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Editorial – **Critical problems in the history of science**

"Critical Problems in the History of Science"? This was the title of a book well known for a time to historians of science, the result of a conference at the University of Wisconsin in 1957. It was published in 1959, nearly two generations ago (Marshall Clagett, editor. 1959. *Critical Problems in the History of Science*. Madison: University of Wisconsin Press). Re-reading it now, the subjects seem mainline history of science – the Scientific Revolution, mediaeval links to the European Renaissance, classical mechanics and Copernicanism, eighteenth century science, the French Revolution, some attention to nineteenth century social theory and biology, and the reflections of some of the academics then teaching history of science. Forty years later, in 1997, a new critical problems conference was convened in the same locale, representing scholarship in a field that had been transformed, at least in size, and offering us a glimpse into a more modern history of science (see Arnold Thackray, editor. 1995. Constructing Knowledge in the History of Science. *Osiris* 10). What does it show us of the transformation of the field, and what might its significance be for readers of *History of Oceanography*?

Not a lot, as it happens. There is new attention to gender in the history of science, and to theoretical aspects of the subject, with nods (and brickbats) to postmodernism and other trendy subjects. The really striking innovation is a very self-conscious attention to the theoretical side of history of science. The subject matter stays much the same – mediaeval science and the Scientific Revolution, science and Christianity, experimental biology in the nineteenth century – although there is a welcome attention to non-western science too. What is missing? The answer is the sciences of the environment, despite a little flurry in the last twenty years of books on the history of ecology, and most recently on the history of meteorology.

Way back, when this newsletter was young, I railed at the lack of attention to the history of the marine sciences. Attempting to define what the history of oceanography was about, I concluded pontifically, that "our study must turn us toward science as a *social activity* that investigates the *phenomena of the oceans*" and that "history of oceanography is what historians of oceanography write about" (see *History of Oceanography* 2, 1990). And a few years later I asked, "is it too much to ask that historians of science cast their nets more widely, beyond the bounds of the classical disciplines … into the little-explored waters of hybrid disciplines like oceanography?", concluding that "surely it is about time that we became more evangelistic about the virtues and unexplored possibilities of our work" (*History of Oceanography* 8, 1996). Little has changed, despite the welcome attention of a few more historians of science to the marine sciences. Most of the field remains at what systematic biologists call the alpha-taxonomy stage – the primary description of the phenomena of the discipline, the blocking out of problems rather than mature study and analysis. And mainline historians of science still stay away.

This may be too pessimistic a view. One of the great virtues of new and unexplored areas is that discoveries are everywhere. And with this issue of *History of Oceanography* I hope that one of our less-known glories can be revealed – the resources that are available to historians of a science that is young – so young that the early practitioners of oceanography, for example, are within recent memory. In this, some of our band have simply ignored fashion and theory, forging ahead to document the significant features of the new science. Among these is the retired hydrographer of the International Council for the Exploration of the Sea, Jens Smed. Taking the history of ICES as his special work, he has become the senior authority on that seminal

international organization. It is a pleasure to devote this issue of *History of Oceanography* to Jens Smed and to introduce two of his papers to our community of scholars. *Eric Mills*

A TRIBUTE TO JENS SMED

A BIOGRAPHICAL NOTE

Jens Smed retired from his posts with the International Council for the Exploration of the Sea as Hydrographer and Chef du Service Hydrographique on 31 March 1984…. Smed was born in Vinterslev, a village in Jutland, on 20 March 1914. He was educated first in the village school and then at Aarhus Katedralskole from 1929 to 1933, when he entered the University of Copenhagen to read physics. In 1938 he interrupted his studies in Copenhagen to spend a term in Paris, and in 1939 he took his master's degree in physics and then joined the Service Hydrographique of the Council. In 1941 he was awarded the gold medal in physics of the University of Copenhagen. He became Hydrographer to the Council in succession to Dr Jacob P. Jacobsen in 1946, and two years later he succeeded Professor Martin H. C. Knudsen as Chef du Service Hydrographique.

Knudsen established an international reputation for his work on the determination of salinity and his studies relating to the equation of state of sea water, and Jacobsen was best known for his development of the temperature—salinity (T—S) diagram as a tool in water mass analysis, whereas Jens Smed became internationally recognized, first, for the development of ICES as a regional oceanographic data centre and, second, for his work on long time series of T—S data. Under him the Service Hydrographique played a vital role in the quality-control, exchange, promulgation, and archiving of hydrographic data collected by ICES member countries. It established important links with the World Data Centres for Oceanography in Washington, D.C., and Moscow and the various national data centres and marine and fisheries science laboratories in the member countries; those links did much to facilitate the flow of data and information amongst the marine science communities in Europe and North America. The part played by Jens Smed and the Service Hydrographique in the timely publication of data was no less important. The latter took place through the medium of the Council's series of publications — bulletins, data lists, inventories, atlases, and charts. All this work was done with limited resources and a small but devoted staff whose permanent members were Inger Bondorff, Poula Holm, Birthe Knudsen, and Ruth Larsen. Smed's work with long time series of temperature and salinity data for the surface layers of the northernmost North Atlantic, the North Sea, and the Celtic Sea was of considerable value to physical oceanographers, fisheries scientists, and plankton investigators, but became relevant in a wider context as the need to investigate climatic fluctuations emerged as a matter of urgent scientific and public concern.
(Modified from J. Meincke, L. Otto, A. J. Lee and R. R. Dickson, 1984. Hydrobiological variability in the North Atlantic and adjacent seas. Papers presented to Jens Smed on the occasion of his retirement. *Rapp. P.-v. Réun. Cons. int. Explor. Mer* 185: 5-6).

AND AN ASSESSMENT OF JENS SMED AS AN HISTORIAN

Address to Jens Smed on the occasion of the presentation of the first ICES-History Award

Aalborg, 23. 9. 1995

Dear Jens Smed,

my last formal meeting with you was back in 1984, when I stood up on the occasion of your 70th birthday as well as on the occasion of your stepping down from the post of the ICES-Hydrographer. In this successful career you had established a worldwide known data base and we honoured your work with presenting to you a special volume of the [ICES] RPV [volume 185], the so called Smed Volume "Hydrobiological variability in the North Atlantic and adjacent seas" which was the result of an ICES Mini-Symposium in 1982.

For today I was asked - and gladly accepted - to briefly talk about another career of yours, namely that related to ICES-History. For the preparation I had available a compilation of contributions to ICES-History (compiled by Jens Smed) and I learned, that your first historic paper dates back to 1979 (History of Standard Sea Water, co-authored by Fred Culkin). Furthermore, 1 counted 8 published and 11 unpublished manuscripts, the latter probably waiting in a queue ready to go to appropriate journals or books. Your papers concentrate on three issues:

the role of nations and their political interests to found the ICES, the role of eminent scientists like Nansen, Krümme1, Pettersson, Schott, Knudsen and Herwig and their scientific interests in creating international cooperation, and thirdly the impact of ICES-products like e.g. the Hydrographic Tables in the advancement of our science. In most cases, your papers allow a deep look behind the curtains. What do we see: Mean conditions to pursue our science do not really change?

As an example, I can refer to your paper dealing with Otto Krümmel's letters to Otto Pettersson: Krümmel tried in 1893 to join the work of the International Group headed by Pettersson, in which the North Sea and the Skagerrak/Kattegat should be surveyed regularly. Krümmel offered simultaneous work in the Baltic, but very soon he could not contribute any more because of difficulties with the Preußische Kommission zur Untersuchung der Meere back home in Kiel. Its president Prof. Karstens was jealous that Krümmel had established all the contacts to the international group and would not support the Baltic work with ship-time or money. It was only after Karstens resigned, the Kiel Kommission was converted to the Deutsche Wissenschaftliche Kommission in 1902 and Krümmel had become a member. Then, there was even an own vessel available to the joint work (Poseidon). The message from this is straight-forward: It is not only in the marine environment, but it is also in the means and methods we use to organize our science that there is a decadal variability.

This to me explains why Jens' engagement in the history of ICES is so successful: it is simply a continuation of his earlier work, where he carefully compiled the data necessary for us today to understand processes relevant to the decadal variability in the environment. Therefore, Jens, if you also keep on going to assemble carefully the historical data and facts, you will provide us with the basis to understand, that behind the day to day business that seems to drown us, (including vigorous discussion on the ICES-structure), there is some mean way to conduct our science and all our quarrels are fluctuations around the mean.

With this in mind, Jens, the work done so far in your historic career is of good weight. If we put it on a balance scale, it would certainly outweigh me standing on the other end of the scale by my own. But, by calling upon the President of ICES, representing the concentrated weight of the ICES-community, we may get the scale into a position which allows us to properly express our sincere appreciation for your contribution to ICES as a historically grown entity, and to also express our hopes, that further contributions are to be expected.

(Open letter from Prof. Dr. J. Meincke)

JENS SMED'S PUBLICATIONS

Abbreviations:
Annls biol.: Annales Biologiques.
CM: Council Meeting document.
Journal du Conseil: Journal du Conseil (permanent) international pour l'Exploration de la Mer.
Rapp. P.-V.: Rapports et Procès-verbaux des Réunions du Conseil (permanent) international pour l'Exploration de la Mer.

S. L.-T.: Salmonsen Leksikon – Tidsskrift.

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ARTICLES

FRIDTJOF NANSEN'S ROLE IN THE FOUNDATION OF ICES

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I. The Stockholm Conference and preceding events

Norway was involved at an early stage in the endeavours to establish an international cooperation for the study of the North Sea and adjacent waters. From the start the Norwegian zoologist Fridtjof Nansen (1861-1930) played an important role in the organization of the International Council for the Exploration of the Sea (ICES). In the summer of 1897 when the British oceanographer Sir John Murray (1841-1914) visited Christiania (Oslo) he, Fridtjof Nansen, and the Norwegian biologist Johan Hjort (1869-1948) discussed summoning of a conference for consideration of the matter. Murray proposed that Nansen should take the initiative to invite the conference to Christiania. If not, Murray would invite to Edinburgh a few real experts and interested persons from the Scandinavian countries, England [Note. "England" was often used synonymously with "Great Britain".], Germany, and France in order to obtain an agreement about uniformity of research methods, instruments etc. The conference should comprise both physical and biological investigations. Especially with regard to the latter, such as

the study of plankton, there was a need for more uniformity, Murray and Nansen felt (Nansen, 1898).

At about the same time an initiative was taken in Sweden. In October 1897 three Swedish scientists, Otto Pettersson (1848-1941), Gustaf Ekman (1852-1930), and August Wijkander (1849-1913) proposed to Oscar II (1829-1907), King of Sweden and Norway, that the Swedish government should submit to the governments of Norway, Denmark, and England that they cooperate with Sweden according to a common plan, on the investigation of the hydrographical (i.e. oceanographic) and biological conditions of the Norwegian Sea, the North Sea and the Baltic in the interest of the sea-fishery. As reason for the petition they referred partly to a resolution passed by the International Geographical Congress in London in 1895 (Pettersson, 1896), partly to the experience obtained during the work in the foregoing years, especially in 1893-94, when the three Scandinavian countries together with Scotland and Germany carried out quarterly synoptic investigations according to a common plan (Smed, 1990). The purpose would be to elucidate the conditions and movements of the upper water layers, from the surface to a depth of about 800 - 1000 m, at all seasons and to study the nature, amount, and variations of the plankton in these layers. The investigations would cover at least five years, and it was proposed that they would start 1 May 1899 or 1 May 1900. The work would be divided between the participating countries, each of them investigating a certain area. To plan the work it would be necessary that representatives of the countries met and worked out proposals for submission to their governments. In the petition it was stated that even if acceptance were obtained only by the countries mentioned important results might be gained, as experience from the investigations in 1893-94 had shown. Furthermore, if these countries would be willing to participate in the project it might be assumed that it would be easier to obtain the accession of other countries, and it was supposed that the Swedish government would then consider extending the negotiations about participation in the work to the other North Sea countries as well as to Russia and France (1).

Upon the decision of King Oscar the Swedish/Norwegian Foreign Ministry in April 1898 approached the governments of Denmark, England, and Germany as to whether they were likely to be interested in cooperation. Norway had already been approached on 15 March. Otto Pettersson informed Nansen about this development in case he did not already know about it. “Support the matter with your influence”, Pettersson appealed to him (2). Nansen considered it a matter of course that Norway would join the international investigation, and he promised to use his influence if this would be of any importance (Nansen, 1898). In September the Norwegian government signified its support to the plan. Apparently Pettersson had envisaged an international conference in 1898. Nansen too found it regrettable that the conference did not come off. He expressed the hope, however, that it could be arranged in 1899 (3). On the whole the replies from the governments approached were positive. So in April 1899 the Swedish/Norwegian Foreign Ministry formally invited Denmark, Germany, Great Britain, The Netherlands, Norway, and Russia to send official delegates to a preparatory conference whose purpose should be to establish a plan for a joint exploration of the northern seas. The Conference was held at Stockholm in June 1899 (Anon., 1899). As a matter of course Nansen was a member of the Norwegian delegation to the Conference where he presented plans for a Central Laboratory to be established in connection with the Central Bureau of the new organization (Nansen, 1899a).

II. Deliberations about headquarters and president

Now discussions began as to where the Central Bureau of the organization should be located and who should be in charge of it. In a letter to Pettersson Nansen made his position

clear. He stressed the importance of having the Bureau near the sea, at a place where water depth and other conditions would facilitate experiments and investigations. According to Nansen only three coasts could be considered: the Swedish west coast and the coasts of Norway and Scotland. The latter was a little too shallow, Nansen found. None the less he had at Stockholm been, and still was, in favour of Scotland if the organization could have John Murray for president, because of his great personal merits as an administrator etc. Nansen was afraid, however, that it would be difficult to have this arranged as he had got the impression that Murray was not *persona grata* in England. Also it could not be concealed that hydrography was at a low level in England, which according to Nansen had a limited capacity, although the Scot Hugh Mill (1861-1950) was one of the best. Furthermore, Germany would probably not join the organization if the Central Bureau was located in Scotland.

On the whole there was some doubt whether the German government was really interested in the plans. So, two of the German delegates to the Stockholm Conference, Victor Hensen (1835-1924) and Otto Krümmel (1854-1912), had requested Nansen to influence their government in a positive direction. The Germans had become anxious that England would not participate. Nansen told them, however, that even if only Germany and the three Scandinavian countries cooperated results could be obtained that would surprise even the most sanguine. Germany, the great seafaring nation must, of course, be actively interested in participating in this work, Nansen argued. He felt that the German authorities had a positive attitude to the matter. But now they had advanced what he considered a preposterous idea, viz. to place the central institution in Copenhagen. His surprise culminated when he learned that they would propose the Dutch fishery biologist Paulus P.C. Hoek (1851-1914) as president of the organization. These ideas would paralyse the whole undertaking in the start, Nansen found. Copenhagen was the wrong place because of the shallow waters in the region which would render difficult the testing of instruments and methods. With regard to Hoek as president Nansen had got the impression that he had not much idea about modern marine research. Nansen invited Pettersson to contact the leader of the new Institut und Museum für Meereskunde in Berlin, Ferdinand von Richthofen (1833-1905) who might persuade his German colleagues to give up their strange ideas.

Nansen's opinion was that because of Pettersson's initiative in the matter the central institution should be located in Sweden, e.g. in Gothenburg. He stressed that a condition *sine qua non* for this was that Pettersson became its leader. Nansen had understood, however, that the Swedish did not wish to have the institution, but would prefer that it was placed in Norway. In that case Christiania would be the right place as it had several well-qualified men, first and foremost Johan Hjort, but also Haaken Hasberg Gran (1870-1955), Alf Wollebæk (1879-1960), and Bjørn Helland-Hansen (1877-1957). Nansen stressed that should he be asked to take charge of the institution it would be a condition that he did not receive any salary because he was already paid by the Norwegian state [as a professor at the university] (4).

Pettersson referred to meetings which Hjort had had in Stockholm with the King, and with the civil minister and Pettersson. He summed up what had been agreed upon at these meetings, agreements which according to Hjort also would cover Nansen's intentions: Sweden would not propose that the central laboratory etc. be located there, but would support the Norwegian proposal that it be placed in some town on the coast of Norway. This town would be Christiania if Nansen became director of the institution and if the Norwegian government and the town of Christiania would approve and support the establishment of the institution there; if not, Pettersson thought that another town, Christiansand or Bergen, should be chosen. He stressed, however, that Norway and Sweden would in any case follow the decisions of the conference, even if their

common wish to have the central institution placed in Norway could not be brought into being because of the influence of other nations. At the above meetings it had moreover been agreed that the negotiations with foreign countries should at present aim at assuring their consent in principle to the decisions of the conference. Only when this had been obtained efforts should be directed upon having the central institution placed at Christiania. From Hjort Pettersson had understood that also the Norwegian prime minister consented to this agreement. In Sweden there would be no problems. It was true that they would now have to deal with a new minister whose opinion in this matter was not known, but the King had given his word and had promised to let the diplomatic service work for the implementation of the plan. Pettersson then explained that the reason why the minister, Gustaf Ekman, and he himself did not advocate that Sweden got the central institution was not that they did not want it. They doubted, however, that they at Gothenburg would find the necessary compliance from the town. Furthermore, they considered it a most important advantage to the whole cooperation having Nansen as director of the institution's central laboratory. So the proposal was no sacrifice for them and they would support it as long as possible. If they were outvoted by the other nations, however, they would have to give in and accept that the institution was placed elsewhere. For according to Pettersson the central institution *might* be placed even at Køge or Hamar [small provincial towns in Denmark and Norway, respectively] although it would be absurd.

With regard to the German proposals to place the institution at Copenhagen and to make Hoek its director Pettersson stated that he, of course, had no sympathy for any of them. He thought, however, that it would not be difficult to get the Germans change their mind and he suggested a procedure to follow: one should try to get the support in principle of Denmark, Holland, Russia, and England, or at least as many of these countries as possible. Then it must be awaited that the Swedish parliament approved the government's proposal. After that it should be proposed to the King that he summoned the so-called Commission H, established at the Stockholm Conference, to Christiania. Nansen and Hjort should then make the proposal that the central office should be placed at Christiania, and Nansen should have everything ready that might serve as reason for this; if possible he should propose where at Christiania the institute should be placed. Could it not be placed somewhere in the Palace Garden, which the King or the government would make at disposal, Pettersson suggested, such as was the case with Villa Nazionale at Naples, he added! [Pettersson here referred to the famous zoological station which Anton Dohrn got permission to establish in a public park.] The representatives of Sweden would then support Norway's proposal and would propose that Nansen be made the leader of the institution. After these "instructions" to Nansen, Pettersson stressed the importance of having England join the cooperation. If it were limited to Germany and the Scandinavian countries the contributions to the central institution would be small and it would be difficult to defray its expenses. Furthermore, England's participation was important because the inflow of Gulf Stream water between Orkney and Shetland and over the Wyville Thomson Ridge should be watched. It is true that Nansen and Hjort might go there now and then on a cruise; but in the long run this would be much too burdensome, and the observation network would be incomplete. In this connection Pettersson declared that England ought to be at the head of an Atlantic cooperation besides participating in the North Sea cooperation, and both projects should have Sir John Murray as connecting link, so that they really cooperated. From The Netherlands Pettersson apparently did not expect much: "As to Holland I am afraid that this country is not seriously with anything except with her trade."

Pettersson had been informed that Nansen had promised his minister to write an article in a Norwegian newspaper about the purpose of the international work. This article might then be

reprinted in Sweden and serve as a support for the decision to be made by the Swedish parliament. In this case, Pettersson warned, it would be advisable not to mention his name in the article since his countrymen would be inclined to think that the whole matter was just one of his scientific hobbies!

> What would do its work on the parliament are such things as, e.g., that Hjort and [C.G.Joh.] Petersen have found that our most common fishes, such as cod a.o., are migratory fishes and that our fiords are empty during summer and that we must out on the open sea to find out where cod, herring, eel, and salmon live when they disappear from our horizons. Furthermore, that we have now come to the point where we must turn to practical account the prolonged investigations of the arctic seas with which our seas exchange fish food, water etc. Also, we need a firm ground for the fishery legislation, which only science can produce. Finally, we Norwegians and Swedes have for a long time had a fruitful cooperation on the field of marine research. (5)(from Swedish.)

Now, however, there were internal problems in Norway. According to Nansen everything was made into politics; also the questions about fishery and marine research should be used to angle for votes: to fawn on Western Norway the government and part of the parliament had got the idea to place the fishery administration, together with the management of the marine research, at Bergen, and to fawn on Northern Norway by placing the Technical University at Trondheim. Both ideas were all wrong, Nansen found. He thought that oceanography and fishery research would in Bergen get most unfavourable conditions: "I know Bergen quite well and can only say that science will not flourish there"(6).

Nansen's words may have been coloured by the fact that he had stressed he would not take over the management of an international institution if he could not cooperate closely with the managers of the Norwegian fishery and marine research, i.e. Hjort and his staff. Such cooperation was only possible, Nansen found, if the institutions were located in the same town, and the international institution could only be established at Christiania, he felt. For various reasons Christiansand would not be a solution, nor would Bergen. He had informed the parliament to this effect. This "the thrifty Bergen people" had taken as a personal affront and had raised an outcry about.

Nansen may have had good reason to feel disappointed. When Hjort in December 1899 had been on the above mentioned trip to Stockholm a provisional agreement had been arrived at, and this agreement was, according to Nansen, based upon the assumption that the Norwegian investigations would be placed at Christiania. The Norwegian government, however, stuck to the decision that the management of the Norwegian fishery and marine research should be established at Bergen. Consequently Nansen had informed the Prime Minister, Johannes Steen (1827-1906), that under these circumstances he could not take over the management of an international institution. He urged the government to advocate that Gothenburg became the seat of the central institution, and not Copenhagen as suggested by the Germans. The latter choice would, according to Nansen, lead the international investigations into a false track from the start. It would be about as bad as if he were sitting at Christiania directing these investigations without being in touch with the ongoing Norwegian investigations of this kind (Nansen, 1900a).

Pettersson was less pessimistic. He agreed that it was bad if the headquarters of the practical work were separated from the central institution. It would be still stranger, he found, if the Technical University of Norway were separated from the Capital and its University. "Will

Norway return to the arrangement before the time of Harold the Fair-Haired," he asked somewhat sarcastically. [Before the Norwegian King Harold the Fair-Haired (ca. 860 - ca.940), the country was split up into a number of minor kingdoms, two of them in the Bergen and Trondheim regions, respectively.] Pettersson was of the opinion, however, that the situation was not hopeless. It would be more demanding for the leaders with regard to cooperation, and would in general be more arduous. But it would work, no doubt about that, Pettersson optimistically concluded (7).

Nansen was still fighting for his ideas. In a letter to the Norwegian prime minister he complained that they had negotiated about inviting the next international conference to Christiania without informing him. Otto Pettersson had several times proposed to him that the Norwegian government or the King should issue such invitations. Nansen, however, had not been able to reply as long as there was no decision with regard to the seat of the Norwegian investigations. He took it for granted that it was of no interest to Norway having the conference at Christiania if there was no desire to have the international institution there. Personally he could not take on him the work connected with such a conference if it did not entail some advantage to the country or to the Norwegian investigations. Nansen then proposed an arrangement according to which Hjort temporarily should be appointed a member of the Board of Fisheries at Bergen. If Christiania should become the seat of the central institution Hjort should return there and have a replacement at Bergen. If not, he should stay at Bergen. In case this arrangement was acceptable Nansen suggested that the conference be invited to meet at Christiania in the autumn of 1900 (Nansen, 1900b).

The government did not accept Nansen's suggestion, and he complained to Otto Pettersson about the situation: The government was not willing to postpone the removal of the Norwegian marine investigations (and Hjort) to Bergen, thereby breaking off the direct cooperation between these investigations and Nansen. Nevertheless the government wanted that he should be willing to take over the direction of the central institute, although they did not meet his wishes at any single point. Nansen was bitter: The only thanks he had received for declaring himself willing under certain conditions were that he had been violently attacked and scolded in the parliament by the minister in charge of this business. The minister made it look as if Nansen was an incompetent who had encroached upon a field where he had the experts against him. Nansen went on reporting, however, that the same day at a meeting with the prime minister he had promised to postpone his decision and to ask Otto Pettersson whether the meeting could be delayed until the autumn. Nansen and Hjort could then in peace carry out their cruise with the new research vessel *Michael Sars*, and Nansen would consider whether after that he saw the situation in a new light (Nansen, 1900c).

Although Pettersson had been informed by the above letter, Nansen the next day sent him an obviously more official letter containing the same information and questions, to some degree in exactly the same wording, but without all the complaints (8). The same day Nansen wrote to the Norwegian prime minister, making his position clear after their meeting the day before. He found that the government now had the choice between either moving the Board of Directors of the Norwegian fishery and marine research to Bergen and in so doing give up getting the international Central Bureau to Christiania, or getting this, but then keep the management of the Norwegian research at Christiania. As promised he should, however, postpone his final decision until autumn, although he considered the possibility that he should then have changed his mind as being very small. He submitted that in return the government postponed until autumn the removal of the management of the marine research to Bergen. There might be a possibility, though very

small, that the government would look differently on the matter when the experience from the summer cruise had become available. Nansen did not conceal that he felt ill-treated by the government, more specifically by the head of the department in question. In Nansen's opinion other motives than purely objective ones had been decisive; and although the government had refused to fulfil any of his conditions it was now required that he should make the sacrifice (Nansen, 1900d). In some way or other, however, an agreement must have been obtained, apparently through Johan Hjort. In a letter to the prime minister Nansen declared that under the conditions which he had mentioned to Hjort and which the prime minister had now accepted he was willing to take over the management of the Central Bureau if such a wish should be expressed by the other countries, and if the Bureau would be placed at Christiania (Nansen, 1900e).

It is not quite clear which functions Nansen had accepted to take over. Pettersson may have been in doubt too. In any case he asked whether he might assume that Nansen would take upon him 1) the presidency of the organization and 2) the directorship of the central laboratory. Nansen must have answered in the affirmative during Pettersson's visit to Christiania shortly after. Pettersson stated that he would have preferred Sir John Murray as president (or honorary president). As this was now impossible, however, the choice must fall upon Nansen (9). John Murray could not be elected, as he would not participate in the conference; he had planned to go to Christmas Island on business.

III. Postponement of the planned conference at Christiania

In the meantime the Norwegian government had fixed the date for the conference to 15 October 1900 (Nansen, 1900f). Because Germany, because of an illness of their chief delegate, Walther Herwig, had not notified their participation the conference was postponed to spring 1901, however. This delay was not popular among the Scandinavian scientists. It was especially inconvenient to Johan Hjort who had interrupted his cruise with *Michael Sars* in the Norwegian Sea in order to go to Christiania for presentation of the vessel, its instrumentation, and the results of the cruise to the participants of the conference, only to be informed that it had been postponed because of the failure of the Germans to notify participation. "That is not likely to increase your sympathy with the Germans", Pettersson wrote to Hjort and was certainly right (10). Hjort was disappointed, and temperamental, as he declared that he would have nothing to do with future conferences, and his attitude towards Germany's participation in the cooperation was expressed clearly:

> With regard to Germany's position you know that barely anything can surprise me. I have always considered it a desperate thing that politicians shall participate in our conferences, [Footnote. The German chief delegate, Walther Herwig, was an administrator and politician.] and I still do. I stick to my old passion: cooperation of the scientists of the Scandinavian countries. (11) (From Norwegian.)

The Swedish-Norwegian Ministry of Foreign Affairs and the Norwegian Department of the Interior had, however, come to an agreement (a rare event, according to Pettersson!) that they would comply with the desire of the Germans for a postponement of the conference.

Although the delay was annoying, Pettersson later came to the conclusion that in a way it might be considered a piece of good fortune as it was not certain that all countries would have been represented at a meeting on 15 October 1900. After having talked with a number of Russian

scientists he foresaw "a damned work" with the Russians, and perhaps also with the Germans, concerning the central institution and especially the central laboratory. According to Pettersson it was evident that the Germans had no idea of how the central institution should work or how a comprehensive investigation of the sea should be carried out. It would therefore be extremely useful if the observations from "Michael Sars" could be worked up at once, so that "these people" could get an idea of how the work should be done, and not think that just collection of usual "dead material" in a set of tables was the purpose. Pettersson appealed to Nansen (12):

> Can't you press Gran and Hjort to quickly publish their results? However, don't mention the conference in this connection; for our friend Hjort becomes furious if only he hears about Germans and Herwig etc. I am not so very surprised about that; for he has been badly treated when he had to travel to Christiania in vain. (from Swedish.)

Pettersson then asked Nansen not to bring [Hercules] Tornøe (1856-1907) to the conference, but anybody else (Lemkuhl, Mohn, Schmelck etc.). This request is rather surprising. An earlier letter from Tornøe to Pettersson does not reveal any controversy between them. Tornøe does mention, however, that it is not easy to touch neither private persons nor the government for money after Nansen had drawn heavily (nearly half a million kroner) upon them (13).

IV. Informal meeting at Gothenburg

Because the international conference had been postponed, Pettersson wished to arrange a meeting of Scandinavian marine scientists. He had obviously broached the idea to his Norwegian colleagues. Nansen thought that such a meeting would be very interesting, and if he were free he should like to come. Hjort, however, declared that he was unable to come; he pointed to the danger that it might cause ill feelings in the other countries (14). Nevertheless Pettersson sent out invitations to a meeting at Gothenburg (15). In a letter to Nansen he explained that from Norway he would like to see Nansen, Hjort, and Gran, from Denmark C.F. Drechsel (1854-1927), C.G.Joh. Petersen (1860-1928), and Martin Knudsen (1871-1949). One purpose of the meeting was undoubtedly to consider items connected with the forthcoming international conference. Officially, however, the purpose was to discuss the continuation of the ongoing Scandinavian cooperation until the international investigations started. The Swedish government had advised that this formulation be used and be circulated by the newspapers, stressing that the meeting was a private one (16).

As a matter of fact Pettersson sent to the editors of the Swedish newspapers the following communication asking them whether they would be inclined to print it in their "honoured paper":

> Private meeting of Scandinavian scientists. The meeting of the international Commission at Christiania where definitive proposals will be made for the joint investigations of the northern seas during the years 1901-1905 by the North Sea countries and Russia, at the request of the German government has been postponed to the beginning of next year. The possibility then arises that the international investigations cannot start at the fixed time, 1st May next year. Therefore a private meeting of the leaders of the investigations in the Scandinavian countries will be held at Gothenburg at the end of this week in order to discuss how the hydrographical work which during a series of years has been carried out by Danish, Norwegian, and Swedish Commissions should be arranged between 1st May 1901 and the date when the wider cooperation to be established at the forthcoming

> conference at Christiania can start. The meeting is solely in the nature of a private deliberation. (17) (from Swedish.)

The note had been prepared in cooperation with the Ministry of Foreign Affairs who considered that in this formulation Germany and other countries should have nothing to complain about. Pettersson requested Nansen either to send the note directly to a Christiania newspaper or to rewrite it in Norwegian and send it in his own name, for "if not they will write some nonsense of their own" (18).

Hjort did not change his mind with regard to the Gothenburg meeting. He cabled to Pettersson that he strongly depreciated the meeting if the wider international cooperation was still desired, as he felt sure that the other countries would make the meeting a pretext for withdrawal (19). In a following letter he explained that he had learned what a bad impression all the unfortunate discussions in Norway last spring had made abroad. He had been informed that every word was reported to the German government and to Herwig. Furthermore, Hjort knew that the Germans were very jealous of the Scandinavian cooperation, so every appearance of keeping them out should be avoided. If the Germans and others now learned about the Gothenburg meeting Hjort thought that the greater plan would break down. Personally he would have preferred, as mentioned above, that the cooperation had been limited to Scandinavians. As other countries had been invited, however, they should act accordingly. He had considered it his duty to consult the prime minister, who was the convener of the international conference, and the minister had agreed completely with him. Hjort stressed that his only intention was to be loyal to international cooperation (20).

Nansen obviously was of two minds with regard to the meeting. He informed Pettersson that he would come (21), but backed out a few days later. The problem was that he had been incautious enough to consult the government, who were much against his participation when neither H.H.Gran nor Johan Hjort went there, as he was Norway's official representative in the international committee. Furthermore, he was not the leader of Norwegian marine research, so he would not fit into the designation of the meeting as "a private meeting of the leaders of marine research in the Scandinavian countries." It would, according to the Norwegian government, be especially invidious that he participated in a narrow meeting as Norway had issued invitations to a larger conference. Nansen regretted that the government had been mixed up in the matter, which gave the Scandinavian meeting a more official stamp (22). The next day he, in even stronger words, explained to Pettersson how terribly annoyed he was that he had yielded to the government. He should not have cared a damn and could have gone whatever they would have said. He intimated that it might have been Hjort's uneasiness that spread to the government and made them want to talk with him. In a way he felt that he was an offender who had failed in the last minute - a very unpleasant feeling, he added (23).

Pettersson took it calmly. He told Nansen that he would have acted in the same way, as authorities should be obeyed both in Norway and Sweden. At the same time he informed Nansen that he now had invited Hensen and other German colleagues to the meeting. "Eine private gesellige Zusammenkunft" [a private social gathering] as he called it. He requested Nansen to pass on this information to "His Excellency Steen" [the Norwegian prime minister] and continued somewhat sarcastically,

> for although we hold an absolutely private meeting we nevertheless will not keep it secret. Will you tell His Excellency that if I had imagined that he saw any danger in scientists

> holding a private meeting to discuss scientific questions I should not have proposed this as it is far from my intention to arrange anything which is unpleasant to the Norwegian government. When the invitation now has been sent out, however, I must also for us scientists claim the right to meet and discuss our matters - a right which we here in Sweden have had from the oldest times; which, as His Excellency knows, they also have in Denmark; and which is also held in respect in Finland under His Excellency Bobrikoff [the Russian governor-general in Finland] (24). (from Swedish.)

The Gothenburg meeting was held on 20 November 1900. Participants were Leonid Breitfuss (leader of the Russian investigations in the Barents Sea), Oscar Nordqvist (leader of the Finnish investigations in the Gulfs of Finland and Bothnia), Martin Knudsen from Denmark, and from Sweden Per Cleve, August Wijkander, Filip Trybom, Gustaf Ekman, Otto Pettersson, and Vilhelm Bjerknes (Norwegian, but at that time working at Stockholm). The invited marine scientists from Kiel and Hamburg were prevented from coming. Pettersson sent a report on the meeting to Nansen. The purpose of the meeting was here stated as being

> to compare and discuss the equipment which the various countries would have at disposal at the start of the international cooperation which by the Stockholm Conference had been proposed to be 1 May 1901, as well as the preparations which at that time ought to be finished. (From Swedish.)

Obviously to avoid every criticism the report ended:

> Organizational questions concerning the future were not discussed; they were considered to be reserved for the deliberations of the official Commission which before long will meet at Christiania. (25) (From Swedish.)

No doubt “organizational questions” were eagerly discussed behind the scenes!

As a matter of fact, Nansen had at last decided to attend the meeting. It then happened that he received the information about the final date for the meeting so late that he could not make it. Their meeting was dogged by misfortune, as Nansen expressed it to Pettersson. However, he used the opportunity to stress that the prime minister's and Hjort's action in this matter should be considered only as caution and diplomatic sagacity, in order to get the international investigations started. "That we consider this caution to be somewhat exaggerated is another matter", he added (26).

V. Nansen hesitatingly agrees to accept leadership

Herwig´s ill health had held up the plans for the Christiania Conference. In November 1900, however, Herwig informed Pettersson that he now was in full convalescence and that he and his government were as warm friends as ever of the planned investigations. He did not say anything about the time for the Conference (27). When informing Nansen about Herwig´s application Pettersson took the opportunity to ask for particulars about Nansen's negotiations with the Germans during the past summer. He stressed that everybody in Sweden involved in the question worked on getting the Central Bureau to Christiania with Nansen as its leader. For this, however, it was absolutely necessary that Norway definitely joined the cooperation and cancelled its reservations, "as far as it does not disturb the plans for her own fishery investigations" (28).

Nansen confirmed that Norway would accede to the cooperation; the "reservation" mentioned should probably be considered as just an empty phrase for the benefit of the Norwegian parliament. In order to get an idea about Germany's position Nansen had written privately to von Richthofen. According to him Germany was likely to join the cooperation, and he thought that the delay really was due to Herwig's illness. The trouble was, von Richthofen had added, that they needed a leader and there was too much disagreement among the marine scientists in Germany (29).

What Pettersson would have liked to know, however, was not the content of Nansen´s correspondence with von Richthofen. As he explained in a private letter to Nansen he was interested in learning about the attitude of Herwig, i.e. the German government, towards the proposal for placing the Central Bureau at Christiania. The Germans were now establishing an "Oceanographic Museum" in Berlin. Could that mean that they wished to place the Central Bureau in this town? Nansen might have got some idea about the intention of Germany during his visit there earlier in the year. According to Pettersson England would not raise any objection against placing the Centre at Christiania. As far as Sweden was concerned Pettersson had been instructed to support the proposal that the Central Bureau and Laboratory of the cooperation be placed at Christiania if the conditions there were found to be favourable for the purpose, and provided that Norway definitely acceded to the international cooperation. With regard to this Pettersson again stressed to Nansen how necessary it was that the country which took the lead joined the cooperation unreservedly. He had no doubt that this was the intention. However, the intentions of a government might change, as might also the governments themselves, and it would be an intolerable situation, especially for Nansen as the leader, if, for example., the Minister or the Fishery Board at Bergen some time in the future would refuse to carry out part of the international work, explaining that the fishery plan and the fishery interests of the country demanded that "Michael Sars" and Hjort did not go out. If the government had unconditionally acceded to cooperation it would in such a case have to send another vessel, e.g. *Heimdal* [survey ship], instead of *Michael Sars* or to order the Fishery Board to carry out the investigations. If on the other hand the government had acceded arbitrarily, then difficulties might arise. Pettersson continued:

> The person who may make these difficulties is - our friend Hjort. Well, remember now that I speak privately and absolutely frankly! These difficulties will arise, if I know the mentality of our good friend Hjort. He is the greatest power of our whole cooperation, but also its greatest risk as he is indifferent about collaboration. He wants to have the investigations carried out but thinks that he can do it all himself and that it is completely unnecessary to have, e.g., the Germans join. Furthermore, he is easily irritated, and if he gets the idea that Norway fares better by herself, then he goes his own way. As to the Fishery Board at Bergen I don't know anything about it. I can tell you, however, what our own Swedish Fishery Board has tried. It would take advantage of the international investigation to obtain its own steamer (in the Baltic; but Lundberg would not allow us to get a new steamer on the west coast). After that they would not care a damn about the international work. Well, I have stuffed this nice plan into a bag together with its instigator, the inspector of fisheries, Lundberg. It will not be the Fishery Board that obtains the steamer, but we who get both steamer and station! Now, I consider the Norwegian Fishery Board at Bergen to be better and infinitely cleverer than our own. However, to be confident it is necessary to have concrete forms and agreements among

> the nations. If the condition laid down by the Norwegian government is a "departmental phrase" only it should be easy to get it cancelled now when the time of the agreement has come. If it should turn out that it is not so easy to get it cancelled, then it means that it is really dangerous. (from Swedish.)

Pettersson reported to Nansen that Hjort a couple of months earlier had asked to be considered as in the future standing outside the project. However, Pettersson knew Hjort sufficiently well, he thought, to hope that Hjort, on the contrary, would be the one who carried out the most important part of the work. But however tremendously he appreciated Hjort he would not conceal to Nansen that only three persons saw this matter in its entirety: Nansen, Herwig, and Pettersson, as Sir John Murray unfortunately was now out of the running. They should therefore strive for making the organization so firm that great frictions could be avoided. It would in any case be a very difficult matter to lead the cooperative effort, he thought, and he advised Nansen to get from his government a fixed grant for five years. If not he was likely to have a troublesome time (30).

Nansen found that it was difficult for him to demand a grant for the central institution as it had not been decided where the institution should be placed; the money for the Norwegian investigations they had already. With regard to the earlier mentioned "phrase" which Pettersson feared was a reservation from the Norwegian government, Nansen could again assure him. It just expressed that in such matters the government formally depended upon parliament; there could hardly be any doubt about a positive outcome (31).

VI. The Christiania Conference and its proposals

In the meantime Pettersson had received from Herwig a request for information about the time for the Christiania Conference (32). This meant that at long last the Swedish/Norwegian Foreign Ministry could issue invitations to the Conference, to be held in May 1901 (Anon., 1901). At the Conference, which was presided over by Nansen, it was proposed to split up the central institution into two, viz. a Bureau at Copenhagen with Hoek as leader (General Secretary) and a Laboratory at Christiania directed by Nansen. These proposals are not mentioned in the report of the Conference, because they would have to be approved by the governments. This became a problem in Norway. Nansen informed Pettersson that the Norwegian government could not do anything before parliament had reconsidered the matter because an additional grant of 10,000 kroner annually from Norway had been offered on the understanding that both Bureau and Laboratory were placed in Christiania. According to Nansen, the opinion was that the arrangement now recommended was less considerate to Norway because it was demanded that she alone should pay to the Laboratory just as much as Sweden, Denmark, Germany, Holland, and England together, in addition to her contribution to the general funds, whereas no extra contribution was demanded from Denmark for the Central Bureau. As this was regarded as a very inconsiderate arrangement it was doubtful whether it would be in keeping with Norway's dignity as a country to accept it. Nansen declared that he had been aware of this situation and had tried, in vain, to give the matter another form. The only thing he had obtained was to get cancelled the proposed expression "on condition that the expenses [of the Council] should not exceed the share contributed by Norway," a change that was fortunate, for with the original wording the Norwegian authorities would in no case have accepted the arrangement, Nansen maintained. Apparently he was bitter: he stated that he now had submitted the proposal etc. to the government and had placed his service at disposal if it was wanted; by this he had done his share, he declared. He considered it a mistake that the Conference could not agree upon an arrangement based upon

the original premises; in that case everything could now have been settled. He was afraid that the decision would again be delayed. What would happen if Norway definitely decided not to accept the Laboratory? To have it at Copenhagen would be impossible. Would it then be necessary to have a new conference to make new proposals, which again would be discussed? Nansen saw no end of this. The best had absolutely been, he said, to have followed the proposal at Stockholm according to which it all had come to Scotland under John Murray (33).

VII. Nansen's discontent repudiated by Pettersson

Pettersson, however, did certainly not agree on Nansen's interpretation of the situation. In a long, detailed and rather sharp letter to Nansen he made clear his opinion. It was unfortunate that the Norwegians did not find the proposal of the Conference satisfactory. Everybody had left the Conference confident that Norway had got her desiderata fulfilled as far as this was possible, and that the Norwegian representatives and even the Norwegian government had found the proposal acceptable. When it was found impossible to get the whole central institution to Christiania it was split up, so that the Central Laboratory, the better part of the organization, came there under a Norwegian director and with an international grant of 13,000 Mark. The splitting up was done because it was assumed that Norway wanted the Central Laboratory and that the offer of an extra contribution was made first and foremost to get the Laboratory established. Of course, the Norwegian government and parliament had the right to cancel or reduce the grant because of the new situation. According to Pettersson, however, this did not necessitate a new conference. It was true that some sort of a central laboratory certainly was necessary, but the idea about an experimental Central Laboratory as well as the idea about an extra grant to it from the country where it would be located was entirely Norwegian. Pettersson added that it was a brilliant idea, and in his opinion the leader of such an institution would have an absolutely unique opportunity for scientific success and for making discoveries within the methodology of hydrography as well as with regard to the dynamics of ocean and atmosphere. For this purpose he would have at his disposal resources which were unusually great for a scientific laboratory (more than 20,000 Mark annually). Should now the Norwegian parliament make use of its right to cut or cancel its extra grant this would, of course, imply, Pettersson explained, that the Central Laboratory instead of becoming an independent experimenting scientific laboratory would be reduced to the tasks which were absolutely necessary for the international work. In that case it would probably become a branch of the central institution at Copenhagen where they had Knudsen, a well qualified and trained physicist who would be able to produce "standard water" and for this the 13,000 Mark from the Council should be sufficient.Pettersson then aired the possibility of placing the Central Bureau, without the Laboratory, at Christiania, stating somewhat tartly that perhaps the Norwegian parliament would not appreciate it so much having the central institution moved to Christiania that it would repeat its generous offer, if the tasks of the institution were fishery statistics, proof-reading, and to give opinion on questions of collisions between trawlers and police boats, or the interests of line-fishermen. Perhaps it would also be realized in Norway that Christiania might not be the best place for a statistical institution that would keep track of the commodity prices at Geestmünde, Ostende and other cities! Finally, with direct reference to Nansen's letter, Pettersson strongly repudiated that the Conference had "demanded" anything from Norway, and it would also not do so from Denmark (34).

In spite of the reproaches in Pettersson's letter, Nansen took it calmly and did not wish to waste more words on the matter, because both he and Pettersson knew the true facts of the case, he said. He declared that what he had written was not his own view, but the opinion of those in Norway

who would have to deal with the matter (35). Obviously he was still bitter, however. In a letter to Hjort he complained that he knew nothing about his government's position with regard to the international laboratory etc., as they had not given him any information at all and he did not like to go and see them. The whole matter had lost most of its interest to him, and he now strongly considered withdrawing from it, he said (Nansen, 1901).

VIII. Norway agrees to the proposals of the Christiania Conference

The uncertainty about Norway's acceptance of the proposals of the Christiania Conference had spread to Denmark. The Danish marine biologist C.G. Joh. Petersen had been aboard the Norwegian research vessel *Michael Sars* during a cruise and had gotten the impression from Johan Hjort that the Norwegian government was not really interested in cooperation unless the total administration was placed in Norway (36). Otto Pettersson, however, could confirm that the Norwegian government now had indicated that it would adopt the decisions of the Conference, would participate in the general expenses, and would ask the parliament to agree in the additional grant of 10,000 kroner for the Central Laboratory. Pettersson added that

> what Steen says about Nansen and what Nansen says about Steen and what Hjort says about both may be quite amusing and naughty, but can no longer influence the ongoing negotiations. [...] The trouble in Norway is a divertissement in the intervals which unfortunately, are somewhat too long (37). (from Swedish.)

In the end the Norwegian parliament did agree to the proposals of the Christiania Conference, and Pettersson could congratulate Nansen on the result. It would really have been a remarkable blunder if Norway had lost the opportunity, Pettersson wrote, and continued:

> Scientific academies and institutions shoot up as mushrooms on fertile field everywhere in the world; here we have something new with quite another scope, and it was fortunate that Norway understood this. Might you now have a good cooperation between <u>østlandet</u> and <u>vestlandet</u> [i.e. between Christiania and Bergen] and between the county kings and the Central Laboratory! And might His Excellency Hoek understand his business! It is not impossible <u>that he does</u>. Let us hope the best and give him "a fair field. " (38) (From Swedish.)

Everything was now ready for the formal establishment of the new organization, and after an invitation from the Danish government, the founding meeting of the International Council for the Exploration of the Sea was held at Copenhagen in July 1902 (Anon., 1902).

IX. Nansen finds the outcome of the events satisfactory to Norway

The following month, Nansen informed the new Norwegian prime minister, Otto Blehr, about the outcome of the Copenhagen Conference. Of importance, in addition to the establishment of the Central Bureau at Copenhagen and the Central Laboratory at Christiania, was that the organization of the practical-scientific fishery investigations would be taken care of by two Commissions, one for the investigation of the overfishing question, especially concerning flatfish in the southern North Sea, the other for investigation of the reproduction, migrations and distribution of the fishes. The questions to be dealt with by the second Commission were of the most burning interest to the Norwegians, Nansen stressed. It was therefore important that Johan

Hjort had been elected convener of this Commission. An Englishman, Garstang, became convener of the first Commission which, Nansen explained, was of little or no interest to Norway. Nansen continued:

> I think we Norwegians have every reason to find this arrangement, which was the best that could be obtained under the present circumstances, satisfactory in every respect, in as much as the direction of the most important part of the work will be in Norway, and we also get that part of the central organization which is of any real value, viz. the Laboratory. The Central Bureau which the Norwegians last year were disappointed not to get is in this way considerably curtailed and is now practically reduced to just a sort of communication office with some clerks, but is in fact deprived of any expert leadership. It is true that an expert hydrographical assistant is appointed there, but the central point for this part of the work will probably be in the Laboratory at Christiania where it all will be controlled. So I am afraid that Norway has got the lion's share of it and that the others have not yet quite become aware what they have done. (Nansen, 1902) (from Norwegian.)

One might think that Nansen here had overdone the Norwegian share a bit. However, of course, he had to sell the best possible arrangement to his government. And more essential: it was actually an introduction to a plea for more governmental support of Hjort's work. In the main part of the letter Nansen praised Hjort's efforts at the Conference, where he had stressed the necessity of practical results in a way that made it understandable to everybody. Nansen expressed the hope that Hjort would get the necessary support from the government, which would repay manifold.

In any case Norway was now ready for participation in the programme of international cooperation, and Nansen directed the Central Laboratory until its closing in 1908 (Smed, 2005).

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Archival material

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11. Letter of 10 October 1900 from JH to OP.
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ICES AND THE NEW ORGANIZATIONS - COMPETITION OR COOPERATION?

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Abstract

The International Council for the Exploration of the Sea (ICES) was established in 1902 for the study of the Northern Seas. A need for regularly worked hydrographic (i.e. oceanographic) stations in the North Atlantic was soon felt, however. This led to the setting up of an International Commission for the Scientific Exploration of the Atlantic, chaired by the Prince Albert I of Monaco (1841-1922). Plans for a detailed study of the North Atlantic by naval vessels crossing the ocean in connection with the opening of the Panama Canal in 1915 were prepared, but were not implemented because of the outbreak of the World War. After the war Unions of the newly established International Research Council set up a Section and a Subsection for physical and biological oceanography respectively, later on combined into a Section for Oceanography. ICES feared that this body would mean a menacing competition, a fear that was renewed when the President of the Section for Oceanography proposed to establish a sort of umbrella organization for a number of bodies dealing with oceanography, including ICES. The proposal was turned down, however, and the outcome was cooperation, not competition.

I. Introduction

When the International Council for the Exploration of the Sea (ICES) was established in 1902 the region to be studied by the member countries was essentially the North Sea, the Baltic, and the Norwegian and Barents Seas. At the 1st Preparatory Conference, held in Stockholm in 1899, however, the Swedish Hydrographic Commission, chaired by Otto Pettersson (1848-1941), stated that from a hydrographic and biological point of view it was not possible to fix so narrow limits for the area of investigation because of the influence exerted by the currents in the Atlantic on the waters of the North Sea and the Norwegian Sea, so it would obviously be necessary to keep track of the variations originating in the Atlantic. The Commission proposed therefore that the Conference should decide whether the work of the organization to be established should be extended to cover a part of the northern Atlantic, or a separate, more extended investigation of the Atlantic should be undertaken by the countries bordering the North Atlantic, such as Great Britain, France, the USA, and Canada. In the latter case the investigations might be supported by the marine stations on the oceanic islands such as Punta Delgada on the Azores, and might be combined with the work of the Prince of Monaco (Commission Hydrographique Suédoise, 1899, pp. XXXI-XXXII). The Conference decided to limit the Atlantic investigations of the organization to a minor region northwest of Scotland.

The need for regularly worked hydrographic stations in the open Atlantic was however, still felt, and the Swedish delegates had not given up the idea of extending the observations to the western Atlantic. In a letter to Fridtjof Nansen (1861-1930), Norwegian delegate to the Stockholm Conference, Otto Pettersson intimated that it should not be impossible to start also an "Atlantic cooperation". Sir John Murray (1841-1914), the famous Scottish oceanographer, would be a sort of honorary president of both bodies in order to get them form a whole (Pettersson, 1899). This idea was not realized. But the need for regularly worked hydrographic stations in the open Atlantic was again stressed, this time by the Council's hydrographer Martin Knudsen (1871-1949) in a paper contributed to the Eighth International Geographic Congress, held at Washington, D. C. in 1904, in which he expressed the hope that USA would join ICES in exploring the Atlantic (Knudsen, 1905, pp. 506-508).

In the meantime Otto Pettersson, trying to remedy the drawbacks of the situation, planned to organize observations from a network of private yachts crossing the Atlantic, an initiative that did achieve much success, however (Smed, 2004, pp. 165-166). So at the Ninth International Geographic Congress, held at Geneva in 1908, he and Gerhard Schott (1866-1960), of the Deutsche Seewarte (German Marine Observatory), recommended that synoptic oceanographic surveys be carried out in the Atlantic during one year (Pettersson and Schott, 1908, pp. 387-393). Referring to this, the Congress resolved that the physical and biological investigation of the Atlantic Ocean was one of the most pressing problems in oceanography (Claparède, 1909, pp. 121-122, 147-148).

II. Establishment of new commissions

In order to follow up the resolution the Congress proposed the establishment of an "International Commission for the Scientific Exploration of the Atlantic", in short: an Atlantic Commission. Also a resolution stressing the necessity of a modern investigation of the Mediterranean was adopted by the Congress, and the establishment of a Mediterranean Commission was proposed. The chairman of the oceanography section of the Congress, Otto Krümmel (1854-1912), was authorized to ask a number of oceanographers and persons connected with natural science to become members of the commissions. He was also requested to ask Prince Albert of Monaco whether he would do the two commissions the honour of becoming their

chairman, which the Prince agreed to (Ulrich and Kortum, 1997, pp. 251-252). During the following two years the members of the commissions were nominated, and meetings were held in Monaco in 1910 in connection with the inauguration of the Musée Océanographique. Here detailed plans for a study of the Atlantic were discussed (Berget, 1910).

III. ICES fears competition

Although Otto Pettersson had been deeply involved in the establishment of the Atlantic Commission and in the plans for its work he now apparently feared that the new organization would develop a more extended cooperation not including ICES, a fear he imparted to the General Secretary of ICES, Christian Frederik Drechsel (1854-1927). ICES had approached the USA to induce this country to join ICES. Drechsel thought that this step might have dissatisfied some people behind the Prince of Monaco and the Atlantic Commission, and that they now would try to get the USA join the Commission instead (Smed, 2004, p. 169). Drechsel communicated this fear to C.P.O. Moltke, Danish representative in the USA (Drechsel, 1911) who, however, assured him that the USA was not interested in a type of organization which had purely scientific purposes (Moltke, 1911). So the risk that USA would join a rival organization was over for the time being.

IV. ICES takes over the initiative from the Atlantic Commission

The exploration of the Atlantic was again discussed at the Tenth International Geographic Congress, held in Rome in 1913. Here modified plans were agreed upon which were reported to the chairman of the Atlantic Commission, the Prince of Monaco. He was of the opinion, however, that in the coming year work should be concentrated on getting the Mediterranean Commission constituted. So he suggested that activities in the Atlantic be postponed for a year.

ICES now took over preparation of detailed plans for the investigation of the Atlantic. These were discussed by an informal meeting of some members of the Atlantic Commission and other scientists, presided over by the Prince of Monaco, at Kiel in June 1914. The plans should have been realized by means of naval vessels crossing the Atlantic in connection with the opening of the Panama Canal. Because of the outbreak of the First World War the plans were not carried out (Smed, 2004, pp. 174-175).

The Atlantic Commission never did become a menace to ICES. As a matter of fact it did not meet after the meeting in Monaco in 1910, except for the informal meeting at Kiel mentioned above. So the Atlantic Commission did not survive the First World War, whereas its twin sister, the Mediterranean Commission (Commission internationale pour l'exploration scientifique de la Mer Méditerranée (CIESM)) still exists. It met in Rome in 1914 and was formally constituted at a meeting in Madrid in 1919.

V. New situation – new fear

After the war Otto Pettersson, now President of ICES, feared that Monaco, as he often named Prince Albert, would win England's support for a plan to create a coalition of the Allies for marine research. To counteract this, he suggested that ICES should cooperate with CIESM, linking up the connection which had been cut in 1914, and reviving the investigations of the Atlantic (Pettersson, 1918).

An entirely new situation had developed, however. Because of the ill feelings of the Allies against Germany, preparations for the establishment of new organizations, limited to allied and some neutral countries, were started to replace the International Association of Academies. It

was claimed that this procedure was in accordance with the Peace Treaty, ratified by Germany. An article of the Treaty said that "treaties, conventions and agreements of an economic and technical character" not included in a specific list ceased to be operative, and it was maintained that this article was intended to cover also conventions on scientific matters (Anon., 1919, pp. 154-155). So, new organizations not including the Central Powers should be established (Kevles, 1971, pp. 56-60). Meetings with this purpose had been held already in 1918 in London (Anon., 1918, pp. 133-134) and Paris (C.G.K., 1918, pp. 325 - 327), and they were followed up by an Assembly at Brussels in 1919 (Schuster, 1920) where an International Research Council (IRC) was constituted which would function as a federation of national research councils and academies. The objects of the Council would be (H.G.L., 1919, pp. 464-466):

> a) To coordinate international efforts in the different branches of science and its applications.
> b) To initiate the formation of international associations or unions deemed to be useful to the progress of science.
> c) To direct international scientific action in subjects which do not fall within the province of any existing association.
> d) To enter, through the proper channels, into relations with the Governments of the countries adhering to the Council to recommend the study of questions falling within the competence of the Council.

Several unions were instituted under IRC, such as the International Union of Geodesy and Geophysics (IUGG), which in its turn was split up in a number of sections. One of them, the Section for Physical Oceanography, would deal with tides, currents, temperature, salinity, density, and other physical phenomena of the oceans. According to Ablon (1919, p. 27), the physical oceanographers did not accept the biologists joining their section. In any case the marine biologists set up their own Subsection for Biological Oceanography, under the Section for Applied Biology, a section of the International Union of Biological Sciences (Joubin, 1921). It would be completely independent of the Section for Physical Oceanography, but Prince Albert of Monaco became President of both. G. Magrini was elected secretary of the physical section, Louis Joubin of the biological subsection.

According to Ablon (1919, p. 26) an embarrassing situation occurred at the Brussels Meeting when a Belgian delegate outright asked the French participants a question "which was on everybody's lips", viz. why France for so long time had stayed outside the cooperation. When one of the French delegates, Professor Delage, tried to explain that it was due to lack of grants the Belgian delegate bluntly exclaimed:

> That is untrue! If France has stayed outside the International Council for the Exploration of the Sea it is at the instigation of one man only, Mr. Fabre-Domergue! (from French.)

As explained elsewhere (Smed, 2001, pp. 6-7) this would seem to have been the general opinion in ICES. Also in French quarters the opposition of the Inspector General for Fisheries, Paul Fabre – Domergue (1861-1940), was mentioned as one of the reasons for the country's delayed participation in ICES (Le Danois, 1920, p. 3).

At first the relation that the new organization might have to ICES was not clear to the authorities of the latter. The General Secretary, who received his first information about the new

organization by a letter (Gilson, 1919) from the Belgian delegate to ICES, Gustave Gilson (1859-1944), got the impression that the Brussels meeting expected ICES to change its name and become a section under the new body. Drechsel considered that the only task of IRC was to assure that no international institution in which the Allies were involved had anything to do with Germany. Of course he did not accept that ICES could be controlled by the IRC, and he had learned that the English member of the ICES Bureau, Henry Maurice (1874-1950), also had rejected this idea (Drechsel, 1919a, 1919b). Otto Pettersson too, at that time President of ICES, also must have misunderstood the purpose of the IRC, which he apparently considered as being dominated by Belgium. He expressed the view that the International Bureau at Brussels presumably would turn out to be a bluff! Belgium had never accomplished anything and would never play a dominating role (Pettersson, 1919a).

Drechsel was aware that not everybody admired the work of ICES. He drew Pettersson's attention to some critical articles by the British fishery biologist W. C. McIntosh in the periodical *Nature* where it was said that

> it is just the consideration of the almost valueless mass of certain statistics that, amongst other things, has led to the view that, judged by its promises and performances, the "International Council for the Investigation of the Sea", so far as the welfare of the British fisheries is concerned, is a series of waste of money (McIntosh, 1920, p. 358).

Drechsel added, however: "It is probably of no importance. I am more afraid of Monaco and his entourage" (Drechsel, 1919c). Pettersson's point of view was that:

> We can cooperate with Monaco, and a division of work we can accept, but it should not become a combination. (from Swedish. Pettersson, 1919b)

As a matter of fact the situation was quite different. At the Brussels meeting the British delegate Arthur Schuster, Secretary of the Assembly, officially announced that the allied countries, and the neutral countries admitted to the International Research Council, would receive an invitation from the British government to send delegates to a conference in London, the purpose of which would be to establish a plan for joint biological and fishery studies in the North Atlantic and the North Sea. Schuster pointed out that the International Council for the Exploration of the Sea at Copenhagen still existed, and it was to be hoped that the United States, Canada, and France would join it.

The Subsection for Biological Oceanography then:

1. asked the General Secretary of ICES to propose to his organization to extend its field of investigation to the North Atlantic and to invite those allied and neutral countries bordering on the North Atlantic, but not yet represented on ICES, to take part in the investigations;
2. expressed the wish that ICES, for these investigations, would establish relations with the bodies founded by the International Research Council [This was acceptable because Germany had left ICES];
3. expressed the wish to see France join the investigations of the North Atlantic (Schuster, 1920, pp. 37-38).

This declaration obviously called for cooperation with ICES, not for competition. Nevertheless there was apparently still some fear that the new organization would compete with, or even replace ICES. Otto Pettersson did not like the new body. Drechsel could accept

cooperation about questions of common interest on condition of complete liberty and independence - not as he had understood what was suggested at Brussels: that the one institution should be controlled by the other. Personally he would be happy to see any cooperation with the Brussels institution postponed as long as possible (Drechsel, 1920).

This attitude may have had the result that the Prince of Monaco, representing the Institut Océanographique in Paris and the Musée Océanographique in Monaco, was not invited as a guest to the first post-war ICES meeting. The matter had been discussed with Drechsel by Otto Pettersson who, however, realized that an invitation might have disadvantages, because the Prince, being President of the two oceanographic bodies of the IRC, might represent a competitive organization (Pettersson, 1920).

The Section for Physical Oceanography at its first General Assembly, held in Paris in January 1921, summarized the scientific scope of the Section as follows (Proudman, 1934):

Morphology of the sea bottom,
Morphology of the surface of the oceans and seas,
Movements of the water masses,
Physical and chemical studies of seawater.

In a letter to Drechsel Otto Pettersson pointed out that two great organizations existed which could divide the work under mutual agreement between them: Atlantic cooperation [i.e. ICES] presided over by Maurice, with headquarters in Copenhagen and Drechsel as its General Secretary, and the Mediterranean cooperation headed by the Prince of Monaco, with its centre in Paris and Magrini as its Chief Secretary. Pettersson continued in his usual outspoken way (Pettersson, 1921):

> These two cooperations at present regard each other with a dignified reserve comme deux chiens de porcelaine sur une cheminée. I have studied the situation a little during my stay in France last winter and found at the bottom of people's feelings the same inveterate distrust as there exists in political relations between England and France which gave me a bad apprehension for the future which you will easily understand. Both cooperations have a point of contact in Paris where the influence of Monaco is great. The government of France has to pay a contribution to both cooperations and sooner or later the question will arise: "can we not be content with one?"
>
> Now it seems very natural that France should not be content with one cooperation since France has to care for its Mediterranean fisheries - which are at present neglected in a way which seemed almost ridiculous to me - and its far more important Atlantic fisheries. So the participation of France on both sides would be self-evident if it were not for the existence of a third cooperation - that founded at Bruxelles - which pretends to embrace both the Atlantic and the Mediterranean and which has practically done nothing except the construction of an immense scheme of rules and paragraphs which will never come into execution. This nebulous cooperation embraces all things: geology, meteorology, physics etc. and is presided by the Prince of Monaco. As Magrini has a too scanty reputation among scientists he is only Secretary; the Scientific leader should be professor Schuster of R.S. [i.e. the Royal Society]. As the contribution of countries who enter into this "international cooperation" is only 500 frcs annually and the names of Monaco and Schuster are known all over the world, a great number of governments and Academies in Europe have bestowed upon themselves the cheap pleasure of membership and I find that the Swedish Academy [of Sciences] has also accepted the invitation.

The ICES Bureau intended to send Otto Pettersson as its representative to a meeting of the Executive Committee of the IRC's Section for Physical Oceanography at Paris in January 1922. Pettersson assured Drechsel that he would not go without having ascertained the solidity of the cooperation. On the other hand he realized that ICES could not ignore the existence of the two organizations: the Mediterranean Commission and the IRC Section for Physical Oceanography, especially because Louis Joubin, an ICES delegate, was a member of both. There was now a need for ascertaining, Pettersson thought, whether the leaders of the two organizations were sympathetic towards an independent cooperation with ICES on the basis of a well regulated division of labour and free intercourse and exchange of results, experience, and community of methods. Maurice and Drechsel agreed that ICES must cooperate with the IRC and the Mediterranean Commission, although they did not have much confidence in them. Maurice declared that the IRC had shown no signs so far of doing serious work, and Drechsel did not believe that any serious work in the Atlantic would ever be carried out on the part of the French, Spanish, and Portuguese institutions (Drechsel, 1921).

Pettersson did go to the meeting in Paris. Here it was decided to establish special Committees for the study of the Atlantic and the Pacific. It was suggested that Maurice should be President of the Atlantic Committee, and the other members should be Otto Pettersson, Edouard le Danois, and two Americans. Drechsel was somewhat dissatisfied with this decision. He felt that ICES was entitled to decide who should be its representatives on the Committee. He considered it to be to the benefit of the common work if Maurice took over the presidency of the Committee; on the other hand, the fact that the Committee was established with members of ICES, Americans, and others, could only mean a splitting up of ICES (Drechsel, 1922a). Maurice was of the opinion that unless the Atlantic Committee was definitely affiliated to and controlled by ICES there would be a split of ICES in any case, because it was not likely that the French would finance participation in ICES and in the Mediterranean Commission at the same time, and, in addition, provide the means for the Atlantic Committee; they were not really interested in North Sea work, but would work in the Atlantic. Maurice thought they should conduct their Atlantic work as participators in ICES. If they were going to undertake this work through an organization outside ICES, it would not be long before they ceased to be members, he believed (Maurice, 1922). Drechsel considered it impossible in the long run to keep all countries, from Finland to Portugal, together in one Council, partly because of the different interests of the countries, partly because of the intrigues which he felt would continue to occur as long as France, Spain, and Portugal were members. At that time ICES had not been fully reorganized after the First World War. France had become a member, and negotiations were conducted with Spain and Portugal. Drechsel now suggested that these negotiations should be stopped and France be given up as a member. Instead Estonia, Latvia, Poland, and Germany should join ICES, which would mean about the same income. France, Spain, and Portugal would then have their own Council, fully independent of ICES, but with Maurice as its president (Drechsel, 1922b).

Maurice believed that now there was a need for a meeting of the ICES Bureau to find out what the French were driving at with regard to the Atlantic Committee, as he did not propose to go into the Committee in the dark. At the meeting, which was held in London in March 1922, the Secretary of the Committee, Ed. le Danois, explained its genesis and purpose: In order to split up the work of the Oceanographic Section of the IRC, it had been proposed to have an Atlantic and a Pacific Committee. France, the USA, and Canada had expressed willingness to join the Atlantic Committee, and the USA had agreed that the president of the Committee would be a European

and that its seat would be in Europe. The Committee would not be powerful enough to carry out research, but would be an academic body (Anon., 1922). In that case Maurice thought it would be better for the Committee to have a scientist as president, but Le Danois was of the opinion that Maurice in his capacity as President of ICES - an established organization and the best representative of oceanography in Europe - would have full scientific support. Johan Hjort (1869-1948), Vice-President of ICES, felt, based upon his long experience, that international cooperation in order to be effective must be practical. So at present the only advantage of setting up an Atlantic Committee was the support of the USA, and he thought this might better be obtained by the USA rejoining ICES - an opinion shared by Maurice. Otto Pettersson pointed out that so far the Committee had only a poor foundation. The matter might be taken up later when the Committee was in working order. Le Danois, however, stressed that before setting to work the Committee wished to get the support of ICES, and a common president would help in this connection. It would be dangerous to the unity of research in the Atlantic if USA were allowed to run the Committee alone.

After these discussions it was agreed to postpone the decision. In this connection it may be relevant that it had been proposed to form within ICES an Atlantic Committee with Johannes Schmidt (1877-1933) as its leader. As Schmidt had not shown any disposition to accept such a position it was considered preferable instead to further develop the existing Atlantic Slope Committee of ICES, chaired by Le Danois. However, a North Atlantic Committee, chaired by Schmidt, was established by ICES in 1923.

VI. Bureaucracy in the Section for Oceanography

To establish relations with other organizations, both the Section for Physical Oceanography and the Subsection for Biological Oceanography invited ICES and CIESM to nominate a delegate to their Executive Committee (Joubin, 1921, p.4). It was regarded in the Subsection that the results achieved were not satisfactory compared to those obtained by the Section for Physical Oceanography, and a combination of the two bodies was proposed (Joubin, 1922, p.4). This was implemented in 1922, resulting in the Section for Oceanography.

Apparently it took several years to get the Atlantic and Pacific Committees of the Section formed. As late as the Assembly of the Section at Prague in September 1927, it was reported that the two Committees were being constituted (Anon., 1928, p. 15). As stated by Le Danois the Atlantic Committee had no means for carrying out research. This was left to ICES, the Service of International Ice Observation and Ice Patrol (the International Ice Patrol, effectively the U.S. Coast Guard) in the North Atlantic (established in 1913 after the “Titanic” catastrophe), and the North American Committee on Fishery Investigations. So in the report of the Committee attention was drawn to the necessity of augmenting the relations with these organizations to develop activities (Anon., 1928, p. 32). In the Pacific the situation was similar. Here the work was done by the International Committee on the Chemical and Physical Oceanography of the Pacific, founded in 1923, and in 1926 changed into the International Committee on the Oceanography of the Pacific (Vaughan, 1937, pp. 95-96). So the two regional Committees of the Section in reality represented just a lot of bureaucracy, as did also an arrangement that the presidents of the active organizations should be vice-presidents of the Section.

After the death in 1922 of Prince Albert of Monaco, the Spanish delegate Odon de Buen (1863-1945) had become President of the Section. At its Assembly at Stockholm in 1930 he proposed the establishment of an “umbrella” federation that would embrace a number of organizations dealing with oceanography:

International Council for the Exploration of the Sea
Commission Internationale pour l'Exploration Scientifique de la Mer Mediterranée
Bureau Hydrographique International
International Committee on the Oceanography of the Pacific
Ibero-American Oceanographic Council (founded in 1926).

To these came the Committees set up by the Section itself, viz. the Committees for the Atlantic and the Pacific, and a Tidal Committee. The problem was that all organizations of the first group were governmental, whereas the Committees of the Section were not. Also the federation had therefore to be governmental and have delegates from governments as well as from the nongovernmental Committees.

There was no general acceptance of this arrangement. It called for an effective collaboration of physicists and biologists in the Section itself. The British delegate Joseph Proudman was convinced that admission of biologists to the Section would cause difficulties and should be avoided in the interest of science.

The reason for taking up these discussions at the time was that the whole system of the International Research Council was under reorganization and a new convention would be introduced in 1931. In view of this, the Presidency proposed that it should continue its functions until then. Proudman declared that this motive was not persuasive, and requested voting. The proposal was turned down. On the motion of Proudman Martin Knudsen was then elected President, Rolf Witting (1879-1944) Secretary. On the proposal of Knudsen Odon de Buen and Magrini were elected members of the Executive Committee.

VII. Cooperation – not competition

In the new convention, in which the International Research Council was renamed the International Council of Scientific Unions (ICSU), the former Sections were named Associations. So the Section for Oceanography became the Association Internationale d'Océanographie Physique (or International Association for Physical Oceanography (IAPO)). The oceanography Association was authorized to set up its own statutes. This was done at the Assembly in Lisbon in 1933 (Anon., 1934, pp. 29-31). It was decided that the Association should mainly deal with those parts of oceanography in which mathematics, physics, and chemistry were used for the scientific study of the sea. The Atlantic and Pacific Committees of the former Section were abolished, whereas the Committee on Tides survived. It was furthermore decided that any international organizations that were engaged in physical oceanography might obtain membership of the Association. Accordingly the Assembly decided to invite to become members the five governmental international organizations mentioned in Odon de Buen's proposal, together with the International Ice Patrol in the North Atlantic. So the final outcome was cooperation, not competition.

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MAJOR JAMES RENNELL'S CURRENT CHARTS DIGITALLY AVAILABLE

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James Rennell's current charts for the Atlantic and its companion volume, published in 1832 posthumously by his daughter Lady Jane Rodd, were to set the standard in charting surface currents for many years. Although the volume is available in many libraries, the charts are rarely found. Electronic versions of the charts have now been made publicly available.

After a successful career as Surveyor-General of Bengal, appointed by the East India Company, James Rennell (1742-1830) rose to the rank of Major by 1776 and grew to be the leading geographer in England (Pollard and Griffiths, 1993). From 1810 until his death, Rennell turned his attention to hydrography. Charting the currents of the Atlantic was carried out on behalf of the British Admiralty, and the basis for these charts was data supplied to him by his numerous naval friends, among whom were the Hydrographer of the Navy, Alexander Dalrymple, the Hydrographer John Purdy and Admiral Sir Francis Beaufort. Almost all of the data are from British navy vessels, collected in the period ca. 1790-1825. Attempting to gather data from other than British vessels, Rennell asked Sir Joseph Banks (then President of the Royal Society) in 1819 to approach U.S. sources for data from ship's logs. No mention is made that American data were actually used by Rennell, suggesting that this attempt was unsuccessful (Pollard and Griffiths, 1993). The only American data used were taken by Dr. Benjamin Franklin in 1776 and 1785 during two voyages to and from the British Isles. These are the oldest data in the dataset.

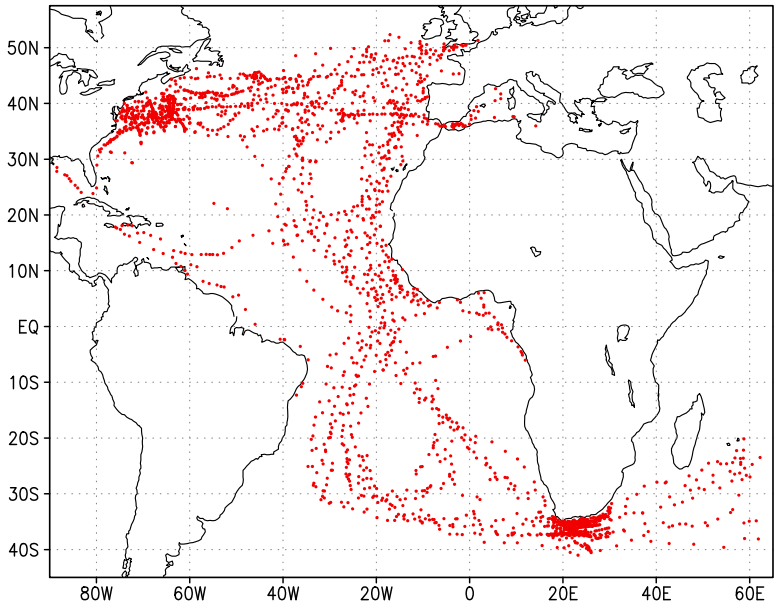

Figure 1. The locations of all entries in the Rennell dataset.

The basis for the current charts included some flow measurements but was mostly sea-surface temperature (SST) measurements. The early instrumental SST measurements were made across the Atlantic Ocean with a few in the Indian Ocean. Obviously, the majority of measurements were concentrated along the frequently used shipping lanes (Fig. 1). Some ship tracks were planned with the sole purpose of measuring SSTs along or across the Gulf Stream position and some of these ship tracks are jotted down on the Charts (Fig. 2).

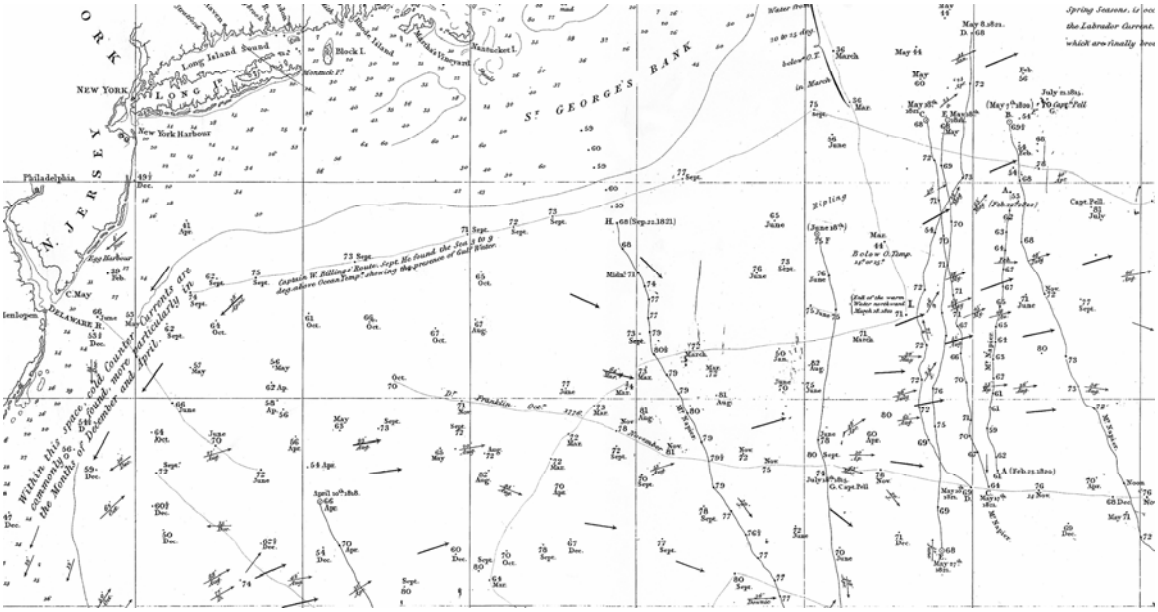

Figure 2. Part of Rennell's chart of the Gulf Stream area. Indicated here are some ship tracks made along and across the Gulf Stream. The part depicted here has been scaled down, making the SST readings and Rennell's comments illegible. The horizontal scale of the original figure measures ca. 45 cm.

The data gathered along these tracks must be the first, multi-ship, systematic survey of Gulf Stream surface temperatures. On the whole, the data compiled by Major James Rennell appears to be the earliest useful survey of water currents and ocean surface temperatures available, given that a reliable estimate of the ship's position (i.e. longitude) could not have been made unless the vessel was equipped with a chronometer. Chronometers were not in widespread use until the late 18th and early 19th century (Peterson *et al*., 1996).

Rennell extensively describes the currents charts in the covering book (Rennell, 1832). There are five charts, the first and second being for the eastern and western Atlantic Ocean, respectively. The third gives the "South-African current and counter-current from the Atlantic to Indian Ocean", the fourth gives the "connecting currents between the Atlantic and Indian ocean" and the fifth focuses on the Gulf Stream area. On all charts, observations of SST, currents and numerous observations of wind strength and direction are entered as point values. Along the coasts and over banks, water depths are given and a few sightings of icebergs and data on the release and retrieval of bottles and (parts of) ship wrecks are entered. Part of the second chart, which illustrates the detail of these charts, is given in Fig. 3.

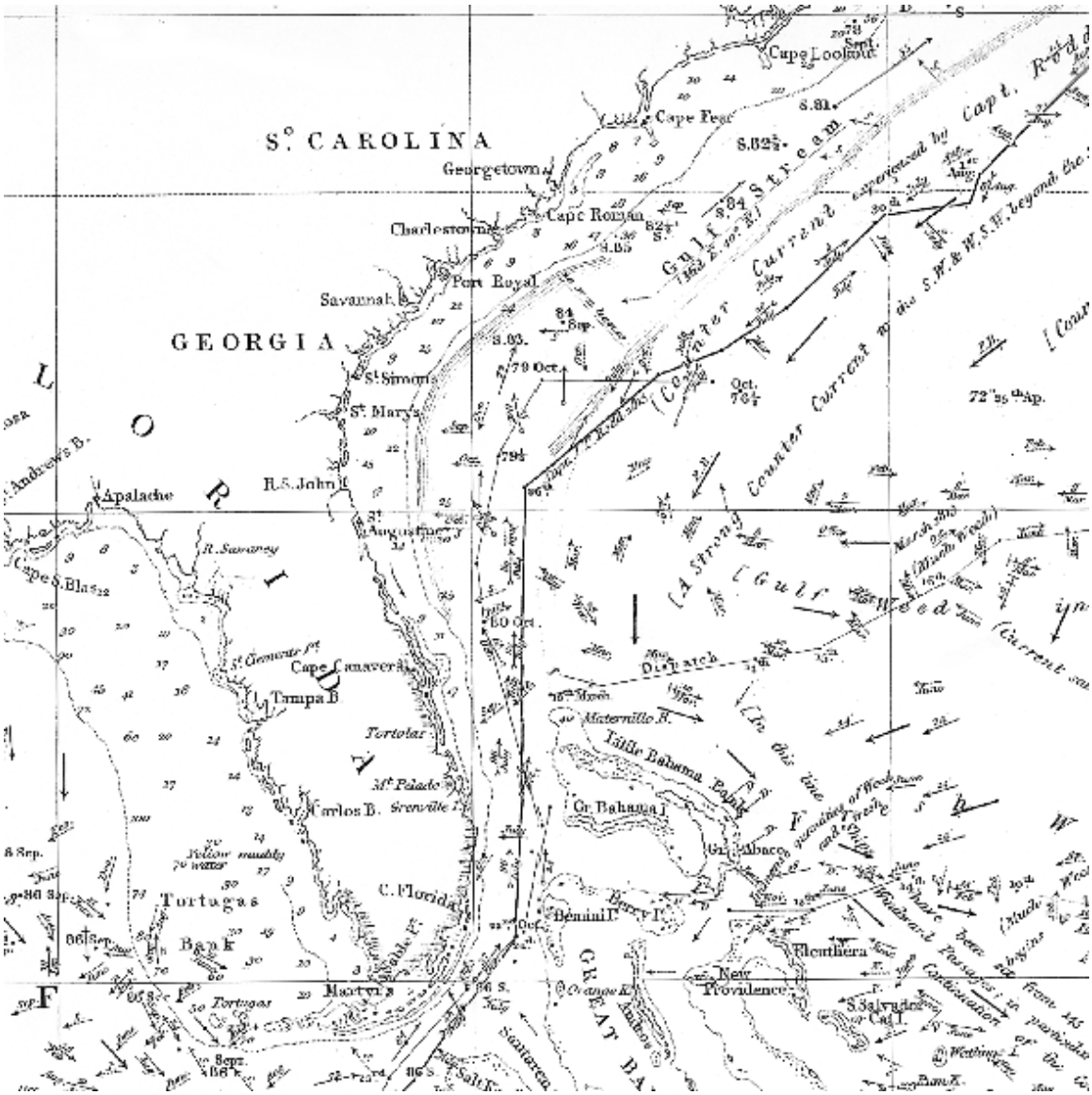

Figure 3. Part of Rennell's second chart, showing the region around Florida. The bold upright numbers give the sea surface temperature (SST) measurement (in Fahrenheit) and the month in which this measurement was taken. Some of the SST measurements are linked by a thick line denoting a ship track. Each track is labeled with captain and/or ship name and year. Thick arrows give current observations, thin arrows give observations of wind where the character of the arrow (dashed, solid, with feather, with open circle, etc.) labels it to a ship or captain. Italic numbers give depth of the water column in fathoms. Numerous miscellaneous remarks are added to the charts.

Interspersed in the text of the volume, Rennell gives the captain and/or ship name contributing to the SST measurements in his compilation. Initially, we tried to recover the SST data directly from the ship's logs. Many of the logs could be located in the National Archives in Kew (UK), but the logs we checked did not contain the SST data. Consequently, we had to digitize the SST data

directly from the charts, which is reported on in a separate publication (Van der Schrier and Weber, 2007).

There are two aspects of the SST data and Rennell's interpretation on which we report here. Rennell must have been aware of the seasonal cycle in SSTs, explaining the small percentage of the data (1.7%) for which it was unclear in which month they were taken. Most of the data are collected in spring and early summer. However, the concept of interannual variability must have been less well-known; the year in which the measurement was taken is unknown for the largest part of the data (ca. 65%). Most of the measurements which are labeled by both a year and a month are organized along a known ship track, sometimes also giving information on the day or even the time of observation. Rennell's text provides the information for some of these ship tracks, but most of the tracks are only entered on the charts. The parts of the data which are labeled by a year (ca. 35%) are biased toward the 1820s.

In his treatise, Rennell comments on some temperature measurements as "above (or below) Ocean Temperature." This "Ocean Temperature" is taken to be constant in longitude. On one chart (for the eastern Atlantic), at each parallel of latitude, Rennell adds two temperatures indicating the extremes of the seasonal cycle in temperature for this latitude. Based on a comparison with the "Ocean Temperature", Rennell deduced the existence of a warm tongue of water advected with the Gulf Stream system. The "SST climatology" Rennell used is very similar to values the German climatologist Kaemtz put forward in 1832. Kaemtz updated and expanded the work on isotherms Alexander von Humboldt published in 1820. With much of Rennell's manuscript written in the late 1820s and his death in 1830, it seems that the climatology Rennell used predates that of Kaemtz. It is unlikely that Rennell used earlier climatologies put forward by Brewster or Humboldt in 1820 because of the discrepancy between their values and his. The exact source for Rennell's "Ocean Temperature" is the subject of ongoing research.

The great breadth of Rennell's study of the entire Atlantic Ocean was truly unprecedented at the time and proved to be an invaluable model for subsequent researches into the surface circulation of the World Ocean (Peterson *et al*., 1996). Rennell's treatise on the circulation of the North Atlantic preceded that of Matthew Fontaine Maury (1855) by a good twenty years and the latter added little to what Rennell already knew (Gould, 1993). In fact, Rennell's biographer, Clements Markham (then President of the Royal Geographical Society) wrote in 1895 that Rennell's book was "the very first contribution to the science of oceanography" and that Rennell "was the founder of oceanography: the branch of geographical science which deals with the ocean, its winds and currents" (Pollard and Griffiths, 1993).

The original charts were found in the UK Hydrographic Office (www.ukho.gov.uk). The digital images of these charts are available from www.knmi.nl/~schrier. The digitized data and the reconstructions of the mean SST patterns will be available shortly from the British Oceanographic Data Centre (www.bodc.ac.uk)

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IN MEMORIAM

Christian Carpine, (Marseille 1933 – Monaco 2007), a tribute

Christian Carpine was born and raised in Marseille where his youthful explorations of the surrounding Provençal countryside stimulated his lifelong passion for the living world, both terrestrial and marine. Graduating from Marseilles University with a natural sciences degree, he then gained its newly-instituted oceanography doctoral qualification. In 1956, while preparing a thesis for a scientific doctorate, he joined an expedition on board the research vessel *Calypso*. The following year Jacques Cousteau was appointed director of the Musée Océanographique at Monaco and he invited Christian to join the staff. Christian's many subsequent expeditions in the Mediterranean and North Atlantic, on board various ships and in underwater craft, were under this aegis.

Christian was called up for military service in 1960-62, during the Algerian crisis, returning to prepare a new thesis, which gained him a doctorate in 1970. When government funding for scientific research was diverted elsewhere, the Musée could no longer support its own research and between 1971 and 1983 Christian was assigned to administrative posts associated with international bodies concerned with research and exploration of the Mediterranean and with the various congresses held around its shores. In 1983 the curator of the museum's collections retired and Christian took over as curator. In this post he undertook the first professional study of the items, publishing in eight volumes illustrated catalogues of the museum's entire holdings of scientific instruments and apparatus. Between 1984 and 1991 he arranged the annual exhibitions celebrating the centenaries of each of Prince Albert's nineteenth-century expeditions. With the advent of F. Doumenge as director in 1989 Christian was among those long-serving employees appointed "chevalier du merite culturel"; sadly further reorganization of the museum displays led to his redundancy in 1996.

Many of Christian's publications were researched with the assistance of his wife, Jacqueline Carpine-Lancre, known to all historians of oceanography for her lifetime of service as at the Bibliothèque du Musée. Despite his command of English, Christian was reluctant to travel abroad and speak at meetings, though happily his valuable contributions to the history of oceanography and particularly the works of Prince Albert, founder of the Musée, were committed to print. Christian's own marine explorations, coupled to his mechanical competence and his pleasure in historical research, gave him a very wide understanding of Prince Albert's work and of the history of oceanography in general. After his retirement, Christian applied his considerable artistic talent to a series of drawings of oceanographical ships, prior to the First World War. His death, after lingering illness, has left this book sufficiently close to completion that his wife and children intend to see it into publication. We may look forward to that, but grieve that we shall not see his like again.

(Anita McConnell, North Cottage, Tannery Road, Combs, Stowmarket IP14 2EL, UK; am638@cam.ac.uk)

Titres universitaires

Licence de sciences naturelles [Faculté des sciences de Marseille, 1953-1957]
Doctorat d'océanographie (1958) :
« Recherches sur les fonds à *Peyssonnelia polymorpha* (Zan.) Schmitz de la région de Marseille »
Doctorat ès sciences (1970) :
« Écologie de l'étage bathyal dans la Méditerranée occidentale »

Campagnes océanographiques

1956 : campagne à bord de la *Calypso* (golfe de Guinée et Atlantique central)

1959 : campagnes à bord de la *Calypso* (Méditerranée occidentale ; îles du Cap-Vert)
1963-1970 : campagnes à bord de la *Winnaretta-Singer* (Méditerranée occidentale)
1963 : plongées avec la soucoupe plongeante SP 300 (côte des Maures)
1964 : plongées avec la soucoupe plongeante SP 300 (côtes de Corse)
1964 : campagne à bord de la *Calypso* (côtes de Corse)
1966 : campagne à bord du *Jean-Charcot* (Madère)
1968 : campagne à bord du *Marcel-Bayard* (au large de Nice)
1969 : campagne à bord de l'*Alsace* (au large de Nice)
1969 : plongées avec le bathyscaphe *Archimède* (Açores)
1976 : campagne à bord du *Capricorne* (Méditerranée occidentale)
1977 : campagne à bord de la *Calypso* (Méditerranée occidentale)

Activités professionnelles

1957-1970 : Assistant scientifique au Musée océanographique de Monaco
1971-1974 : Secrétaire scientifique de l'Étude en commun de la Méditerranée.
Participation aux réunions administratives du *Mediterranean Marine Sorting Center* à Khereddine, Tunisie (1972, 1973)
1974-1983: Membre du Secrétariat général de la Commission internationale pour l'exploration scientifique de la mer Méditerranée.
Organisation des Congrès-Assemblées plénières de Monaco (1974), Split (1976), Antalya (1978), Cagliari (1980) et Cannes (1982)
1983-1996 : Conservateur des collections du Musée océanographique de Monaco

Activités complémentaires

Histoire de l'océanographie : participation au première Congrès international d'histoire de l'océanographie (Monaco, décembre 1966)

Typologie et iconographie des navires océanographiques : conférence à l'Académie de Marine à Paris sur l'évolution des navires océanographiques (1973)

EXPOSITIONS

De 1984 à 1991, une évocation historique a été organisée en collaboration avec Jacqueline CARPINE-LANCRE, dans la salle Albert I^{er} du Musée océanographique, pour commémorer, année après année, l'activité scientifique du Prince ALBERT, sous le titre général « ***Il y a cent ans, le Prince Albert...*** ».

PUBLICATIONS

1958 Recherches sur les fonds à *Peyssonnelia polymorpha* (Zan.) Schmitz de la région de Marseille. *Bulletin de l'Institut océanographique, Monaco*, vol. **55**, n° 1125, 50 p.

1959 Campagne de la *Calypso* : golfe de Guinée. 3. Aperçu sur les peuplements littoraux. *Annales de l'Institut océanographique, Paris*, vol. **37**, pp. 75-90.

1960 Révision des connaissances sur la biologie et la prévention des Xylophages marins. *Bulletin de l'Institut océanographique, Monaco*, vol. **57**, n° 1187, 50 p.

1960 Note préliminaire sur les communautés benthiques de la région de Monaco. *Bulletin de l'Institut océanographique, Monaco*, vol. **57**, n° 1191, 4 p.

1963 Contribution à la connaissance des Gorgones Holaxonia de la Méditerranée occidentale. *Bulletin de l'Institut océanographique, Monaco*, vol. **60**, n° 1270, 52 p.

1964 Contributions à l'étude bionomique de la Méditerranée occidentale (côte du Var et des Alpes maritimes - côte occidentale de Corse). Fascicule 3 : la côte de l'Esterel, de la pointe des Lions à la pointe de l'Aiguille (région A 2). *Bulletin de l'Institut océanographique, Monaco*, vol. **63**, n° 1312, 52 p.

1964 Contributions à l'étude bionomique de la Méditerranée occidentale (côte du Var et des Alpes maritimes - côte occidentale de Corse). Fascicule 4 : compte rendu de plongées en soucoupe plongeante SP 300 (région A 1). *Bulletin de l'Institut océanographique, Monaco*, vol. **63**, n° 1314, 36 p.
[en collaboration avec R. Vaissière]

1964 Contributions à l'étude bionomique de la Méditerranée occidentale (côte du Var et des Alpes maritimes - côte occidentale de Corse). Fascicule 6 : un Octocoralliaire nouveau pour la Méditerranée : *Scleranthelia musiva* Studer, 1878. *Bulletin de l'Institut océanographique, Monaco*, vol. **64**, n° 1327, 10 p.

1965 Méthodes de prélèvement et de tri en bionomie benthique, *in : Méthodes quantitatives d'étude du benthos et échelle dimensionnelle des benthontes*, pp. 29-31. - Paris : Commission internationale pour l'exploration scientifique de la mer Méditerranée.
[en collaboration avec G. Fredj]

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[en collaboration avec G. Fredj et R. Vaissière]

1965 Quelques observations sur la faune bathyale dans le canal de Corse. *Rapports et procès-verbaux des réunions - Commission internationale pour l'exploration scientifique de la mer Méditerranée*, vol. **18**, n° 2, p. 83.

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[en collaboration avec J. Alinat]

1970 Une expérience de chalutage profond (recherche de la « Caravelle » engloutie au large de Nice). *Bulletin de l'Institut océanographique, Monaco*, vol. **69**, n° 1408, 16 p.

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1975 Les Gorgonaires de la Méditerranée. *Bulletin de l'Institut océanographique, Monaco*, vol. **71**, n° 1430, 140 p.
[en collaboration avec M. Grasshoff]

1978 Écologie et écologisme. *La tribune de Monaco*, vol. **1**, n° 15, p. 10 ; n° 17, p. 7.

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1991 [Traduction et adaptation en français] *Coquillages*, par N.R. Gordon. – Paris : Atlas. – 144 p.

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Histoire des navires qui ont effectué des opérations océanographiques avant la première Guerre Mondiale (en préparation, texte et illustrations)

(Compiled by Mme Jacqueline Carpine-Lancre, Beausoleil, France; jacala@libertysurf.fr)

Dale C. Krause (1929-2007)

Dale Krause – marine geologist and geophysicist, former Director of UNESCO's Division of Marine Sciences (Paris, 1973-1989) and loyal friend of oceanographic history – died on 17 August 2007 in Anaheim, California (USA).

The scientific contributions of Dr Krause spanned three periods: his graduate and postgraduate research in Scripps Oceanographic Institution in La Jolla (1956-1962), his tenure as a founding professor at the Graduate School of Oceanography of the University of Rhode Island until 1973 when he moved to Paris to join UNESCO. After retiring from the Organization, he returned to research in 1992, joining the Marine Science Institute of the University of California at Santa Barbara.

In 1973 the Office of Oceanography of UNESCO was divided into two parts: the IOC Secretariat and the Division of Marine Sciences (OCE). Dale Krause and the writer arrived in 1973 to join colleagues who had been transferred from the former Office of Oceanography to launch an innovative programme, the mandate of which was the advancement of marine sciences in developing countries and overseeing UNESCO's relations with non-governmental organizations. OCE was also given a strong educational and publishing mission.

Dale was a frequent advocate of 'good science', the cutting edge and frontiers of which he loved to discuss. Pertinent to the scope of this Newsletter, he was imbued with a deep sense of and respect for the history of science, often looking back on the processes involved in the pursuit of these new frontiers. I brought to his attention the fact that the 50th anniversary of John Murray Expedition to the Indian Ocean (1933-34) was approaching. He agreed that, as the expedition was carried out on board the modern (at that time) Egyptian research vessel *Mabahiss* – with its local crew and two Egyptian oceanographers working with UK scientists, this was a good model for cooperation between advanced institutions and emerging ones. He also realized that celebrating such occasions in itself sparks motivation among young scientists while making them aware of the accomplishments of older generations. The expedition also constituted a launching pad for modern oceanography in Egypt. It was followed by the Egyptian Expedition to the Red Sea (1934-35) and the founding of the Department of Oceanography at Alexandria University in1948 by the two Egyptian oceanographers of the John Murray expedition.

Both the British and Egyptian counterparts enthusiastically accepted UNESCO's invitation to celebrate this occasion, resulting in the cooperation between the Royal Society and Alexandria University in organizing the "*Mabahiss*/John Murray International Symposium on Marine Science of the North-West Indian Ocean and Adjacent Waters', held in Alexandria (Egypt), September 1983. The proceedings were published as a special volume of *Deep-Sea Research*, Part A, Vol 31, Nos 6-8A. Also a book based on the narratives of the expedition by its leader R.B. Seymour Sewell, which had been lying idle in the British Museum archives, was published by UNESCO in English (1986) and Arabic (1988) as *Deep-sea Challenge*, illustrated and edited by A.L. Rice. This book complemented the historical account of the human involvement in the International Indian Ocean Expedition, published also by UNESCO (sponsored by OCE) in five languages between 1981 and 1986 as *Assault on the Largest Unknown* (title of the English edition), by Dan Behrman.

In a parallel exercise, UNESCO (again, the Division of Marine Science) put forward the idea of reviving the exploration that had been conducted by the Netherlands HMS *Willebrord Snellius* (1929/30) in the Indian Ocean by a second expedition to the eastern Indonesian waters. Some years later Indonesia and The Netherlands launched the *Snellius-II* Expedition (June 1984–July 1985).

ICHO III (1980) in Woods Hole (Massachusetts, USA) and ICHO IV (1987) in Hamburg (Germany) received generous support from OCE and IOC for participants' travel and publishing the proceedings. UNESCO's support to these activities was encouraged by Dale.

Not only did he emphasize the quality of science to be promoted in the developing world, but Dale was also quick to notice the phenomenal growth in the number of marine scientists in these countries. Under his guidance, a UNESCO intern studied the contemporary directories of marine scientists, from which they deduced that over roughly three decades (1960 through the 1980s), the marine scientific community of the developing world and that of the world as a whole had increased tenfold. Of significance, the relative growth in numbers in the developing countries began to exceed that in the industrialized ones. By 1983 the number of marine scientists in the developing world had equaled the total number for the whole world in 1970. (De Shazo, Y.M., and D.C. Krause, 1984. Marine scientists in the world: UNESCO, Paris, MARINF/53, 16 pp.)

In *Sixty Years of Science in UNESCO (1945-2005)*, UNESCO 2006 (695 pages), Dale and his former OCE colleagues (S.A. Morcos, M. Steyaert and G.D. Wright, in consultation with A.S. Suzyumov and D.G. Troost) contributed to the history of international science while reminiscing with great pleasure and satisfaction as they authored the chapter (pages 354-370) entitled 'Building blocks for marine science; a history of the Marine Sciences Division (OCE).

[The help of Tara Krause and Gary Wright is warmly appreciated.]

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NEWS AND EVENTS

THE NEXT INTERNATIONAL CONGRESS ON THE HISTORY OF OCEANOGRAPHY. ICHO-VIII, the Eighth International Congress on the History of Oceanography, is scheduled to be held in Naples in June 2008, in association with the Stazione Zoologica di Napoli. Further information will be available shortly and will be passed on by e-mail to all subscribers of *History of Oceanography* as soon as possible.

WHOI DATA LIBRARY AND ARCHIVES. The role of the Data Library and Archives (DLA) is to collect, preserve, and manage records related to the Woods Hole Oceanographic Institution (WHOI) that have continuing administrative, historical, or scientific research value. Two examples are the Oral History Project and the Manuscript Collections.
The Oral History Project was formally established in 1998 with the goal to capture the recollections and personal insights of the entire spectrum of the WHOI community, including administrators, support staff, ship's crew, engineers and scientists. It is through these remarkable oral histories that we learn about the early years of the working life of WHOI, as well as the stories behind current scientific research as well. In addition, the Oral History Project has documented the early history of two other Woods Hole research institutes - the U.S. Geological Survey's Atlantic Marine Geology Program, which was established in 1962 in collaboration with

WHOI, and the Marine Biological Laboratory, which is the oldest lab of its kind in the country. Oral history conversations center on early marine research, scientific projects, technology and field work, and how each individual came to be a member of the Woods Hole Scientific Community. The DLA is the repository for the audio and videotape recordings and printed transcriptions from more than 160 interviews, many of which are available for loan. More information may be found at the Oral History Project webpage. The Data Library and Archives collects both Administrative and Manuscript Collections. The Administrative Collections, which may be restricted to use within the institutional community, consist of materials from the various departments at the Woods Hole Oceanographic Institution. The Manuscript Collections contain materials donated by WHOI scientists that relate to their professional, civic, business, religious, political, and social activities. The DLA currently has over 75 manuscript collections. A complete list of the Manuscript Collections, and a finding aid for those collections which have been processed, can be found at: http://dlaweb.whoi.edu/DIG_RES/finding_aids.html. (Rosemary Davis, WHOI/MBL Archives, Woods Hole, MA, USA; rdavis@whoi.edu)

DOCUMENTING THE HISTORY OF THE UK's NATIONAL INSTITUTE OF OCEANOGRAPHY, 1943 -1973. A project is underway to document an important phase in the development of oceanography in the UK. Its focus is the establishment and development of the National Institute of Oceanography (NIO) until its amalgamation with other UK laboratories in 1973. The National Institute of Oceanography actually came into being in 1949 (though it did not move into its own premises until 1953) but the protracted negotiations that led to its foundation began in 1943 as part of wider moves to plan for the resumption of fundamental scientific research after the war. At about the same time the setting up of Group W at the Admiralty Research Laboratory to work on wave forecasting brought together a team of scientists and engineers under the leadership of George Deacon that would form part of the new institute. NIO also inherited scientists from the pre-war Discovery Investigations into Southern Ocean whaling and their research vessels, *Discovery II* and *William Scoresby*.

The impetus for the creation of NIO came from within the Admiralty as well as the scientific establishment because of concern about the way in which the study of physical oceanography had been neglected in Britain. NIO was founded at a time when many interesting new opportunities were emerging in marine science and soon made notable contributions, in wave measurement and Atlantic circulation studies among others. It participated in joint and international research programmes and in the 1960s the new RRS *Discovery* took part in the International Indian Ocean Expedition. Over the quarter century in which the institution existed in this form, NIO scientists, eight of whom either were or were subsequently elected Fellows of the Royal Society, carried out groundbreaking work that formed the foundation on which much present-day research is based.

The project has accumulated extensive personal descriptions of the research and life of the Institute from scientists who worked at the NIO and these will be compiled into a book that should give an insight into both the groundbreaking science but also the personalities who carried out the research. The present story ends in 1973 when NIO, having come under the aegis of the Natural Environment Research Council, became the Institute of Oceanographic Sciences, with other centres at Liverpool and Taunton. IOS itself moved from Wormley, Surrey, the laboratory's inland home since 1953, to form part of the Southampton Oceanography Centre (now National Oceanography Centre, Southampton) in 1995.

The project was initiated by John Gould and, after initial e-mail discussions, some survivors from those early days met in October 2006 (see photograph), to agree an outline plan and assign individual responsibilities. Work on individual contributions has been going on since and a further meeting to review progress is scheduled for mid-September 2007. It is hoped to publish the results in book form, with a website containing ancillary information. As yet no publisher has been selected for the book. An existing brief history of the lab at Wormley can be found in Rice, A.L 1994. Forty years of land-locked oceanography: the Institute of Oceanographic Sciences at Wormley, 1953-1995. *Endeavour*, 18(4): 137-146.
(Margaret Deacon, Cornwall, UK; dandm@seward.eclipse.co.uk)

Attendees at the initial planning meeting on 24 October 2006

Below, left to right.

Michael Longuet Higgins, FRS (member of Group W), Fred Culkin (former head of Chemistry), Margaret Seward (oceanographic historian and daughter of Sir George Deacon), James Crease (former Head of Marine Physics), Tom Tucker (member of Group W, Head of Electronics and ICOT Director), Sir Anthony Laughton (former NIO Director), Ed Hill (NOCS Director), David Cartwright FRS (POL Director), Pauline Simpson (NOL Librarian), John Gould (NOCS Visiting Fellow), Brian McCartney (POL Director).

NEWSLETTER FOR THE HISTORY OF SCIENCE IN SOUTHEASTERN EUROPE. The latest issue of this important and comprehensive newsletter, dated February 2007 and edited by Professor Efthymios Nicolaidis, is available online on the website of the National Hellenic Research Foundation, based in Athens (its Editorial Secretary is our colleague Dr George Vlahakis), at http://www.eie.gr/hasi/newsletter.html. The contents of the latest issue include information on the Museum of the Observatory of Athens, a lengthy list of reports on history of science and technology meetings (many of them devoted to Greek and Ottoman science and

technology) and many other topics and events from Greece, Turkey, Romania, Bulgaria and nearby Southeastern European countries very poorly covered in the prevalent U.S.-based history of science and technology periodicals and newsletters. Further information on these topics and on the fine collection of scientific instruments in the Hellenic Archives of Scientific Instruments is available on the basic website (above) or from George Vlahakis at gvlahakis@eie.gr.

ROMANIAN ACTIVITIES IN HISTORY OF MARINE SCIENCE. A meeting on Biodiversity and Anthropic Impact in the Black Sea and in the Littoral Ecosystems of the Black Sea, held in Agigea, October 21-22, 2006, included a session devoted to the 30th anniversary of the establishment of the Marine Biological Station "Prof. Dr. Ioan Borcea (MBS) in Agigea (Constantza). At the beginning, Prof. Gheorghe Mustata from the University "Alexandru Ioan Cuza" of Iassy Faculty of Biology, director of the MBS, outlined the outstanding personality of the founder Ioan Borcea, the developmental stages of the Station, inaugurated a memorial plaque to its foundation, and unveiled a bust of Prof. Constantin Motas. In the presence of a number of officials, Prof. Mustata opened the conference, and followed by other introductory remarks by officials, a portrait was dedicated to Lecturer Maria S. Celan (1898-1989), a remarkable pioneer of Romanian marine algology, who spent over fifty years at Agigea. In addition a number of new monographs devoted to research by Ioan Borcea, and on Romanian marine ecosystems were presented. The conference, attended by about 80 people, then continued on with scientific sessions.
(Dr Alexandru Bologa, Agigea, Romania; abologa@alpha.rmri.ro).

MAKING SCIENCE GLOBAL. IMPLICATIONS OF THE INTERNATIONAL POLAR AND GEOPHYSICAL YEARS. A conference, fully titled *Making Science Global: Reconsidering the Social and Intellectual Implications of the International Polar and Geophysical Years*, will be held October 31-November 1, 2007 in the S. Dillon Ripley Center of the Smithsonian Institution, Washington, DC, USA. Supported by the US National Science Foundation, it examines the impetus for and impact upon science, society, and the culture of the International Polar Years (IPYs) of 1882-83 and 1932-33, and the International Geophysical Year of 1957-58. It will also examine how historical perspectives might be useful for those involved in the current IPY of 2007-08. The conference will overlap with the annual meeting of the History of Science Society starting in Washington on November 1. For details, see http://nasm.si.edu/getinvolved/makingscienceglobal/. (James R. Fleming, Colby College, ME, USA; jfleming@colby.edu)

INTERNATIONAL CONFERENCE ON OCEAN LAW AND POLICY. The Law of the Sea Institute of Boalt Hall School of Law, University of California at Berkeley, is co-sponsoring with Inha University of Korea, an international conference on ocean law and policy, to be held in Seoul October 17-18, 2007. A major theme will be a retrospect of the Geneva Conventions on the Law of the Sea after 50 years. A number of panels will be devoted to the history of dispute resolution in various global regions since 1958. (Harry Scheiber, Boalt School of Law, University of California at Berkeley, Berkeley CA, USA; hscheiber@law.berkeley.edu).

BOOK REVIEWS & NOTICES

Arias García, Alberto M. 2006. *El Instituto de Ciencias Marinas de Andalucía. 50 años de investigación en Biología Marina, Acuicultura y Oceanografía en Cádiz.* Madrid: CSIC. 218 pp.

Readers will surely be fascinated by this history of an anniversary 1955-2005. In 1955 the Spanish Council for Scientific Research founded in Cádiz a research laboratory to study the fisheries from Cape St. Vicente to Cape Cantín. The author had outstanding access to the principals of its story and wrote at the right moment, while memories are vivid but many of the major figures are no longer alive. The absence of fashionable theories intruding their way into Arias's account is also refreshing. Rather than pointing toward this marine institute's members birth order, personality type, or social class values driving their behaviour, the author simply tells the institution's story from its correspondence and publications. While some historians of science might regard this as old-fashioned method, their tastes may not be shared by the majority of readers. Arias's book is a pleasure to read and provides a well-researched and detailed account of an intelligent, imaginative and intriguing Andalusian marine biologists group of naturalists. It is highly recommended reading for any one interested in knowing more about the science performed along the Spanish South-Atlantic littoral in the past 50 years.

This is a book that is organized in two parts. The analysis in the chapters of the first part is as follows: the early days of the institute between 1955 and 1959: those years of growth and consolidation, the period 1960-1978; the background that the 1978-Constitutional year gave to science turned on a new interval from 1978 to 1989; and the nowadays more rapid scientific advance between 1990 and 2005. This is a book which seeks to persuade who prefer to learn more on the science taking place around the marine science institute of Andalusia to read its second part. Through easily readable reasoning and captivating examples, the book devotes 60% of its content to the sources of ideas, to what the main figures said to each other, and to how the biology emerged from their study.

All academics interested in the Guadalquivir river estuary, the Cádiz Gulf and the South Iberian Atlantic Region close to the Strait of Gibraltar between the Canary Islands and Cape St. Vicente will benefit from this historical study.

(Enrique Wulff, CSIC, Marine Science Institute of Andalusia, Campus Universitario Rio San Pedro, 11510 Puerto Real, Spain; enrique.wulff@icman.csic.es)

Svansson, Artur. 2006. *Otto Pettersson. Oceanografen, Kmisten, Upfinnaren* [*Otto Pettersson. The Oeanographer, the Cemist, the Iventor*] Göteborg, Sweden: Tre Böcker Forlag. 376 pages, illustrated. In Swedish with an abstract in English. ISBN 91 7029 604-9.

The scientific interests and executive skills of the Swedish natural scientist Otto Pettersson (1848–1941) embraced a wide range of fields. In addition to contributions to chemical and physical aspects of the ocean, his research included works in chemistry, especially physical chemistry. Pettersson was also a skilled inventor of scientific instruments for measuring the physical properties of the sea. In spite of its title, *Otto Pettersson. The Oceanographer, the Chemist, the Inventor*, this life history largely concentrates on the oceanographer. It focuses on Pettersson's scientific and organisational achievements in what became a multidisciplinary field of marine science. Other aspects of his professional life are presented as a backdrop for Petterson's interest in marine science or are left in twilight. Thus the reader will learn relatively little about Petterson's training and career in analytical chemistry at the University of Uppsala

(1866–1884), and not much about Pettersson's shift to Stockholm's högskola where he in 1884 got the first chair in chemistry, a professorship he held until 1909. And he/she will hardly gain any knowledge about Pettersson in his role as chairman of the first Nobel Committee in Chemistry (1900–1912).

An overall historical background to the book and Petterson's work was a rapid growth in population of Europe from 1850 and onwards, primarily due to decreasing infant mortality. One consequence of this augmentation was an increased need for food supplies and thus a higher rate of exploitation of fish resources. The governing political elites in the coastal states of Northern Europe saw a need to manage sea fisheries and increase systematic knowledge about ocean conditions. In the same era a growing academic interest in elucidating a more comprehensive picture of the ocean environment drew natural scientists from several disciplines such as chemistry, physics, zoology, and botany to investigate the sea. Systematic investigations and a multidisciplinary marine science developed significantly between 1880 and 1940, and emphasised the intersections between applied fisheries investigations and general oceanographic research.

Otto Pettersson became aware of a possible connection between the sudden appearance of schools of herring (*Clupea harengus*) and the temperature and salinity in the sea when his friend and fellow in chemistry, Gustaf Ekman (1852–1930), pointed that the so-called "herring periods" (1) along the coast of Bohuslän probably were connected to the inflow of a subsurface water layer of 32–34 % salinity and temperatures of 2–3^{o} C, the (later) named [Northern] Bank Water. The herring disappeared when the water withdrew. Petterson's investigations of the occurrence of herring on the western coast of Sweden made him convinced of the importance of investigating the relationship between the chemistry and the physics of the ocean and the biology of fishes, including the significance of biological oceanography. This field Petterson, in the Swedish tradition, named hydrography (2).

One pivotal focus in the investigations of the fishes was the number and distribution of fish populations inhabiting particular regions, and Pettersson was a crucial factor in linking this focus with questions to of how physical and biological conditions influence the fishing resources. His views and national investigations inspired him to formulate and realize what turned out to be a most fruitful scientific program for the field of marine science in Europe and North America. Petterson was a scientific entrepreneur with great organizational capacity, who in co-operation with especially fellow Scandinavian, but also Northern European, natural scientists founded and ran the International Council for the Exploration of the Sea (ICES) for nearly four decades. ICES became crucial in the establishment and growth of the field of marine science in particular prior to 1940. Today Pettersson is mostly remembered for his institutional initiatives; the instruments he constructed have been replaced by others, and most of his ideas have faded away, but some of the theories are integrated in today's body of knowledge in oceanography.

Svansson's *Otto Pettersson. Oceanografen, Kemisten, Uppfinnaren* is not a biography in a conventional understanding of the literary genre, in that it does not narrate one continuous life story. Instead, the chapters are arranged in two distinct sections. In the first parts (Chapters 4 to 8) Svansson reconstructs Pettersson's life year by year, and in the second and by far the most

[1] People had since medieaval times experienced a periodic appearance of schools of herrings, then 20 to 50 years of a rich herring fishery, and thereafter almost total disappearance of the herring.

[2] Hydrography was a term frequently used in the context of ICES especially until the 1970s. Today the name in general use is oceanography; hydrography is often synonymous what now is labelled fisheries oceanography.

interesting part, he writes on different themes of Pettersson's professional life, the section embracing organizational initiatives in Sweden (Chapters 10 and 11), the establishment of ICES (Chapters 5 to 9b), and the scientific investigations and experiments (Chapters 12 to 16). In one chapter (Ch. 17) friends and/or colleagues are presented in alphabetical order, whereas his private life is almost left in the semi-dark, with the exception of the son Hans, who had an academic career as oceanographer.

Through detailed descriptions of Pettersson's contributions to the intellectual and institutional building of a discipline, Svansson provides the reader with a valuable insight in the daily work of an entrepreneur. He reveals the significance of personal relations, Scandinavian co-operation and Petterson's many efforts to be in charge and control activities. The author draws of a wealth of sources, mainly private and semiprivate letters, and also Pettersson's published works. This book is a result of what must have been many years of energetic and meticulous searching in public archives and libraries in Sweden and Scandinavia. When reading the text the audience comes very close to the historical sources upon which Svansson has based his reconstruction of Pettersson's career as an oceanographer.

Oceanography as a scientific field grew out surveys, theories and development of methods and measurements. Svansson gives several examples of Petterson's participation in the scientific debates and his instrument construction to enable precise measurements of the sea's physical properties. One topic examined in the book concerns the mechanism of the general ocean circulation, more precisely what the significance was of salinity, temperature and winds for the dynamics of ocean circulation. According to Svansson, around 1900 Pettersson held salinity to be of equal importance with temperature, whereas he denied that wind driven currents had any overall significance as a driving force for the circulation of the seas. But around 1905 the physical oceanographer and Swedish compatriot Vagn Walfrid Ekman (1874–1954), a remote relative of the above-mentioned Gustaf Ekman, refuted Pettersson's view by formulating theories that explained the wide ranging importance of wind and wind-driven currents for the dynamics of the ocean. Ekman's understanding of the role of the wind constituted a theoretical basis of ocean circulation in the twentieth- and twenty-first century, but Pettersson's view was passed over.

A dispute related to the one above concerned the formation of deep- and bottom-water in the Arctic, and linked to this the role of ice melting as a cause of ocean circulation. Svansson explains that Pettersson held that melting ice, in general, played a dominant role in ocean circulation, whereas his counterpart, the Norwegian oceanographer Fridtjof Nansen (1861–1930), argued that ice melting had only a local and thus secondary significance in causing the formation of deep water. In the Arctic Nansen viewed atmospheric cooling as the main agent for the formation of heavy bottom water. For subsequent investigations Nansen's view has formed a theoretical starting point.

To get to know the circulation of the oceans, oceanographers had to know not only the directions and velocity of currents, but also the precise salinity and exact temperature of the water masses and in the early 1890s Pettersson built an insulated ocean water-sampler – "the Pettersson water bottle". This instrument was the result of a long-lasting process to construct reliable and easily usable samplers to collect sea water at different depths and under harsh conditions. Svansson explains that among the substantial improvements Pettersson made was the use of new principles for insulation, to protect against changes of temperature in the surrounding water, hitherto a significant problem in all water sampling. The Pettersson bottle was used by Nansen on his *Fram* expedition (1893–1896), and after his return from Arctic, Nansen, a talented inventor, suggested further improvements to Pettersson, the most important being to mount a thermometer

in the water bottle. Together they made the "Pettersson-Nansen insulated water bottle". But when Nansen in co-operation with Ekman (1905) presented the "automatic insulated water bottle", and somewhat later the Danish physicists Martin Knudsen in ICES did a further upgrading, the "Pettersson water bottle" gradually disappeared. Pettersson also constructed a variety of current meters to enable more accurate measurements of the directions and velocity of currents, but in this he was surpassed by V.W. Ekman who developed the "Ekman current meter", which was, with small improvements, in use until recently.

Svansson, who is an oceanographer by training, explains and contextualizes Pettersson's work and disputes within the frames of the internal history of oceanography. He introduces non-oceanographers to Pettersson's professional life and shares with readers his immense knowledge of physical oceanography. Svansson gives detailed accounts of the disputes in which Pettersson took part, and the audience will occasionally also be introduced to later research and debates concerning the same issues. The book is carefully edited, and it contains many tools useful for historians: a name index, a guide to archival sources, a complete bibliography of Otto Pettersson's works and also a few photos. Unfortunately photos and/or precise drawings of instruments described in the text are missing. For illustrations the reader will have to consult those in the classical *No Sea too Deep. The History of Oceanographic Instruments* (3).

Alas, the strict splitting up into a chronological section and a thematic one makes it difficult for the reader to see the various aspects of Pettersson's life and career in relation to one another. But criticism aside, *Otto Pettersson. The Oceanographer, the Chemist, the Iventor* will be of useful to both oceanographers and professional historians with an interest in the history of disciplines. Historians of science interested in the importance of scientific entrepreneurs and founding of disciplines should take note of this book, and the same goes for those doing research on the intersection between the fields of natural sciences and public management. Beyond the specific history of one natural scientist in a certain period and place, the correspondence provides valuable insight to a scientific field which partly developed outside the universities. Through his book Artur Svansson has contributed to a broader understanding of how a multidisplinary discipline actually materialised in Scandinavia and Northern Europe around 1900.

(Vera Schwach, Norwegian Institute for Studies in Research and Higher Education, Center for Innovation Research (NIFU STEP), Oslo Norway; **vera.schwach@nifustep.no**.)

Morcos, S., M. Zhu, R. Charlier, M. Gerges, G. Kullenberg, W. Lenz, M. Lu, G. Wright and E. Zou (editors). 2004. *Ocean Sciences: Bridging the Millennia. A Spectrum of Historical Accounts*. Paris and Beijing: UNESCO Publishing and China Ocean Press, 508pp. ISBN 9231039369 and 7502761195.

This book is based on papers selected and edited from those presented at the Sixth International Congress on the History of Oceanography (ICHO VI), held at Qingdao, People's Republic of China, from August 15–20, 1998. The manuscript was produced as a result of a three-year joint project between the First Institute of Oceanography (FIO, Qingdao) of China's State Oceanographic Administration (SOA), and the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO).

[3] Anita Mc Connell: No Sea too Deep. The History of Oceanographic Instruments, (Adam Hilger Ltd) Bristol 1982: 122–130, 144–146.

By publishing the volume, IOC and FIO seek to inform scientists and the general public about the development of our knowledge of the sea and its resources. The ICHO VI Editorial Panel, a wide-ranging group of senior scientists led by Selim Morcos, struggled hard to organize a manuscript in which the rather disparate contributions from the conference were given shape and continuity, and in particular, the English-language technical editor and coordinator, Gary Wright of UNESCO Publishing, did a fine job in achieving an acceptable English style to many of the contributions and in adding explanatory and connecting material. The result is a book which is worth dipping into, which in places is fascinating, illuminating many interesting byways of oceanographic science, but which inevitably reflects the rather specialized set of interests of those who attended the meeting in Qingdao.

The book begins with six biographical chapters on famous oceanographers, covering Joseph Louis Gay-Lussac, Otto Petterson, Victor Hensen and Claude ZoBell. To one who remembers school physics classes on the gas laws, it is surprising to see Gay-Lussac in the company of pioneer oceanographers, but he was in fact the first person to accurately measure the salinity of seawater (which he called "saltness") and to speculate on its uniformity of properties. The article by William Wallace describes him as "the first chemical oceanographer."

Next come six chapters of more orthodox historical oceanography on various expeditions and explorations. Rosalind Rolfe Gunther Marsden—a descendant of Rolfe Gunther—describes the economic and political background to the Discovery Committee work in the Southern Ocean during the 1925–1939 exploration of Southern Ocean water structure and biology where until now the political story has remained untold. In another surprising and interesting contribution, Selim Morcos describes the almost-forgotten Anglo-Egyptian work of the *Mabahiss* Expedition to the Indian Ocean in 1933–1934. The work was not in fact repeated until the International Indian Ocean Expedition of the 1960s. Interestingly, much of the data were never published, and some were spirited away by the scientists involved, only to be reunited decades later (after death in fact) and finally analyzed to reconstruct the 1930s state of the ocean. Yha Yhang describes the explorations of Zhen He in the 1420s, leader of the great Chinese sea voyages to the seas of south Asia and east Africa, and there are several articles on the history of Russian marine exploration in the Arctic and Pacific.

A section on regional and bilateral co-operation reveals the surprising amount of personal jealousy, malice, and politics that surrounded the birth of the International Council for the Exploration of the Sea (ICES), even in those supposedly serene pioneer days of a century ago. Selim Morcos, Jens Smed, and Artur Svansson tell the amusing story of how the mistaken search for the origin of eel larvae in the Mediterranean led to a big boost for the oceanography of that sea. Also amusing are the two quite different accounts by two scientists of the development of marine biological institutions around the Black Sea, one from a Romanian viewpoint (Alexandru S. Bologa) and the other from the viewpoint of the nation in which these institutes are now found, the Ukraine (Yuri N. Tokarev). The section ends with two papers on how German marine research before the First World War affected developments in South Africa and in China via the observatory built at Tsingtau.

"Man and the Sea" has three of the most interesting papers. Charlier *et al.* deal thoroughly with the development of varied concepts for sea defenses, showing that fashion as much as experience has dictated changes in design—this paper has since been republished in a marine engineering journal. Yuan-ou Xin describes how traditional Chinese navigation (good old Zhen He again) was helped by advanced Chinese technology such as the compass, of course, but also the ability of Zhen He's ships to make progress against the wind by the use of leeboards and the

junk rig, which allows sailing closer to the wind than European square sails while being easier to manage than Arab lateen sails. Charlier et al. (again) deal with the history of the tide mill. I was amazed to discover how prevalent these mills were in the tidal waters of Britain and Atlantic France during the Middle Ages and beyond. Some have been restored to working order, including one on the Isle of Wight, while others are now museums, but the authors make a plea to bring them back. Why not? Even though they are no longer needed for grinding corn, they could still be an emission-free method of generating small-scale electricity for local purposes.

The final sections are less interesting in that they deal with national themes of the conference participants. Clearly China is strongly represented here, and we learn from many authors of the development of marine research and marine industries in the Peoples' Republic. So rapid is China's economic development and so quickly do new laboratories spring up that probably these accounts are already out of date.

To say that the quality of this book is variable would be an understatement. However, there are many pleasurable and erudite accounts of interesting facets of marine science history. Historical oceanography is a subject that is clearly well founded, is sometimes very useful (as when it brings to light unpublished data from past expeditions), and is certain to grow as oceanography changes into a mature (though hopefully not moribund) science.

(Peter Wadhams, Polar Ocean Physics Group, Department of Applied Mathematics and Theoretical Physics (DAMTP), University of Cambridge, United Kingdom).

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Pettijean, P., V. Zharov, G. Glaser, J. Richardson, B. de Padirac, and G. Archibald (Editors). 2006. *Sixty Years of Science at UNESCO 1945-2005.* Paris, UNESCO, 695pp.

UNESCO, the United Nations Educational, Scientific and Cultural Organization, almost became UNECO, without the science, had it not been for the efforts of Joseph Needham, who later became Head of the (then) Natural Sciences Section. Of course science would have been included as an aspect of general culture, but it is hard to guess what the effect of the new organization, established in 1945-1946, would have been without the explicit mention of science and attention directed to it specifically in the years after World War Two.

UNESCO's involvement in large scale science has been impressive. Consider its role in the startup of the International Union of the History of Science and the International Union for the Protection of Nature, the organization of CERN, sponsorship of arid zone and hydrology research and the IGY, the Intergovermental Oceanographic Commission (IOC), the Man and the Biosphere Programme, World Ocean Circulation Experiment (WOCE) and the Tropical Ocean Global Atmosphere (TOGA) programmes, its Human Genome Programme, and World Climate Conferences, to select almost at random from the host of activities undertaken or promoted by this influential international agency.

To celebrate the six decades of this activity, *Sixty Years of Science at UNESCO* provides a broad survey of scientific activities in five sections dealing with early organization ("Setting the scene, 1945-1965"), basic sciences and engineering, the environmental sciences, science and society, and a series of overviews and analyses. Most contributions are short, précis-like summaries, but a few, especially those by professional historians, are analytical as well as descriptive, and indicate the problems that arose in contributing to the organization of global science in a world full of political complexity. Most authors – probably the editors can be given most of the credit for this – avoid the temptation to gild the UNESCO lily and do mention the

difficulties that it has faced over the years, ranging from financial stringency to the hostility of some nations (notably the USA) to its efforts.

The marine sciences have played a relatively small role in UNESCO in comparison to the total range of its activities. Nonetheless, they have been affected, almost always positively, by at least two organizations, the International Oceanographic Commission, which still exists, and the Marine Sciences Division (MSD), which ceased to exist in 1991 after twenty years. Four contributions outline the origin and activities of the IOC and MSD: Ray Griffiths on the creation of the IOC; Jacob Hamblin on UNESCO, the Cold War, and the IGY (for more on this, see Hamblin's book, 2005. *Oceanographers and the Cold War. Disciples of the Marine Sciences.* University of Washington Press); Geoffrey Holland on the history and activities of the IOC; and Dale Krause, Selim Morcos, Marc Steyaert and Gary Wright on the history and influence of the Marine Sciences Division. The last is particularly useful in giving examples of the way a focused programme (in this case centering on management of coastal seas and education) was organized and executed, along with the reasons it did not survive.

There is a lot to be learned about international science in general by reading *Sixty Years of Science at UNESCO*. There is also a lot that can be learned about the big science aspects of the marine sciences, particularly oceanography and ocean management, by browsing and reading here. The book can serve as more than an institutional survey after six decades – it is a useful and well produced guidebook to further research and a roadmap of the courses taken by a particularly influential international organization.

THE AGULHAS CURRENT. The publication of a book on all aspects of a single current has become an unusual occurrence. Such a book was published recently by Springer-Verlag (see the announcement of it in *History of Oceanography* 18). Called *The Agulhas Current*, it is the result of a number of years' work by Johann Lutjeharms of the University of Cape Town's Department of Oceanography. Whereas the main aim of the book is to integrate all the existing information on the current and its ecosystem that is dispersed throughout the oceanographic and meteorological literature, it also includes some information on the history of research on the current. Dispersed throughout the text are inserts on a number of specific historical and scientific subjects. These include some that have been published previously in *History of Oceanography*, for example on the origin of the name Agulhas; the life and influence of John D. Gilchrist, the first South African marine scientist; the grossly unscientific method with which the famous Matthew Fontaine Maury dealt with aspects of the Agulhas Current in his best-selling *Physical Geography of the Sea*; the way in which all the pre-war German research on the southwest Indian Ocean was forgotten or ignored when the International Indian Ocean Expedition (IIOE) was planned and executed in the 1960s; the lasting influence of the IIOE; the life and work of Major James Rennell, the first geographer to describe the Agulhas Current in some detail; the lamentably short history of the CSIR's National Research Institute for Oceanology; and much more.

Abstract of Gerd Wegner. 2005. *In der rauhesten nördlichen Gegenden. Naturkundliche Betrachtungen zur Föderung des Hamburger Seehandels und das Walfangs in 18.Jahrhundert.* (See the Bibliography section for a full reference to this monograph).
In 1746, the book *Nachrichten von Island, Groenland und der Strasse Davis* (An account of Iceland, Greenland, and the Davis Strait) was published in Hamburg. Its author, Johann

Anderson, the son of a whaling ship owner in Hamburg, became a lawyer and member of the Hamburg Senate. For about 20 years he acted as burgomaster of his home town.

All his life the scholar Johann Anderson collected information about Iceland, Greenland and the adjacent fishing and whaling areas. As pietistic Christian he was convinced that the Lord's blessing to mankind was to be recognized especially in those areas. With his exceptional knowledge he prepared the *Nachrichten* mainly during the 1730s. The manuscript was a scientific selection from the contemporary knowledge of the northern areas. Never having travelled that far north himself, Anderson based his compilation on a critical analysis of the available literature, first hand reports of sailors and merchants, as well as objects from the northern areas in curiosity collections of his time. As Anderson reveals his sources in citations, the literature he actually used can be related to the quite large literature potentially available in his time.

The variable commercial and political situation of Hamburg during Anderson's time and tremendous financial claims from the town by surrounding countries show Anderson acting as a "patriot". Driven by the contemporary ideas of Enlightenment, he aimed his manuscript for "the use of science and commerce", as it was subtitled. Thus, he specifically tried to stabilize the decreased trade of salted herring and the reduced whaling enterprise of his town by increasing scientific knowledge and perhaps by initiating a new trade with the North Atlantic islands.

When Anderson died in 1743, his manuscript was ready for print. Although it appeared posthumously in 1746, the book was published just in time from the scientific point of view. The contemporary questions concerning the local and seasonal appearance, the fishing and the processing, of herring were answered by the single stock herring theory developed by Anderson. Furthermore, he classified the toothed and baleen whales in accordance with the shapes of their backs, the first parts visible to the whalers. His classification was comparable to that presently used. Anderson's information on the oil volumes of the different whale species was directed straight at whalers and merchants.

While the commercial influence of the *Nachrichten* was not documented, the scientific utilisation of parts of Anderson's herring theory as well as his descriptions of the sperm whale and narwhal lasted into the 20th century. However, the first systematic description of the Fulmar, *Fulmarus glacialis*, he gave in this book was not recognized by ornithologists. The North Atlantic chart in the book was one of the first printed presentations of an undivided Southern Greenland. The reason for omitting the traditional ice covered straits through it is given in the text. This chart as well as further figures and parts of the text were used in Greenland descriptions after his time.

In 1746, the editor and the printer in Hamburg created an attractive and well advertised book from the manuscript left by Anderson. At least three German editions (1746, 1747) and very soon Danish (1748), Dutch (1750, 1756), and French (1750) translations, made the *Nachrichten* a widely distributed book. The single stock herring theory was criticized immediately, although the final refutation was not published until the second half of the 19th century by Friedrich Heincke. Mistakes in the description of the Icelandic people very soon led to a Danish counter-description (1753). Despite the mistakes concerning the Icelandic people's behaviour in the *Nachrichten*, the Danish refutation, the "true account of Iceland" in the last analysis showed the *Nachrichten* to be wrong in very few points.During the centuries, the *Nachrichten* led to some "Andersonsche fairy-tales"[4]. These rumours originated in errors, for example, the nonexistent "Dodd-Anderson

[4] In German a play upon words created by Dreyer-Eimcke (wie Anm. 1444) in analogy to the fairy-tales of the Danish writer Hans Christian Andersen (1805-1875).

herring theory", or in a mixture of facts and fantasy, for example, Carl von Linné's story of being run off by an angry burgomaster Anderson in Hamburg.

The structure and contents of the *Nachrichten* chapters on commercial marine stocks are comparable to those in textbooks on fisheries biology of today. Thus, Johann Anderson has to be addressed as one of the forefathers of actually fisheries sciences in Hamburg.

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