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The Utrecht Astronomical Institute, 1632 to 2012

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Abstract. Utrecht University was founded in 1636. In 1642 the university's astronomical observatory was founded. It was, after that of Leyden, the second university observatory in the world. The observatory was initially located at the Smeetoren, a fortification dating from 1145. In 1854 it moved to Sonnenborgh, a stronghold dating from 1554. In 1987 the personnel moved again, this time to the university campus, the Uithof.
We describe the development of research and education in Utrecht over the centuries, with emphasis on the period after 1920. In 2009 the faculty formulated a very favorable advice to the university, viz. that in view of its good potentials astronomical research and education should be strengthened in Utrecht. This decision was accentuated by a likely positive advice of an international visitation committee. But briefly after that the university decided to terminate astronomical education and research in Utrecht, an incomprehensible decision.

1. The Smeetoren

In the first half of the 17th century the Netherlands - the 'Seven Provinces' - were liberating themselves from Spanish rule. This 'Golden Age' was for the Netherlands a period of prosperity. Arts and sciences flourished as never before. In this positive atmosphere the town council of Utrecht decided in the year 1636 to elevate its 'Illustrious School' to a university. Not long after that it was decided to attach an astronomical observatory to this university. The immediate next question was where the observatory should be situated. Initially, thoughts went to the 'Lichtenbergh', a large building in the center of the city, but an alternative was the Smeetoren, a defense tower of the city, built in 1145. It stood on the city's ramparts along the Catharijnesingel, the westerly defense canal, and in case of emergency it should be defended by the guild of the blacksmiths. Most of them lived in the near Smeestraat (street of the blacksmiths). The discussion flowed back and forth until in 1642 the decision finally went to the Smeetoren. The spire was removed from the tower; it was replaced by a simple platform. This observatory was the second university observatory in the world. That of Leyden university, ten years older, was the first.

One may wonder how it is that this small country had such an interest in astronomy. This was related to shipping. The Seven Provinces had a powerful merchant fleet. It was at that time even larger in size than that of all other European countries combined. Holland and Zeeland ships sailed the seven seas. For shipping, it was important to know the position at sea and that was done through the positions of the stars. Finding the location on earth was an important art for a shipping country. Hence, one of the reasons for the construction of these two university observatories was the wish to improve knowledge of the celestial sky because of the necessity to know the positions of ships by means of astronomical observations.

Figure 1. A winter painting of the Catharijnesingel in Utrecht with people enjoying themselves on the ice. The painting is due to Jan ten Compe, somewhere between 1740 and 1755. The Smeetoren is seen at the left.

There is no clear information who was the first astronomy teacher in Utrecht. Presumably this was Regius, a staunch supporter of Descartes and of the system of Copernicus. In view of the then ongoing discussion on the structure of the planetary system, geocentric or heliocentric, the appointment of Regius seems an excellent choice but by his aggressive attitude he alienated himself from his colleagues and that lead eventually to the curious result that during part of the 17th century the Utrecht astronomy was hostile to Cartesianism and to the system of Copernicus. Teaching was at that time even mainly based on the geocentric philosophies of Aristotle. An exception was Johan de Bruijn. He was appointed in 1652 as a professor of physics and mathematics. A convinced Cartesian who detested unscientific attitudes. In one of his papers he took a position against the prevailing superstition that a comet would announce doom. During his tenure (1652 - 1675) a small telescope was purchased.

In 1674, near to the end of De Bruyn's tenure, the city of Utrecht was heavily damaged by a hurricane. Part of the central church (the Dom church) collapsed and the Smeetoren too was damaged. It was only repaired in 1680.

There are no indications of any original astronomical research in Utrecht in the 17th century. There are even signs that at the end of that century, the observatory had severely declined. That changed with the appointment of Petrus van Musschenbroek, professor of mathematics and astronomy. He was from a family of instrument makers. Before being appointed in Utrecht, he was professor in Duisburg where he built an observatory. It did not stay very long because it was abandoned after his departure. In Utrecht he improved the available instrumentation. After his refusal of an appointment to Copenhagen, the city donated him a significant sum of money. That was used for the purchase of new instruments. Such happened again after his refusal of an appointment to Göttingen.

When we talk about astronomical instruments here we are not talking about large telescopes on a fixed mount. There was not even a permanent stock of instrumentation in the observatory. Customary, the instruments were kept in the professor's home and were brought to the observatory in case of need.

Figure 2. The Smeetoren in Utrecht painted by Cornelis van Hardenbergh in 1818. The tower, built in 1145, was part of the city's ramparts along the Catharijnesingel, until it was put into use as the astronomical observatory of Utrecht University in 1642.

In 1642, the year of the observatory's founding, the Smeetoren was already pretty old and that did not improve with the progress of time. It was clear from the onset that the platform was too small for the use of instruments of any significance. In the 18th century a small observer's cottage had been built on the platform but that yielded no significant improvement. In the beginning of the 19th century Van Beeck Calkoen made some attempts to modernize the observatory. His plan to build a small observatory house on the platform dates from 1808. For unknown reasons, most probably lack of money, it was not effectuated.

With the passing of the centuries, the scientific element became more prominent in the astronomical activities. Already Petrus van Musschenbroek emphasized that experiments should be the basis for scientific progress. In the early 19th century Moll and others performed some physical experiments and his students Rueb and Van Rees went on in that track. But apart from some research on the orbits of comets there was little truly astronomical research work. One of the experiments of Moll concerns the measurement of the speed of sound (shooting a gun at some distance and measuring the time difference between the appearance of smoke and hearing the shot) and another dealt with the Doppler effect. This latter investigation was done by people with absolute pitch who had to listen to the whistles from trains moving towards or away from the listener.

But the new era announced itself. Realization dawned that the old Smeetoren with its small and gradually more and more unstable platform was insufficient for real scientific research and for astronomy education. It was the famous physicist Buys Ballot who took the initiative.

2. Sonnenborgh

The construction of a new observatory is due to Buys Ballot, a versatile scientist, chemist, physicist, mathematician, astronomer. In the '40s he had dealt with a study of the physics of matter in which he advanced an atomic theory based on the assumed simultaneous existence of attracting as well as repulsing elementary particles.

Buys Ballot strove to get a new observatory to replace the Smeetoren that, in the middle of the 19th century was about to expire in ruins. The city bulwark Sonnenborgh was one of the four strongholds that had been planned in 1551 at the initiative of Emperor Charles V. Sonnenborgh had been built between 1551 and 1554. It seemed an excellent place for a new observatory that could meet the requirements of that time.

Prior to forwarding his plans, Buys Ballot had visited Brussels, accompanied by the astronomer Van Rees and the latter's coworker Krekke. They noticed that, close to the Schaarbeek Gate of the city of Brussels the astronomical and meteorological institutes stood side by side on the same field. Such was also the case for some astronomical and meteorological institutes in Germany. To the Dutch visitors that seemed a good example, to be followed in the Netherlands. With good support of the king and government arose on bulwark Sonnenborgh both the Utrecht observatory and the Dutch meteorological institute. The building plan for these two institutes was sketchily developed by Buys Ballot. The design of the observatory was drafted by the city architect Boll van Buuren and the lecturer in astronomy Rueb. On September 15, 1853 King William III laid the first stone.

The observatory, which was completed in 1854, consisted of three parts. Central was the meridian room (the 'observing room') containing a meridian circle of Simms that was acquired in 1826. That purchase was made possible thanks to a donation of 10 000 guilders from the city of Utrecht. It was given to Moll after his refusal to accept an appointment to Leyden University. There were two, initially three, additional pillars in the meridian room, on which, later in the century, a universal instrument from Repsold and a passage instrument of Ertel were placed. In the northern dome a Fraunhofer telescope found its place. It had an objective lens, due to Fraunhofer, of 11.5 cm diameter. That telescope too was purchased from the 1826 donation. The other dome initially remained empty, but in 1863 a refractor with a 10-inch lens was placed

Figure 3. Christophorus Buys Ballot (1807 - 1890), founder of the Astronomical Observatory and the Royal Dutch Meteorological Observatory at Sonnenborgh.

there. It was manufactured by Steinheil in Munich but the objective was later replaced by one from Merz, also from Munich. Among the other instrumentation there were some smaller movable telescopes.

Later, in the 80s of the 19th century another small building was placed on the site. Some ten years later it was connected with the main building by the library room. On the 'new building' as it was called, a simple, actually very primitive dome was built that would house some telescopes of various origins that did not fulfill quality requirements. Only much later, '1957' it was replaced by a modern dome. Initially this dome contained a 40 cm telescope built in Utrecht by instrument maker Van Straten. Later, the Van Straten telescope was moved to a site in Switzerland and instead came a modern Maksutov telescope.

After having established his two institutes Buys Ballot was mainly active in meteorology. The directorate of the astronomical observatory was in the capable hands of Oudemans, but he left already after a few years, being asked to direct the triangulation of Java in the Netherlands East Indies. It was a job that would take some two decades.

After his departure the observatory was directed by Hoek, an intelligent scientist with modern ideas. He was the first to realize that comets may occur in groups, an observation that suggested a common origin. Furthermore, he has intensively dealt with the question of measuring the speed of light and answering the fundamental question if that speed depends on the state of motion of the medium through which light was assumed to propagate, the 'ether'. Is the ether in absolute rest or does it move along?

Figure 4. The bulwark at Sonnenborgh, was built according to the wish of emperor Charles V, in order to improve the defense capacities of the city of Utrecht.

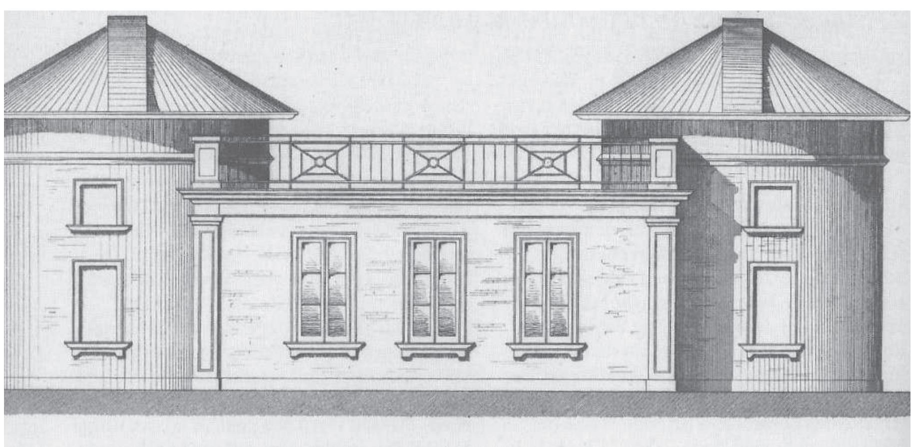

Figure 5. Drawing of the observatory as it was in 1854: two domes on either side of the meridian room. The northern dome (left) contained the Fraunhofer telescope; in the other a Merz Telescope was placed in 1863.

To this end he built an interferometer and found that the speed of light is independent of that of the source. Thus, Hook's work was a precursor of the later investigations by Michelson and Einstein.

Figure 6. The two institutes seen from the north. In the middle of the 19th century all city walls were removed to be replaced by English-style green parks. Only the bulwarks Sonnenborgh and Manenborgh were maintained.

After Hoek's untimely death Oudemans, having finished the triangulation project, returned to Utrecht. He was succeeded in 1897 by Nijland, by education a mathematician, who quickly wrote an astronomical thesis when it was realized that an astronomy vacancy would soon open. Nijland was a zealous visual observer of long-period variable stars. In his observations the variable's brightness was determined by estimating the brightness difference between the variable and one or more comparison stars. His series of observations, covering more than 30 years in the early 20th century, only ended with his death in 1936. They constitute an interesting homogeneous archive of light curves of long-periodic variables. The criticism that one could utter to his approach is that his observations could also have been made by a good and diligent amateur astronomer. He never attempted the development of new instrumental techniques, photographic or photoelectric. That gave the Utrecht observatory at the time of Nijland's death in 1936 a somewhat jaded impression. That changed with Minnaert.

3. Minnaert

This Flemish biologist graduated in 1914 at the university of Ghent (Belgium) with a thesis on photosynthesis: what is the influence of light on plants? Once, as a student, he told his supervisor how important it would be, when it would be possible, to measure the intensity of light. According to the story the supervisor answered: 'Young man, forget it; that is impossible.'

During the First World War the Fleming Minnaert was strongly committed to the project of changing the working language of the University of Ghent. Until then the lectures were, legally obligatory, only given in French, in spite of the fact that the

Figure 7. The observatory at the end of the 20th century. It shows, besides the two 19th century domes, also the cabin on the roof that contains the coelostat mirrors of the solar spectrograph. The southern dome dating 1957 is seen at the left.

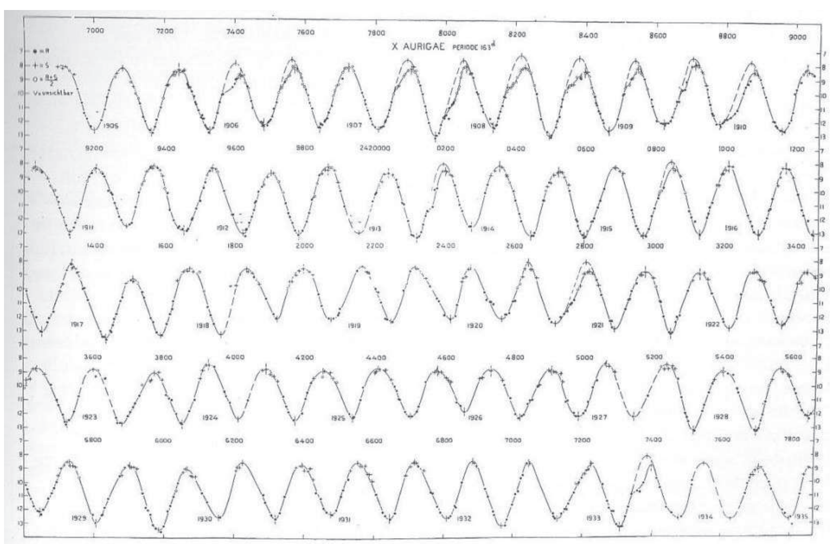

Figure 8. One of Nijland’s light curves of a long-period star. This diagram shows the variation of light of χ Aurigae between 1905 and 1935.

Figure 9. The young Flemish biologist Marcel Minnaert (1893 - 1970) prepared a doctor's thesis on the influence of light on plants, wondering if it would ever be possible to objectively measure the intensity of light.

university was situated in the Dutch speaking part of Belgium. The Flemish part of the Belgians felt this as severe discrimination. When, around 1916, the major part of Belgium was under German occupation the circumstances seemed ripe for transforming the working language into Dutch. But then it rapidly appeared that no Dutch speaking physicist of sufficient quality could be found in Belgium. Hence, Minnaert was sent to Leyden in The Netherlands, where he met various physicists, among them high-level scientists like Lorentz. After a year he returned and taught physics in Ghent. He himself witnessed the quality of his lectures as 'mediocre but anyway of better quality than what had been taught so far'.

After the war he was accused of collaboration and sentenced to a number of years of forced labor. But at that time he had already fled to the Netherlands. During his time in The Netherlands he had learned that Utrecht physicists were indeed able to measure the intensity of light. The Utrecht laboratory of physics harbored a capable group engaged in the development of photometric techniques and the study of atomic and molecular spectroscopy. In order to have access to high dispersion spectra of a strong light source the director, professor Julius, had built a solar spectrograph. This was the third world-wide, after the solar spectrographs of Mount Wilson and Arcetri.

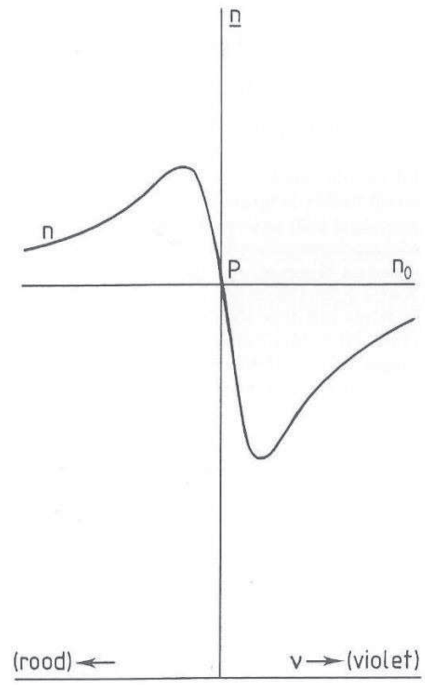

Figure 10. Anomalous dispersion plotted against the wavelength.

Minnaert came to work under Julius. After having lived in Utrecht for a year at his own expense he got an appointment at the physics laboratory. Besides his work for the laboratory he started his study for a second doctor's thesis, this time one on the theory of spectral lines in the Sun. We now know that they are caused by electronic quantum transitions in atoms and ions in the solar atmosphere. But at that time such was hardly known, certainly not yet generally accepted. Julius proposed that the lines were caused by the process of anomalous dispersion. That process does indeed create a dark absorption at the wavelength of the line. Moreover, these absorptions are slightly displaced with respect to their theoretically expected wavelengths. The displacements can be measured. Minnaert did indeed find that the lines were slightly displaced and came to the somewhat triumphant conclusion that the wavelength shift, that had earlier been predicted by Einstein, was not necessary to explain the line shifts.

In these investigations it was overlooked that the solar atmosphere is too tenuous for producing any significant degree of anomalous dispersion. The density of the solar atmosphere was not known at that time. That Julius and Minnaert were on the wrong track was made clear in a publication by Albrecht Unsöld from Kiel, Germany. He explained line formation on the base of the earlier developed quantum theory. Absorption, scattering, re-emission, all play a role. That was the reason why Minnaert suddenly realized that he was on the wrong track. It was for him the impetus to change his direction of research and that initiated rapid and significant developments in which he set up, in parallel with Unsöld, the theory for the origin of solar spectral lines.

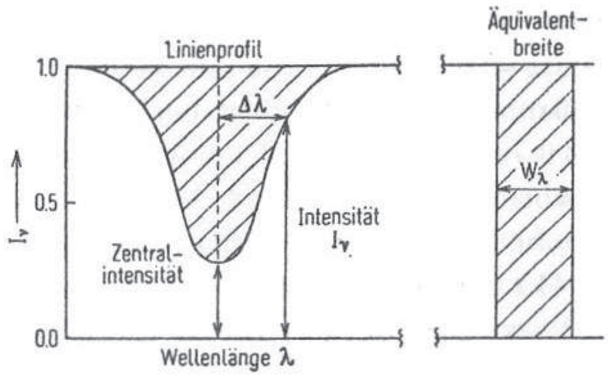

Figure 11. Introducing the notion 'equivalent width' by Minnaert (1927).

As a start he developed the concept of equivalent width of spectral lines and soon after came the theory and observation of the curve-of-growth. This was all worked out by a number of younger coworkers, including Mulders and Houtgast. The latter was the first to be put to the study of detailed profiles of strong spectral lines. He showed that 'redistribution' (at that time called non-coherent scattering by Houtgast) does play a role in the formation of the line profile. Thus, Minnaert and coworkers laid the foundation for the physical theory of spectral lines in the Sun and, hence, also in the atmospheres of stars. His collaboration with Unsöld was of great importance.

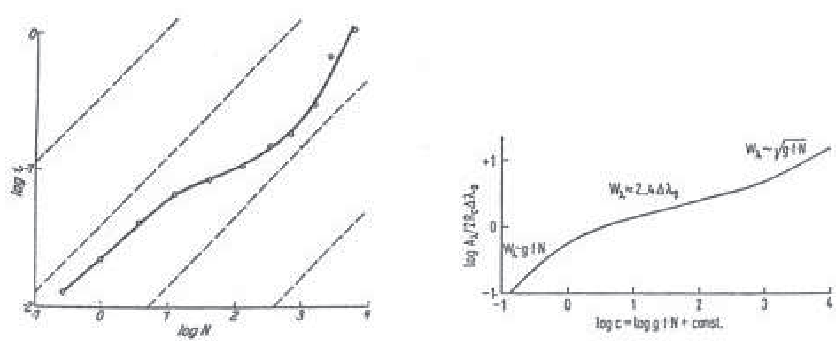

Figure 12. The first curve of growth (1929, left) and a theoretical model (right).

In that same period the famous Atlas of the Solar Spectrum by Minnaert, Mulders and Houtgast was published. The first few printed copies could leave the country just before the occupation of The Netherlands in 1940. It was an important document that for decades proved to be an essential source for the study of the photosphere of the sun.

After Nijland's death in 1936 Minnaert was appointed as his successor. It so happened that at about the same time he was invited for a professorship in Chicago with access to the Yerkes observatory, at that time one of the world's most important astrophysical institutes. But Minnaert choose Utrecht.

It was also in the years before the 2nd World War that the tradition of spectral observations of solar eclipses started. The 'flash' spectra of the chromosphere yield information on this nearly inaccessible part of the sun - the transition layers between the photosphere and corona. A long series of eclips expeditions led by Houtgast extended for several decades of the 20th century. The series was discontinued only in the seventies when knowledge of the outer solar layers could be derived from near-continuous space observations.

4. Post-war Years

After five years of heavy occupation with hundreds of thousands dead, came May 5, 1945. A glorious day. We were free! The Netherlands were liberated! But we had to restart from scratch. The country was devastated; the most necessary was missing. Reconstruction took time and energy. But gradually the country recovered and also the astronomical work could make a fresh start. The university lectures were resumed with a large number of students that were eager to start their studies after years in which that had been impossible.

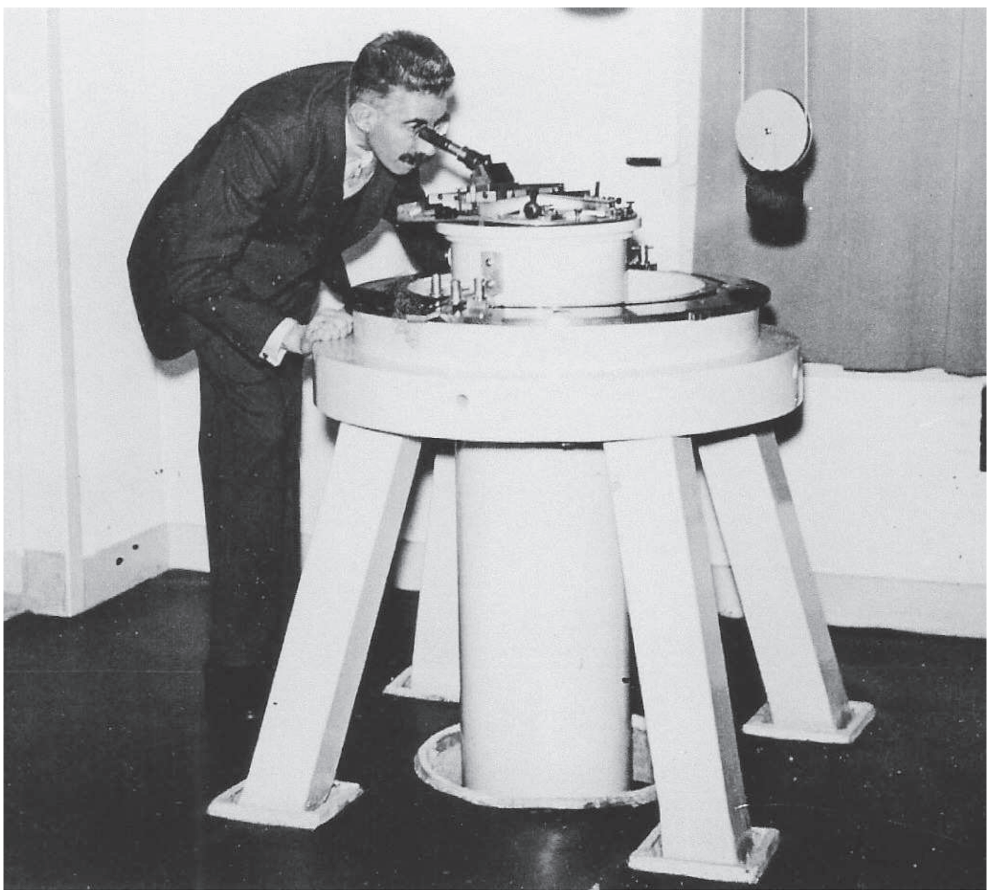

Figure 13. Minnaert at the solar spectrograph, after the move of the instrument from the physics laboratory to Sonnenborgh.

Scientific investigations also restarted. While the work of Minnaert and Unsöld learned how the analysis of the spectrum of the sun could yield values for the average temperature, pressure and state of motion of the solar photosphere, that analysis could be refined on the basis of the examination of the detailed profiles of spectral lines. The variation with depth of the various physical parameters, hence the 'model' of the photosphere could be determined. Once that had succeeded, it was realized that such an approach should be possible too for the investigation of the atmospheres of stars. Thus, gradually, the study of stars and their atmospheres and the related basic topics of the structure and evolution of stars became part of the work in Utrecht. That research began with the study of O- and B-type stars but later the investigation focused on specially selected groups of stars, in particular such groups that could give crucial information on the origin and evolution of stars. In that line much attention was paid to determining the mass loss of stars. Among the groups of stars that got attention were the hypergiants, a small group of extremely large stars with masses more than some 20 times that of the sun and diameters of several hundred times that of the sun. Objects close to their final evolutionary stage. Their continued observation yields information on the last stages of the evolution of massive stars. This is just an example of one kind of stars that were investigated. More objects and types of stars could be mentioned.

Solar variability became important. During the International Geophysical Year, 1957 -1958, there was increased awareness of the importance of variable phenomena on the sun. That was for two reasons. First to better understand the structure and functioning of the solar body (the concept of the solar dynamo was gradually developing). What is a sunspot? What is a solar flare? How do they originate and what are their physical properties? However, the study of solar variability is also important for its impact on the earth. Are a flare's radiation harmful to our planet? And how about the Coronal Mass Emissions and the magnetic fields carried along? Do they influence terrestrial phenomena?

For such studies solar radio astronomy, another post war development, was important, next to the investigation in visible light. Attention was paid to the transient phenomena in the radio spectrum. With a very fast solar radio-spectrograph, developed in Utrecht, the physical properties could be studied of the so-called Type III radio busts. These very short lived spectral phenomena are caused by particles that move outward through the corona, almost at the speed of light. Their study draws the attention to relativistic phenomena in the outer layers of the sun.

In addition, new physical methods for the spectral study of sun and stars were introduced. The technique of heterodyne spectral analysis was developed. It consists of mixing the stellar light with that of a source radiating a coherent, very monochromatic signal: a laser. That way it is possible to study cosmic objects in frequency ranges that would be inaccessible other ways. As a start, a model of an opto-electronic receiver was constructed. Test measurements were performed on the planet Jupiter and bright stars such as α Lyrae. Later observations referred to more exotic celestial objects. Several decades later this technique was successfully applied in the HI-FI experiment in the Herschel space telescope.

An ambitious project was the cleverly designed Dutch Open Telescope (DOT), a revolutionary concept for detecting small details on the sun. After a long period of building and preparing, the instrument was set up on a stable tower on the Atlantic island of La Palma. It provides basic data about solar structures with sizes close to the telescope's diffraction limit. This performance is achieved by eliminating most of the atmospheric disturbing effects. Small details can thus be shown. The DOT shows how magnetically confined loop structures originate and evolve in solar Active Regions and

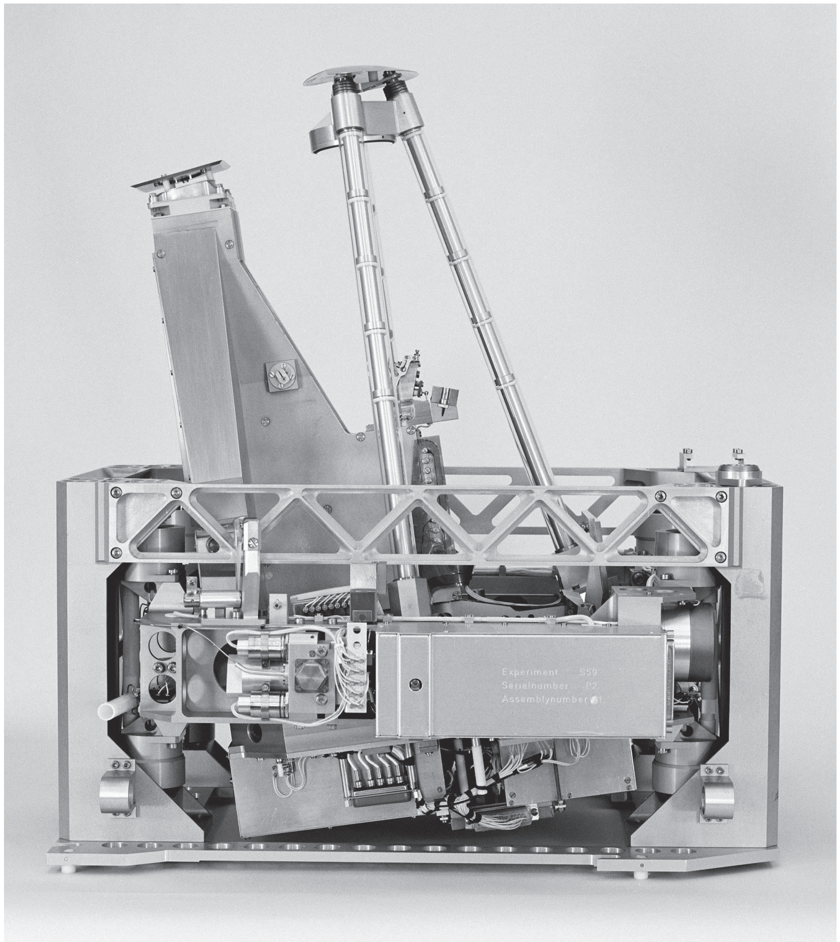

Figure 14. The first satellite-borne stellar spectrograph ever (S59) was constructed in a cooperative project of the Utrecht space research laboratory and TNO (Technical Organization) in Delft. It was launched in ESO's TD1A satellite in 1972.

beyond. Electric currents are running through these loops. They can be as strong as hundreds of billions of Amperes. Such loops may give rise to the occurrence of solar flares.

5. Space research

In 1961 space research was started in Utrecht. An initially small group developed rapidly and gave rise to the Laboratory for Space Research. Administratively it was loosely connected to the university. Its functioning was made possible by a special grant from the Ministry of Education and Science. Parallel to it arose the space research group in Leyden, followed a few years later by the group in Groningen.

In line with the Utrecht traditions the first space studies were directed at the sun. Space research enables one to observe features emitting high-frequency radiation and

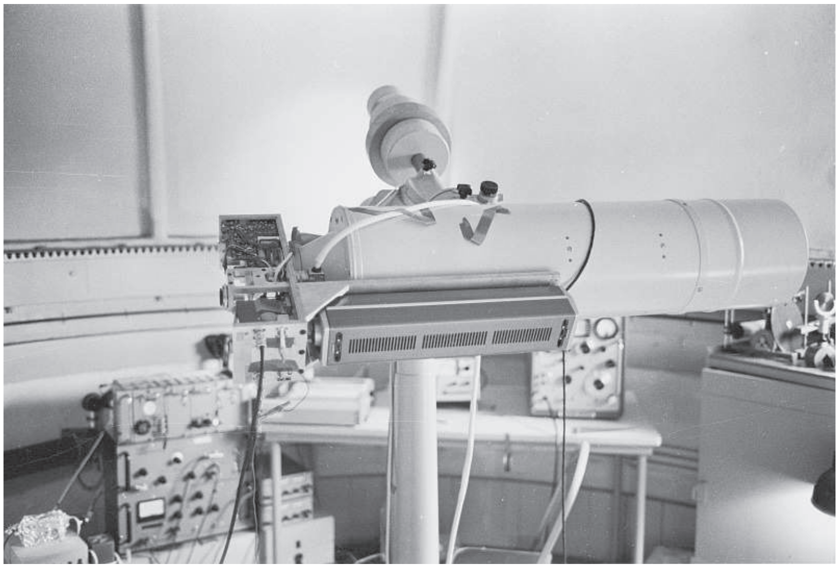

Figure 15. An experimental heterodyne receiver mounted at the Maksutov telescope of the Utrecht observatory.

Figure 16. The Dutch Open Telescope (DOT), on the island of La Palma. It was inaugurated in 1997 by Prince Willem Alexander of The Netherlands.

particles - in short, it gives access to hitherto unobservable highly energetic solar phenomena. Instruments were developed for observing solar flares in X-ray wavelengths. There were some indications that the essential part of a solar flare is not what is seen in visible light, phenomena with temperatures of the order of one or a few tenthousand

K. Investigations in the X ray domain showed that a flare often starts with a highly impulsive phase with temperatures of the order of millions of degrees.

After the first observations more refined instruments were developed. These, better suited to the problems under investigation, led to the discovery that many flares have an initial period lasting for a few to several tens of seconds in which temperatures are reached in the order of 50 to 70 million degrees.

These observations generate the question where on the sun these high temperatures are effected and thus a large X-ray camera could find a place in NASA's Solar Maximum Mission satellite. In this instrument X-ray imaging was based on a 'coded mask' of considerable size - technically a difficult enterprise. The 'camera' was able to image fairly small details on the sun. It confirmed the suspicion that flares can originate by the process of reconnection of two current carrying loops. The 'short-circuit' that thus arises leads to a very energetic plasma with the observed high temperatures. Once, a solar flare was observed that showed a series of 13 subsequent bursts, each lasting not longer than 0.1 second, during a total time span of about one second. Each of these 13 bursts had temperatures of the order of 400 to 500 million degrees.

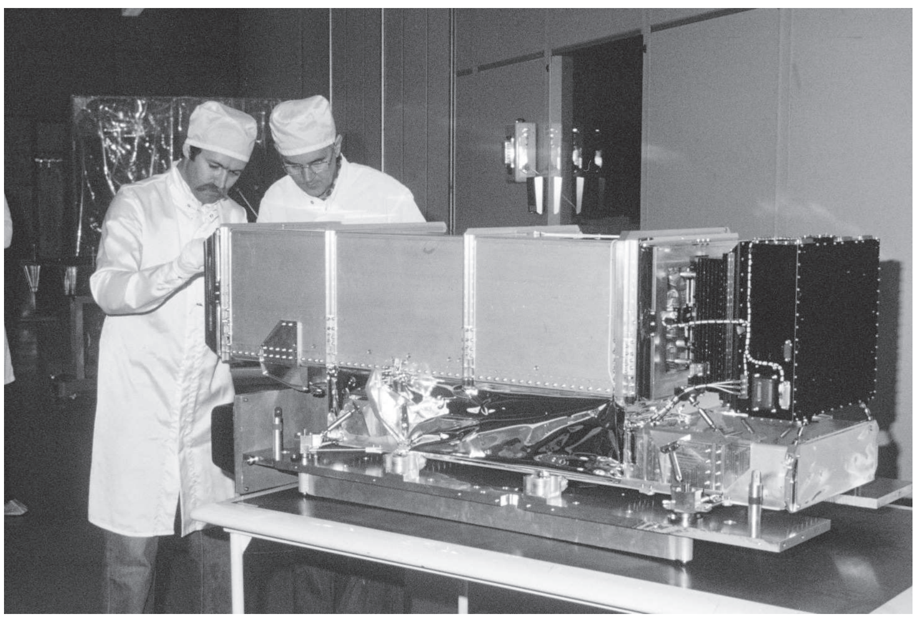

Figure 17. The Hard X-ray Imaging Spectrometer (HXIS) in the laboratory, before being placed in NASA's Solar Maximum Mission. SMM was launched February 14, 1980.

Another branch of space research in Utrecht was that of stellar spectroscopy. The first stellar ultraviolet spectrograph that was ever launched in a satellite was produced in the Utrecht laboratory. It was the spectrograph S59 in the European TD1A satellite. It yielded ultraviolet spectra of a hundred bright stars.

In the course of this work it became clear that the cosmos shows intricate explosive phenomena of various and often very surprising kinds. A very first indication was found with an Utrecht instrument in the Astronomical Netherlands Satellite, ANS. It detected X-ray bursts that originated in degenerate stars in globular clusters. Hence it became clear that a fascinating future was lay in the study of highly explosive phenomena in the cosmos. They would bring us closer to the most fundamental aspects of the lives of stars and of the evolution of galaxies in our universe.

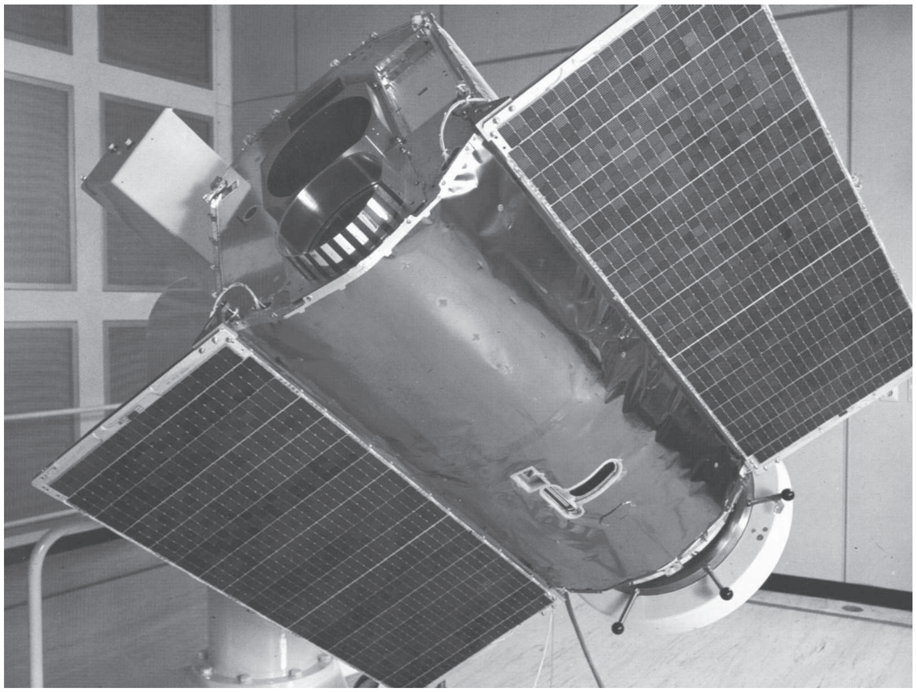

Figure 18. The Astronomical Netherland Satellite, launched 1974, discovered X-ray burst originating from degenerate stars.

Another important discovery in that line was the identification, at the end of the 20th century, of the Gamma-ray bursts, a phenomenon that had been unclear for some thirty years and whose origin was finally clarified thanks to observations in the Italian-Dutch satellite Bepposax.

6. The last phase

In 1987 the stronghold Sonnenborgh was left. For a long time already it had been too small and too primitive for modern research. The laboratory for space research had already departed much earlier and had found its own location elsewhere in the city of Utrecht. In 1987 the astronomers moved to the university campus ‘De Uithof’ and some years later space research too found a site in a nearby building. And so, after a few decades, the two components found each other back at the same location. Meanwhile, the space research groups in Leiden and Utrecht had joined forces, now in the same Utrecht location, and at about the same time they were united in one umbrella organization with the group in Groningen. The umbrella organization of Dutch space research carries the name SRON: Space Research Organization of the Netherlands. The SRON is no longer linked to a university but it is an independent institute under NWO, the Netherlands Science Organization

Summarizing the recent work in Utrecht, a small part of the ongoing research is directed at the development of structures in the solar atmosphere, on the basis of DOT observations.

The main part of the research in the Utrecht astronomical institute is focused on such kinds of stars that could be assumed to be 'strategic' objects: What will the study of selected stars and groups of stars learn of the structure and formation of the universe and it diverse compounds. One example of such groups is the supernovae, light markers of the expansion of the universe.

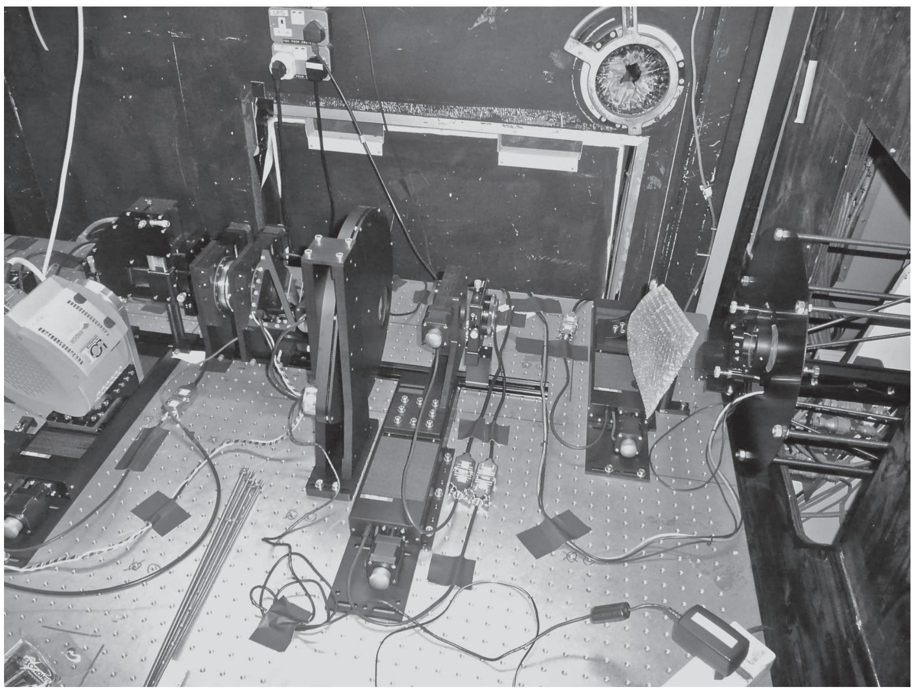

Figure 19. The Extreme Polarimeter as installed at the Nasmyth focus visiting instrument platform of the William Herschel Telescope on La Palma

A third promising recent development is that of studying the polarization of the atmospheres of stars and planets. The 'Extreme Polarimeter', ExPo is an imaging polarimeter used for high-contrast observation of circumstellar environments in the visible part of the spectrum. The instrument is designed to be flexible, with individual components that can be upgraded or replaced. This allows for continued improvement of the instrument between observing runs. Such instruments may improve views on planetary atmospheres and of gaseous cosmic structures in general. In principle they are of a size that makes it easy to carry them along in satellites. A fascinating other aspect is that these instruments may eventually enable one to detect atmospheres of exoplanets by the study of the polarization of their light.

A great future seemed to lie ahead for astrophysics in Utrecht.

That was also the opinion of the Faculty of Physics of Utrecht University. A few years ago this Faculty concluded that the promising and high quality of Utrecht astronomical research makes it desirable to strengthen the group by the appointment of some additional employees and another professor. Also, a new building for astronomy and space research should be made available.

This positive view was shared by an international review committee headed by the US astronomer, Professor Frank Shu. This committee formulated as one of its conclusions that the work in Utrecht was of comparable level as that of the major US astronomy departments.

The future still seemed bright for astrophysics in Utrecht.

To everyone's surprise it ran differently. In 2011 the University decided to terminate Utrecht astronomical teaching and research and a year later, 2012, after 370 years, astronomy ended in Utrecht. Words of protest and surprise could not help. No explanation was given. The astronomers from Utrecht and with them those from the Netherlands and the world are stunned and saddened.

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