

THE OBSERVATORY CONFLICT

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INTRODUCTION

This thesis will discuss the various modes of communication between the institutions of science¹ and its public. In order to discuss the different functions of the above communication, a thorough investigation of the terms "the science and the public" is necessary. How are the borders between science and non-science defined and how do this boundary work affect the communication process among the two different spheres? These questions should be of obvious interest, when one considers the way science and technology shape our every-day lives in modern societies. Science, whether in pure or applied form, is something we constantly meet, in our homes filled with technical appliances, and at our working-place where our dependency on information technology is growing stronger.

As a startingpoint for my thesis, I have chosen to focus upon a conflict of some duration at the University of Oslo². The bone of contention is the use of an old university building, that for a hundred years or so functioned as an astronomical observatory. The main issue of the conflict is whether the building ought to be used as a museum exhibiting the history of natural science in Norway, or to house a research center on the works of the Norwegian playwright Henrik Ibsen. I concentrate this conflict, because in the wake of the discussions made by the involved parties, comments have been made that echoe some of the central tenets of discussion in academic fields concerning the relationship between science and its public, or more general, science and society. This debate will be of central concern in my thesis.

I write under the theoretical assumption that the institution of science is, like any other institution in society, a system open to and dependent on changing conditions prevailing elsewhere in society, due to economical, cultural and social factors. The life of the scientific institution is interwoven with the life of the society in which it exists. Thus, to catch up with the development and change in science and in society, a continuous reflection on the

relationship between the two is necessary. For the scientific institution, this act of reflection involves an outward look, that also makes the ground for a process of self-reflection. I will argue that this kind of self-reflection is a necessary step on the road to increased communication with the outer society. *Thus, the main concern of this thesis will be to analyse the Observatory conflict and debate in order to see in what manners the issues of this conflict relate to issues dealing with the relationship between the natural sciences and its public.*

This analysis will consist of two main units. First I try to define the role of the building in the conflict, what sort of symbolic meaning the building is bearer of and in what ways it is presented as having a unique character. The main concept of analysis in this part will be the notion of boundary object. In the next unit of analysis, I continue to use some of the theoretical presumptions of the previous unit, but I shall concentrate more in detail upon the visions of the natural scientists of creating the Observatory building into a museum. This vision will be analysed with the help of theoretical concepts central to theories of science communication. The contributions to the debate, mainly to be found in news-papers, will form a part of the analysis in both units.

The theoretical framework of this thesis will be presented in two steps. In part one and part two I will present my choice of methodology, which focuses heavily on the key concepts of *boundary work* and *boundary object*. In part three of this thesis I shall present contemporary views on the nature of the *communication of science*. This is a topic that is part of the discussion regarding the nature of the relationship between science and its public. Thus this presentation includes a short investigation into the concepts central to contemporary discussion in this area.

¹ I will use the terms "science" and "natural science", as well as "scientist" and "natural scientist" with identical signification in this thesis.

In addition, some theoretical issues having to do with the establishment and management of museums (of science) will be given some attention in the second chapter, which will present the plan for a museum in the Observatory building. As this museum as of yet has no other existence than on paper, the museum itself will not be of paramount concern in this thesis. The intention is to analyse the arguments in favour of a museum of natural science that are presented in the museum plan, as well as in the contributions to the debate of the Observatory.

The materials which forms the basis of the analysis are mostly Norwegian daily newspaper articles and articles from the university magazine Uniforum. I also refer to three conversations I had with three of the participants in the Observatory conflict, interviewing them in the summer of 1999. The three participants were all connected to the Faculty of Mathematics and Natural Sciences at the University of Oslo. I undertook the interviews in order to ask the participants to deepen their arguments as they appeared in various printed media. In this way I hope to understand the scientists self-understanding of their role in the conflict better. The questions I asked these participants are included in an appendix to this thesis.

The Observatory conflict is not yet solved, and few changes in the situation has occurred as I have been working on this thesis. My analysis will concern the events that happened in the period from 30th September 1997 until 1th October 1999.

² Abbreviated UiO.

PART ONE

Presentation of the Observatory conflict

The debate that will be the my point of departure in this thesis was provoked by a decision made by the Collegium at the University of Oslo in September 1997.³ The decision concerns the use of the university's old observatory building. The Observatory (as is its proper name) built in 1833, is the oldest of the buildings belonging to the University, and has been in use as a point of observation for about 100 years, closing down its original function in 1934.

The building is situated in the garden of the University Library, in an outer part of the center of Oslo. The building is close to 800 sqm. Another, smaller building, the former residence of Professor Hansteen, is meant to be used together with the main building.

The last two years have marked the start of a new epoche for the old building. In 1999 a new-built University Library opened at the campus of Blindern. The old University Library building will change its function and will in the future house the National Library (that will move to Oslo from its previous location in Mo i Rana in the north of Norway). This involves a lot of change for the various offices and institutes that have had a connection with the "old" University Library. The present user of the Observatory building, the Norsk Musikksamling⁴, is to move out and into the building of the National Library. The old University Library building will be reconstructed, and the date of the completion is set till after year 2000.

As mentioned above, in September 1997 the Collegium of UiO made a decision concerning future use of the Observatory. It was decided that the expanding literary research centre Senter for Ibsenstudier⁵ were to move into the Observatory building. This research centre, established in 1992, functions as an information and service centre for national and world-

³ In accordance with Kollegienotat (Collegium document) A-97/2379. The decision was made at the meeting of the Collegium September 30th 1997, under the rubric: "Evaluation of the Ibsen Research Centre".

⁴ "Norwegian Musical Archives"

wide research on the works of Henrik Ibsen (1828 – 1906), maybe the most famous Norwegian abroad. The intention is to publish a new, complete annotated edition of the works of Ibsen, in the year 2010. To administer, and indeed do, this work, the research centre is in need of more office space, to house the researchers who are working on the project. The collection of Ibsens handwritten manuscripts are to be placed in the “new” National Library, and it is necessary for the research centre to be located as close as possible to this collection. The manuscripts are not allowed to be moved more than 100 metres from their storing rooms in the National Library. Up until the present time the research center has been located in the “old” University Library, but the space that is at their disposal in this building is already too small, and it will not do to wait until the reconstruction of the building is finished. Moreover, there are no guarantees at the present that there will be sufficient space available in the National Library building.

In the decision of the Collegium from September 1997 it was emphasised that the history of the building, being a research centre for the natural sciences, was to be taken into consideration in the work of rebuilding the Observatory, in order for it to house a modern research centre. As a result of this decision, which intends to favour both the needs of a research centre in the humanities as well as the historical reminiscences of astronomical research, the Faculty of Mathematics and Natural Sciences were asked to make a report that could give advise on how to reconstruct the building in a way that would meet the needs for a presentation of the history of the building connected to the natural sciences. An “ad-hoc” committee was formed to write a report that was given the headline “The Observatory – A showroom for natural science in Norway”.⁶ The report that was made on the project strongly recommended a complete use of the Observatory building in order to turn it into a museum. I will come back to this report in a moment.

⁵ “The Ibsen Research Centre”. The centre recently changed its name to Ibsen-senteret; “The Ibsen-centre”. I will continue to use the former name throughout this thesis.

Those who strongly opposed the decision made by the Collegium in 1997 formed a group called Observatoriets` venner⁷. This group was formed to advocate a use of the building for the purposes of exhibiting the history of the natural sciences in Norway. They argued their case through negative comments in the daily newspapers, as well as the university newspaper Uniforum. The decision seemed impossible to reverse, however, when UiO received an offer of 6 mill. NKR to support the reconstruction of the building, a gift given from the private funding institution Jahre-fondet. The gift was accepted on the condition of letting Senter for Ibsenstudier be the main users of the building. This gift was proposed in April 1998, and the contract was decided and signed on the 1th of December 1998.⁸

In the mean time, the report on the Observatory that the Faculty of Mathematics and Natural Sciences were responsible for, had been finished. But the report's main objective, the need for the whole of the Observatory building in order to exhibit science history, did not receive much attention. The group responsible for this report, as well as various supporters of their case, became provoked by what they perceived as an ignorant attitude from the UiO administration concerning their complaints. They again protested the decision made by the Collegium, and the university newspaper Uniforum, as well as other Norwegian daily newspapers continued to witness debates and commentaries from the involved parties. I intend to take a closer look on the complaints expressed by these comments at a later stage of the thesis.

⁶ "Observatoriet - Et utstillingsvindu for naturvitenskap i Norge", Oslo 1998.

⁷ "Friends of the Observatory"

⁸ According to Kollegienotat (Collegium document) A-97/2758.

The issues involved in the conflict.

Who has the right to use the building, who “owns” it? It is of course owned by the University of Oslo, and the complaints on the decisions made on behalf of the University attack the way the University treats its own history. In a quotation from a newspaper-cutting taken from *Aftenposten* on May 3, 1999 two natural scientists, a mathematician and an astrophysician express the view in this way: “It would be to great damage if the University of Oslo maintained a decision that involves that the university sees the history of mathematics and natural science as less important than the history of literature.” [my translation]

A central part of the conflict concerns whether it is necessary to be *true to history* or not, concerning the re-use of old buildings. What the scientists argue is that the building is the best fitted building to house a museum of the natural sciences, because the building in itself is a museum. This argument is countered with the view that it is not necessary to preserve the past for all sakes, and that more urgent, present needs have to be favoured instead of long-gone history. “It must be possible to make use of a building for other than the original purpose”, was a comment made in *Uniforum*, upon this view.⁹ Although the natural scientists seem to hold that their needs are being neglected on the part of the University administration, they also seem to realize that they have to present good arguments in order to convince the university administration of their right to use the building. As one of the informants told me in conversation: “Each of the parties have great interest in using the building.” History is not a good enough reason in itself to claim the right to anything, it is the present that decides the most pressing needs.

⁹ Sverre Ingstad, first solicitor managing clerk at the University Library, *Uniforum* 19, 1998. [My translation]

The *decision-making procedure* in itself has also been criticized. The feeling of being overlooked is perhaps born out of the combination of a procedure where the scientists claim that their participation was lacking, and seemed almost prevented, and that the object of concern is of such special value to this group, that the lost opportunity to give voice was a crucial loss. These reactions can be read from the newspaper contributions. (eksempel). In the conversations I had with some of the contributors to the debate, several of the main complaints were repeated. The ignorant way in which the scientists case was treated was often emphasized. When I asked whether there had been taken any initiatives on the future use of the building before the decision was made in the Collegium, the answers were that it seemed natural to wait until the then present users of the building, Norsk Musikksamling, had moved out.¹⁰ The decision made at the Collegium meeting in the autumn of 1997 was wholly surprising. In addition, that it was made as an item on the agenda only in connection with the evaluation report on the Senter for Ibsenstudier was heavily criticised.

This treatment, or, proceeding of the case was commented upon at an early stage. In Uniform nr. 17, 1998, the group calling themselves "Observatoriets` venner" made a plea to the Collegium that they would handle the case of the future of the Observatory once again, but as an independent business. Here they claimed that: "This is not a satisfying mode of treatment". [My translation]

The sudden decision to move Senter for Ibsenstudier made it difficult to enlist sponsors to the establishment of a museum in the Observatory, according to one of the scientists that I spoke with. In a situation of this kind it is not possible to make business agreements concerning the future. Financial backing would help, and might even be necessary to those seeking to promote their case to the University administration. The building`s future is, of course, financially dependent. In this difficult situation the group of people fighting for a museum,

¹⁰ As mentioned earlier, "Norsk Musikksamling" were planned moved into the "new" National Library, after the reconstruction work on the library building had been finished – sometime after the year 2000.

became quite provoked by the Collegium's decision to accept the offer of funds from the Jahre-foundation. As mentioned above, the offer to fund the rebuilding of the Observatory held the proviso that the Observatory building was to house Senter for Ibsenstudier, except for the rooms of extraordinary character such as e.g. the cupola that will be used to exhibit the history of the building to visitors.

The compromise; to divide the space so that both parties could have a share; was suggested but not welcomed by the group of natural scientists. The museum-report also strongly recommends the solution of taking the whole of the Observatory in use, to have enough space available to be able to create an interesting exhibition. When I, during my conversations with the scientists, asked about the compromise solution one of them expressed it so that what was left to natural science was to "do the work of setting up an exhibition for the university". In other words, the person felt that they were asked to do work for free, for a result that only the University administration would gain from. Furthermore, this poor treatment left a feeling of disillusion, that would not "incite to make much further efforts on science communication". This last remark connects the Observatory debate to the more *general complaints* that shine through the newspaper-cuttings, and that were commented upon in conversation; the lack of effort-making and clear policy on science communication on behalf of the university administration.

The problem is not lack of interest among the public. At the Institute of Theoretical Astrophysics, I was told during conversation, the interest is quite demanding, with about five telephone calls a day. The problem is the co-ordination of the work, as well as time to carry it out; if responsibility is left to the the individual researcher, the result will often vary according to the time and working hours the researcher will devote to this task.

When reflecting on the way the Observatory conflict was presented in the media, one informant told me that it was not easy to present the case in the long run, because the subject mat-

ter ran out of interest. Another informant remarked that the contributions to the debate were more or less limited to occasional commentaries, and gave as a reason that the participants were unwilling to start a kind of jealous quarrel. Both parties in the conflict can, in the view of this informant, claim that their vocational traditions are neglected – and both would have great use of the building. In respecting these conditions it is not easy to discuss the matter in question without seeming unfair to one or the other party.

To conclude this summary of central issues, I suggest three central features to be the key issues of the conflict. These are; the concern for the values of tradition and history, the dissatisfaction with decision-making procedures at the university, and problems connected to the need of science to communicate with its public.

On the notion of boundaries and of a boundary object.

The central item of the conflict is the Observatory building itself. Why is this building of such a special value for such different groups as researchers of natural science and reserachers in literary theory and history? How do they perceive and describe this object of mutual interest? The preliminary account above is intended to present some main issues that I will continue to discuss in this thesis. To sort them out in order to to make an analysis I will make use of a theoretical framework with connection to the research field of the Public Understanding of Science¹¹. This research field involves and often combines different academic perspectives that are all related to the questions concerning the communication process between science and society. In this case I shall concentrate on the natural sciences, and I will make use only of a limited part of the theoretical framework that has been used in PUS-studies.

¹¹ Abbreviated PUS. I will use the concepts "boundaries" and "boundar work" in accordance with Gieryn (1995).

As a preparation for the next part, I shall make a brief presentation of the notion of boundaries. This method has been employed on cases concerning the problem of defining the borders of science at interface with society. This definition-process can be found in varying situations, and is by theoreticians labeled as *boundary work*. In order to understand the construction of the image of science and the scientific institution, it is worthwhile to have a look at the boundaries of science.

The way boundaries are drawn is prone to reflect the current image of science in a society. The term boundary work suggests activity, the process of making, and can be illustrated by the way scientists advocate their specific manner of research and their claims to truth, or the images that present the world of science in the mass media (serious hard-working men with thick glasses and white frocks). Boundaries can be drawn with the help of institutions, language, intellectual and cultural capacities, theoretical claims and refutations, experiments, scientific measurements apparatus etc. There exists various symbolic options.

As a unit for analysis, concerning the borders drawn around the practice of science, some theoreticians use what they call a "boundary object"¹² as an object of referral. This unit is helpful as a kind of meeting-point where interacting agents can act out their needs and motives, leaving their symbolic mark and creating a mingling of meanings. An analysis of these different components of meanings can throw light upon the process of boundary-making itself, in the work of tracing the various signs and symbols left there by the various agents, the components of meanings that in fact created the object.

A boundary object conveys certain sets of sometimes varying meanings, differing according to the specific aims of the users. However, the boundary object is the passing, or, meeting point of these meanings, functioning as a goal or medium where to realize them. This means

¹² Leigh Star & Griesemer (1989)

that various actors are involved in trying to determine, identify, model and define the identity of the object.

Is it be possible to see the Observatory building, or the idea of a museum of science therein, as a boundary object?

In assuming that an object of this kind can convey meanings to be realized according to different goals, I will try to analyse the Observatory conflict as a fight over a coinciding boundary object. The tool of the fight is the power to define the identity of the building. In classifying and interpreting its proper use and value, one is also able to justify one's right to occupy the building. In the next chapter, which will be part one of the thesis, I will investigate the ways in which the Observatory building exist as a boundary object.

PART TWO

The creation of a boundary object.

To discuss the claim that the Observatory building can be seen as a boundary object, I will concentrate on the aspects of of the building that are of historical significance.

What is a boundary object? What are the characteristics of such an object? To define the notion of a boundary object, I make use of a study by Leigh Star and Griesemer¹³ in which they use the notion of boundary object to analyse the process of building a museum of natural history. They start out by commenting that:

"Most scientific work is conducted by extremely diverse groups of actors - researchers from different disciplines, amateurs and professionals, humans and animals, functionaries and visionaries. Simply put, scientific work is heterogeneous. At the same time, science requires cooperation - to create common understandings, to ensure reliability across time, space and local contingencies. This creates a central "tension" in science between divergent viewpoints and the need for generalizable findings."¹⁴

In the case Leigh Star and Griesemer are presenting, various agents such as scientists, private sponsors, amateur collectors and university administrators worked together in building a research-museum of natural history, based on collections most often of regional origin, the Berkeley's Museum of Vertebrate Zoology. The authors are concerned with the process of *reconciling meanings*, in other words, combining the different perspectives and visions of the participants. In this process of reconciliation the work of *translation* is central. Translation of

¹³ Leigh Star & Griesemer (1989).

¹⁴Ibid.; p. 387.

meaning is necessary for cooperation, and is made possible through a strategy such as *method standardization*.

The authors present the different visions of the participants in the museum construction process. They describe how these visions are combined together through method standardization, and left recognizable for all participants as components in certain boundary objects central to the museum. The visions can consist of e.g. scientific ideas and theories, or interest in ecology and the preservation of nature, the search for prestige and reputation within institutions such as a universities and research centers, and the thereby existing competitions between such institutions in a national or regional context. The methods of standardization are the means by which the different contributions of the participants are put in order. The contributions, regarded as information by the authors, are then "...generating a series of boundary objects which would maximize both the autonomy and communication between worlds."

The contents of the museum are built and maintained through what the authors Leigh Star and Griesemer classify as boundary objects. In the story of the museum of natural history the "... boundary objects are produced when sponsors, theorists and amateurs collaborate to produce representations of nature".

The definition they give of a boundary object is this: "This is an analytic concept of those scientific objects which both inhabit several intersecting social worlds (...) and satisfy the informational requirements of each of them."¹⁵

The authors classify the types of boundary objects into four classes. These are:

Repositories, such as a library or museums,

Ideal types, such as diagram, or a collection of fossiles

¹⁵ Ibid.; p. 393.

Coincident boundaries, that are the common referent of different perspectives, such as the geographical area where scientists and amateurs alike collect species for the museum collection, and *standardized forms*, such as forms with standardized indexes to fill in when collecting species.

Of these four classes of boundary-objects, identified and named in the text analysing the construction of the Berkeley's Museum of Vertebrate Zoology, I have chosen to isolate two classes and interpret the meaning of them in the context of the Observatory conflict. The two chosen are the *repositories* and the *coincident boundaries*.

I choose to interpret them as follows:

As a *repository* it is natural to think about *the Observatory building* itself, its content and planned functions. As a *coincident boundary* I find *the history of the building* to be a fitting candidate, as it is the history of the building which in the first place makes it special, and it is this history, in all its complexity, that will form the basis for the particular use requested by the group of scientists.

The content of these types of boundary objects differs, in the text by Leigh Star and Griesemer, and in my thesis. While Leigh Star and Griesemer are concerned with the contents of a museum already existing, actively involved in the production of scientific knowledge, my discussion of the Observatory conflict is about a museum yet to be realized, concerned with displaying the history of scientific research in a national context. Thus, the context of analysis is marked by a difference between the tracing of elements in a given order (the contents of an existing museum), and the tracing of order in some given elements (the structure of the arguments in favour of a museum-to-be). I hope that the intention of using these notions and transforming them for use in a context different from the original, will be

the same as the one stated in the paper by Leigh Star and Griesemer: "The objects thus come to form a common boundary between worlds by inhabiting them both simultaneously"¹⁶.

I think that the aspect of placing a boundary object on the border of different social worlds in order to analyse its construction is worthwhile to apply even to boundary objects that are meant to be fully realized in the future. The process of combining different views and producing a unit of meaning is possibly more open to view when still in the making, than other such processes that have to be traced back into the past. The weakness of such a non-existent object of analysis, is of course a certain vagueness in regard with its nature, as its nature is not yet clearly fixed.

The complexity of the subject in question can be analysed in the following way: The Observatory building renews its importance/aktualitet, but in a different context than what is its historical roots. Reaction from the ones who are familiar with these roots are a natural protest. The building is of strong symbolic value to their self-understanding, and the presumption is made that the building in general has this strong symbolic value. They think that it is obvious what kind of value and importance the building has. Then it shows that their concern is not universal, the existence of the building as a symbol for the natural sciences in Norway is not to be taken for granted. This symbolic value has to be demonstrated.

In their presentation the group of scientists draw upon images of science, historical facts and socio-economic arguments to promote their case. In this way they create a boundary-object out of the Observatory building, by marking out the important meeting-places at the border between science and society. In this way it can be possible to label the argumentation strategies of the scientists as boundary work.

The group of Ibsen-researchers also appeal to history, but to a smaller degree than the scientists, and by making other connections between events than they do. I will argue that the boundary work of this group is not reconcilable with that of the opposite group. But even

¹⁶ Ibid.; p. 412.

though the boundary work of the Ibsen-group strongly differs from the the boundary work of the natural scientists, I choose to include the arguments of the former in the analysis, as they provide an example of how diverging perspectives can relate to an object which is identical in material means (the Observatory building).

To continue with an analysis of the Observatory as a boundary object, I will present in more detail the history of the building. Following this part will be a closer look at the arguments presented in the report and the arguments in the contributions to the news-paper debate. These are contributions made from both parties of the conflict.

The history of the Observatory.

In this presentation I rely mainly upon an account of the events that was given in the official report concerning the future use of the building as a museum for the history of the natural sciences in Norway. As mentioned earlier, this report was made on behalf of the Faculty of Mathematics and Natural Sciences at the UiO, on a request from the university administration.¹⁷ I pay much attention to the presentation of the history of the building, because this naturally is the cause of the involvement in the debate, and it also forms a bottom line in the arguments in the conflict. Apart from the worries over the present-day interest in natural science, it can possibly explain some of the strong feelings connected to an awareness of the past.

The University of Oslo was the first university to be established in Norway, in the city of Christiania, the name of the capital Oslo at that time. In 1811 when the decision to found a university was made, the country was part of the kingdom Denmark-Norway, with Norway playing only a minor role in the governing of the kingdom. In 1814, as a result of the war in

Europe involving the Nordic countries, Denmark lost its rule over Norway to the Swedish throne. Norway, however, took advantage of this unstable political situation and proclaimed independence. The new nation was founded on the 17th of May 1814, with a constituent assembly writing the constitution of Norway. The independence lasted only a few months, and Norway was subordinated Swedish suzerainty in the autumn of 1814, but were allowed a strong inner self-government.

In this situation, the young nation directed its efforts towards building the university, in order to educate Norwegian senior civil servants, independent of Swedish or other nations educational institutions, as well as foreign national interests.¹⁸ It was also in the interest of Norway to educate engineers and natural scientists that could participate in strengthening the nations' industry and economical perspectives. The fight for sovereignty lasted through the whole of the century. In 1905 Norway became an independent kingdom.

The Observatory building was erected in 1833, and inaugurated in 1834, as an astronomical observatory. It was the first building to be built as part of the newly founded Det Kongelige Frederiks Universitet.¹⁹

The Observatory building played an important role during the first decades of the emerging Norwegian scientific institutional life at the university. It functioned both as an observatory for the astronomical and meteorological sciences, as well as for scientific research in geophysics. The first user of the Observatory building was Christopher Hansteen, a Norwegian astronomer and geophysician who was also appointed professor of applied mathematics at Det Kongelige Frederiks Universitet. He was born in 1784, and lived with his family (prominent

¹⁷ "Observatoriet – Et utstillingsvindu for naturvitenskap i Norge", Oslo 1998. I will later return to this report, to further explain its content.

¹⁸ This version of the historical events is drawn from a recently published book on the history of the UiO, written by John Peter Collett (1999).

¹⁹ "The Royal King Frederiks University"; after the name of the Danish King Frederik the 6th. The university changed its name to the University of Oslo in 1939.

members of the cultural life in Christiania) in the dwellinghouse connected to the Observatory, from around 1833 until his death in 1873.

Professor Hansteen was not only a scholar actively involved in the scientific work made in the Observatory. He also held occupations such as director of Norges Geografiske Oppmåling²⁰, and was co-editor of the first Norwegian research journal. He also supported young talents within the world of natural sciences, and some of these talents were to play an important role in the later development of natural science in Norway. Thus the working environment of the Observatory provided a centre for scientific activity that gave fruitful results; the era of Hansteen is called the "Golden Age" of scientific research in Norway.

The building played an important role in the work done in mapping Norway geographically. The zero-meridian that was used in this work (this was before the international use of the Greenwich meridian) traverses the building, with its centre directly under the scientific measuring instruments in the observatory cupola.

Other practical results of research done at the Observatory were more visible to the general public. Astronomical observations were also important for the regulation of time. During the years 1838 – 1922 a "time-ball" was let down from a stick visible far away on the top of the roof of the building. This "time-ball" signaled that it was midday, twelve o'clock, and this event happened every Wednesday and Saturday.

After the death of Christopher Hansteen, the Observatory continued its existence as an astronomical observatory until 1934. At that time, the expanding University of Oslo needed more space, and the new campus at Blindern in the north-west of Oslo was built. The new building housing the Institute of Astrophysics was inaugurated in 1934, and all activity was moved from the Observatory to the new Blindern building. Another institute found its place in the Observatory building; Norsk Polarinstitut²¹, which continued to use the building until 1964.

²⁰ "The Geographic Surveying of Norway"

²¹ "The Norwegian Polar Institute"

Next, the University Library moved Norsk Musikksamling²² into the Observatory, and they have remained there up until the time of the Observatory conflict.

The Observatory building as a boundary object.

At this stage in my thesis I shall pay attention to the contributions to the debate that relate directly to the visions and ideas of the future of the Observatory that have their root in its special history. The opposing parties in the conflict focus on key features of the building's history in their effort to define the building as an object of concern to their specific purpose. In this process of definition, I will argue, the building appears as a boundary object, reflecting the different groups' interpretation of its history and its particular importance. The question is whether this is there exists more than *one* boundary object.

Both groups value the building highly, but for different reasons. To the Ibsen group, it is a practical necessity to have offices close to the National Library (because of the rules of the Ibsen-manuscripts). To the scientists the building is a museum in itself, and an obvious symbol of the natural sciences. But to anyone visiting the building, or working in it, the Observatory appears as a place of great beauty and of an impressive historical atmosphere; one journalist in the newspaper "Aftenposten" describes the building this way in a conversation with the chief manager of Senter for Ibsenstudier:

"The room is two floors high, the tower cupola overarches elegantly the beautifully decorated hall of entrance. From the gallery we are lead through corridors, up creaking stairs, have a

²² "Norwegian Music Archives"

short glimpse into the attick, before we find ourselves standing in the tower-room. It is large and icecold, and offers a grand view of the city and the fjord".²³

The building surely is in itself an attractive place of where to work. Also, the surroundings provide a unique working environment, as this quote from one employee working at the former tenant Norsk Musikksamling explains:

“It [the Observatory] is unbelievable beautifully located, here in the backyard of the University Library. During the whole of summer we can work with the windows open without hearing any noise from the traffic. How many places elsewhere in the center of Oslo is this possible?”²⁴

But how does one go about making this building one's own, or at least to justify one's right to "occupy" a historical space? The Ibsen group points to the general cultural history of Christiania. The manager of the Senter for Ibsen-studier speaks of "...her associations to "Vildanden" and "Byggmester Solness", and she has no doubt that Ibsen belongs in the beautiful building of architect Chr. H. Grosch, built in 1833."²⁵ The manager emphasizes the relationship Ibsen had to the family of Christopher Hansteen, and thereby, indirectly, to the Observatory building. The home of Hansteen was known as a generous one, open to the cultural and academic elite of the relative small city of Christiania. The daughter of Hansteen, a womens' liberation pioneer, is said to be a model for the figure "Lona Hessel" in Ibsen's play "Samfunnets støtter".²⁶ In a debate contribution to the University magazine Uniform another member of Hansteens family who had a connection to the theater; Christopher

²³ Anne Lise Stafne in Aftenposten; 6th Mars 1998. [My translation]

²⁴ Department head Øvind Norheim at "Norsk musikksamling", interview in Uniform nr. 14, 1997. [My translation]

²⁵ Anne Lise Stafne interviewing Astrid Sæther in Aftenposten; 6th March 1998. [My translation]

Hansteens' older sister Conradine Dunker, is mentioned.²⁷ She was one of the pioneers of institutionalised professional theater in Christiania/Oslo.

The members of the Ibsen group point to other, more symbolic features of the building. It is mentioned that the building was built close to the birth-year of Henrik Ibsen²⁸, and that Ibsen, being an observer of society, properly belongs in a house with a tower (cupola) that originally functioned as an observatory²⁹.

The arguments presented by the Ibsen group have touched the idea of an Observatory boundary object both as a *repository*, as well as a *coincident boundary*. The Observatory building is regarded as a repository, ready to be filled with activities of a defined function and specific meaning. The presentation of the activities is made with relation to the building's history. This is a process of allying oneself with the history of the building that make the building function as a coincident boundary. The history of the Observatory is mainly related to the natural sciences, but the arguments above incorporate other perspectives on the history by interpreting significant events and hallmarks in the context of cultural and literary history. The perspective of the "argumenters" is that of literature and the history of the works of Henrik Ibsen, and by focusing on certain events and symbols they are creating a link between the building and the purpose of the research centre (Senter for Ibsen-studier). They are thereby able to feel at home in the building. It is not satisfactory to argue that an empty building is emptied of its history as well, as one participant indicated in an interview in the newspaper *Dag og Tid*³⁰. The arguments above indicate that it is necessary to define the scope of meaning associated with the building, as its symbolic value on beforehand is strong. In the

²⁶ Ibid.

²⁷ Sverre Ingstad in *Uniforum* nr. 19 1998

²⁸ Martin Toft interviewing Astrid Sæther in *Uniforum* nr. 14 1997.

²⁹ Anne Lise Stafne interviewing Astrid Sæther in *Aftenposten*; 3th March 1998, and Per Anders Todal interviewing Astrid Sæther in *Dag og Tid*; 26th March 1998.

³⁰ Per Anders Todal interviewing Astrid Sæther; 26th March 1998.

case of the Ibsen-group this is necessary exactly because their prospected use of the Observatory building is not directly connected to the building's original purpose.

On the scientists hand the history speaks for their case as it stands. To justify the use of the building as a museum, the group of scientists need to connect history to the present as well as the future. Thus, they have to cross the boundary between science and society.

One of the first contributions to the debate in the newspapers was made by a professor at the University of Trondheim³¹. His text expresses strong discontent with the decision made by the collegium of the University of Oslo in the autumn of 1997. The following quotation illustrates this discontent as well as placing the importance of the building in a context of the present: "A disregard of the milestones of past times can lead to a lack of control of the choices of direction in the future."³² The way of linking the Observatory with present-day scientific research is usually to put the museum plans in a context of the lack of recruitment of students to study the natural sciences³³. One contributor wishes to "(...) inspire young talents to an effort in the field of natural science, something that our country needs more than ever before."³⁴

But if the Observatory and its history is to play such a central life as a symbol and inspirator for the present and the future, the nature of its symbolic status and value has to be interpreted and clearlyfied further. The museum report from the Faculty of Mathematics and Natural Sciences describes the history of the building, both with an eye on the fields of research connected with the building as well as its prominent position in the general educated life of Christiania. The scientists who had their work in the Observatory dealt with issues of central value to their society. To ascertain this rightly gives the building an important role as a symbol of former cultural and scientific expression, but it does not automatically justify the

³¹ Tore Lindbekk in Aftenposten; 31th March 1998.

³² Ibid. [My translation]

³³ A situation discussed in e.g. Ole-Johan Eikeland & Olaf Tvede, NIFU Rapport 20/98.

³⁴ Kaare Aksnes in Aftenposten; 19th April 1999. [My translation]

importance of the building for present-day use in connection to natural science. This importance has to be presented, and has been presented as the construction of a museum. In the museum report the involved participants come from various disciplines, and not all disciplines have a specific connection with the history of research at the Observatory. The participants were selected on behalf of the Faculty of Mathematics and Natural Sciences. The disciplines involved were physics, astronomy, chemistry, biology, mathematics and the institution Statens Kartverk³⁵. This breadth of participation suggests that the projected museum would display a broad presentation of the history of natural science in Norway. But as the museum is placed in the Observatory building, the history of the building and its connection with the history of the university and the city of Christiania is a natural framework. If one can see the Observatory as a boundary object, then its boundaries crosses those of different disciplines within natural science, technology in the past and the present, as well as the University of Oslo, and cultural history. In this way, one links the world of natural science with other worlds, such as culture, economics and politics in past times and in the present. This way the field of natural science regains a position in society, that estimates its importance as a vital and necessary activity in both traditional and modern society. By the use of the Observatory as a "Showroom" for natural science and its history in Norway, it is made possible for the scientists to establish a symbolic room or arena, from which to define, explore and communicate science across the borders that divide it from other academic and non-scientific institution in society, as well as the public.

How to interpret these arguments in a theoretical framework of the boundary work theory?

Let's first look at the concepts used to describe the process of creating a boundary object.

These were the process of *reconciling meanings* with the help of *translation* that was made possible through *method standardization*.

In the case of the Observatory conflict the possibilities of reconciling meanings between the two conflicting parties are few. The two groups fighting for the building are differing strongly in their purposes to use the house. As mentioned earlier, the suggestion to share the space in the building has not been welcomed by the scientists. The Ibsen group has not protested this suggestion, but the plan presented for the sharing of rooms reserves only a few rooms to display natural science (including the tower room), while most of the building will be used for the offices of the Ibsen research centre. The main users of the building will then be the Ibsen research center.

As the different perspectives and visions of the participants are hard to combine, I suggest that the building exists as two boundary objects, with the coinciding boundaries of history playing very different roles in accordance with the two non-reconcilable purposes for the use of the building. The process of reconciling meanings cannot start, as the two different purposes for the use of the building are dependent on a different method of standardization; that of the humanities and of natural science. A translation of the different languages the participants use is not of crucial importance or interest. The participants speak their cause to make the difference between their need for and purposes of using the building clearer, not to start a possible process of reconciliation.

Is it possible then, at all to regard the Observatory building as a boundary object in this conflict? The building is the main "agent" in a conflict involving two competing parties. They compete for the right to use the building, or, for the right to call it one's own. In this competition one of the main weapons has been the ability to use history justify one's right to use the building. This is because the building occupies an important place in the history of the University, and any user of the building has to relate to this history. The way to justify the use of the building is to a certain degree dependent upon the ability to make this history one's own. As has been displayed through the various statements from the competing parties in the

³⁵"Stately Institute of Cartography"

debate, the history of the building is not necessarily clearcut or one-dimensional. It involves different aspects and allows different perspectives. And the Observatory building is the reference of these crossing images and approaches.

One lesson can be drawn at this stage in the thesis. The Ibsen-group has a difficult time incorporating the history of the building in their project, at least compared to the contents of arguments of the natural scientists. The Ibsen-group is better off ignoring history, and instead concentrate upon the present. This means that they have to point to the legal decision procedure of the Collegium at the UiO. The natural scientists, as discussed above, on their hand are forced to connect the past to the present to counter these kinds of argument.

Thus, the two opposing groups in the conflict argue their case, each basing their arguments upon two different premises. These premises clearly reflect their situation, and the purposes of their involvement.

The Ibsen group found their arguments on the fact that a decision concerning the use of the Observatory building has already been made. Accordingly, they are now the legal users of the building. They ask the protesting party to respect this decision and the administration procedures of the University³⁶. One of the contributors gives the above as the reason why the Ibsen-group have refrained from a full involvement in the debate³⁷.

The scientist-group on the other hand, attacks the decision which has already been made as unfair. The decision is not only viewed as unfair because they see it as neglecting the history of the natural sciences, but also for procedural reasons. The University Administration, it is argued, has failed to involve all potentially interested parties in the process of deciding the future use of the building. They attack the decision procedure in itself, one participant describing it with words such as "inacceptable", "non-democratic" and "one-sided"³⁸. But the

³⁶ Sverre Ingstad in Uniform nr. 19 1998.

³⁷ Jon Gunnar Jørgensen in Uniform nr. 5 1999.

³⁸ Kaare Aksnes in a public letter to the vice-chancellor at Uio; Kaare R. Norum, in Uniform nr. 4 1999. [My translation]

basis of their arguments is often founded on emotional arguments such as cultural meanings and historical traditions and values. In this way, the scientists build up and display a strong emotional bond to the building, while the Ibsen-group emphasizes their legal connection. The Ibsen group is rationalising their right to use the building, while the scientists are emotionalising their rights.

The Ibsen group is better off if the focus is on the decision only, as an involvement into the other aspects of the discussion would lead, not only to hardened feelings as the quote above feared, but to a problem of defining boundaries, as was discussed above. To this group, the aspect of decision-making is the only necessary aspect. The scientists' group is attacking this aspect by arguing that it is one-sided, that it does not pay attention to the values inherently in the building, or to the disciplines connected with it and its history.

The University administration acknowledges both these aspects, but the issue of finance is a dominating factor³⁹. The financial side of the issue is brought up in the arguments from the Ibsen-group as well. They describe their difficult situation in provisoric offices, and as a group they feel neglected by the university administration⁴⁰. However, their most central argument is that it is impossible to reverse the situation (the decision), as it will only lead to economical and organisational problems. In this light, the arguments referring to values seem irrelevant, and of no real importance.

Thus, in this climate of discussion, the scientists need to refine their arguments with concern to the value of traditions, of history and of science. In this way they try to explain, clarify and justify their need for an institution such as a museum of the history of natural science. In the remaining part of this thesis I will concentrate on the scientist's version of the importance of the Observatory building. I will concentrate on different aspects of the prospected use of the building as a museum of the history of natural science in Norway. This means that I

³⁹ The Vice-chancellor at UiO, Kaare R. Norum is positive towards the idea of a Museum of Natural Science on the condition that financial backing is possible (at this moment unknown). Uniforum nr. 4 1999.

continue to view the Observatory as a boundary object, but the focus will be narrowed to the focus on the history of research in natural science solely. But even this narrow focus will reveal itself to be a complex one.

The Observatory as a Museum

What is a museum, and more specifically; a museum of natural science? What are its functions, who are the users, and who are engaged and occupied by establishing its existence and for what purposes?

According to Jim Bennett, exhibitions of natural science are to be seen as meta-representations of science, and therefore should always be marked by a reflective and critical stance. The material to be presented and the public to be addressed are not easy to define in short and simple terms, according to Bennett:

"Where historians formerly sought to trace histories of ideas and to fashion communities of interest on mutualities of theory, they now embrace a much broader scientific culture.

Education, popularisation, instrument development and manufacture, laboratory training and professional and industrial practice are but a few elements in this larger view of science where museums can contribute."⁴¹

I will have a closer look at the museum report launched by the ad-hoc committee at the Faculty of Mathematics and Natural Sciences. I shall try to extract some of the ideas on the process of building a museum and ways of conduct that the report reflects. This will enable me to draw conclusions in regard to possible shortcomings and important issues that will be

⁴⁰ Jon Gunnar Jørgensen is commenting upon this aspect in Uniforum nr. 5 1999

analysed and discussed in the last part of the thesis. Even if the report was meant as a provisoric document only, and in addition was made in short time before any economical framework was prospected, it is interesting to pay attention to the aims that are explicitly stated, as well as to what topics has been given priority in sketching out a plan of exhibition. The about 40-pages (including appendixes) report on the museum prospect made by the “ad-hoc”-committee at the Faculty of Mathematics and Natural Sciences provides a detailed overview on how the building is intended to be used. It provides the reader with two possible solutions; one that makes room for an exhibition of the natural sciences only, and one that shares the space between a science museum and an Ibsen research centre. The first solution, though, is highly favoured, and in the following I shall present this solution. The solution of sharing space displays many of the same objects, only to a smaller degree, and with its historical scope limited to the events of direct connection with the University of Oslo. Because of this limited scope, I choose to concentrate on the full version of a museum. In the museum report the need for a museum exhibiting the history of science is explained in the following way: The statement is made that today’s society is to a high degree formed by the results from research in the natural sciences – but few people are really aware of the important historical role that science has played. There are no institutions to inform the public of these historical events. The future developments of our society demand of us to have the knowledge of how to produce and make use of new products, not the least with regard to environmental problems. To understand the present, it is necessary to know one’s past. The present day activities of natural science in Norway are built upon traditions which have parts of its sources in the Observatory building.

In this way the past and the future are linked together to make a plea for more attention to science in the present. The report continues with the observation that in these days there is a decline in the interest among people in the natural sciences, and the recruiting of students to

⁴¹ Bennett (1998); p. 173.

these fields of study is weak. The report states that “It is important to turn back this development”, and that a museum would provide a “valuable contribution” to this effort to strengthen the status of the natural sciences.⁴²

Following this short introduction where the purpose for writing the report is explained, the report presents the museum plans and the history of the Observatory, in order to explain the importance of the project. The main aim of the museum, as it is presented, is to focus on the history of natural science, in a chronologically ordered display, often centered around famous and widely acknowledged researchers that made special contributions to this history. But the museum is also intended to become an active meetingplace for various groups; there will be cooperative activities with the organisation Unge forskere⁴³, as well as with other already existing university museums in Oslo such as the Technical Museum or the Museum of Natural History.

The authors of the document are connecting the need for presenting the history of natural science to the need of heightening the awareness of and interest in scientific topics. Scientific knowledge is becoming a crucial resource in the further growth and development of modern industrial societies. The look towards the future is taken care of in the exhibition, as one of the rooms will be used for a presentation of the new information technology. The document reflects to a decreasing interest in natural science among school pupils, and how this leads to a lack of recruitment of students to the studies of natural science at university/college level. To increase the knowledge of, and the recruiting of students to, natural science among the population, it is necessary to increase the interest in topics of natural science. The proponents for the Observatory Museum hope that the museum plans can realize these aims. The potential visitors are presented and categorised into groups such as students and journalists, but school-children are supposed to be the main group of visitors.

⁴² "Observatoriet - Et utstillingsvindu for naturvitenskap i Norge?", UiO Oslo (1998); p. 5. [My translation]

⁴³ "Young researchers"

The remaining part of the report provides an overview of how the different rooms in the building are to be used as museum exhibition rooms. Apart from exhibition rooms, the Observatory Museum is intended to house an auditorium, office rooms and a library. The museum will consist of different rooms exhibiting historical periods chronologically. The year 1811 is a natural startingpoint, the year the first university in Norway was founded, the start of institutionalized science in Norway. The historical account will thus concentrate on the history of natural science in connection with university history. It is stated that the use of the Observatory will be arranged in order to show "...the growth of the culture of mathematics, natural science and technology, emphasising the efforts made by the university."⁴⁴ This cultural climate will be given a broad presentation, and the historical intellectual connections between natural science and the humanities will be given priority. It is not explicitly stated what kind of connections these are, but it is natural to have in mind the position the Observatory and its working members, had in the general intellectual life in Christiania. Not only because Christiania was a small city, and the prominent and culturally active citizens easily came in touch with each other. The research activities carried out at the Observatory were of vital interest to a society ready to re-establish its public life in line with what was happening elsewhere in Europe, in areas such as industry and scientific research. How to organize a presentation of this aspect of scientific culture is not clearly stated in the brief description presenting the different exhibition halls, however. It is seen as important to create an authentic atmosphere, with period furniture and style of interior, original scientific instruments, books and pictures. Apart from the permanent information texts that will be installed, further information can be given from guides and lectures. The old research instrument belonging to the Observatory are localised; only a few are still in the old building, but most of the still exist and can be brought back into place.

⁴⁴ Ibid., p. 2.

Some preliminary remarks upon scientists views on science communication.

As we have seen, the Observatory museum report reflected some ideas and conceptions of a public of science, and suggested various ways of communicating over the "gap" between lay-people and scientists. It also stated some explicit aims for establishing a museum, such as recruiting students, increasing the general interest in natural science.

These issues are being discussed elsewhere as well, such as in the newspaper cuttings quoted below. In a feature article in *Aftenposten*, May 14th 1996, the geologist Knut Bjørlykke points to the paradox that even though science and technology are becoming more and more central features of our modern society, the interest in these subjects is declining. "Does this undermine our culture of natural science?", asks Bjørlykke. [my translation]

Nutrition researcher Christian Drevon points to the lack of media coverage of scientific subjects in a commentary in the same newspaper February 11th 1997. He asks for a renewed effort on science journalism: "In regard to the consequences [of science and technology] for our daily bread and life, one ought to have a section on natural science in the same manner as the sections existing on sport, culture and politics." [My translation]

Ole Didrik Lærum is one of the pamphlet authors contributing to the debate. His book "Science for Breakfast" addresses both scientists, mediators and the public.⁴⁵

In his book he criticises his fellow colleagues for not caring enough about the duty they have to popularise their work and inform the general public about their scientific activity. The politicians are also given critical attention, when Lærum argues that they are making many important political decisions concerning science and technology, but basing their choice on a far from sufficient knowledge of the matters in question.

⁴⁵ Lærum (1991)

In his book, Lærum follows a line of criticism that is recognizable from central discussions in the field of PUS-studies. This criticism attacks the view that research data and scientific knowledge can be treated as ready-made products, and that the science journalists are left with the task of presenting, or translating, this product in a readable way to the general public. “In other words,” Lærum says, “the researchers’ job finishes at the time when the journalists’ continues.”⁴⁶ Lærum argues against this view that most research activity is a continuous process. The resulting products are not always faultless, and the more current the research data are, the more they are marked by uncertainty. Lærum concludes that both science/research journalism and popularisation of science have a built-in uncertainty, and that neither of the activities can be carried out without taking a critical stance towards knowledge. As a conclusion of this chapter, and a preparation for the last part of analysis of the Observatory conflict, I will try to summarize some main concerns that seem to have their origin in the worries over the changes in the organization of science during the last decades. This concerns the image of science reflected in society, an image that is crucial in understanding the premises for science communication between practioners of science and receivers of scientific knowledge.

Natural science is often a conflicting subject for non-scientists. The recent developments of science has created problematic aspects that are of concern to a community broader than the scientific community itself. How does the scientific community answer to these concerns? How are the challenges from an educated, critical and often dissenting public met? Do the prospected profound changes of the practice of science change its need and way of gaining reputation and legitimacy as well?

The scientists’ conception of its public is discussed in a paper by William W. Cobern, as a contribution to a seminar held on the subject of “Science, Technology and citizenship” in Oslo in November 1996. The aim of the author is to re-examine certain assumptions held on

⁴⁶ Ibid.; p. 93

the nature of the relationship between science and its public in order to foster a re-conceptualisation of this relationship. A quote from his paper can work as an introduction to the next part of the thesis: "I do not think it is helpful to think of science as something separate from the people who construct, write about, teach or learn scientific knowledge. Regarding the scientific community, we live at a time when that community finds itself in the throes of considerable angst. It is an angst not only about an apparent lack of public esteem for scientific understanding but also about an apparent lack of public esteem for science and scientific ways of thinking,"⁴⁷

⁴⁷ Cobern (1997) p. 53.

PART THREE

Communication and the boundaries of science

In the previous two chapters I have tried to draw a rough picture of the situation the natural scientists are facing. In this last chapter it will be my task to evaluate the strategies and the method of argumentation that this group of proponents have chosen to employ in order to win their case.

Science does not exist in isolation from the rest of society, even though some of the participants in the debate have expressed feelings of neglect and isolation on behalf of the University administration and the general public. Why do this situation of feeling neglected occur? An answer to this question could possibly tell us something about how the nature of the relationship between science and society is perceived by both parts.

To be able to indicate a possible answer to this dilemma, I proceed as follows;

I shall present some theories on the problem of defining and understanding the relationship between science and society. In line with these theories there exists critical views on science communication in particular, and these views will also be given a presentation of.

Then I swiftly present a statement regarding the differences between scientific culture and humanistic culture, a difference argued to partly determine the cultural identity of the agents in each area. This aspect of cultural identity will be of central concern when I continue to analyse and discuss the Observatory conflict, in order to see if an analysis can tell us anything about the nature of this conflict.

As mentioned above, to understand the arguments the scientists have chosen to focus upon in their complaints, I find it necessary to rely on some recent theoretical criticism on the way the nature of the relationship between science and society has been understood and presented.

The particular way of viewing this relationship is one of the factors determining the way the

communication between science and society in fact works. The reason why I am particularly interested in focusing closer upon this subject, is that the arguments presented in favor of a museum of natural science are explicitly connected to the problem of communicating science. As mentioned earlier, one of the main arguments is that the museum is a necessary part of the solution available to the world of natural science in popularising and recruiting the public to the pursue of scientific activities.

The question to put forward is then whether the arguments are embedded in "reality" or not, whether the statements put forward are possible to defend with a point of departure in the theories of PUS, or if it is possible to criticize the views put forward by the scientists, basing the criticism on the theoretical reasoning dealing with the problem of communicating science.

Some historical perspectives on the relationship between science and its public.

Natural science is widespread and accepted culturally and socially in modern societies. Through education, social and moral norms, everyday technological equipment, profession such as medicine, engineering and the like, lay people will in some way or other come in touch with natural science in the society they live. In other words, the way science was institutionalized and organized in the developed countries throughout the twentieth century, has given the scientific culture a unique position and authority in the society. The content of the history of science is a complex one, and must be seen in relation to the rest of society, such as economical, political and cultural elements. This account will be restricted to a sketch outlining some main meetingpoints between science and its public.

Marta Feher gives in her paper "The role accorded to the public by philosophers of science" an account of how the nature of the relationship between science and the public has

undergone changes during the about 300 years existence of modern science⁴⁸. It is thereby a presentation of how the social and cognitive borders between the institution of science and its public has adopted various forms during the centuries. Marta Feher describes the nature of the relationship this way: "While the members of the scientific community (experts) depend epistemologically on each other, the public depends on the scientific community. In other words, the epistemic dependence of science is esoteric (internal), whereas that of the public is exoteric (external). This makes their relationship assymetrical."⁴⁹ The nature of this assymetrical relationship is elaborated further: "More precisely, though science needs no external cognitive support, it needs cognitive approval and acceptance of its knowledge claim. (...) This goal is served by the popularization of scientific results, and their possible use and benefit."⁵⁰

Martha Feher is concerned by the epistemological aspects, constituting the asymmetrical relationship between scientists and laypeople. The role of science is also of concern to Joseph Ben-David who has treated the historical changes of the organization of science in a sociological work called "The Scientist's Role in Society"⁵¹, from which I will continue the presentation.

Ben-David argues that the way any scientific activity is organized depends heavily upon various socio-cultural circumstances external to the scientific institution. He tries to show this through a comparative study of the history of natural science, and his unit of analysis is the different *roles* the scientist has been given under different circumstances according to time and place. According to Ben-David's account, the scientist did not acquire a proper, autonomous cultural identity until in the eighteenth century, when scientific activity grew in accept and reputation as an alternative world view slowly approached in a society changing its

⁴⁸ Feher (1990)

⁴⁹ Ibid.; p. 236.

⁵⁰ Ibid.; p. 236.

⁵¹ Ben-David (1971).

values from the religious to the profane. The general interest in science and the reputation of the scientist grew as an alternative world-view came to be accepted by the changing society. This development had its roots in Britain, and spread to other countries such as France, as a part of the rationalistic movement at the time of the Encyclopedie⁵².

Martha Feher's account of science and its public starts at the time of Bacon⁵³, when the lay public played an important role as legitimizers of cognitive truth and knowledge claims, while the need of science for social accept and economical support was fought in "higher circles", such as the crown and other authorities. Scientific experiments was made in public, to secure the neutral character of the results, thanks to the observing "uninterested" public in front of the scene. The experiments made inside laboratories with only a few witnesses, all of them connected to the scientific profession, was not seen to be legitime or to provide neutral results at all. The participation of the public as critical observers thereby seemed a necessecity of cognitive reasons.

Steven Shapin is investigating into the various components that define the role of the scientific institution in various societies at various times⁵⁴. In his paper he describes the same conditions, but with the additional comment that what was to be reckoned with as a public in the days of Bacon most often was limited to only certain educated upper level groups of society, but even though consisting of non-scientists. This aspect of the legitimacy claims of science Shapin labels as "scientific testimony and the problem of public trust". In the words of Shapin; "...eyewitnessing was to be the hall-mark of proper scientific procedure..."⁵⁵ One of the problems that emerged with the growth and institutionalization of scientific practice, was concerning who would count as an eye-witness. The answer given was that the eye-witness had to possess the relevant cognitive and manipulative skills, skills that the general

⁵² "Encyclopedie ou Dictionnaire raisonne des sciences, des arts et des metiers" (1751-65). Filosofileksikon (1996).

⁵³ Francis Bacon (1561-1626), English philosopher and statesman. Filosofileksikon (1996).

⁵⁴ Shapin (1990)

public did not possess. This lack of skills makes, according to Shapin, up to an important means by which we discriminate between science and non-science, up to the present day. This mean is the notion Shapin calls "cultural competence", which consists of "the relevant cognitive and manipulative skills"⁵⁶ The cultural competence is managed by and inside the scientific institution, and the root of the institutionalisation of science is to be found in the age of industrialisation in the nineteenth century. This institutionalisation process is, according to Shapin, establishing clearer distinctions between "the man of science and the public"⁵⁷.

The conditions for scientific activity changed when science developed closer ties with industrial life, through the advancement of technology based on scientific knowledge. Ben-David observes that the new scientific research centres are mainly to be found in Germany, due to a certain freedom of self-organization to be found at the German universities that allows experimentation, and in combination with a certain interest in applied research pursued by the emerging industrial leadership. When scientific research proved to be useful in combination with industrial interests, science soon took on economical value, both among private industrial companies and the national state authorities. The scientist received a new role, as a central figure in the new economical structure in the emerging national states of Europe.

When the scientific institution was formed during the last two centuries, its survival was more or less based upon support from the national authorities, besides the ties knot to industrial life. This funding system, as well as the increasing specialisation within the scientific practice, led to a change in the role of the public, at least in direct terms. Science was recognized as being cognitively autonomous, but it still needed social support and legitimacy, and acceptance of its truth claims. At the same time science grew in prestige and power, as scientific discoveries

⁵⁵ Ibid.; p. 998

⁵⁶ Ibid.; p. 993

⁵⁷ Ibid.; p. 998

were transformed into technological equipments easing the life of the citizen and providing a higher quality of living standard. This development continues into the 21th Century.

Changing conditions.

During the last century, science has continued to improve every-day life, and to challenge lay conceptions of reality. It has also established itself as a cultural force. Scientific theories such as the theory of relativity evoked responses also beyond the scientific institution, being a vital source of inspiration for scholars in other fields as well as artistic life.

The need of funding sources became even more urgent in the last part of the 20th century. Scientific research were on an increasing scale to be implemented in the national economy of modern states. The two World Wars are also crucial factors in this development. This marriage between science and the military have lasted for some more decades, producing what is been called "Big Science"⁵⁸. What are the result of these changes? In what way does this affect the society in general, and what role do society play in influencing this development? In short, how is the relationship between science and society to be understood under these changed conditions?

In the book "The New Production of Knowledge"⁵⁹ a number of theoriticians involved in science studies have paid attention to the changes that are determining the conditions for scientific practice in general. Through their analysis, a pattern of the changes emerges, dividing the production of knowledge into two different modes. The authors label these two different versions Mode 1 and Mode 2. Mode 1 is "oldfashioned", characterized by disciplinary research within stable, traditional institutions such as the universities, in a predominantly cognitive and academic framework. Mode 2 is a new emerging form of

⁵⁸ A compilation of essays on the rapid growth of natural science research in the U.S. in the 20th century, has been given this title "Big Science: the growth of large-scale research. Galison & Hevly (1992).

knowledge production, with its chief characteristics being transdisciplinary, problem-oriented research. This means that research in Mode 2 is carried out in close context with application, and involving various actors from different intellectual fields. A quotation from the book illustrates this:

"Contemporary science appears to be in more or less continuous flux, a state of turbulence which contrasts sharply with the conception of science as a socially autonomous enterprise with stable institutions, well delineated disciplinary structures and ageing slightly remote practitioners."⁶⁰

These changes in industry and economy as well as social structure make up to changed conditions for the production of knowledge. This production is on an increasing scale moving out of the universities and into society, reflecting the various cultural and political currents existent. At the same time the pressure for accountability of the scientific institutions is increasing. As scientific research is becoming more and more advanced and dependent upon a huge technological machinery, the costs involved are increasing, thereby necessitating a close connection with national authorities or big companies in order to carry out the research.

This issue is elaborated in the book within the perspective of communication between science and society. The authors argue that a certain density of communication is one of the chief characteristics of our modern society. This density is caused much by the same conditions that it is stimulating, namely the new developments within the science and technology of infrastructure and information technology. Knowledge is more easily transferable, and information is becoming more widespread and accessible. In combination with this comes the increased

⁵⁹ Gibbons (et al.) (1994)

⁶⁰ Ibid.; p. 22.

level of education that enable more people to participate in decision-making procedures in society, as well as demanding more from authoritative instances.

All this affects the public image of the traditional knowledge-building institutions:

"Another shift in higher education is from being inner-directed to becoming outer-directed (...) in reference to the self-image of the universities as autonomous institutions. They perceived themselves largely as self-contained and self-referential institutions. Practices such as peer review and academic tenure still reflect this view. (...) Today, higher education appears in a different light. Universities form part of a larger and denser network of knowledge institution that extends into industry, government and the media. Both their autonomy and their monopoly position are reduced. This is reflected in a diminished social status of higher education teachers and in their relationship with other professional groups and the market. Knowledge is generated across rather than in self-sufficient institutions."⁶¹

This changing phase of modern science has been very much debated among specialists of science communication. Harry Collins and Trevor Pinch argue in their book "The Golem" with the subtitle "What you should know about science" that only certain aspects involved in the production of scientific knowledge are useful for the public to gain information about.⁶² These are the controversial issues concerning scientific research that e.g. involves questions of strong uncertainty, of health concerns, a lot of governmental funding money or profound ethical considerations.

In the recent years many studies have been made under the rubric of Public Understanding of Science. These studies are most often characterized by a multidisciplinary approach, including theories from diverse academic fields such as sociology, communication/media studies,

⁶¹ Ibid.; p. 78.

⁶² Collins & Pinch (1998).

pedagogy and philosophy. The subject of concern is of a complex nature, involving psychological, sociological and epistemological aspects.

In my view, many of the contributions to this field are characterised by a criticism of traditional approaches towards science studies in general, and the study of the public understanding of science in particular. These traditional approaches are presupposing that there are clear epistemological distinctions between science and non-science, a view that is challenged in more recent theoretical work. The controversy or line of criticism within the field of PUS-studies can be expressed with the help of the concept of linearity and its opponent non-linearity⁶³. The expression linearity is used to describe a traditional way of viewing science communication. In this view scientific knowledge is produced inside and protected by the scientific institutions, it is popularised to be understandable to the non-specialists, and it is effectuated throughout society with the help of schools and mass media. The result product is seen as a vulgarisation of the original scientific work, with a move away from the original technical scientific language resulting in a loss of meaning and profoundness; in short, it is less scientific, if at all. This view is criticised for being blind to the complexity involved in this kind of “knowledge transmission”.

The change in look upon the nature of science communication draws some of its sources from the new theoretical approach to science studies in general. The new theoretical approach emerged as a reaction to changes within the scientific institution itself, as well as the use of science. The two last centuries have witnessed many revolutionary discoveries in the area of scientific knowledge that have resulted in organisational changes in scientific practice. The knowledge administered is becoming more and more specialised, esoteric and important. The way scientific work is organised affects taxpayers money as well as producing authoritative

⁶³ I have this twin-concept from Ulrike Felt, who originally introduced it as the linear model and deficit model on science popularisation. As I am not presenting any specific theoretical text on this view, I will use the concepts in the way I have interpreted and understood it after having read different texts dealing with similar approaches. These texts are e.g. Cloitre & Shinn (1985) and Hilgartner (1990).

experts taking a central part in political decisionmaking. Science is more and more marked by bureaucratisation, commercialisation and is not the least more and more criticised. Who are the users, producers, winners and victims of modern science?

Recent works in the theory of science discuss the way distinctions are made between what are called science and non-science.⁶⁴ This discussion I see not as an attempt to claim that science in the sense that we know it does not exist, or scientific knowledge in itself is false, dangerous or whatever. Rather, I see this approach as contributing to a reflection upon the question of who are supposed to be responsible for the future development of science. It is in a way a plea for the democratisation of knowledge. It wants us to be aware that scientific knowledge represented by specialised fields is a sort of knowing restricted for the few, but is still a type of knowledge that affects all.

The criticism of the linear model in science communication touches upon issues that have their root in the concerns outlined above. The “non-linearists” criticise the old model for not paying attention to the way knowledge is produced, nor its distribution or how it is used.

In the process of production, the scientific activity is seen in the linear model as a protected area, restricted for scientific thoughts made by professionally trained scientists only. This does not hold for the modern organisation of scientific work, where governmental supported problem-oriented research involves political, economical and ethical considerations, and not only a pure, value-free search for knowledge. The growing division of and specialisation in different scientific disciplines also makes scientific knowledge in one field inaccessible to scientists working in other fields of research.

⁶⁴ As example can be given Bloor (1991), who questions the epistemological distinction between scientific and non-scientific statements, and in this criticism form “The strong Program” in the sociology of science. A more historically orientated work, dealing with the interconnections of personal, social and political factors and the production of knowledge is Schaffer & Shapin (1985).

As mentioned earlier, a book devoted to the analysis of this latter development is Michael Gibbons' (et al.) "The new production of knowledge".⁶⁵ The authors of the book pointed to a divide between the "old" traditional ways of making science, restricted to disciplinary orientated research which they call Mode 1, and the new Mode 2 which is characterized by transdisciplinarity and problem orientated research. As is stated in the book: "The production of knowledge is advancing into a new phase. It operates according to new imperatives in tension with the traditional way of doing things with far-reaching implication."⁶⁶ The authors see positive implications of this change: "Mode 2 creates a novel environment in which knowledge flows more easily across disciplinary boundaries, human resources are more mobile, and the organisation of research more open and flexible."⁶⁷

Wynne discusses the reasons for this change in perspective with reference to historical factors.⁶⁸ During the post-war period the scientific institutions were strengthened politically and economically with the help of government support. The public support of this activity seemed to be taken for granted. But manifestations of people's distrust with science and technology were not possible to overlook in the long run. As Wynne expresses it: "In short, the re-emergence of the public understanding of science issue in the mid-1980s can be seen as part of the scientific establishment's anxious response to a legitimization vacuum which threatened the well-being and social standing of science."⁶⁹ However, Wynne sees this reluctant attitude of the public as connected to the distancing moves that the scientific establishment itself made from the public during its modern history.

Wynne emphasizes a distinction between the public identification with science and the public understanding of science. He criticises the view being held among some scientists that these two aspects equal each other. This view places the problems connected to science

⁶⁵ Gibbons (et al.) (1994)

⁶⁶ Ibid.; p. 19

⁶⁷ Ibid.; p. 20

⁶⁸ Wynne (1992).

communication on the side of the public. Wynne argues that in this way one overlooks important factors that determine science communication: “Questions such as those about whose interest are served by different kinds of science and scientific representation, and on the basis of trust and social accountability of different institutional forms of control and ownership of science, are effectively deleted.”⁷⁰ In Wynne’s words it is these “unacknowledged dimensions which shape the public uptake or “understanding” of science.”⁷¹

The communication process

How do we use knowledge? Following this question Wynne tries to make us reflect on the way knowledge is contextualised, whether it is scientific or lay knowledge. When lay-people distance themselves from scientific knowledge, the distanced attitude cannot always be explained by lack of interest, capability, or negative attitude. The explanation can just as well be that the presumed universal nature of scientific knowledge has to fit into a particular situation, to function as a problem-solver. Sometimes, knowledge of scientific facts is the opposite of problemsolving, as Wynne explains in connection with the seeming ignorancy towards scientific information among workers in places involving high risks. Wynne uses workers with X-rays in hospitals, and workers at a nuclear fuels reprocessing plant as examples. The more the workers gain knowledge about the scientific basis for the risk calculations made by the administration, the less secure they feel, and the less they seem to trust in the social organisation at their workplace, including the other workers and the administration making decisions. In circumstances like these, the social fabric and the trust relationships that are

⁶⁹ Ibid.; p. 38.

⁷⁰ Ibid.; p. 38.

⁷¹ Ibid.; p. 38.

woven into it, plays a much more decisive role in coping with risks, than individual knowledge of the “physical” facts.

Wynne concludes: “The general point borne out by research elsewhere is that this social position work, or social identity-maintenance and repair, is the fundamental dimension within which scientific knowledge is experienced and received, rejected, reshaped or whatever.”⁷²

And he later continues:

“Also to imply that scientific understanding is always good without looking at the social content is not only misleading but could be socially corrosive, provocative, possibly authoritarian, and self-defeating for the endeavor of promoting public uptake of science. Scientists and scientific institutions need to understand better the different publics they address, and their own recognized assumptions about those audiences and user-contexts.”⁷³

The way people use scientific knowledge, or knowledge in general, is closely connected with other business they are concerned with in their daily life and in their profession. This way of negotiating and differentiating knowledge in accordance with the subject in question stands in opposition to the proclaimed universal, rigid and decontextual nature of scientific knowledge. This identification with the context in which the knowledge is transferred is important in understanding how people in general value, distrust or use science, in the sense of public understanding of science.

Wynne argues that one should balance “standardized knowledge as a public resource with localized participation and freedom from social control.”⁷⁴ Wynne does not recommend this as a universal prescription, but as a way of including the above discussed aspects in science communication: “The point is in what it suggest about the intrinsic relationship between the

⁷² Ibid.; p. 40.

⁷³ Ibid.; p. 40.

existing cultural values of science which sacralize precision, lack of ambivalence, standardization and universalism, and implications of social control or negation of people's social identities.”⁷⁵

This quote brings us back to the historical account in the start of this paragraph, where Wynne's view of why people seemed to turn away from science was presented. If the public feel neglected by the responsible producers and managers of an important, but impenetrable stock of knowledge, the result will easily show itself through a hostile and ignorant attitude. And this aspect I see as very important in any discussion about science communication.

The two cultures.

To communicate science and to promote science are not to be perceived as two identical activities/issues. But the way scientists display and popularize their knowledge also has a function of promoting science, as a specific institution, as a strategy of solving problems, or as a type of culture with a distinct world view. The idea of science that a scientist naturally employs as a starting point when communicating with non-scientists, is an image that has been constructed somehow, for different reasons and within different contexts. Thus, the communication of scientific knowledge and the promotion of the scientific institution are somehow connected.

Maybe the best known contribution to the discussion about science and culture is C.P. Snow's now about forty years old Rede lecture “The two cultures” that discusses the differences and often hostile attitudes existing between the world of the natural sciences and the humanities.⁷⁶

⁷⁴ Ibid.; p. 41.

⁷⁵ Ibid.; p. 41

⁷⁶ The Rede Lecture, held at Cambridge in 1959. Snow (1959), Canto edition 1993, Cambridge University Press.

In a way Snow reflects on the existence of two distinctive *knowledge* cultures in a way that has similarities with Wynne's approach, although the differences probably are more eye-catching. But both contextualise a certain way of knowing within a local culture, with mechanisms of identification linking the culture and the way of knowing together.

The analysis of these two diverging cultures are of course made in another historical climate than what surrounds us today. Snow's description of technological conquests of the future misses the aspects of negative side effects that later came to issue. The political and economical situation has changed, in Snow's homecountry of Great Britain as well as in the rest of the world. Apart from this, Snow can be seen as touching upon conflicts that are still recognizable, maybe in other settings or more modified. Snow's acclaimed distinction between two different intellects, or ways of thinking, seems to hold standard, at least in popular versions and in the imaginations of academicians.

This is the way in which Snow presents his idea of a (scientific) "culture": "At one pole, the scientific culture really is a culture, not only in an intellectual but also in an anthropological sense. (...) there are common attitudes, common standards and patterns of behaviour, common approaches and assumptions."⁷⁷ The opposite, literate culture is marked, or demarcated, by its lack of scientific literacy. This incomprehension of scientific knowledge Snow sees as a influence on the traditional culture that easily leads its advocates to adopt anti-scientific sentiments. But in the same way as the traditional culture seems short of scientific literacy, the new emerging techno-scientific culture lacks respect and understanding for the "traditional" culture.

In the afterword written to "The Golem", authors Collins and Pinch interpret Snow's idea of being scientific literate in this way: "C.P.Snow, in his famous essay on the two cultures, set comprehension of the second law of thermodynamics as the standard for scientific literacy."⁷⁸

⁷⁷ Ibid.; p. 9.

⁷⁸ Collins & Pinch (1998), p. 151.

The authors of the book seem to share Snow's worries about cultural and literal divisions:

“(...) many scientists have reacted [on *The Golem*] as though they would rather the scholars had stayed on their own side of the cultural divide.”⁷⁹, and they later conclude that “Science is a part of a culture that belongs to all of us.” Snow himself expresses it this way; “This polarisation is a loss to us all.”⁸⁰

Snow is concerned about the future, a future that he sees will depend heavily upon scientific and technological development world-wide, to provide better living conditions for human beings. The advantage the scientific culture possesses in this respect, except for the obvious advantage of producing and administering the potentially useful scientific knowledge, is exactly the specific kind of culture that forms its own territory across national, racial, political and religious borders. This kind of culture makes it possible to “move” scientific knowledge and technological inventions from one part of the world to another, without losing the sense of the distributed “goods”. This point of universalism has been strongly under attack from recent critical writings on the nature of science. It is exactly the contextual nature of knowledge that e.g. Wynne was emphasising in his critical analysis of science studies, as can be remembered from the previous paragraph.

But apart from this somehow naive idealisation of scientific method and ideology, I think it is possible to view Snow's account with modern eyes, and still agree with some of his reflections. At least it is useful to have such a cultural polarisation in mind when one is to deal with a subject like popularisation of scientific knowledge.

In this last chapter I shall return to this reflection on the two knowledge cultures, as it is possible to detect some of the same sentiments that are given voice to in Snow's text in many contributions to the discussion on the topic of science in Norwegian newspapers.

⁷⁹ Ibid.; p. 151.

⁸⁰ Ibid.; p. 11.

*The Observatory conflict and the problem of cultural identification:
Analysis and discussion*

In the beginning of this chapter I discussed the changing conditions of scientific research, and referred to the book "The new production of knowledge"⁸¹. The authors of this book emphasized that the pattern of the organisation of the producers and receivers of knowledge is under change, and that the restrictions, aims and limits of the knowledge-producing institutions are likewise under change. The channels of knowledge have become more differentiated, and less homogenic than before. The institution of science is not ahistoric, or detached from society. It is continuously developing, just as much as the content of the scientific knowledge it manages. As the form and function of the institution is changing, so is the public image of it. I will argue that if one is not aware of the impression existing in the public opinion on the institution one is promoting, communication will not be possible. The expectations differ, between the producers of science and the users and receivers of this knowledge. To communicate science it is necessary to know one`s public as well as to know science.

My claim is that the group of scientists involved in the Observatory conflict were not fully aware of the importance of reflecting on one`s own cultural identity before, or when entering the debate. I shall make an attempt to reflect on this issue in this third part of the thesis.

A quote from the book "The new production of knowledge" can work as an illustrating comment: "New forms of knowledge production can, as they diffuse, make for ambiguous situations as older demarcation lines and boundaries become more porous or break down altogether."⁸² My hypothesis is that the Observatory conflict is an example of such an

⁸¹ Gibbons (et al.) (1994)

⁸² Ibid.; p. 37.

ambiguous situation. If the situation of the present is characterized by profound changes, then it is not easy to link the past with the future, as the natural scientists in the Observatory conflict are trying to do. In what ways do they argue in favour of such a link?

The reason why they attempt to start a public debate on these issues is obviously the problematic affair of administrative character at the institution of the University of Oslo.

But I will suggest that the problem of gaining attention also has something to do with the phenomenon Snow labeled as the two cultures; the one of natural science and the other of humanist studies. I think it is worthwhile to apply the concept of boundaries on this aspect.

The boundaries of the humanist knowledge are more porous and easy to cross than those of natural science. The knowledge of natural science is less accessible, but probably has a more profound impact on people's lives but in a more indirect manner. But because of its difficult accessibility, it is harder to promote this kind of knowledge, and make it interesting to lay-people. Natural science is both challenging and boring, in being connected both to great discoveries as well as to dull school lessons.

This can possibly to some degree explain why the need of creating a space of communication seem so pressing to the natural scientists. At least it can explain the problem of feeling ignored and forgotten, and that strong sentiments are being invested in this conflict. The feeling of being over-looked as a group seems to hold its ground in the general milieu of natural science. In the weekly magazine *Morgenbladet* a professor of chemistry and a professor of physics give some remarks on the Observatory affair in a commentary written in the light of the Research Days that were arranged September 23. – October 3., 1999. "(...) few people reacts to the wish from the University of Oslo to transfer the observatory of Christopher Hansteen dated 1834, to the collections of Ibsen. Even those who are interested in culture do not seem to question the fact that the Observatory, the maybe most important

building in Norway concerning the history of the natural sciences, will not be preserved as a monument on the natural sciences.”⁸³

The terms recruitment, culture and tradition are terms that are often repeated across the contributions. It seems as if one sees an important link between the lack of awareness of tradition and the lack of recruitment of students to studies in natural science. One informant I spoke to pondered whether the decreasing recruitment of students to the studies of natural science, and the seemingly general lack of interest from the public was in part caused by the exclusion of natural science from the general cultural life of the nation. His view echoes the reflections Snow made upon the two different cultures, roughly divided into natural science and the humanities. One informant expressed a similar view in noting that when science was presented in the media, the focus was most often laid on the practical and utilitarian aspects of science, mainly represented by technological inventions, and that this is a one-sided approach. This approach signifies natural science as being of only instrumental value to a society.

But what kind of cultural role do the natural sciences play in a society? The question must be answered by reflecting on the role of the scientists as producers and managers of knowledge, an approach discussed in the beginning of this third part of the thesis. Many aspects of modern societies are dependent upon scientific knowledge; discoveries in natural science and also innovations in technology are of vital importance to all modern societies. And the role of knowledge will not be less vital in the years to come. But the arenas where research are most vital are prone to quick changes. Arenas such as medicine and bio-technology are gaining most attention in the media, and these rapidly changing disciplines will change the prevailing image of science among the public as well.

⁸³ Einevoll & Ystenes in *Morgenbladet* (38) September 24, 1999. The fact that the two professors writing this are employed at other institutions than the UiO gives an indication that concern for the building is not limited only to scientists with a connection to the UiO.

The Observatory museum is supposed to be mirroring this changing face of science. At first sight, it seems to me a difficult task to combine a presentation of the history of science in Norway with the aim of effecting an increase in awareness and interest in present day science. The main difficulty lies in the narrow scope that the Observatory offers as a startingpoint. The building held a central role in the development of research in Norway, but only certain fields of natural science are represented, such as astronomy and geophysics. The international scene of science is a varied one, and marked by continuous change and increasing specialisation. How is it possible to link the segment of research-tradition connected with the Observatory with the way the public meet science today in their daily lives? Does this kind of exhibition meet the needs of the public, or is an exhibition of the history of natural science in Norway an instance of one-way communication? It is natural that a museum placed in an old observatory reflects the specific use and history of such a building, and the limited space of exhibiting halls, and the restrictions put on the reconstructions of the building, are determining factors to the scope of the exhibition. But in this case, the need for a preservation, awareness and presentation of the history of science as a cultural tradition putting its mark upon the society of Norway seem to be a more proper choice of aim. However, the museum report suggests a co-operation with other related museums and institutions in Oslo. Linking educational offers with the Museum of Natural History, Zoology, Mineralogy, and Botany in the east of Oslo could be a good solution as a combination of different scientific disciplines. The Museum of Technology offers its visitors a science centre that could also provide a vital role in presenting science in an activating and engaging way, connecting both the "classical" discoveries of science and contemporary scientific challenges with the history of scientific activity in Norway. The fact that Oslo lacks a museum devoted to the history of natural science in Norway; or to the history of the University of Oslo in general

for that matter, is emphasised in the museum report. The report also points to an increasing interest in the establishment of this kind of museum.⁸⁴

The scientists express a feeling of neglect in the public space. They feel they are not visible, even though their work is of vital importance to modern societies. My suggestion is that the changing modes of knowledge production can possibly explain to some degree this feeling of being ignored and forgotten. Mode 2 has a more direct approach to the society and the public than Mode 1, which has a more indirect contact with the public. It is in Mode 2 we find applied science; scientific solutions to problems of practical concern connected to industry and technological innovation. This kind of research is dependent upon its public to be able to create approvable and functionable solutions. The public must approve of the solutions offered, because they are the future users of technological innovations. The feedback from the public is needed and sought for, and is even sometimes influencing the outcome of the research.

The situation of the Mode 1 is wholly different. The scientific research is made within institutions with little or only indirect contact with the general public. The subject matters of the research seem often very remote from the everyday trivialities of most people. High-energy physics is an example of such scientific disciplines. The highly abstract form of the arguments and the often very specialized knowledge involved afford few possibilities of insights to the non-scientist. But even though the relationship with the public is problematic and of an indirect character, the scientific institution is dependent upon consent from the public to keep its authoritative position and to secure funding resources.

With the changing conditions of science, the relation to the public must be defined anew. The public meet the scientific research of Mode 2 in a different and more direct way than the

⁸⁴ In 1996, a conference was held by an organisation promoting the history of the university. The possible use of the Observatory building as a museum was discussed in this conference. Hjeltnes (1996).

traditional enlightenment project of science communication of the Mode 1. This situation change the expectations of the public, and to communicate with it, it is necessary to be aware of this change.

I will argue that the group of natural scientists fighting for the Observatory museum to a certain degree are aware of this change, when fighting for the establishment of a museum of the history of natural science in Norway. Their point of departure; a building that was used as an astronomical Observatory hundred years ago represents a quite remote reality for most people in the age of "cyberspace". But the research traditions of the Observatory are in many ways also connected to applied science, to scientific research with consequences everybody can relate to (e.g. disciplines such as meteorology). The natural scientists present plans of turning the museum into an active meetingplace where the public meet natural science in the past and the present, as well as to have a glimpse of scientific research of tomorrow.

To speak in the terms of boundaries; the Observatory museum project intends to create a boundary object that can help translate the contents of scientific research to the general public. One informant suggested that to present the history of natural science in such a "frame of cultural history" that the Observatory building could provide, would make the public access to this research tradition easier, and thereby possibly increase the general interest in and support of natural science. The scientists seem to move towards the boundaries of the humanities in their search for acknowledge and attention. But the criterias for a boundary object to meet across these boundaries according to Leigh Star and Griesemer, seem to be lacking: "They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizeable, a means of translation."⁸⁵ As discussed in part two of this thesis, the goals of the two parties in the Observatory conflict are differing too much for a reconciliation and translation process to start.

⁸⁵ Leigh Star and Griesemer (1989); p. 393.

Ought natural science display its tradition in a manner totally different from the humanities? Are the premises for communicating science unique for the natural sciences? The scientists reveal some concern for these topics in their plans for a museum, and in the argumentation in the Observatory debate. However, as their point of departure is an historical building, their arguments rest heavily on the ideas of historical values and traditions. Arguing with these aspects do not justify the claim to the building automatically, and the scientists seem to be aware of this when they turn to the present days problem of recruitment of students to natural science. The arguments touch some fundamental aspects of the existence of the scientific institution, but a deeper reflection on this fundament is needed in order to gain attention from the public. But the fact that this debate concerning the use of an old building has provoked such fundamental reactions, should be reason enough to give attention to the conflict, and the issues involved in it.

CONCLUSION

In this thesis I have tried to analyse a specific, university-located conflict in order to assess whether it is possible to point to similarities in the way of arguing in this specific case and other more general contribution to a debate on science communication.

I think it is possible to point to some similarities, and these are often issues that traditionally are placed on the agenda of discussions on science and the public; the question of support-building, knowledge-building, recruiting of students and money to the institutions producing scientific knowledge.

I end up with drawing two conclusions. The first is connected with the concept of scientific culture that I discussed in chapter two:

As I argued above, in the last decades, the institutional conditions for knowledge production have changed, and with this also the cultural climate scientific knowledge production is identified with. In this period of transformation it is increasingly difficult to form an outward identity, as this identity is not only a simple consequence of existing as an institution, but a more complex consequence of existing as a culturally and socially demarcated institution.

This also holds for institutions of scientific knowledge production. Theoricians of science are still more often questioning the traditional views on scientific activity. Some traditionally orientated theoricians and practisers of science are firing back, and attacking the critical orientated for being dangerously relativistic, and potentially destructive for the possibilities of creating certain, scientific knowledge. I have interpret these discussions as attempts on setting a new agenda on what issues are to be discussed and focused upon by theoricians of science.

But to speak of what is important is also to suggest conditions to impose on the activity of scientific knowledge production. The transformation of identity is in question, and this lead to uncertainty about the role the natural sciences and the scientists are supposed to play in a society that are changing, and with it, its traditional institutions.

The feeling of being overlooked is threatening for the image and feeling of self-identity that one rely on in navigating in a complex society. This uncertainty can also threaten the very existence of an (scientific) institution; in order to survive it is necessary to have public support in order to achieve political goodwill and funding money.

The feeling of being overlooked that the scientists involved in the Observatory affair expressed in various newspaper articles and during conversation, seem to correspond to such a threat to identity that I discussed above. The scientists feel that they are invisible in the cultural public of the nation, they seem to play only a minor role on the public scene. They have no clear-cut cultural identity, at least not on the public scene. Snow's proclaimed scientific culture does maybe still exist as a myth, sometimes as a reality, but the picture of it is changing and the definitions are changing.

Although the interest in scientific topics among the public was said to be growing, and the industrial and technological developments are making us more and more dependent upon scientific research activities, the scientists still feel left out. Why is this paradox existing, why should the scientists feel neglected?

Apart from the possible explanations already discussed, there is in my view also a reason that I connect with the theoretical field of the public understanding of science. In chapter two I discussed Wynne's contributions on the topic of (culturally) contextualised knowledge, which in short concluded that the public uptake of science differs from the scientists understanding of science. This is in some ways quite obvious, as a non-professional naturally knows less than a professional on a given matter. But what traditional views on science communication seem to forget, and that Wynne tried to remind us, is that the public consists of a group of *active* receivers. And if the production of scientific knowledge continues to move forward in the direction suggested by the authors of "The new production of knowledge" that I referred to

in chapter two, the notion of "the public" will maybe turn out to be a group even more problematic to define.

My second conclusion will then be that Norway needs to strengthen the activities on the scholarly field of the communication of science to the public, not only by the practical means of increasing popularisation initiatives, but also through extended research on the specific scientific culture and public scientific culture prevailing in Norway.

To put these two conclusions together in one: If science communication were more focused upon as a research-field of its own – then maybe the Observatory debate would have recieved more attention – not because of history, but because of the very present.

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APPENDIX i

Interview questions

In Norwegian:

Spørsmål 1: Hvilke eventuelle planer/fremsatte initiativ forelå for Observatoriebygningen før den første beslutningen angående bygningens fremtid ble tatt av Kollegiet i september 1997?

Spørsmål 2: Er det mulig å peke ut noen bestemte årsaker som kan forklare de kommunikasjonsvanskelighetene som synes å prege Observatoriekonflikten?

Spørsmål 3: Hvor viktig er Observatoriet, og museumsplanene for bygget, når det gjelder formidlingsbehovet for naturvitenskapen - hva gjør man uten Observatoriet?

In English:

Question 1: Did there exist prospective plans or were there put forward any initiatives concerning the Observatory building before the first decision on the future of the building was taken by the Collegium in September 1997?

Question 2: Is it possible to point to some specific reasons that can explain the difficulties of communication that seem to characterise the Observatory conflict?

Question 3: How important is the Observatory, and the plans for a museum in the building, when it comes to the need of the natural sciences to communicate - how do one manage without the Observatory?

I made three interviews at the University of Oslo; two at the Institute of Theoretical Astrophysics on the 13th of July, and on the 19th of August, and one at the Department of Mathematics on the 31st of August, all in 1999. Each interview lasted for about half an hour up to one hour.

SUMMARY

In my thesis *The Observatory conflict*, I have undertaken to analyse a conflict that took place at the University of Oslo as a reaction to a decision made by the Collegium of this university in September 1997. The decision concerns the use of an old observatory building owned by the university. There are two parties fighting for the right to use the building. These are a research center of the literary works of Henrik Ibsen, "Senter for Ibsenstudier", and a group of natural scientists that intend to use the building as a museum of the history of natural science in Norway. Strong sentiments have been invested in the conflict.

My approach to the conflict has been a point of departure in contemporary discussions on science communication. Thus, I mainly concentrate upon the idea of a science museum that has been promoted by the group of natural scientists.

The thesis consists of three parts. In part one I present the conflict. In part two I analyse the nature of the building, basing my analysis on descriptions of it presented by both involved parties. In part three I concentrate on the natural scientists views on the nature of science communication and the relationship between science and the public. In all three parts the arguments presented by both parties in a debate that followed in the wake of the conflict will be of central importance. I also rely heavily upon a prospect of a museum the history of natural science that the group of scientists have presented.

Key concepts in this thesis are boundaries, boundary work and boundary object which are used as analysing tools mainly in part two; while science communication, the relationship between science and the public and the public understanding of science are central notions to the discussion in part three.

The thesis concludes that the aspect of science communication should have gained more attention in this conflict.