

## **The University of Copenhagen and the Challenge of New Scientific Ideas in the early 17th Century.**

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How did a traditionally conservative and state controlled university respond to new scientific ideas in the early 17<sup>th</sup> century? The case of the University of Copenhagen indicates that both university professors and rulers of state generally adhered to the scientific heritage of the Middle Ages. This does not mean, however, that new scientific ideas were not discussed at all.

### ***I***

The Reformation of 1536 started a thorough change of the political and ecclesiastical organization on which Denmark-Norway had rested for centuries. The University of Copenhagen was a key instrument in this process. The university had been inaugurated in 1479, but during the 1520s the university quickly became entangled in the religious schisms that presaged the Reformation and by 1531 activities at the university had all come to a halt.<sup>1</sup>

When King Christian III in 1536 had won the civil war that was to settle the future conditions of the kingdom, a reopening of the university was of highest priority. For the victorious king to dictate the future organization of the Danish and Norwegian state and church was one thing. Another matter was the accomplishment of these ideas and associated legislation amongst the population as a whole. A central institution was needed wherefrom directives on the practical work on the implementation of the Reformation could be given, and a place where the retraining of the clergy and the education of future teachers could take place. Thus the University of Copenhagen was from day one of its re-establishment closely connected to the power of State and in particular the king. In reality the university was a state institution subject to the authority of the king and controlled by the so-called conservators whose senior member was the king's chancellor who at the same time also held the position as chancellor of the university.

This implies that what could be viewed as progressiveness in the pre-Reformation movement, where new philosophical and theological ideas could be created in opposition to the established learned world of catholic Northern Europe, now had to conform to the political

necessity. The university was chosen to be a stronghold for the new structure of the Danish and Norwegian society and inevitably soon developed a conservative nature. Of course one might view the part played by the university in the ongoing transformation of the society after the Reformation as an expression of a progressive or even revolutionary attitude, but this was only orientated towards the consolidation of the Lutheran princely state and did not apply to scientific or philosophical ideas as such.

The well-known fact that philosophy was regarded as the handmaid of theology applied also to the University of Copenhagen during the 16<sup>th</sup> and 17<sup>th</sup> centuries. This circumstance was of course affected by the above mentioned strong relationship between university, church and king. But the prime objective of carrying through the Reformation also influenced the work of the three other faculties of law, medicine and philosophy. As elsewhere in Lutheran Northern Europe theology at the University of Copenhagen was a study of the absolute, Evangelical truth. A truth that was the foundation of not only the very existence of the world but also the foundation on which the power of the state rested. It was therefore an unavoidable demand that this truth should remain unshaken. The teaching of theology aimed at equipping the coming parish priests with the right groundwork by teaching them this truth whilst warning against any diverging opinions. This emphasis on theology marked out the lines of instruction for the university as a whole. The instrument of foundation of 1539 specifically stated that it was the aim of all four faculties to prevent the Evangelical word from dying out and it was forbidden for students to hold declamations on new doctrines or object to the conventional truths.<sup>2</sup> In line with this view medicine, astronomy, physics and mathematics consisted above all of the dissemination of the known, God-given truths about the constitution of man and nature.

However, these truths were as a general rule explored with zeal and often sought to be further improved. It would thus be wrong to think of the university, or indeed the society as a whole, as being generally averse to science and the results it could generate. But it was implied that the object of science was to seek further knowledge of God's finished Creation. To think out, or even seeking to verify, new theories about the order of nature was a possibility that neither appealed nor occurred to the majority of the members of the learned world. And whenever

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<sup>1</sup> Martin Schwarz Lausten: Die Universität Kopenhagen und die Reformation. In Leif Grane (ed.): *University and Reformation*, Leiden 1981, pp.99-113. A short history of the University of Copenhagen is provided by Svend Erik Stybe: *Copenhagen University. 500 Years of Science and Scholarship*. Copenhagen 1979.

someone would try to pursue new ideas, as the examples of Copernicus and Paracelsus show, the publication and spreading of these ideas inevitably met with grave difficulties not the least from the universities. This was also the case at the University of Copenhagen in the 16<sup>th</sup> and well into the 17<sup>th</sup> century.

## II

The University of Copenhagen, along with most universities in 16<sup>th</sup> century Europe, apparently showed no inclination towards challenging the traditional views of science. This inertia has often resulted in a condemnation of the early modern universities by historians who have criticized the universities for being too orthodox in their reverence for the inherited science of the Middle Ages, if not for being downright hostile towards science. Yet the 16<sup>th</sup> and, more evidently, the 17<sup>th</sup> centuries witnessed a steady growth in studies of science as a whole. And these studies were carried out with a consistency that resulted in such a large amount of theoretical and practical scientific knowledge that it has become common to use the phrase the Scientific Revolution of that very period. It has been argued that the scientific landmarks of this particular era first and foremost were created by men independent of, or only marginally associated with, the world of the universities. No doubt the foundation of the scientific academies of the 17<sup>th</sup> century and the research of physicians, astronomers and others without any formal attachment to a university played an important or perhaps even decisive role in the creation of modern science. But as shown recently by John Gascoigne and Roy Porter, the part played by the universities in this process was by no means as reactionary as it has been traditionally portrayed.<sup>3</sup> In fact the traditions of the universities gave "important support to the Scientific Revolution in a number of ways" as Gascoigne puts it.<sup>4</sup> When the Scientific Revolution gathered momentum during the 17<sup>th</sup> century this support was rarely given with verve or as a result of a deliberate policy, but rather by supplying the education of the majority of the scientists involved and providing research facilities where further scientific investigations could be undertaken.

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<sup>2</sup> *Fundatio et Ordinatio Vniversalis Schole Haffniensis* [1539]. Printed in William Norvin: *Københavns Universitet i Reformationens og Orthodoxiens Tidsalder, Vol. II*, Copenhagen 1940, pp. 9-70. The instrument of foundation, largely modelled on Wittenberg, remained in effect until 1732.

<sup>3</sup> John Gascoigne: A Reappraisal of the Role of the Universities in the Scientific Revolution. In David C. Lindberg and Robert S. Westman (eds.): *Reappraisals of the Scientific Revolution*, Cambridge 1990, pp. 207-60.; Roy Porter: The Scientific Revolution And Universities. In Hilde De Ridder-Symoens (ed.): *A History of the Universities in Europe, Vol. II, Universities in Early Modern Europe (1500-1800)*, Cambridge 1996, pp.531-62.

<sup>4</sup> Gascoigne, opus cit. p.247.

### **III**

The University of Copenhagen does not fit into this description in so far as the initial careful and hesitating approach to scientific research does not appear to have been softened by the early 17<sup>th</sup> century. The professors in Copenhagen were rarely pioneers of science and judging by the few extant curricula from the early 17<sup>th</sup> century, science had not changed much since the 1530s. The teaching still followed the instrument of foundation which pointed to the traditional body of authors from the universities of the Middle Ages. Hence medicine was taught according to Galen and Hippocrates, physics according to Aristotle, and astronomy according to the theories of Ptolemy. In 1603 Hans Poulsen Resen, professor of theology and rector of the university in that year, specifically stated that his teachings were in accordance with what had been laid out *in fundatione*.<sup>5</sup> The absence of new textbooks can not be judged as a result of ignorance or indifference on the part of the professors. As a general rule they were all educated at leading universities of Europe and quite familiar with scientific discussions of current interest. But this almost never rubbed off on the university when they returned to Copenhagen to take up the vacant chairs that awaited them. As an example the physician and anatomist Caspar Bartholin had studied at length in Padua where he assisted Casserio and wrote an anatomical textbook which won widespread acclaim across Europe. Yet after his return to Copenhagen in 1611 and his subsequent appointment to the chair of medicine, he never performed anatomy at the university, neither did anyone else until the 1640's. As is evident from his medical writings, Bartholin was also heavily influenced by iatrochemistry, but he does not appear to have made any attempt at including it in the syllabus either. The University of Copenhagen had always held paracelsianism and chemistry at a safe distance. Bartholin's actions perhaps echoes the year of 1571 when the university accepted to appoint John Pratensis, who was a paracelsian and close friend of paracelsian textbook author Peter Severinus, to the chair of medicine. But at the same time the Academic Council demanded that he should confine his teaching to the works of Galen and Hippocrates. We do not know whether similar demands were put forward by the Academic Council or other influential parties at the university in the time of Caspar Bartholin. But it was doubtless understood by all new members of the academic community that they were expected to perform according to the traditions of the university.

<sup>5</sup> The four oldest extant curricula (1603/04, 1612/13, 1618/19 and 1619/20) are printed in H.F. Rørdam: *Kjøbenhavns Universitets Historie fra 1537 til 1621, Vol. IV*, Copenhagen 1874.

But the professors were not all equally hesitating in their approach to new or different scientific ideas. The year 1600 saw the establishment of a botanical garden adjacent to the university and in the field of astronomy the heritage from Tycho Brahe paved the way for a discussion of the planetary systems. Tycho's pupil and subsequent professor of astronomy, Christen Longomontanus, in 1622 published his *Astronomia Danica* which made headway for a compromise between the Tychonian and Copernican theories. A compromise which found its way into the syllabus without, however, being able totally to supersede the celebrated Sacrobosco and other medieval textbooks which prevailed well into the 17<sup>th</sup> century. Even so astronomy provides us with an example of a discussion taking place within the university on an important issue of the day. One might also point to mathematics where decimal fractions and logarithms were introduced not long after their publication by Stevin and Napier respectively.

#### **IV**

On one hand the reaction to the introduction of new scientific ideas and practises in early 17<sup>th</sup> century Copenhagen leaves the impression of a cautious attitude, where any increase in novel views at the university were doubly met with an exposition of the scientific heritage of Antiquity and the Middle Ages. On the other hand this was not the same as a total rejection of new scientific viewpoints. And more importantly it was not a total rejection of the possibility of discussing competing theories. It might be that new theories were almost invariably shot down in the lecture rooms, but they did after all get a chance, so to speak, to flap their wings before. In relation to the Scientific Revolution this fact is of the greatest importance. Because even if the university rather refuted than propagated new insights within the fields of science, the students would after all receive some basic knowledge of the scientific discoveries challenging the traditional curricula. And even if challenging theories were not discussed in the lecture room, then they were almost certainly discussed in more informal surroundings. Books written by the teaching staff usually debated views held by scientists with opinions deviating from those considered *comme il faut* in Lutheran Copenhagen. It seems very unlikely that these debates should have been confined to the pages of the books and not have found a continuation among their readers. A particularly suited place where these debates could thrive was the guided discussions or teaching of students in the homes of the professors. Here the student lodgers were bound to be introduced to a world of science with more facets than the world usually presented within the official university context.

## V

The question remains why the university in spite of everything was so slow to pick up on scientific innovations. I have already pointed to the university's dependency on the king and the need to conform the work of the university to the prevailing wishes of the state. No doubt this fact was reflected in an overall cautiousness on the part of the university. This so much more in the early 17<sup>th</sup> century where church and state in a joint effort to purge the country of persons with ever so slightly deviating opinions on matters of, above all, religion were prone to call any divergent opinion into question. The university was embedded in these actions since the faculty of theology acted as a judiciary council in all matters concerning religious disputes. Also the Academic Council, consisting of representatives from all four faculties, became entangled as not even some of the professors escaped dismissal.

On the other hand there are numerous examples of the king trying to encourage growth in the activities of the university, but where the apparent unwillingness on part of the professors halted the initiatives. In the case of anatomy King Christian IV in 1603 ordered the public dissection of a body twice a year, yet the university took no step to carry out the order. Also an attempt in 1621 to reform the faculty of medicine and introduce botanical excursions, chemistry and surgery was refused by the university. Paracelsian medicine was generally in favour at the court, but as was the case in Paris, the university doctors seem to have held even tighter on to the teachings of Galen in opposition to the court physicians.

It would therefore be wrong to judge the conservatism of the university as stemming solely from outward pressure from the king or the church as an institution. Likewise the conservatism of the university can not be said to have existed alone on grounds of inward pressure from the professors themselves. Rather it seems to have been a combination of the two factors, but which was the most decisive, and why, is a question too complex to explore in further detail here.

It is, however, possible to conclude that despite both the university itself and the state, personified by the king, took a stance that prompted a conservative attitude towards the nature of scientific research, this research and the threat it might pose to traditional science was neither ignored nor totally silenced at the university. For that reason alone the University of Copenhagen was instrumental in preparing the ground for the Scientific Revolution to take place also in Denmark and Norway.