (Oceanography Section), and reported on the activity of the *R. Comitato Talassografico* in 1927-28.

Carlos Antonio Marelli, Director of the La Plata Zoological Garden, Argentina, contributed a Bibliography of Sea Water, Brackish Water and Freshwater Ichthyology, Fisheries and Fish Farms in Argentina. He did, however, not travel.

Pierre Marti contributed an *Aide-mémoire* on "The Use of Acoustic Sounding in Plotting Nautical Charts". He discussed the need for standardisation associated with the preparation of bathymetric charts based on echo-sounding. The 1.500 m/s unit of measurement is applied in giving the velocity of sound in sea water.

Francisco-de-Paula Navarro (1898-1960), from IEO, Majorca Laboratory, studied the problems in determining density of seawater samples via different methods (refractometry, aerometry, and Mohr-Westphal balance) for use by IEO's coastal laboratories. He showed a preference for dipping refractometers.

William J. Peters from the US Geological Survey, presented by the Chairman of AGU's Section, G.W. Littlehales, contributed the concept of compass and dip-circle deviations caused by harmonic motion.

Otto Pettersson from Sweden, ICES Chairman (1915-20) and Vice-Chairman (1902-15 and 1920-32), was concerned with a resolution on monthly temperature variation charts for North-Atlantic surface waters (Svansson 2004).

Mario Picotti, from the *Reggio Istituto Geofisico di Trieste* who in 1929 was transferred from the *Ministero della Marina* to the CNR, discussed seawater salinity and density and the methods for so determining.

Heinrich Rauschelbach, from the *Deutsche Seewarte* (German Meteorological Observatory), Hamburg, designer, presented a new type of current-meter.

Paolo Revelli, Director of the *Scuola Speciale di Geografia*, Genoa University, presented various documents on Christopher Columbus and the Genoese School of Cartography.

Giuseppe Romagna Manoja, from the Italian Navy, Captain of the ship *City of Milan*, who had denied landing of and radio support to the 1928 Nobile



Polar flight, reported on the results of the scientific research accomplished in an expedition to King's Bay, Spitsbergen.<sup>21</sup>

Ernest Victor Roberts, a retired British Royal Navy Lieutenant, described an echo sounder from the British Admiralty, who at that time was passing on designs for a self-recording mechanism that was able to record depth in a drum on the Barograph principle. He also contributed to the design of Hughes echo sounder.

Charles de la Roncière (1870-1941), curator of prints at the National Library in Paris, and Vice-Chairman of the *Société de Géographie* and historian of the French Navy and colonies, discussed the origin and evolution of Catalan cartography (the Jewish cartographic school in Majorca) and the connexion between the Catalan cartographers who settled in Portugal and the cartographic work accomplished by Christopher Columbus (Wright and Roncière 1926).

Bruno Schulz, from the *Deutsche Seewarte*, Hamburg, set forth the influence of air on marine organic life. He had written for the journal *Isis*, in 1926, an article on "The Technical Development of Oil Firing".

Massimo Sella, Director of the Marine Research Station at Rovinj, contributed studies of tuna and eel migrations in the Rovinj area, results he had already published in *Atti della Reale Accademia dei Lincei* and *Memorie del R. Comitato Talassografico Italiano*, in 1926 and 1929. Sella had combatted an outbreak of endemic malaria in the Rovinj area (Sella 1929).<sup>22</sup> He did not attend the Seville event.

Was. W. Shoulejkin from the Oceanographic Institute of Moscow, USSR, wrote on (i) the evaporation of sea water and the thermal interchange between the sea and the atmosphere (a matter on which he had published an article in *Gerlands Beiträge zur Geophysik* in 1928); (ii) a maregraph for the open sea (a contribution later published in ICES's *Journal of Marine Sciences*, Vol.4, No.2, for August 1929); (iii) the specific gravity of ice; (iv) fluctuation of oscillations of the centre of gravity of a ship and the measurement of the wave profiles. He did not come to Seville, pursuing his works on combustible reactions in Moscow.

Harald Ulrik Sverdrup, eventual Chairman of ICES (1955-57), was in 1929 Professor of Meteorology at the Geophysical Institute in Bergen. He worked on data from the *Maud* 1918-1925 cruise (Sverdrup 1929), which had departed from Christiania, Norway, in July 1918, proceeded through the Northeast Passage, went along the coast of Siberia with the intention of being frozen into the ice and float to the North Pole under the command of Amundsen. On the North Siberian shelf, where occasional intrusion of high-salinity water takes place and low oxygen values occur, he deduced a discharge of heat from the sea floor amounting to from 60 to 100 g. calories per square cm per year.

Tchang-Si, a PhD graduate from the Chinese Hopei University, and a student at the *Institut franco-chinois de Lyon* (who arrived in 1921 and departed in 1931), presented the preliminary results from his thesis on the *opisthobranchia*,

<sup>21</sup> Manoja, a dedicated Fascist, was *en route* to King's Bay as Nobile's support vessel (Nelson 1993).

<sup>22</sup> (Sella 1929) For the control of mosquitoes *Gambusia* was entirely satisfactory; the 1928 anti-malaria campaign is reported here. Sella contributed on this subject from 1921 (Sella 1921).

and discussed about the families *Akeridae*, *Philinidae*, *Pleurobranchidae* and *Haminocidae*, referring to specimens from the Lazaret cove in French Provence (Zhang Xi [Tchang Si] 1931).

Pierre de Vanssay de Blavous, French Hydrographic Engineer from the Managing Committee of the *Bureau Hydrographique Internationale*, Monaco, responded to André Courtier's paper submitted to the Congress. He referred to the basic echo sounding data in the Resolution of April 1929 passed at the Monaco International Hydrography Conference on Acoustic Soundings and Sea Depth Estimates. These data were important for plotting bathymetric charts.

Aristocle Vatova, author of the most important paper coming out of the Rovinj Station, namely, the omnibus "Compendio della flora e fauna del Mare Adriatico presso Rovigno" (Vatova 1928), reported on the thermal anomaly due to extreme cold in February-March 1929, as per his records of sea-temperature in the Gulf of Trieste. Mass mortality of benthic organisms was registered during that freezing winter spell. Vatova's measurements shed new light on formation of the so-called North Adriatic Water.

Francesco Vercelli, physicist, Director of the *Istituto Geofisico di Trieste*, who had conducted on the vessel *Magnaghi* an oceanographic survey in the Red Sea in 1929 (a particularly remarkable survey because the Red Sea had never before been systematically examined over two monsoon periods), contributed a study of the straits as communications medium through the seas (Anonymous 1953).

## Conclusions

Enjoying Spanish hospitality and the leadership of Odón de Buen, 129 oceanographers met at Seville in May 1-7, 1929, from Grigore Antipa, Director of the Natural History Museum, Bucharest (and Haeckel's assistant at Jena for many years), to Tadeusz Zubrizicky, Head of the Central Hydrographic Bureau, Warsaw. The Spanish *Revista del Consejo Oceanográfico Ibero-Americano* reported on the Congress in its February and July 1930 issues. The first volume of the Proceedings (554 pages) was published in 1929 and the second volume (322 pages) was published in 1931. Also important foreign contemporary sources of information on this event were *The Geographical Journal* (London)<sup>23</sup> and the *Bulletin Géodésique* (Paris).<sup>24</sup>

The first antecedent of this International Oceanography Congress was the *Musée océanographique* in Monaco, a project which had been approved and

<sup>23</sup> Organ of the British Royal Geographical Society, which in the July 1929 issue reported on the Congress sessions.

<sup>24</sup> Organ of the *Association Internationale de Géodésie*. General information in Juillet-Sept. 1929 (Vol. 23: 134) and in October 1932 a reference list of all the papers presented at the Congress (Vol. 36: 260-274): "Les deux volumes, luxueusement publiés et avec une abondante illustration, contiennent les travaux suivants [...]".

boosted by Prince Albert and which was inaugurated in March 1910, although he eventually admitted that it had been a premature accomplishment. Dr. O. de Buen, who in 1924 replaced the Prince as Chairman of IUGG's Oceanography Section, received at IUGG's General Assembly in Prague in 1927 a commission to organize an International Congress coincidental with the Seville Ibero-American Universal Exhibition at Seville.

Designed from a governing body like IUGG with difficulties to strengthen the national oceanographic effort through a sea without boundaries perspective and in an "era of national systematic and dynamic Ocean surveys", the 1929 Seville Congress was an event where de Buen would be getting diplomatic and political exposure. It assembled the main officers from ICES, which acted as a governing body of the event, by resolving the needs of the IUGG Oceanographical Section and the technical international commission for the unification of the methods and instruments used in oceanographic and hydrological researches.

Spanish, Italian, French, English and German were the official languages of the Congress. Resolutions from its proceedings were published in those five languages.

In connection with the International Hydrographic Bureau in Monaco, the Congress transmitted to that agency the work performed on Oceanic Cartography aware of the drawbacks of international treaties by trying to satisfy objections from the German delegates. British delegates complained about improper moves connected with ICES's decisions at the Seville Congress. The French delegation was the most impressive and best organised. The Italian delegation produced a special report on its participation, which was published the same year, 1929, by the Italian National Research Council (Congresso 1929).

Finally, the delegates from the Spanish-speaking countries agreed to form an Ibero American Oceanography Council, a body that, under Dr. de Buen's leadership, planned to design research cruises to be undertaken in the 1930s along the Gulf and the Peruvian Streams.

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