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‘Science is not national, but scientists are’: International 20th century astronomy and Danish astronomers

(1.1) Introduction

Louis Pasteur’s avowed quote from 1884 somewhat encapsulates this paper, which is based on certain parts of a completed PhD study on the history of twentieth century astronomy in Denmark and in the USA. The dissertation is a collective biography on the development of modern astrophysics in Europe and America in the 20th Century. It explores the father – son relationship between two astronomers that shaped much of astronomical culture in Denmark and it contrasts Danish astronomy to American astronomy.¹

The primary aim of this paper is a discussion of two professors of astronomy and their roles as politically active scientists or ‘internationalists’, viz. father Elis Strömngren and later his son Bengt Strömngren. A secondary aim is to demonstrate a change in the character of internationalism, or internationalistic approach to science and its policy, choosing two temporal different focal points, namely the aftermath of the Great War and the beginning of the Second World War. The idea is to present two cases exemplifying the tendency described by Geert Somsen in another ESHS-paper in this session.²

The first case on ‘international communication, 1914–1923’, is concerned with the Danish professor of astronomy, Elis Strömngren, scientific communication, and political factors in the wake of the Great War. Elis was nominated for the Nobel Peace Prize in the early 1920’s for his active work for international relations and international science communication, and this constitutes the basis of the first part of this paper. Some central questions are: How did Elis Strömngren act as a scientist? How was he actively, politically involved, if so? How and why was he nominated the Nobel Peace Prize? Which arguments were in play by the nominators? What image of science was promoted?

The second case on ‘German cultural integration, 1941’ discusses both Strömngren’s *participation* and their *motivation for partaking* in a meeting initialized by Nazi German envoys in 1941, and which made up the geographical basis for the much-discussed Bohr-Heisenberg meeting in Copenhagen. Bengt Strömngren was actively involved in arranging this ‘famous’ 1941 scientific working week. Some central questions in this connection are: Why arranging such a 1941 meeting after all? How did the Strömngrens act? Was the 1941 meeting a scientific or a political event? What was the role played by the German ‘cultural institutes’? How was the Strömngrens’ participation motivated by internationalist reasons?

(1.2) Danish twentieth century astronomy

Across the nineteenth century, many astronomical societies were founded in Europe and America. In Germany, the Astronomische Gesellschaft was brought to fruition in 1863 with the dedication to the ‘advancement of science by supporting projects, which require systematic cooperation of many people’. Already before the Great War, more than 400 members from all over mainly the Western world joined the initiative of the international society. In Denmark, the Copenhagen Observatory was founded in 1859, and only in 1916, the Astronomical Society was instituted, later renamed the Nordic Astronomical Society, with Denmark as the editorial centre, led by the Danish professor of astronomy, Elis Strömngren.

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¹ Rebsdorf, S.O., *The Father, the Son, and the Stars: Bengt Strömngren and the History of Danish Twentieth Century Astronomy* (Aarhus: The Steno Institute, University of Aarhus, 2005).

² Somsen, G., “Committing to internationalism: Mediating activities of Dutch scientists between 1900 and 1950.”

A somewhat fair typification of Danish twentieth century astronomy is the period being a “Strömngren Century”. This is owing to the fact that two generations of the originally Swedish Strömngren-family ruled academic astronomy in the Danish capital for more than 70 years. The two generations of Strömngrens dominating the field were Elis Strömngren, and later Bengt, occupying the coveted directorship at Copenhagen. Both Strömngren’s held highly influential positions within international circles and their stubborn ideal of science as an international enterprise is the main thread through this paper. Let us now turn to father Strömngren.

(2.1) Case 1: International communication, 1914–1923

Elis Strömngren (1870–1947) was born in Sweden and was appointed professor of astronomy in 1908 at the University of Copenhagen in Denmark; a position which he held until 1940. Elis Strömngren was elected as a member of the Royal Astronomical Society in 1916, he was president of the *Astronomische Gesellschaft* in 1921–1930 and chairman of the Nordic Astronomical Society in the period 1916–1947. Strömngren had a very strong scientific network consisting of German astronomers and mathematicians and he was a member of the so-called Danish-German Cultural Society since the early 1920’s. This was founded in 1916 as an institution in which well-to-do citizens and the intelligentsia could fraternize with Germans. This society was later continued by the somewhat more controversial Danish-German Association, which was inaugurated in September 1940.

Scientifically, Strömngren immersed himself into two main research areas, *viz.* classical astronomy and astrometry and the so-called ‘three body problem’ of computing the mutual gravitational interaction of three masses in empty space. Strömngren worked diligently for international scientific communication by managing the so-called Central Bureau.

The Central Bureau of Astronomical Communication was founded by the *Astronomische Gesellschaft* in Kiel in 1884, twenty-one years after the international — German-based — society was founded. Its function was to safeguard most astronomical research institutions to receive the latest results of celestial body observations. Until 1914 it was located in Kiel and took the city’s name as ‘the Kiel Bureau’ for intercontinental exchange of astronomical discoveries. As in many other fields of science, international cooperation weakened during the Great War. Apart from Elis Strömngren’s common academic activities, he realized that it was impossible for the Kiel Bureau to maintain telegraphic and postal communication between astronomers from allied countries. As a *scientist*, annoyed with the fighting nations’ hampering international scientific enterprise, Elis Strömngren chose to suggest moving the bureau to neutral Denmark, as a provisional mid-station — with himself as bureau director. Thereby, he actively and whole-heartedly chose to work for international communication, despite “external political factors.”

After the Great war, In 1919, the International Research Council was created in Brussels. The purpose of this council was to coordinate international activities in a variety of scientific branches and to prompt the creation of international unions to secure scientific progress. As a direct consequence of the statutes of the International Research Council, the International Astronomical Union (IAU) was set up in the summer of 1919. A sub-department was also instituted, namely the International Central Bureau for Astronomical Telegrams. Owing to Elis Strömngren’s previous engagement during the Great War, it was agreed that the Copenhagen Observatory should constitute the connecting link between the old ‘Kiel Bureau’ and Brussels.

In Elis Strömngren’s opinion, Danish involvement in the fresh IAU cooperation was not self-evident. Initially he was against the principle of the neutral states’ entry into the inter-allied associations. He found it

undignified to mould scientific unions, in which scientists of whole nations a priori are excluded by reasons irrelevant to science and without any regard to the positions of the individual scientists.³

³ Blaauw, Adriaan, *History of the IAU: The Birth and First Half-Century of the International Astronomical Union* (Boston: Kluwer, 1994), p. 6.

Thus Strömngren was directly alluding to the war boycott of German membership of the fresh union. Notwithstanding, after further consideration, he eventually realized the opportunity of asserting himself in what he regarded as the decisive question of introducing German scientists in the union. There was no doubt in his mind: "The days of intransigent standpoints within astronomy are numbered."⁴

Yet, by participating in the IAU it would be possible for Denmark to actively work against the International Research Council's principle of cordoning, which was written into the statutes of the council in 1919. Even though Elis neither voted for nor against a Danish representation, Denmark became a member state the same year and the Danish Union Committee was put together to consist of Elis Strömngren and another Danish astronomer. During the first IAU general assembly in 1922, held in Rome, it was decided, among other things, that the head office of the Central Bureau should be located in Copenhagen, thereby proving important to national astronomy through a strengthened international visibility. The Central Bureau issued numerous circulars and telegrams and the many subscribers were soon distributed on five world continents, obviously giving rise to great bustle at the Copenhagen Observatory.

(2.2) International communication and the Nobel Peace Prize

Elis Strömngren's stubborn ideal of science as a strictly international enterprise became widely appreciated in international circles. As a result, he was nominated three times for the Nobel Peace Prize for his work for international communication and cooperation. But he never became a laureate. We will now investigate the issue of his nomination.

The Nobel Peace Prize nominators were the four Scandinavian professors of astronomy and editors of the *Nordic Astronomical Journal*. In addition, there were several heads of astronomical institutions in Germany and Austria-Hungary, and finally two Swedish parliament nominators (named Petré and Björck). An example of the rhetoric and arguments in play can be found in one of the nominations to the Nobel Committee written by the Swedish colleague and editor of the *Nordic Astronomical Journal*, Östen Bergstrand, director of the Uppsala Astronomical Observatory:⁵

It is easy to see the unprecedented hard blow that was directed towards astronomical research with the outbreak of the world war. Not only through its inhibitory effect [...] on scientific work [but also] its impact on the — for astronomers — so tremendously important international relations. If in the latter case astronomy could stand up against this blow, standing alone among the sciences, then it is essentially owing to professor Strömngren [...]

Strömngren has performed a monumental work of enormous importance in the name of peaceful culture. Normally it would obviously be to the benefit of astronomical science [only]; but the fact that it has been possible to go through such work in *one* cultural area increases the great importance even for science and culture *as a whole*, since it substantiates the possibility of continuing international relations in this area.

In the letter, we find phrases like "for astronomers — tremendously important international relations"; "essentially due to professor Strömngren"; "enormous importance in the name of peaceful culture"; "great importance even for science and culture *as a whole*"; that Strömngren "substantiates the possibility of continuing international relations."

In other nomination letters to the Nobel Committee, a similar rhetoric was in play. Here, it was accentuated that Strömngren had worked for "fraternity between nations" — thereby alluding to some 'scientific brotherhood' as well as a pacifist rhetoric such as "Strömngren promoting peace congresses." Other highlighted events by the hand of Strömngren were "activities of cultural-historical interest (international science as a 'cultural good'); "peace endeavors"; "taking over telegraphic news mediation for the whole world"; "arranging the outcome of the most important astronomical journals between warring

⁴ *Ibid.*

⁵ Letter to Norwegian Nobel Committee in Christiania, March 1920.

parties”; “publicizing articles during the war written by scientists from allied countries” (Italy, Russia, and English dependencies); and finally Strömngren’s work for keeping the “international astronomical relations preserved during the whole war [...] they will probably remain preserved in all future.” This last sentence reflecting the nominators’ view of science as ‘a cultural instrument’.

In conclusion, the celebrations of Elis Strömngren were legion, and the rhetoric also pointed outside the world of scientific subject matter by referring to 1) the “brotherhood of scientists” — thereby perhaps aiming for a reversal of nationalistic tendencies, 2) Pacifist rhetoric (in the name of peaceful culture), 3) Science as a cultural good, 4) The political or social function of science — a cultural instrument. Moreover, the nominations overtly displayed an almost naïve scientific enthusiasm — or at least a somewhat positivistic line of reasoning — by referring to the claim that “Astronomy has a even more international status than any other science.” This was a view also held explicitly by Elis Strömngren, namely that the Earth as a flattened sphere, rotating with regard to the night sky, therefore put astronomy in a special place concerning the necessity of international group effort throughout the rotating globe. An additional supporting argument went by stressing that the continuing discovery of new celestial objects had to be observed without delay, in order for the data not to be gone forever. Therefore, astronomy was given a special status by some astronomers as being particularly international.

But even with the nominators’ emphasis on scientifically external factors, and despite extensive documentation, diligent nominators, and a series of three nominations in the years 1920, 1922, and 1923, Elis Strömngren was never awarded the Nobel Peace Prize. His work was not sufficiently beneficial to human mankind but rather to the benefit of astronomers and their field. His work for maintaining communication of scientific progress despite war difficulties had possibly been regarded too scientifically internal. Notwithstanding, such arguments might have been satisfactory in earlier nominations, but the awarding of the Nobel peace prize in 1920 to the League of Nations had heralded a new era in the history of the Peace Prize, which coincides with the inter-war years, and is primarily characterized by the considerable number of prizes to statesmen.

Concluding the first — and major — case of this talk, let me pronounce some answers to the questions stated in the beginning. Elis Strömngren acted as a *scientist* by referring to the internal international nature of astronomy, as a *science-administrator* concerning the practical management of the Central Bureau, and as a *politically engaged scientist* in the issue of stressing the necessary continuation of international communication. By merely stressing that the International Research Council were employing reasons that were completely irrelevant to science, it can be argued that Elis Strömngren thereby made these reasons relevant to science! The result of his actions was the image of a particular political conviction as to the continued internationalisation of science. This issue of the Nobel Peace Prize nomination leaves an impression of the scientific community as a unity yearning to manifest itself as a necessary cultural catalyst or factor. The “scientific brotherhood” — or vessel for scientific enthusiasm — promoted an image of science’s greatness and manifested astronomy as a necessary science, which was inevitable for the cultural and political world.

(3.1) German ‘Cultural integration’, 1941

We will now examine the case of Bengt Strömngren (1908–1987), the successor of Elis Strömngren’s professorship from 1940. The following year — 1941 — make up the pivotal point of this second, smaller part of the paper. During the early stage of the German occupation of Denmark, both Bengt and Elis Strömngren were actively involved in arranging and participating in a famous scientific working week.

As opposed to his father, embodying classical astronomy, the key figure of my biographical PhD thesis, Bengt Strömngren, has been highlighted as even one of the most prominent astrophysicists of the twentieth century. Born in Sweden, but brought up and educated in Denmark, Bengt Strömngren spent more than sixteen years as director at Yerkes and McDonald observatories and in 1957 as professor of astrophysics at the Institute of Advanced Study in Princeton — with the proclaimed aim of “carrying out intellectual inquiry in the most favourable circumstances”. Strömngren took over the office formerly occupied by Einstein, who died in 1955.

His chief scientific contributions are often divided into three broad themes: 1) Problems of chemical composition of stellar structure and stellar interiors, 1930–1940, 2) the physics of interstellar gas, 1938–1953, and 3) photoelectric photometry of spectral features, 1948 onwards. Bengt Strömngrens

contributions to the internationalization of astronomy were also considerable, and owing to his avowed diplomatic character, he worked as a kind of scientific diplomat and negotiations broker during his later years (e.g. for the IAU). During the period 1940–1951, Bengt Strömngren held the astronomy professorship at the University of Copenhagen and directed the Copenhagen Observatory, and it was in this role, we will follow his activities in 1941.

(3.2) The German Cultural Institute

Founded in Europe during the first part of the Second World War, the German cultural institutes constituted a new coinage in the culture policy of the Third Reich. The purpose of these institutes was to oppose hostile propaganda in countries either occupied by — or obedient to — Germany, but primarily it was to demonstrate Germany as the dominating cultural power in Europe. After all, subsequent to the defeat of France, German dominion over most of continental Europe was indisputable. The term 'scientific institutes' was also used to designate these institutes, and the name was deliberately chosen in order to highlight their scientific focus.

The German Cultural Institute in Denmark was inaugurated on May 4, 1941, with the official objective of "improving the cultural, scientific and artistic connections between Denmark and Germany". This institute was the sixth in a series of similar institutions in other occupied European countries, and the leaders of these institutes were intended to be prominent German cultural figures. The daily work was distributed between a *scientific* department, an *academic* department and a *linguistic* department.

Already in February 1941, Elis Strömngren received a letter from the director of the Danish-German Society (of which he was a member) who, with a declared interest of the German envoy in Denmark, von Renthe Fink's, to have the German physicist Carl Fr. von Weizsäcker from the Kaiser Wilhelm Institute in Berlin give a popular talk in the rooms of the society in Copenhagen. The idea became a reality, and occasioned by the scientific success of this arrangement, Weizsäcker proposed yet another arrangement in September same year at the new German Cultural Institute.⁶ Weizsäcker thus invited Heisenberg to join him for an *astronomical working week*, and it was during this event that the Bohr-Heisenberg meeting took place during the late evenings in Copenhagen.

The focal theme of the conference was planned to be the composition of stellar atmospheres as this was also one of the main research topics of the new director of the Copenhagen Observatory, Bengt Strömngren. In this connection, Heisenberg should give a talk on his work on cosmic radiation. Weizsäcker invited Niels Bohr to join the event as he hoped that Bohr would "understand the situation" that from the German side they should be glad if Danish physicists would be present at the German institute. On the other hand, however, Bohr "should not feel forced to come". Weizsäcker asked Bohr to invite as many Danish scientists as possible to join the meeting, and he also warm-heartedly invited Bengt Strömngren to take part in the event; moreover, Elis Strömngren was invited. On the word of Weizsäcker, the success of the meeting would be determined by the amount of participation by the Danish astronomers, and therefore, Bengt Strömngren would do Weizsäcker a great favor if he did indeed decide to take part in the grand event.

The working week was launched and as it turned out, the only Danes attending the workshop were the two Strömngrens and two of the Copenhagen Observatory staff. Boycott was a possibility, and hence no physicists participated in the meeting as they had in fact boycotted the event from political reasons, nor did anyone else from Danish academia participate — except the university president. Elis Strömngren had a close relationship with German colleagues, and he had brought his son up inside this scientific network. Whereas Elis could perhaps be designated 'German-friendly' due to his involvement with people from the occupying power, Bengt was less active in this respect and went sturdily against everything that happened on the political stage. This did not entail, however, that Elis had any deliberation towards National Socialism, but rather that he had a large set of scientific connections in Germany that he preferred to continue nurturing. *The important thing for Elis was to keep his science international, disregarding any external political situation.* Clearly, it was difficult, if not impossible, for him to stick to this kind of separation.

Concluding the second case of this paper, let me pronounce some tentative answers to the questions stated in the beginning. The idea of the German Cultural Institute was cultural integration

⁶ 18–24 September 1941.

and relations. As Heisenberg wrote in his required evaluation report of the meeting, sent to the Reichserziehungs Ministerium, the relations to the scientific circles in Scandinavia were difficult. Weizsäcker was somewhat more optimistic in his reflections. But in effect, the Cultural Institute never became a success. The reason for the initiation of the meeting was clearly political. The *invited* Strömgrens only did the practical arrangements, and to Bengt Strömgren, the event was a strictly scientific one. To Elis, as member of the Danish-German Society, it was also of a social-scientific kind. However, from the physicists point of view, this was by no means the case. To them, it clearly became a strictly political event in which they would not participate.

So, was the meeting a scientific or a political event? The answer may lie in a combination of the two extremities, as a separation is not conceivably feasible. The two cases in this paper demonstrate a difference between the expressions of the notions of scientific internationalism in the wake of the Great War and in early Second World War. The changes were affected by shifting notions (of e.g. nationality) due to the great differences in the national and political conditions.