STScI

Schnörringen Telescope Science Institute

From the idea until the opening

THE CONSTRUCTION OF THE SCHOOL OBSERVATORY IN WALDBRÖL

80cm Cassegrain telescope for sale

That's what it said in the April (!) 2008 issue of the magazine "*Sterne und Weltraum*". Klaus Vollmann and Thomas Eversberg were unsure whether it was an April Fool's joke, but there was an email address for the University of Munich, which allegedly wanted to sell its research telescope on the Wendelstein in the Alps. The following month was full of excitement, but developed into an extraordinary project that was to influence an entire educational region. This chronicle reports on the following 15 years until the opening of the Waldbröl school observatory.

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Greeting from Prof. Dr. Anthony Moffat

In today's world, the number of young people embarking on scientific careers seems to be dwindling. This is already having negative consequences in various fields such as neuroscience (the last frontier of medicine), climate research, space-based research and many others.

How can we get young people interested in science? Astronomy is widely regarded as the sharpest hook to attract young people into the professional world of scientific research and engineering, as the exciting discoveries in the cosmos continue to generate huge attention. We should therefore welcome initiatives such as those of Thomas Eversberg and Klaus Vollmann to build a world-class astronomical observatory "*of, for and by the people*" (to quote the first American president).

The *Schnörringen Telescope Science Institute* is already well established to provide such a hook with its open doors to pupils and students from near and far. It is even capable of doing serious science. Pretty pictures are one thing, but this observatory wisely focuses not only on imaging (which is limited by the difficult climatic conditions in Germany) but especially on spectroscopy true to the well-known mantra that a picture is worth a thousand words, but with the addition that a spectrum is often worth a thousand pictures!

I know from the *Observatoire du Mont Mégantic at* my institute in Canada that having your own astronomical observatory is a great attraction, and not just for students of astronomy. Once young people are enthusiastic, this applies to all areas of science. It really works! And the telescopes in Schnörringen will inspire young people even earlier in life. It's a win-win situation.

I wish Thomas, Klaus and everyone involved in this incredible project the very best of success!

Anthony F.J. Moffat is Professor Emeritus of Astronomy at the Université de Montréal in Canada. He researches massive stars, their winds, binary stars and the structure and dynamics of star-forming regions and galaxies. After completing his Master of Science at the University of Toronto, he obtained his doctorate at the University of Bonn and habilitated at the Ruhr University Bochum. He has been researching and teaching in Montréal since 1976, is a Fellow of the *Royal Society of Canada* and was awarded the Carlyle S. Beals Prize of the *Canadian Astronomical Society in* 2022 for his outstanding career, scientific achievements and charitable work.

Introduction

Since 1999 there has been an astronomical observatory in Waldbröl-Schnörringen - the SCHNÖRRINGEN TELESCOPE SCIENCE INSTITUTE (STSCI). This observation station was founded by the astrophysicist Dr. Thomas Eversberg and the atmospheric physicist Dr. Klaus Vollmann. Both have been passionate astronomers since their youth and have been working together since 1986. The STScI had sophisticated instrumentation and a control room with complete computer equipment. The background to this observatory is the earlier research activity of the initiators. The STScI therefore also cooperates with the international research community.

In summer 2008, Eversberg and Vollmann acquired a heavy telescope weighing 1.2 tons and with a mirror diameter of 0.8 meters, which had previously been operated by the LUDWIG-MAXIMILIAN-UNIVERSITÄT Munich as main instrument for astronomical research in the Alps and has now been decommissioned. The device is the largest astronomical telescope in North Rhine-Westphalia.

The beginnings (1985- 2007)

In 1985, Klaus was walking through his home town with a friend when the friend suddenly said: "*There's Thomas*". He had spotted his motorcycle in front of an arcade and they both went inside. Klaus already knew that this Thomas was also interested in astronomy and he wanted to meet the guy. But the motorcycle was parked in front of an arcade (!) and he spotted the guy in a light green leather suit in front of a slot machine. "*Oh my goodness, what a load of garbage!*" Anyway, the conversation quickly moved on to astronomy and why bother with this daddling nonsense?

1986 was the time of Comet Halley, but it was more visible in more southerly latitudes. We had two mutual friends and we planned a trip to La Palma together. However, it seemed that the other two friends wanted to empty a few crates of beer while we wanted to see the comet. The trip fell through and we contented ourselves with observations at home. An unsuccessful comet observation in the mountains at home then ended in a breakfast where a plan to build a joint telescope took shape. Klaus wanted a telescope for photometry of minor planets, so he needed long focal length optics. Thomas thought this was a waste of time and was much more interested in photographs of galaxies, for which he needed short focal length optics. Both decided to solve this problem with a compromise and build a Newtonian-Cassegrain telescope. Klaus had already started to build a heavy mount beforehand, but wasn't making much progress on his own. It's better not to do big projects alone. And when you have completed a project, you know pretty well what you would do differently in the future. That was the case here. We now know that a telescope tube made of aluminum is difficult to manufacture, that self-aligning ball bearings for telescope mounts have too much play and that worm gears should be as large as possible. The mechanical requirements for a good mount are very high and require careful planning. After many detours via various manufacturers and workshops, the mount took shape after some time.

At the same time, we needed a mirror optic. We decided on a large 12.5-inch optic in the aforementioned Newton-Cassegrain configuration. The European manufacturers were offering 5,000 -
10,000 marks was far too expensive. At that time, magazines were the only sources of information and advertising that could be consulted. The American magazine "Sky & Telescope" listed the company Scott Optical in Fresno, which offered the desired optics for the equivalent of
offered 1,500 marks. Those were the days when overseas phone calls cost a fortune and while Thomas was in his

As I tried to clarify details with the manufacturer in my rudimentary English, Klaus sat next to me with a stopwatch to keep an eye on the telephone costs ("*Five marks... ten marks... fifteen marks...*"). We wanted to buy an optic for a fortune, didn't know the manufacturer in the USA and didn't know how good it was. We transferred the money! Several months later, when a heavy parcel containing the optics arrived at Thomas', Klaus turned up with a bottle of Krim champagne and said: "*I wanted to set an example!*". It wasn't until much later that the optics were tested at the astronomical institute of the Ruhr University in Bochum, where Thomas' graduated. It was found to be good.

"First Light" of our first telescope and its mount in 1993.

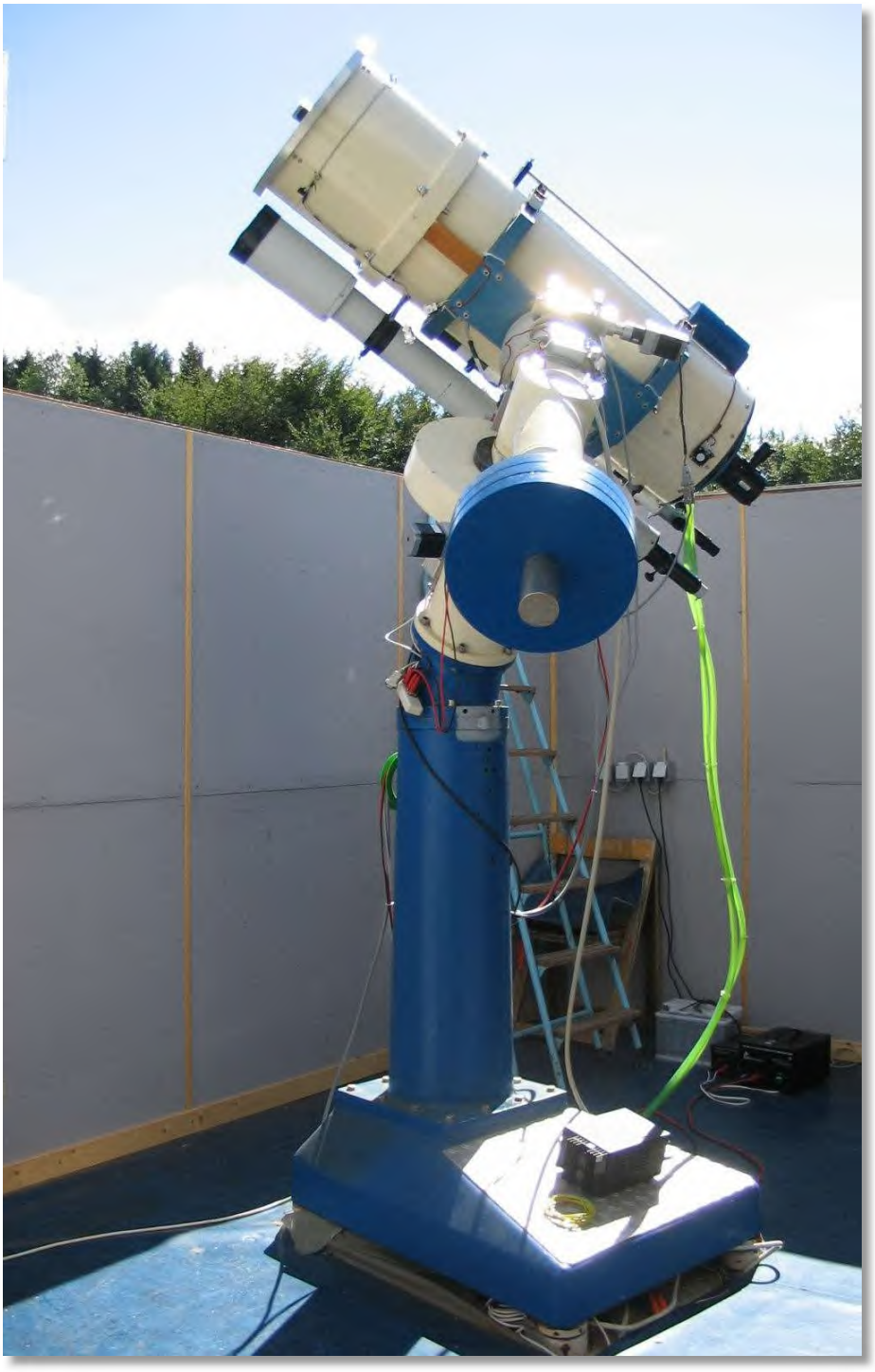
But where should it be monitored? It's not possible in the city and a 100 kg system can hardly be transported in a car and set up and dismantled at a moment's notice. So farmers in the Sauerland region were asked if they would lease ten square meters. A permanent observatory was needed. The telescope was almost finished when things came to a complete standstill. Even during their physics studies, the two had hardly any time to indulge in their hobby, but now they were working on their doctorates and Thomas was leaving Europe for Canada for four years. The two of them arranged something else. Whoever owns their own property will also make it available for the joint observatory.

In his third year in Montréal, Thomas suddenly received the news that his old diploma institute in Bochum was giving up its heavy 800 kg mount for the training telescope. Thomas and Klaus knew the elephant quite well and were electrified. They remembered the two enthusiastic amateur astronomers who tested their telescope on the roof of the institute and threw a little party. In short: we could have the heavy metal. You have to understand the offer: A heavy axle cross from the legendary Wachter company with a huge worm wheel on a massive column from Zeiss. Nothing wobbles! We entered a new dimension. With the support of the metal workshop at the Faculty of Physics, the gears were reworked, supplemented and converted into a computer-controlled system. Thomas and his colleague Uwe Schröder had suggested this to the astronomy professors years before, but they wanted to buy something new off the shelf (today there is a wobbly thing). The ited until Thomas returned from Canada.

Construction of the first observatory in 1999.
Klaus Vollmann and Karl-Werner Eversberg

In the meantime, Klaus had arrived in Waldbröl-Schnörringen, where he settled down and met his future wife Susanne. Thomas first landed in Hanover and had never heard of the spot before (he got lost on his first journey). But that was a really "Astronomical" place. Dark and relatively high up at 300 meters. In the year

In 1999, a few months after Thomas' return, we spent our summer vacation building a permanent observatory on Klaus' property outside Schnörringen. And after a freezing cold night at the telescope, five years later we had a heated control building with full computer control (hikers mistook the two huts for garden sheds).



Our first telescope on a heavy Wachter mount.

Coincidentally, we both worked on spectroscopic measurements during our doctorates. Thomas was never quite clear what Klaus was really doing with his strange rocket experiments in the high atmosphere and Klaus kept questioning the various dubious methods used in the spectroscopy of massive stars, which fascinated Thomas. Spectroscopy is THE tool in astronomy and we had now become scientists. Of course, we now needed a spectrograph. You couldn't buy such devices back then, so we calculated, planned and built the device ourselves. Once again, the metal workshop at the Faculty of Physics in Bochum took care of the mechanics. We bought a camera that was water-cooled by a car radiator and had a professional detector built into it. Every now and then the antifreeze had to be drained - what a mess. And after a lightning strike, all the glory of water cooling was over. The Internet arrived and a website was needed. But which address should it be? The Hubble Space Telescope is operated by the *Space Telescope Science Institute* in Baltimore. It has the web address www.stsci.edu. As a joke, we turned it into the *Schnörringen Telescope Science Institute* www.stsci.de. What was originally intended as a joke has developed into a well-known name in the amateur and professional scene. Thomas is friends with the director of the observatories on the Canary Islands. He once noticed that a screenshot of Schnörringen's website was hanging on the notice board at the STScI in Baltimore.

Our first observatory with control room.

So now the first observatory stood in Schnörringen, fully equipped with a large telescope, two smaller telescopes on a very heavy mount, with full equipment including spectrographs for analyzing light.

You need a workshop for such a system and Klaus had wanted to buy a lathe for some time. One day, he found a suitable machine on the Internet and set it up in his workshop. Our basic training from our days as trainee electronics technicians and materials testers was a long time ago. We needed a refresher. Our colleagues at our trusted metal workshop in Bochum invited us to a one-week internship and we took up residence at Uwe Schröder's in Bochum. If you turned u p at the workshop just five minutes late in the morning, the choir would start:
"*Maaahlzeit*".

Four members of the STScI: Klaus Vollmann, Hans-Werner Eurskens, Hans Nimmert and Uwe Schröder.

Scenes at the internship.

A new idea

Thomas had written his doctoral thesis on the winds of massive stars. These winds are in a state that can only be modeled using complex mathematical methods. Thomas had little knowledge of these methods. Klaus, on the other hand, had modeled precisely such conditions in the Earth's high atmosphere during his doctorate. It made sense to continue our research fields and measure the winds of massive stars spectroscopically at our own observatory and then model them in order to gain new insights. There was only one problem: the evolutionary state in which these stars develop such winds is relatively short (a few million years). Therefore, there are not many of these stars in the sky. They are also relatively faint, so that our telescope could only reach them with very long exposure times. We actually needed a larger telescope, perhaps 60 cm aperture, for our planned investigations. Since astronomers tend to be megalomaniacs when it comes to instruments and our mount could easily carry such heavy and large telescopes, we set out to find one.

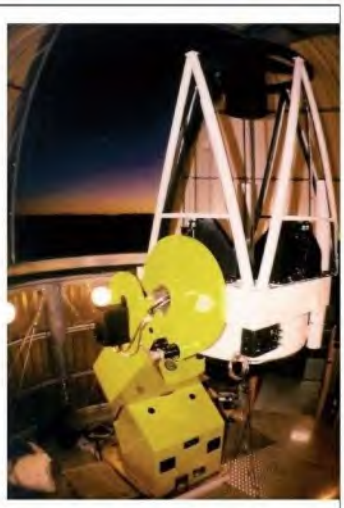
2008 - A new telescope and the founding of the association

Thomas heard again from his old institute that their 61cm "Bochum Telescope" in Chile should no longer be operated and handed over. The operating contract with the "European Southern Observatory" (ESO) on Mount La Silla in Chile expired (ESO concentrated on large telescopes) and the University of Bochum did not want to modernize the device or the mount that had already been handed over to us. We signaled our interest and had ESO calculate the costs for dismantling and transporting it to Germany. We almost had it in the bag, but the professionals in Bochum then decided to give the telescope to the university in Valparaiso/Chile. A second opportunity arose at the observatory in Sonneberg/Thuringia. A 60 cm telescope was stored there, which was not to be used in the foreseeable future. However, an inquiry revealed that the people of Sonneberg did not want to give up the telescope due to their own observation plans. Today, the observatory is a museum.

But then Klaus was pointed to a small advertisement in the magazine "Sterne und Weltraum" by a colleague.

80-Zentimeter-Cassegrain-Teleskop abzugeben

Die Universitäts-Sternwarte München gibt das bislang am Observatorium Wendelstein installierte Teleskop gegen Höchstgebot ab. Die Übergabe des Teleskops erfolgt am Talbahnhof der Wendelstein-Zahnradbahn. Nähere Informationen über Systemdaten, Zustand des Systems und Datum der Verfügbarkeit ausschließlich gegen schriftliche Anfrage (E-Mail) bei der Universitäts-Sternwarte: hopp@usm.lmu.de. Angebote bis 10. Mai 2008 schriftlich an:
Dr. Ulrich Hopp, Universitäts-Sternwarte München, Scheinerstraße 1, 81679 München



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He called Thomas. "*Get the magazine!*". He replied "*Attention, April issue!*", but then set off after all. An e-mail then clarified that this was by no means an April Fool's joke. So off we went! According to the advertisement, we had one month to inspect the telescope, possibly on site in the Alps, and then submit our bids. It became quite a

extraordinary month full of stress, humor, a trip, many discussions, phone calls and bids.

First we traveled 600 km by car to Bad Tölz to visit our friends Karin and Wolfgang Holota. Both are trained physicists and Wolfgang in particular is an expert on telescopes and their optics. We wanted to take him with us to the Wendelstein as a consultant and not miss out on Karin's homemade cake. After the cake, we continued 50 km to Brannenburg at the foot of the Wendelstein. We then took the cog railroad up 1200 meters to the mountain station and then the remaining 100 meters by elevator to the observatory. They were already waiting for us there. We took a close look at the object of our desire and pored over the construction plans with Wolfgang. "*Are there two friction wheel drives braced against each other or is that a drive bearing and an encoder?*" - *"It's one bearing and one encoder."* - *" What about the refrigerator-sized control unit?"* - *"It's included in the delivery."* - *"Do the TTL electronics still work?"* - *"Yes, but the cabling is US standard."* - *"Who takes the telescope apart?"* - *The observatory staff do that."* - *"How are the parts brought down to the valley?"* - *"On a freight trailer of the cog railroad."* - *"And where is the handover?"* - *"At the valley station."*

We told the director of the observatory, Mr. Hopp, that we wanted to use the device scientifically with a spectrograph, knowing full well that this would be appreciated by the professionals. When asked, he told us about the competitors. There were various associations with many members ("*They will have money!*") and a museum in Switzerland. "*A museum for this device? There's no way you're doing that*." He grinned. Our big opportunity was, of course, the short information channel between just two people. How is an association with 120 members supposed to coordinate between bids at short notice?

This was not just any large telescope, but a professional instrument with all the technical refinements for scientific work. It has so-called active optics. Mechanical elements prevent the primary mirror from shifting from the optical axis when the telescope is tilted during observation. Invar elements keep the distance between the primary and secondary mirrors constant even at different ambient temperatures. Fans ventilate the primary mirror for thermal adaptation to the ambient air. The primary mirror is mounted flat on an air cushion to prevent bending of the optics. All measures ensure optimum imaging quality at all times.

After three hours we knew enough and drove back to Bad Tölz. After a long discussion with Karin and Wolfgang in the evening, it was clear that we would take part in the auction. And after a Bavarian breakfast the next morning, we headed north again.

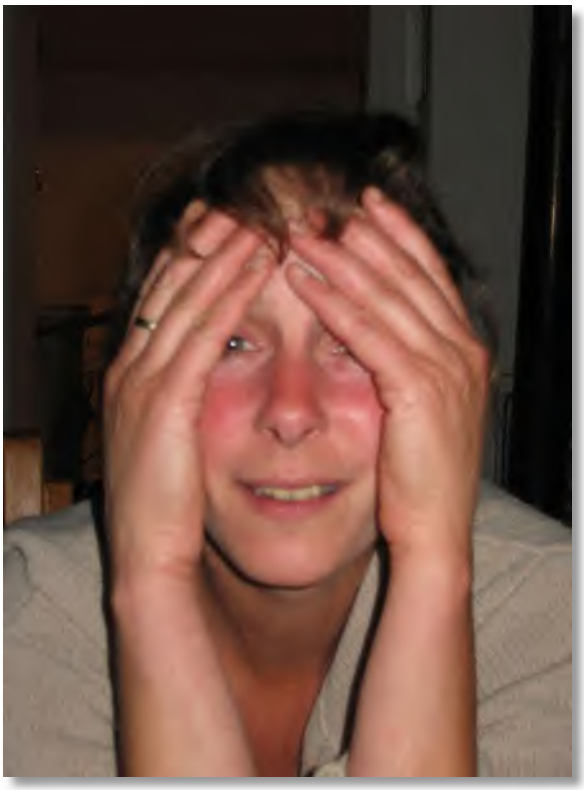
This was not an auction on Ebay but the bids had to be submitted by email. The highest current bid was then sent to everyone and the round started all over again. After a few days, the first bid was 500 euros. We knew the value of the telescope and thought it was probably a joke. So we showed what a rake is and initially bid 15,000 euros to impress our "opponents".

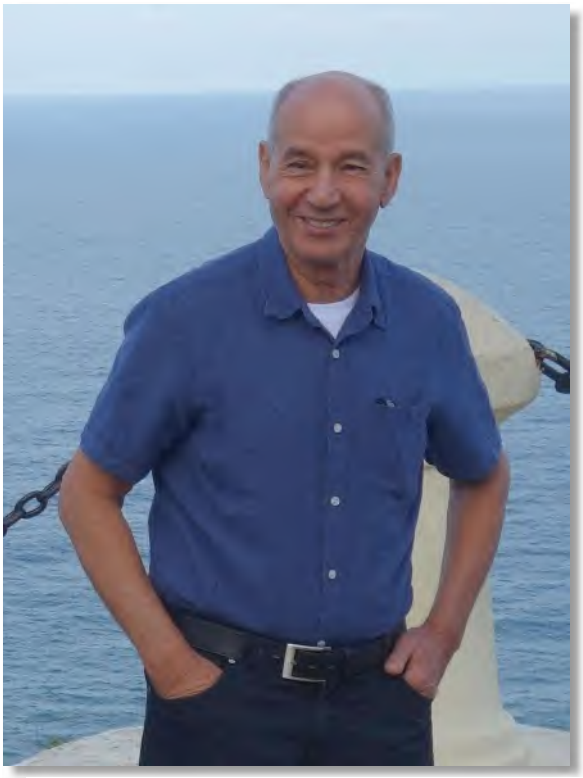
The Wendelstein and the observatory at the top of the mountain.

The observatory of the University of Munich

In parallel to this circus, we now had to raise money. We didn't have a few thousand euros. So we sold all our instruments from the old observatory to an astronomical school laboratory in Wuppertal. It was a win-win situation. On the one hand, the people in Wuppertal got a heavy professional system with scientific instruments for a reasonable price, which could not simply be bought. On the other hand, we both got the money we needed for the new telescope. Everything was completed in a few days - time was of the essence - and a bid of 30,000 euros was sent. Three days before the auction ended, we received the news that 35,000 euros had been bid...

Klaus was planning a new kitchen and made a very cautious inquiry with his wife Susanne. The conversation between the two is unknown, but the kitchen could wait. Thomas was now at the limit of his financial resources and happened to tell his uncle Abdelali Aouati in Frankfurt that the matter was probably settled. For Abdel, however, this was out of the question. He realized the unique opportunity for Thomas' dreams and gave him the final push! We won the bid for 40,500 euros! Thomas: "*When I got the news, I danced in circles! It was a feeling of bliss!*"





... Abdel too.

Only a week later, we received an email from the chairman of an observatory that we had outbid: "*We don't want to say that we are devastated because we were outbid. We didn't react fast enough. But if you are interested, we would buy the telescope from you immediately for 50,000 euros.*" A profit of 10,000 euros within a week. Wow! Unfortunately, however, we had to turn him down, pointing out that the telescope would certainly now be at home in the Oberbergisches Land for several generations. We also heard from a public observatory in Chiemgau, who had discussed the auction in the club. When a senior member of the club pointed out that there might be delivery problems with inch threads from the US manufacturer, the club did not place a bid. We believe that if you are pursuing a serious project, you should carry it out seriously and with all your might. Fear mongering is not an option!

A few days later, we took the 7.5-ton truck onto the highway. We drove together with Klaus' father-in-law Kurt Mittler in the truck and car to Brannenburg at the foot of the Wendelstein. At some point on t h e h i g h w a y , Kurt asked how all the material was supposed to get into the truck. The lifting platform was all well and good, but how do you get everything onto the platform and then into the loading space? A good question that nobody had thought of. After some thought, Kurt said, "There *must be a brewery somewhere, they must have an Ameise"* (a lift truck). Rosenheim is just before Brannenburg and every town in Bavaria has a brewery.

There we discovered the "*AuerBräu*" brewery and confronted the porter with our story. He called somewhere. "*He thinks we're crazy,*" whispered Thomas. After a while, an ant suddenly emerged from the depths of the brewery. We left an ID as a deposit and headed to the valley station of the Wendelstein cable car in Brannenburg. Everything was already waiting there in pieces. Everything was loaded with the ant ("*Long live the AuerBräu!*"). A disclaimer from the university was signed and off we went again via the Auer brewery to the north. The whole journey took almost exactly 24 hours (never has a truck been so slow) and everyone just collapsed into bed after arriving early in the morning.

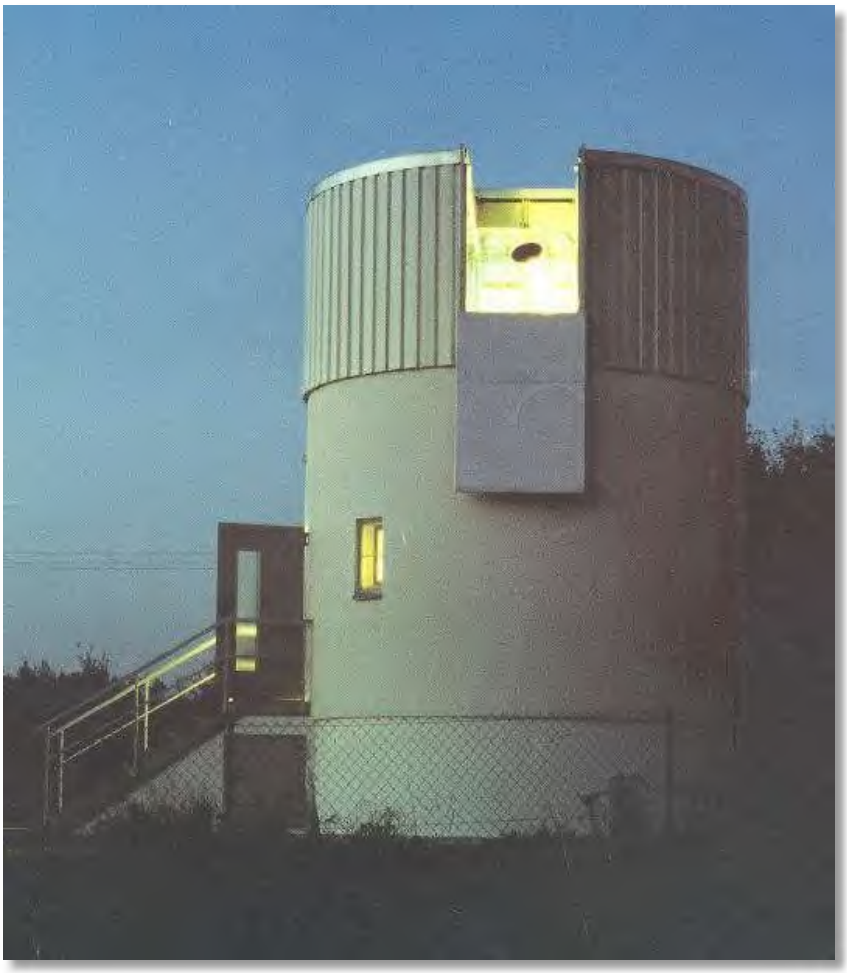
The next morning, all the parts were unloaded and stored in Klaus' barn. A week later, the telescope was set up there to get a complete overview and to present the device to astro friends at a barbecue party. Since then, we know how to handle heavy metal and pulley blocks.

Thomas and Kurt Mittler unloading in Schnörringen.

Set-up in the barn.

First building plans at the barbecue with Hans and Hans-Werner.

Of course, we needed a protective building for the giant telescope and we started thinking about its shape. We looked on the Internet at various observatories (e.g. Weikersheim, Welzheim, Tübingen and Jena) and compared them with our needs and finances (Klaus: "*Everything is far too expensive!*"). We found an interesting building in an article in the magazine "Sterne und Weltraum" with Max Lammerer's observatory in Lichtenfels. It has a cylindrical dome, which is presumably easy to build and therefore inexpensive. We arranged a visit and once again traveled 850 km. Little did we know at the time that this distance was "peanuts" compared to the future (ten years later, each of us had covered around 80,000 km for the observatory). After our initial considerations, everything now amounted to a telescope tower in which the telescope would be as high as possible above the ground for good observation conditions. These very first thoughts were confirmed a few years later. Without realizing it, we were on the right track.



The observatory of Max Lammerer in Köttel near Lichtenfels.

In addition to all the technical questions, we also had to think about the organizational future of the observatory. After consulting with various colleagues, it quickly became clear that a non-profit association/foundation/GmbH could be a great help in terms of financing (the many deductible kilometers alone). In view of the expected number of journeys, this is an important point. We spoke to tax experts in Waldbröl and were advised to set up an association and apply for charitable status in order to promote young talent.

Coincidentally, the concept of promoting young talent fitted in perfectly with a central problem at our observatory. We had a professional telescope that actually belonged on a high mountain in the desert with over 300 clear nights. With a maximum of 100 clear nights in Schnörringen, the telescope would have been
"Pearls before swine", especially if we only observe two nights at weekends (and are then over-nighted at work on Mondays). One hundred clear nights divided by seven weekdays times two nights at the weekend equals a maximum of 30 nights per year. For a telescope like ours, that would be a shame. If we could find enthusiastic fellow observers who could possibly observe on site during the week, we could theoretically use up to one hundred clear nights. And that would correspond to typical professional observatories that are operated near their home universities. So if we could run the observatory together with the next generation, we would have the hoped-for observers and could also establish our non-profit status with the tax office. This in turn would give us some initial financial leeway for the future. However, young people are not recruited from nowhere, but can best be inspired through schools. The idea of a school observatory was on the horizon.

Now we were working on two things in parallel:

1. We familiarized ourselves with the topic of founding an association. We both had no idea what it would take and contacted two associations that could help us. The observatories in Recklinghausen and Ennepetal then bombarded us with countless documents, which we had to rummage through.

2. We contacted various schools in and around Waldbröl and founded the "*Oberberg Astronomy School Network*". For this purpose, we met quite modestly in an inn in Morsbach-Holpe. Here we got to know Peter Stinner, who had taught physics and mathematics at the Kopernikus-Gymnasium in Wissen (Sieg) for over thirty years.

taught, led a very unusual Astro AG and later joined our association (the Waldbröl schools are also represented in our association today with teachers).

On November 29, seven astronomers met to found the "*Initiativkreis Schnörringen Telescope Science Institute (STScI) e.V.*". The founding members were Hans-Werner Eurskens from Hamm, Dr. Thomas Eversberg from Cologne, Hans Siegfried Nimmert from Hattingen, Dr. Norbert Reinecke from Sankt Katharinen, Prof. Dr. Wolfhard Schlosser from Bochum, Dr. Klaus Vollmann and Michael Winkhaus from Wuppertal.

The founding members of the Initiativkreis STScI e.V.:
Hans Nimmert, Hans-Werner Eurskens, Dr. Klaus Vollmann, Dr. Norbert Reinecke, Dr. Thomas Eversberg, Prof. Dr. Wolfhard Schlosser, Michael Winkhaus.

Wolfhard Schlosser explains a special optic for the new telescope to impressed club members.

Norbert Reinecke studied physics with a specialization in astrophysics. He then worked for 31 years as a military physicist (Ministerialrat) in the Federal Civil Service (we like to call him "The Battle Club"). His burning interest in astronomy began at the age of 11 when he built his own cardboard telescope.

He says: "*As so often in life, it was chance that made important decisions possible. In 2004, I was sitting at dinner at a spectroscopy conference in Heppenheim and heard someone behind me talking loudly about a telescope mount that he had built himself. In contrast to many others, the two interlocutors obviously knew exactly what they were talking about. Because of their energetic way of speaking, I thought "...finally people who express themselves clearly, they are really awake!". The two were Thomas Eversberg and Klaus Vollmann.*

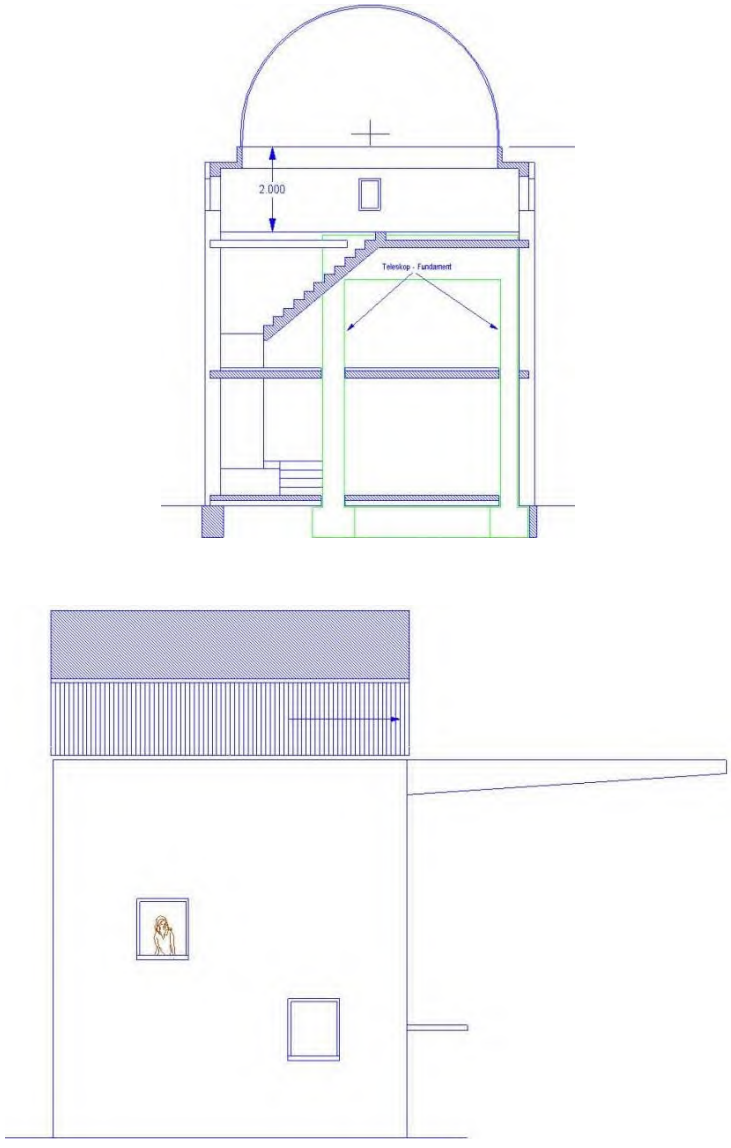
As I had a 15 kg telescope wobbling on a rather light Vixen DX mount at home, I pricked up my ears and tried to somehow get into conversation with these two about a purchase. With a few deliberately provocative but funny remarks, I finally managed to make contact and we quickly reached an agreement that evening. The pair's self-assembly mount turned out to be unusually strong and heavy and changed hands for a very amicable price. Today it carries a 50 kg telescope in my observatory safely and without wobbling.

From then on, the three of us remained in close contact in connection with astrospectroscopy and a real personal friendship developed. When Thomas and Klaus successfully bought the large German 80cm telescope on the Wendelstein of the University of Munich at auction in 2008, they founded a non-profit association and asked me if I would like to be one of the seven founding members required by the law. I was really incredibly touched and happy about this offer, because it meant nothing other than the fulfillment of my childhood and youthful dream of really big telescopes and at the same time it meant a chance to participate in a complex project. At the time, however, nobody was even remotely aware of how demanding and complex everything would become.

Norbert Reinecke.

2009 - First building designs

Klaus had known our friend and colleague Hans Nimmert since his youth at the Hagen observatory. Hans was an expert in the design of telescope mounts, among other things, and had already designed his own private observatory. He approached us with initial designs for a protective structure, which were discussed at length. He shared our idea of a telescope tower and designed variants with a sliding roof and dome. A sliding roof in particular was the ideal solution at the time, as a dome several meters in diameter and costing tens of thousands of euros was still beyond our imagination and finances.



Two designs by Hans Nimmert.

Susanne Krosse took a completely different path in Flensburg. At the time, Susanne was a professor of architecture at the University of

Biberach and worked on innovative building concepts. Thomas knew Susanne from his studies and at some point told her what he was planning in Waldbröl and needed a rather special building. This was music to Susanne's ears and she began to plan. The result was several variants, all of which could pass any architectural competition. These included a complex insulated by straw, but also a tube like a UFO ("*Cool - I can already see Captain Kirk here.*"). All designs met our needs for a good temperature environment as well as insulation and damping of the material to keep the air turbulence at the telescope necessarily low in favor of good viewing conditions. We all regretted that we could not realize any of the various designs for cost reasons. Working with Susanne was a great experience for us.

Designs by Susanne Krosse

The straw house.

The shade roof.

The
UFO.

Although we did not yet have a building design, we were able to use the time to submit a preliminary building application. We submitted this to the building authority in Gummersbach in January 2009 with a design from Susanne. In a big city like Cologne, the bureaucracy could drive you to despair, but it was completely different at the building authority in Gummersbach. The officials were very sympathetic to our application and showed great understanding for the needs of an observatory. They guided us through various pitfalls and explained to us that the application had to contain certain points in order to obtain a building permit.

1. We had to draw up a forecast that demonstrated predominantly public use. In particular, this included inviting professionals to use the facility. To this end, we had to approach universities and schools and obtain their written interest.

2. Every public use had to be specified. So
   e.g. the support of pupils and students or the transfer of data to universities.

3. We needed independent expert opinions on the necessity of the location (outdoor area necessary due to light pollution, heat, etc.). Independent experts are professors and corresponding employees at astronomical institutes.

4. We had to explain who we were expecting financial support from and explain our strategy.

5. We should also have a financing forecast drawn up by an independent expert.

None of the points posed a problem for us and we set out the principles of our objectives in the motion. From the motion:

The telescope complex can only be installed outdoors. There are three main reasons for this:

1. ***Darkness*** *- street lighting and traffic cause scattered light in the sky, which impairs the quality of any astronomical work. In order to be able to measure even faint objects in the sky, any kind of disturbing light must be avoided.*

2. ***Stable air conditions*** *- stars "wobble"! Heat differences caused by buildings and roads cause turbulent air masses that dramatically disturb the imaging of celestial objects. A telescope should therefore be operated in an open field, away from roads and buildings.*

3. ***All-round view*** *- buildings and vegetation reduce the part of the sky that can be reached. To be able to reach a maximum part of the night sky with the telescope, you need a horizon view that is as clear as possible.*

Special demands are also placed on the complex and its facilities. These include a protective building for the telescope, measuring instruments and the appropriate equipment in the form of heated rooms for reliable work. As the telescope complex is just as much a building as conventional houses, the above criteria (darkness, stable air conditions, all-round visibility) must be taken into account.

1. ***Darkness*** *- It must be possible to darken all entrances, windows and other light sources. The appropriate measures can be easily implemented (switches, task lighting with low light flux, red light, window blinds). Access routes remain closed to normal traffic.*

2. ***Stable air conditions*** *- Unstable air is caused by temperature differences between the telescope or control building and the surroundings and must be minimized under all circumstances. The telescope building remains unheated and the surrounding outside air flows through it (dome gap, wall openings). Heat radiation from the heated control building is prevented by maximum insulation. Heat locks between the telescope and control building prevent any possible heat exchange. On a floor surface in the immediate vicinity with a high heat capacity*

(asphalt) is dispensed with in favor of grit or similar (low heat capacity). Air turbulence is particularly strong near the ground up to a height of a few meters and decreases with height (laminar air flow). The telescope base should therefore be positioned as high as possible above the ground (2 or 3-storey building).

3. ***All-round view*** *- The planned site for the complex is located on an open, sloping field around 200 meters outside the Waldbröl district of Schnörringen. There are trees to the south and southwest, which have no influence on the visibility conditions due to their distance of around 200 meters.*

Our explanations were obviously convincing because two years later we received the final building permit from Gummersbach.

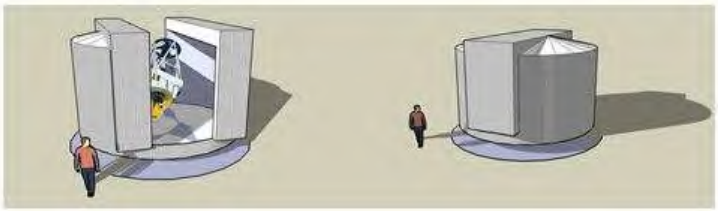
2010 - The dome and a new building design

We spent a year planning and discussing the shelter. Which materials should we use? Would it be a sliding roof or a completely different solution? A spherical dome of the required size was out of the question for financial reasons alone - and then there was the transportation! We offered to write a thesis on the subject of an "astronomically optimized shelter" at the university in Aachen.

Diplomarbeit:

"Konstruktion einer Seeing-optimierten Teleskopkuppel für eine astronomische Sternwarte"

Im Oberbergischen Kreis wird zur Zeit vom "Initiativkreis STScI e.V." eine astronomische Sternwarte mit einem 80cm-Teleskop geplant. Das Teleskop soll für Forschungszwecke und die Ausbildung des wissenschaftlichen Nachwuchses eingesetzt werden. Eine besondere Herausforderung bei der Planung des Observatoriums stellt die Teleskopkuppel dar. Die atmosphärischen Bedingungen zum Betrieb einer Sternwarte sind in Deutschland tendenziell schlechter als an den von Astronomen üblicherweise gewählten Plätzen. Zur Minimierung störender Luftunruhe (Seeing), induziert durch das Schutzgebäude des Teleskops, müssen verschiedene Maßnahmen beim Bau der Teleskopkuppel ergriffen werden. Daher fallen die im Markt erhältlichen Serienfertigungen in Form einer Glasfaserkuppel als kostengünstige Option aus. Stattdessen sollen die Entwürfe moderner Observatorien (VLT, NTT, SUBARU, GEMINI) einbezogen werden. Außerdem stehen seit einiger Zeit Forschungsergebnisse zu diesem Thema zur Verfügung, die bei der Planung berücksichtigt werden sollen. Die Resultate der Untersuchungen zeigen, dass die Seeingqualität durch eine entsprechende Konstruktion etwa verdoppelt werden kann. Ein Observatorium mit einer Seeing-optimierten Kuppel existiert in Deutschland aktuell nicht und wäre damit die erste ihrer Art.



Kontaktadresse:
Dr. Klaus Vollmann
www.stsci.de

No reaction from the student body. We shared our thoughts with colleagues from the professional and amateur community. Then, in January 2010, we received a tip from an amateur colleague that VEBEG was offering a 6-meter dome for auction. "*The what? VEBEG? Never heard of them!*" We learned that this is the German government's recycling company and that you can buy everything from research ships to army boots at auction there. The VEBEG sells discarded federal property and now a huge telescope dome, which was previously used at the Wettzell geodetic station in the Bavarian forest, was suddenly up for sale. The geodesists used a telescope to track low-flying satellites and now they needed a new dome that could follow the movement of the telescope quickly enough. So we made another viewing appointment and headed to Wettzell. There we found a GRP dome that was ideal for our telescope.

Klaus in front of the dome in Wettzell.

But the question was: how do you get such a beast to Schnörringen? One might jokingly answer: by water, by land or by air. But that's exactly what we checked! We had a few weeks to submit our bid and we wanted to make the most of it.

Bringing the dome north by ship was not entirely impossible. The Danube was only around 50 km away. So you could take a ship across the Danube to the Rhine as far as Bonn. The remaining kilometers on the road could then be covered with a low-loader. You just had to find routes without underpasses. Calls to ship owners revealed that transportation would cost around 10,000 euros. "*Hello, if we buy the dome at auction now, we'll already be broke!*" However, it would also be possible to cover the entire distance with a low-loader. But that would mean even more underpasses. Nevertheless, Klaus asked the police how such a large transport should actually be handled. We learned that each government district that the vehicle passes through has to issue a separate transport permit and that a police escort is mandatory in all districts. And, of course, each district then receives a processing fee. Financially and above all organizationally completely illusory.

Then our friend and club colleague Norbert Reinecke came up with a completely new idea. At the time, he was working at the Federal Ministry of Defense on the Hardthöhe in Bonn and said that they had a helicopter and that a CH53 would be able to carry it. We then read that the Sikorsky CH53 was the heaviest helicopter in the Bundeswehr. From a Bundeswehr website:

> *"The CH-53 transport helicopter is used to transport people and materials as well as for special tasks. The CH-53 can be deployed worldwide, in almost all climate zones, in almost any weather, day and night, at all threat levels."*

"*Great, now Norbert is going crazy!*" A few days later, he invited us to a meeting with several officers on the Hardthöhe. "*Tell me, do you have a camouflage suit...?*" After Norbert had approached a high-ranking officer in the Bundeswehr about the possibility of a helicopter transport, this case was discussed in a remarkable way at a small conference in the ministry. Some high-ranking officer asked the group with a serious and deliberately stern expression whether the heavy CH-53s had ever transported a "hemispheric external load" despite many training flights. The group of officers looked puzzled at first, but quickly guessed the true nature of the question from the chief's facial expressions and

regained his composure after just a few seconds. There were amused murmurs in the group that this unusual exercise idea was useful for being prepared for any situation. "Hemispheric load" sounded like a challenge, and what's more, the supervisor's suggestion is always clever by definition. So a test order was immediately formulated for the command authority responsible for the material, stating the point of origin and destination as well as the size and weight of the corpus delicti. However, when the test result was then submitted, taking into account all safety regulations, it became clear just how much effort had to be made here. Because it must be possible to jettison external loads at any time in an emergency, only unpopulated areas may be flown over. This led to a huge meandering detour with the need for intermediate refueling and an escort helicopter plus fire department for all intermediate landings - and correspondingly high costs of around 350,000 euros. That was the end of the matter.

The time for a bid at VEBEG was approaching and we still had no solution to the transportation problem. Fortunately, Kurt knew some people in Waldbröl who were always willing to take on crazy projects. These included Peter Peisker and Gerhard ("Primchen") Wirths, who both ran a logistics company. At the very first presentation of our telescope at an event organized by the Waldbröl Trade and Industry Association (GIV), they called out to us "we solve problems". That wasn't just talk. They advised us to buy the dome at auction and they would pick it up. *"Excuse me?"*

As a rule, there are only a few interested parties for astronomical 6-meter domes. We therefore "played poker" a little and made a very modest bid - and won the contract. So suddenly we were the proud owners of a dome in the Bavarian Forest that could not really be transported to Oberberg so easily. But we didn't actually have Peter, Primchen and Kurt, who set off a few weeks later with Peter's camper van and a few crates of beer to dismantle the dome. We still don't know any details about this weekend trip, but we imagine that the three of them had a lot of f u n . Anyway, the following Saturday morning, a low-loader with the dismantled dome drove into the Peisker depot. Some interested supporters including Peter, Primchen, Kurt and the mayor of Waldbröl, Peter Koester, were on site at 6:00 a.m. to celebrate the arrival of the dome with champagne and bread rolls. *"Tell me, Mr. Koester, what are YOU doing here at this hour?" - "Well, I think it's great!"*

"Primchen" Wirths and Peter Koester celebrate the arrival of the dome.

The dome is coming!

Veit Mach is an architect and is involved in GIV Waldbröl. He was aware of our building concerns and offered to give them some thought. He quickly drew up plans for a pitched roof building plus a telescopic tower. We worked with these plans for the next few years; they initially formed the basis for all further applications and were quickly included in the image brochure of the town of Waldbröl.

During the planning for the building and especially for the telescope tower, we had to give further thought to the optimal materials and the local climatic conditions. Any air turbulence has a disruptive effect on astronomical observations: Stars and planets appear washed out in the telescope. A large part of such image blurring is homemade and can be reduced by structural measures or by skillful selection of the observation site. Professionals always take care of these issues. As we own a professional telescope and are also trained scientists, we could not ignore this point. Within a few months, we familiarized ourselves with the matter and looked for concepts and materials that were feasible both in terms of our budget and our geographical conditions. From then on, it was all about diffusion, insulation, humidity, temperature, U-values, phase shift... our heads were spinning. Klaus even consulted the Fraunhofer Institute for Building Physics to find the best materials for our needs. Civil engineers would have had fun with us.

2011 - Dome construction and transportation to Schnörringen

The year was now dominated by the telescopic dome. It still had to be assembled and transported from Peter Peisker's depot to Schnörringen. In view of the 540 km it had already covered and Peter's management skills, the remaining five kilometers were actually a piece of cake. But how should the 6m thing be transported by road? That would be an expensive special transport... Interestingly, Peter didn't bother with this question, he didn't see any problem at all. In any case, his experts put the dome together in no time at all and the monster was ready for transportation in the yard.

Karl-Heinz Gehlhausen,
Peter Peisker,
Klaus Vollmann.

We were prepared for transport permits and fees, but that was out of the question for Peter, as he had old colleagues in the police. A call to the station: "*The transport will take place tonight (!). You don't need to come, we'll take care of it.*" Answer from the station: "*We want to see that, we'll come!*" We stood pretty helplessly next to the action while everyone involved got moving. You have to know that the two lanes of a country road are six meters wide.

Just as wide as our dome. It was getting dark and Thomas was quite right that this show would be hidden by the merciful darkness. However, our "Schupos" didn't see the point and proudly drove off with their blue lights flashing.

The next morning, the low-loader was taken the remaining two hundred meters from its evening parking spot by a tractor to the observatory site where the crane unloaded the dome. The dismantling in Wettzell, the transportation to Waldbröl, the assembly and the journey to Schnörringen would have been completely impossible without all the help. The regional involvement and enthusiasm for the observatory became apparent early on.

We continued to look for money throughout the year. We produced a large and very attractive image brochure describing our plans. Even back then, we had a benevolent helper in the Oberberg district in the form of Wilfried Holberg from the Oberberg business development agency. He wrote to the Ministry of Economic Affairs, Energy, Building, Housing and Transport of the state of North Rhine-Westphalia to ask whether the observatory could be supported in any way. However, this was not possible for legal reasons.

Transportation of the assembled dom
to Schnörringen.

2012 - The old control cabinet and the backfill

Klaus' plot of land for the observatory is sloping and we had to fill in the earth and have it professionally compacted to create a level building site. This was done three months after the dome transport.

The electronic TTL control (transistor-transistor logic) of the large telescope was already 25 years old. TTL elements are now very robust due to their simplicity. You can actually let such control cabinets roll down the slope and they still work. However, the structure was not sufficiently clear to us and we didn't have time to familiarize ourselves with it. This could just as easily be done by vocational students. Klaus therefore contacted the Carl Reuther Vocational College in Hennef. He explained to a teacher our idea of getting the control unit ready for operation and found interested students who could test our control unit in the as part of their final project. The work "*Preparation and commissioning of the control electronics of a reflector telescope*" can be found on our website.

The original TTL control cabinet.

Unfortunately, we later had to abandon this approach because technical developments in this area are happening dramatically fast. The control system of the time, which was the size of a refrigerator with its large slots, is now the size of a book.

One of the control inserts.

2013 - Tower construction I - The basement

We had now had our large telescope for five years and still no funding, although we had applied to many foundations for support. These included the German Aerospace Center (DLR), the German Physical Society, banks and savings banks in the region, the Heraeus Foundation, the Krupp Foundation, the Mercator Foundation, the Telekom Foundation, the Klaus Tschira Foundation, the Robert Bosch Foundation and the NRW Foundation. We had a discussion with the regional MP in the state parliament and with the CEO of the German Aerospace Center. We also produced a comprehensive glossy brochure and flyer. All to no avail. Sometimes the rejection was justified regionally and sometimes administratively - never in terms of content. We were slapped on the back, congratulated on our civic commitment and that was that. You simply have to live with that in such a campaign because your own enthusiasm doesn't automatically infect others. Only "time thieves" are really annoying. We got to know a professional fundraiser who asked us for a project plan to get active. After writing around 40 pages a few weeks later, he never got back to us. . . □□

It didn't help, we had to have a protective building for our equipment and we paid for the telescope tower ourselves. However, we now benefited from the fact that we had studied building physics and its boundary conditions for observatories three years earlier. It turned out, for example, that fired bricks are optimal in terms of thermal insulation and attenuation. A hollow block is only slightly worse, but costs only about half as much. We opted for the hollow block. The two mechanically separated foundations for the telescope and the tower were poured, a massive column made of large concrete drainage pipes was erected and filled as a telescope support and the basement was bricked.

Construction of the tower baser

2014 - Tower construction II - The upper floor

In April, we concreted the support surface for the telescope, the "mushroom", together with Norbert. Two months later, we completed the wall of the upper storey and placed the dome on the tower using a crane.

Norbert at the telescopic foundation. Thomas and Kai Müller on the top floor of the tower.

Peter Stinner joined the association that year. This was a great stroke of luck, as Peter had a great deal of didactic and technical experience as a teacher and long-standing head of an astronomy club. He was also a founding member of the "*Oberberg Astronomy School Network*" and it was hard to imagine the group without him.

Peter on this: *From 1993 to 2015, there was an astronomy club at the Kopernikus-Gymnasium in Wissen(Sieg), which Anke Langenbrink and I led. In the observatory of the Geschwister-Scholl-Realschule in Betzdorf (now IGS Betzdorf-Kirchen), which we revived in 1999, our students were able to obtain color-brightness diagrams (FHDs) of several galactic star clusters in a first CCD photometry project in order to determine the age and distance of these objects. In addition to photographic experiments, subject-linking excursions to three central solar eclipses (1999 to southern Germany, 2005 to Spain, 2006 to Turkey) were characterized by extensive climageographic measurements, which were used to demonstrate and interpret the influence of celestial mechanics on our immediate experience.*

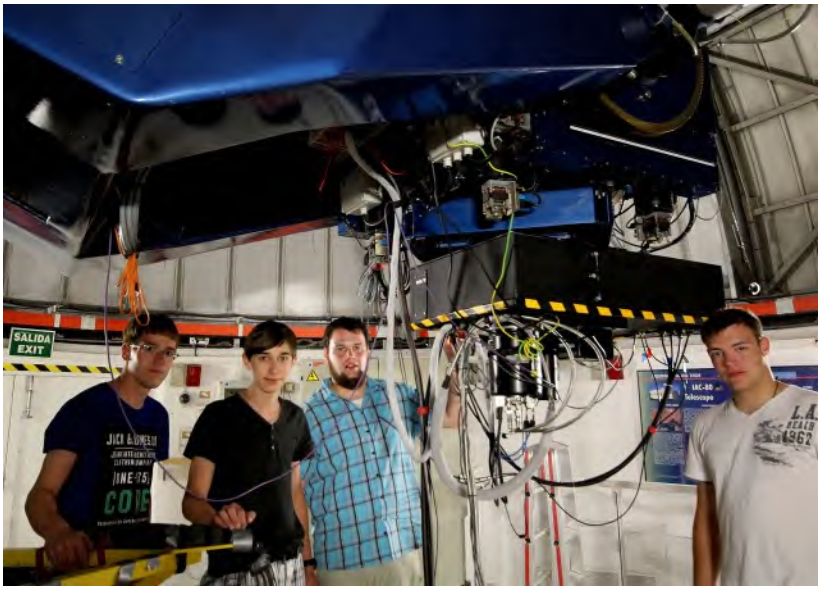
In 1999, ESO, ESA and CERN launched the Physics-on-Stage Festivals (later Science-on-Stage Festivals) as a platform for the international exchange of successful science education projects. In 1999 in Geneva at CERN, the Wissener Astro-AG was represented with its project on the total solar eclipse in southern Germany, and in 2001 in Noordwijk (Netherlands) at ESA- ESTEC with the FHD project from the Betzdorf school observatory. This brought us to the attention of Dr. Michael Geffert from the Argelander Institute for Astronomy (AIfA) at the University of Bonn. In the 2000s, he made it possible for us to do a one-week observation internship at the "Hoher List" observatory in the Vulkaneifel region almost every school year. About a dozen of our students were able to complete their work placement at the AIfA.

Further working group projects were presented under the title "Open Instruction within the Framework of a School Astronomy Team" at the international Science on Stage Festival 2008 in Berlin. The emphasis here was on the importance of school astronomy for opening up teaching in methodological, content-related and institutional dimensions.

The highlights of the coming years were participation in the international research project "Corotating Interaction Regions an Clumping in WR-Star Winds" organized by Thomas Eversberg in June 2013 at the Teide Observatory in Tenerife, an excursion to observe comets in Croatia in the 2013/14 school year and a one-week observation internship at the Simplon Observatory of the Astronomical Society of Upper Valais in Switzerland in 2015.

Three of our students were able to gain their first insights into space technology after graduating from high school during internships lasting several months at Airbus Defense and Space in Friedrichshafen as part of the definition study for the ELISA space gravitational wave interferometer. Numerous former members of the working group went on to study natural sciences or engineering. Fortunately, many of them became physicists, e.g. in elementary particle physics, in astrophysics (radio astronomy, Nearby Supernova Factory), in science management.

In 2008, the Friends of our school made it possible to purchase a slit spectrograph. The first successful spectroscopy experiments on astronomical objects (stars, planetary nebulae, HII regions) led to contacts with Thomas Eversberg and Klaus Vollmann from the STScI via the Spectroscopy Section of the Association of Friends of Astronomy around 2010. The contact to Schnörringen was initially quite loose, but it intensified after I retired in 2015. At the beginning of 2019, I became more involved in the construction work and especially in the planning and construction of the student laboratory. In the future, I would like to contribute my didactic and methodological experience to the STScI's student laboratory in order to pass on my enthusiasm for science in general and astronomy in particular to young people. The focus will be on current scientific methods such as spectroscopy, photometry and astrometry. My personal hobby of astrophotography will play a motivating role.



Students from Wissen conduct research at the 80cm telescope of the Teide Observatory in Tenerife as part of a global project organized by the STScI.

2015 - Ventilation, Floor foundation and important discussions

Damian Himmel in the sub-station.

At some point, Thomas received an email from Damian Himmel from Morsbach. Damian had heard about our observatory, found the website and was interested in astronomy. He said: "*I recently moved from Cologne to Oberberg and still have some time for a project. I think astronomy is great, but I still have no idea*." We were able to give him this "*idea*" and initially invited him to join us. Damian's knowledge was completely different to ours and we very quickly realized how important this was. This is limited not only focus on media work (club forum, pictures, films) but especially for his technical knowledge. Just three years later, the association was to benefit greatly from this. He then joined the association at its Annual General Meeting in March 2016.

In May, Wojciech Walczak from Waldbröl applied the tower plaster and painted the wall white. Wojciech owns a construction company and is a real "doer". His daughter had bought an old house in Schnörringen and he restored the "Ruin" complete. Thomas was amazed that the building in the immediate vicinity of Klaus' house had been saved at all. Wojciech initially wondered what kind of strange tower that was up on the meadow, but was quickly enlightened by Klaus. Carpenter Kai Müller and electrician Florian Höffgen felt the same way. All three obviously loved the observatory and became important craftsmen for our project over time. And because we still needed a good site manager, Klaus' father-in-law Kurt Mittler, who was already working for us transporting the dome anyway, took on this work.

We had already thought about the heat balance of the building beforehand. Sufficient cooling and ventilation of the telescope room is a central point for the observation conditions. If the primary mirror or the telescope is too warm, this creates disturbing air movements like on a hot hob. To counteract this, Thomas

and Damian installed a system of pipes which, in the winter, would lead cold outside air through the dome gap via a fan through the telescope room. In addition, we laid a foundation in front of the tower entrance which will support the access corridor from the service building to the tower in the future.

Damian lays ventilation pipes. Klaus and Kai Müller pour the floor foundation.

Shortly after the tower had been plastered and painted, a decisive series of contacts was accidentally triggered, which gave our work the decisive impetus that led to the timely realization of the observatory. At the end of the year, we received a message from Christa König-Wellershaus in Waldbröl. Mrs. Wellershaus was an art historian and had read about the observatory in the newspaper. Her father was a passionate amateur astronomer and we were to receive his astronomical estate. A few days later, we sat in her living room full of art objects over a coffee and presented our project. Before we left with a few boxes of books, a theodolite and an astronomical clock, Mrs. Wellershaus said that we should talk to the chairman of the fishing fraternity in Bergheim an der Sieg, Mr. Willi Engels, about our money worries. "*What do you mean, fish?" - "Yes, yes, he has received money from the Rhineland Regional Association for his fishing museum. Here's his telephone number. You can refer to me."* Okaaaay....?! We could already see ourselves collecting tons of money with fishing nets, but you never know.

We have learned two things from the Internet:

1. The *fishing brotherhood of Bergheim an der Sieg is* the oldest brotherhood in Germany, with a history stretching back over a thousand years. And six years earlier, under its first brother master Willi Engels, it opened a fishing museum.
2. The Rhineland Regional Association (LVR) has departments for social affairs, youth, psychiatry, schools and culture, but none for science funding. "*It looks bad. Or we could open a psychiatric department for astro- madness. That would fit!*"

No matter! We called Mr. Engels. He listened to what we had to say about our project and simply said: *Why don't you come to our museum?* So we did. Once there, he gave us a tour of the museum and explained how they had applied for and received the funding and what was probably important for a successful application. Finally, he said: "*Give the head of the LVR cultural funding department, Dr. Kühn, a call. You can refer to me."* Okaaaay....?! We've seen each other at readings, exhibitions and other cultural events, but you never know

Willi Engels with special telescope.

So a call to Dr. Norbert Kühn from the LVR: "*Good afternoon Mr. Kühn... observatory... largest telescope in NRW... pupils... blablabla... tower... schnassel... (*Klaus whispering*: "Tell him we're looking for sponsors.")... dome... blablabla... money..."* Mr. Kühn listened patiently to everything. Then: "*When can I have a look at it?"*

A few days later, Mr. Kühn was on site with a colleague (the colleague was his driver). Apart from the white domed tower, a foundation for the stairwell and our old observatory, there was actually very little to see. Mr. Kühn walked across the embankment, looked at everything quite closely and listened to our fantasies. At some point, his black shoes seemed dirty enough and he asked how much money we needed. Thomas started to stammer... "*That... hm... we're not exactly sure yet... we... only have a rough estimate" (*In reality, Thomas was searching his empty head for any meaningful figure*). - "Sure, but you must know roughly what you need."* (Oh God, don't say the wrong thing!) - *"W e l l . . . so... roughly... maybe... 120,000 euros... give or take... 20,000?"* - "*Why don't you make an application?"* Mr. Kühn said goodbye again in the direction of Cologne and we s t o o d around perplexed. "*What was that all about?*" - "*I haven't got a clue.*"

Over the next few days, we learned that the application did not have to be submitted by us but by the Oberbergischer Kreis (OBK) as a member body of the LVR. Klaus Grootens from the district administration and his team provided us with benevolent support and valuable advice on the procedure. We

consulted the LVR ancillary provisions and handouts for the application and got started. We both work in space management at the German Aerospace Center (DLR) and are familiar with the grants business. Now we were suddenly applicants for a service building ourselves and the procedures at LVR were also somewhat different to those at DLR. However, we were in good hands with the LVR administrators Bettina Loke and Heinz-Friedrich Theißen. They explained the various application points and helped us in many places.

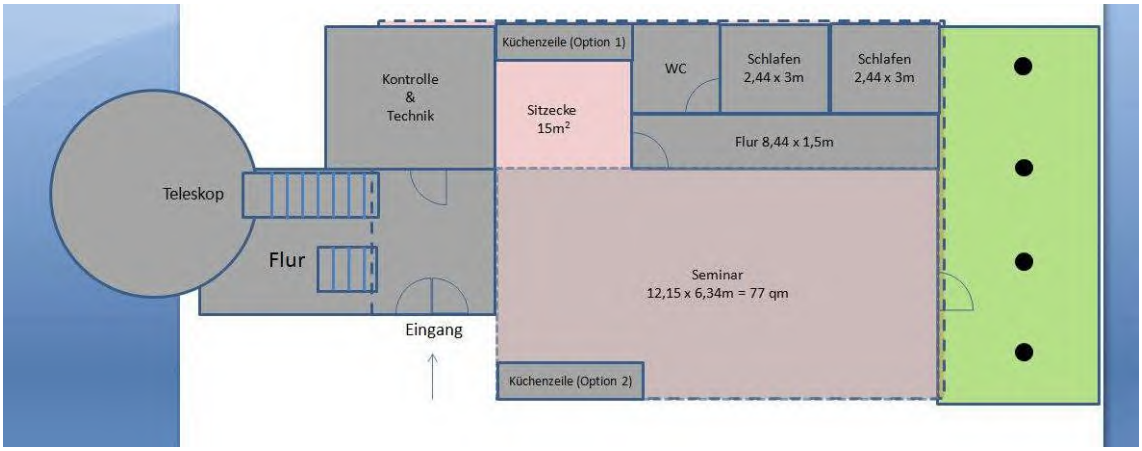
2016 - Supply channel and First funding application

Until the application to the LVR, we had to somehow determine the costs, as we had no calculation for the service building. We could only make a rough estimate, but some kind of figure had to be included in the application. Time was running out! So we calculated the service building, including the subsoil and components, as well as various work equipment and went back and forth with the figures ("*What should we use for the roof???*"). In April, we finished the application and submitted it to the Oberberg district. Because we didn't have the money, there was little to do anyway and we had to be patient. In September, however, the supply channel to the observatory was laid.

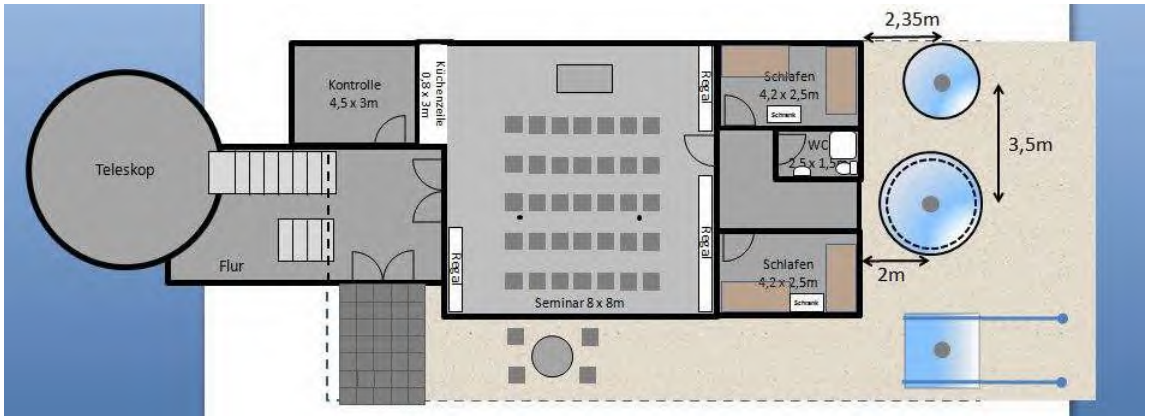
Construction of the supply channel.

Nothing more could be done - no answer from the LVR yet. It became an "empty year" and, given the eight years that had already passed, we were able to calculate that the observatory would be completed in the next century. We made alternative designs for the service building in order to be flexible with regard to the amount of funding that could be obtained. Since Susanne Krosse's first designs, it was clear that container structures were very inexpensive and we moved from floor plan to floor plan by defining room sizes and moving these rooms back and forth in PowerPoint. "*Tell me, what's that room behind the stairwell for?*" - "*That will be the control room.*" - "*I don't like it at all!*" - *Where else are you going to put it?*" - *Hm, no idea. And what's the table in front of the building for?*" - "*There's a beer there.*" - "*Oh yes!*"

After more than 20 drafts, we had found a workable structure with a sufficiently large seminar room.



Our design no. 1.



Our design no. 20.

During this time, we were joined by three teachers, who we naturally welcomed with open arms. Thomas knew Uwe Schröder from their time together at the astronomical institute at the University of Bochum. Back then, the two of them looked after the institute's telescope on the

roof (whose mount we received years later). Uwe was now a teacher of mathematics and physics and was very interested in Thomas' activities. And since Thomas in turn knew that Uwe was just as passionate about astronomy, he invited him to join the STScI. Fortunately, Frank Bohlscheid and Günter Dombrowski also joined us at that time. Both led an astronomy club at their Waldbröl schools (Frank at the grammar school, Günter at the comprehensive school). Frank is a teacher of German and Latin and already had a small private observatory. Günter, a chemistry teacher, was simply enthusiastic about our idea, even though he had just kicked a nail into his foot while working on our secondary station. We now had three teachers on board who could "polish" and implement our didactic concept. They joined the association at the 2017 annual general meeting.

On December 29, we received a commitment of 88,000 euros for the construction of the service building in the first year of the term. We were also informed that a further 60,000 euros had been earmarked for the following year! That was the breakthrough for the whole project and we knew that things were finally going to really get going.

Frank Bohlscheid.

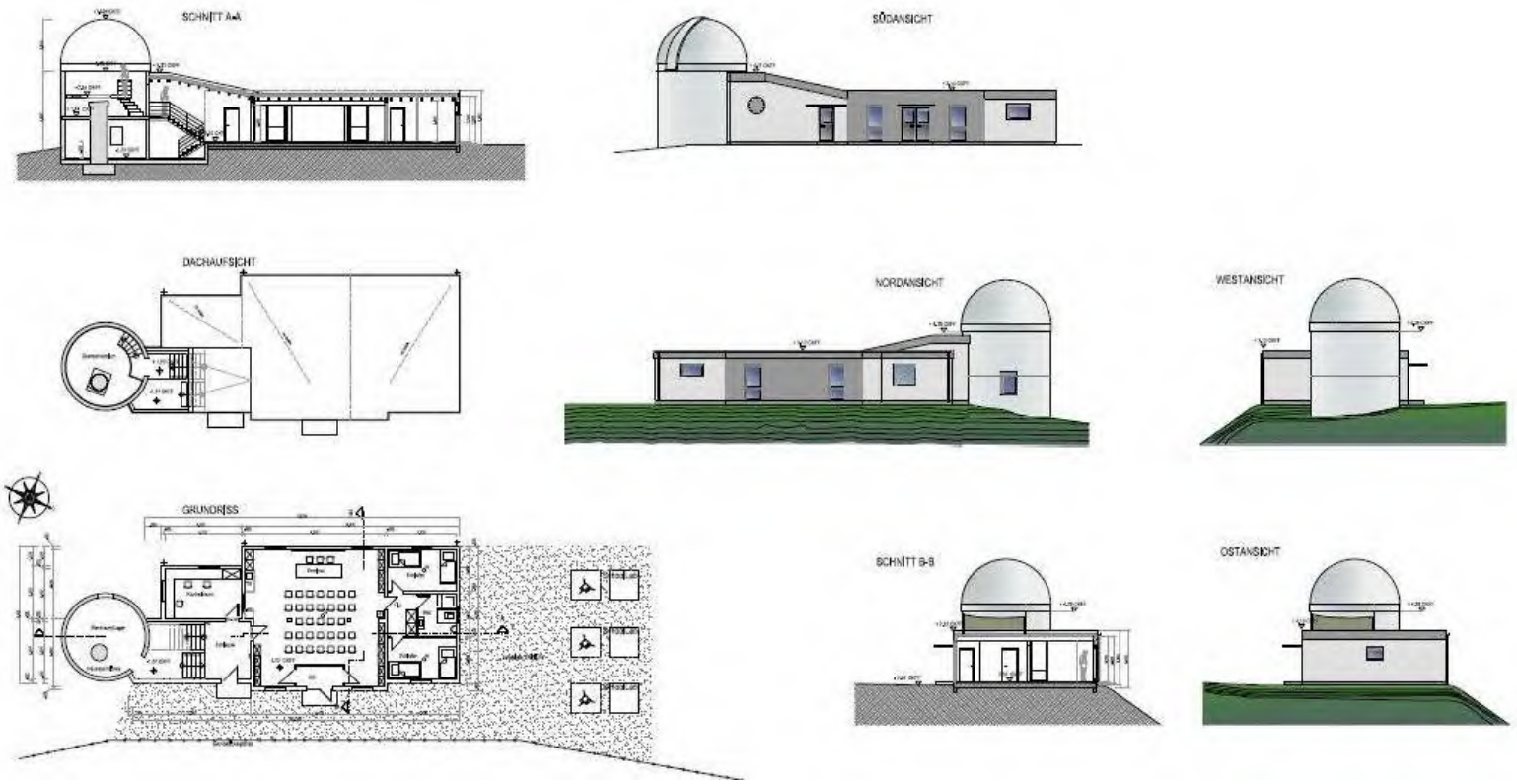
Florian Höffgen & Günter Dombrowski.

2017 - New building application, backfill and floor slab

Damian has a brother, Marius. At some point, Damian brought his brother Marius to the observatory. We were planning woodwork on our first observatory (Damian said it was all old and messed up, so it was one big "huddle". Since then, we called it the "Huddel Observatory") and we could really use some tips for the upcoming work. Marius' hints didn't stop there - he came back. To make matters worse, the two brothers also worked for the same company, which later supplied parts of the student laboratory. Marius also joined the association.

Funding applications are a double-edged sword. They are designed to be as modest as possible and calculated very tightly so as not to be rejected because the sums are too high. Once you have the approval in your pocket, you immediately ask yourself whether you should have applied for more in order to be able to plan more comfortably. What remains is an eternal uncertainty, especially if there is still no precise cost calculation. Unfortunately, our architect had to retire during this time for personal reasons. We now urgently needed a new architect. Because time was of the essence. Actually, it is hardly possible and very thankless for an architect to get involved in the middle of a planning phase, especially when there is hardly any time left for plans and their price calculation. Fortunately, however, Thomas is friends with an architect whom he asked for help when he needed it. Michael Krasa was already familiar with our ideas and always found our reports exciting. We presented everything we had to him for consideration. He then suggested that we choose a simple timber frame, which would be insulated with cellulose and could be built by a local carpenter ("*In Cologne you pay moon prices!*"). It turned out that we were taking the least financial risk with the timber frame technique. With the new plans, a new building application was submitted, which was approved in the summer.

However, our new design also had undesirable consequences. A building with vertical walls must have a greater distance to public paths than a building with a pitched roof (the building load). In addition, our student laboratory was a crucial component of our planning from the outset. The new building and the laboratory now required a larger construction area and we had to have the embankment enlarged. And again, money went down the drain...



The new design by Michael Krasa.

2018 - Service building and second funding application

At some point, Ralf Schmidt turned up at our place. Ralf has his own garden observatory and we repeatedly asked ourselves why he was now working for us. "*I'm simply convinced by the project and want to support it.*" But it didn't stop at "*simply supporting*". Ralf took on central tasks in our work from a standing start and quickly became an important practitioner in our circle.

Ralf explains: "*As a hobby astronomer, after completing my small observatory I was looking for like-minded colleagues to exchange ideas and observe together. A newspaper article in the OVZ finally led to me stumbling across this great project. Promoting the expansion of astronomical education opportunities in the region is a major goal of the association, alongside its own research work. I am happy to be involved. It is a special privilege for me to be able to support the association with my ideas or manual work and thus contribute to g i v i n g young people access to astronomy. In today's fast-moving and technologized world, the ability to think in a networked way, to grasp complex relationships quickly and to acquire skills in science and technology can be a decisive educational advantage. By building the school observatory and the large telescope, we are creating a unique opportunity to learn about t h e fascination of the starry sky. Experiencing the moon, planets, stars, galaxies and planetary nebulae through observation, photography or spectroscopy will inspire the pupils and cast a lifelong spell over them. I am delighted to be involved in this exciting project and that our common goal of getting young people interested in astronomy is getting closer every week.*

When everything is ready, I would of course also like to spend a night or two observing, photographing or working on scientific projects with our spectographer. Maybe there will also be time in between to just have a barbecue or hang out with a book. That has clearly been neglected in all the work so far. (;-)

It was similar with Gerrit Grutzeck. We had known Gerrit for some time. Together with Peter, he was part of a team on our second professional amateur observation campaign on La Palma and had been active in his Astro AG in Wissen for years. Gerrit was now studying physics and wanted to become an astrophysicist. We were amazed at his specialist knowledge of electronics and programming. Thomas: "*We should approach him and see if he*

doesn't want to join our club. He's still so young that he can take over all the stuff with other youngsters at some point."

At the same time, Jonathan Eichner joined the observatory. His father Jens worked for the Oberberg district and supported our efforts. He knew little about astronomy and had other things to do. Jonathan, on the other hand, was a different story. He was doing his apprenticeship at a regional technology company and wanted to become an engineer. He was immediately
"and helped us with the work on site. Just one year later, Gerrit and he developed a digital control system for our dome.

Jonathan Eichner

Felix Macht with bee

Felix Macht is enthusiastic about astronomy. He didn't know much about it yet, but wanted to take part. As he is also a beekeeper and a teacher of Far Eastern martial arts, we could see in our minds' eye how he trains Klaus' wife Susanne's bees with a laser sword at the STScI.

At the Annual General Meeting in March, the four were accepted into the association. We now had sixteen members who either actively supported us on site, provided us with important information or represented us externally. On this basis, we were able to tackle the work ahead. Because with the LVR grant, everything went in quick succession. The foundation slab for the building was already poured in January and by February the rough walls were in place and the roof had been put on. In March, the exterior façade was completed and

In May, all facades were plastered on the outside and all windows were installed.

Construction of the service building.

Thomas, Michael Krasa & Klaus.

In addition to the construction activities there were there were however one important celestial event and two pleasant surprises.

1. A total lunar eclipse took place on July 27. We had invited two Astro AGs from our school network to watch the event with us in the evening. We had therefore expected a fairly small event. But apparently word somehow got around and dozens of interested people from the region wanted to be there. Many spontaneously brought their mobile telescopes with them, so that the space in front of the observatory was well filled with telescopes. We hadn't expected this level of enthusiasm and were fascinated to see how the crowds developed in a relaxed calm. Photos were taken and the phenomenon was not only explained by us. We learned a lot about the future organization of public events.

2. We were informed that the private observatory of the amateur astronomer Dr. Friedebert Maderner, who died 20 years ago, was to be given away near Tübingen. We contacted his daughter Dr. Christiane Spaich in Mössingen and were promised that we would receive the entire Maderner observatory for our project.

3. The telescopes received from Mössingen Observatory were now looking for a heavy mount, which we then wanted to set up in a secondary station. Carelessly, Thomas placed a corresponding request in the community of amateur astronomers ("*Heavy mount wanted*"). Klaus thought this was hopeless, as he knew about the prices of such mounts - until we actually received a tip that an entire observatory in Hanover was for sale. Hans Joachim Bode was a well-known photometrician in the amateur community until his death the previous year. We could possibly get his observatory. However, we would then have to dismantle everything and pick it up in Hanover.

   We went there in December to take a look at everything and plan the dismantling and transportation. This also involved a 3.5-meter dome and a substructure, both of which had to be dismantled. We were impressed by both the telescopes and the heavy mount, which turned out to be very heavy. The dome in particular was very useful for our secondary station. Mrs. Thome-Bode was happy to put everything in our hands. Meanwhile, it was not a good time for outdoor work and she kindly gave us time to dismantle it, which we were able to postpone until the summer.

Our school laboratory continued to be an open topic. We had to neglect this part because of the work on the tower and service building. We knew that most observatories have a large telescope, an experienced astronomer shows spectators the device, they think it's great, go away again - and have learned nothing. We wanted to do things differently! Small groups of two to four pupils should be able to work at their own observation station in our school laboratory, consisting of an electronically controlled telescope and a shelter as well as the appropriate instrumental equipment. This would allow them to carry out independent observations and measurements in the sky, developed by teachers. We hoped that the pupils would help each other during the work and thus learn how to use technical equipment through their own practical experience - in the spirit of "hands on science".

But of course we needed weather protection for each of the three stations. Initially, we thought of a joint building with a single retractable roof, like the one we already had at our secondary station. However, that would have been a very heavy construction. So three individual huts or three domes - which would have catapulted us into unaffordable spheres. We also didn't want to do without heatable workstations based on our own experience. When it's a few degrees below zero, you just go home after a short time - we know what that's like! Then we discovered the solution in an amateur journal: a protective structure for the stations in the form of a building that could be pushed away. If you opened the door of the protective structure (we later called it our
"cube"), the entire building could then be pushed away on rails. Fold in the floor, set up the chairs, close the door again - and there you have a heated control room. Fortunately, our two club members and brothers Damian and Marius Himmel worked for a company in Waldbröl that specialized in metal room and roofing systems. Cubes made of corrugated sheet metal were a good solution anyway because of their durability. We looked at the technology on site, stuck with the idea and Marius and Thomas began with a rough construction plan for cubes with an edge length of two meters, which Marius would turn into construction drawings.

But we still had no funding for the school laboratory - until we came across the Hans Hermann Voss Foundation in Wipperfürth. Hans Hermann Voss was an engineer, successful entrepreneur and philanthropist. He bequeathed his entire fortune to a foundation that promotes young technical and scientific talent from schoolchildren to students. In our view, our concept was very much in line with the aims of the Voss Foundation, but of course we first called to introduce the observatory to the foundation's staff and to clarify whether our

assessment was correct at all. Klaus called: "*Observatory... blah blah blah... school lab... educational goal... snotty... three telescope stations... blah blah... money problem...*" The colleague on the other side was online and Klaus explained the photos to her. Then he remembered the movie that Damian had taken with his drone a few weeks earlier - a flight around the observatory. He took her to the corresponding website - and there was silence at the other end of the line. - "*That's great! Apply for funding, it won't be without a chance.*" We applied in May. And just two months later, we received a notice of approval for the construction and instrumentation of all three stations.

This was the breakthrough for our astronomical equipment. However, we first had to postpone the orders for the laboratory because we first had to complete the work on the service building. We also had to collect the observatories in Mössingen and Hanover. In November, Klaus, Hans-Werner, Ralf and Thomas first went to Mössingen. Everyone involved enjoyed this very much, as it was an exciting and thoroughly moving trip. We published the report "Journey into the past of a hobby astronomer" in the Journal of the Association of Friends of Astronomy (VdS).

Travel into the past of an amateur astronomer

by Ralf Schmidt and Thomas Eversberg

It was great news that we received from Mössingen a few weeks ago. Observatory to give away! Sven Melchert announced this news in the VdS forum at the end of October. The list of materials quickly caught the attention of us old geezers who love amateur astronomy classics. There was talk of Zeiss and Lichtenknecker refractors, a 20 cm folding refractor, a 30 cm Maksutov and a 40 cm Newtonian. However, he also warned that dismantling would not be easy. Anyway, we register our interest and Sven sends pictures that smell like a little adventure. But is it worth it to gondola from the Oberbergisches Land to the Swabian Alb? Sure, if those things were nearby ... Anyway, let's go! On the four-and-a-half-hour drive to Mössingen, we have a lot on our minds. What can we expect? A cell phone call with our "vanguard" Hans Werner increases our excitement immeasurably. Heavy mount! Not to be removed! Building the mount ourselves with a technical implementation never seen before! Many telescopes!

An hour later, we arrive and are warmly welcomed by the Spaich/Maderner family. A small reception with Swabian delicacies has already been prepared. We decline with thanks according to the motto, first the work then the pleasure. But it's actually the high level of expectation and the excitement of what's to come.

Off we go to an old barn that has apparently been lying dormant for 20 years. The path leads us up a wooden staircase to the attic. Once we arrive at Hans Werner's house, we have to close the creaky hatch to be able to stand in the area of the mount. We are greeted by a huge homemade construction. A bizarre monument over two meters high and weighing an estimated one ton. Chain gears and controls that are almost incomprehensible (Fig. 1). An absolutely unique piece. The piece looks like a drum revolver with different sized cartridges. Everyone is visibly impressed. All you hear is Booooei, Lichtenknecker, madness, Maksutov, Cassegrain, I'm freaking out, there's no such thing!

In the adjoining room is a perfectly equipped workshop from the 1990s with a lathe, drilling machines, jigsaws, electronic controllers and lots of tinkering stuff. What kind of person was this Dr. Maderner? As a dentist, he was probably a brilliant inventor who spent all his free time developing and building things after work.

We are mentally trapped in his life's work and are reluctant to destroy it. But we set off anyway and get down to business. We expertly fillet the revolver, bring down the telescopes and load a lot of small items.

Afterwards, we sit together at the Spaich family's place and enjoy our well-earned Swabian specialties with a good Bavarian beer. We are told that we can also have the entire workshop, but we hesitate again as to whether we can accept this great offer. So a grateful farewell! A nice end to the day at the hotel. We discuss the offer to get the workshop too and give ourselves a jolt. So we announce our plans for the next day. With the knowledge that we will return to the barn one more time, we all fall asleep blissfully.

The next day! Breakfast and off we go. As we thoughtfully clear out the workshop, we sense the wide-ranging interests of the astronomy colleague who died twenty years ago. We discover electronic measuring devices, circuit diagrams and relevant literature.

Welding equipment, special tools and lathe. A specialized generalist whose work deserves respect. But one thing is not quite right! Where are the eyepieces? The Spaich family is stumped. We explain that with five large telescopes, you should actually expect ten eyepieces, "the kind of magnifying glasses you use to look into the telescope and don't leave in the barn because of their value". Mrs. Spaich sets off! Ten minutes later, she calls us into the house and shows us a cupboard...

Since we got our 80-cm telescope with a focal length of ten meters, we've been looking for very long focal length eyepieces so that we can look through them in a meaningful way. ATT in Essen, HATT in Hattingen, various forums ... without success. And now we hold a 70 mm and a 100 mm eyepiece from Lichtenknecker in our hands!

A 20 cm f/10 folding refractor according to Günter D. Roth

Next to it is a leather bag with other eyepieces of different designs. And one shelf down is the legendary 14x100 Wachter-Gigant binoculars from Lichtenknecker. We are gobsmacked!

Once again, we would like to point out the value of all this equipment, but the Spaich family is very happy that it will continue to be used for the astronomical work of young astronomers at our observatory. We are touched by the generosity and goodwill shown to us.

We pack up and say goodbye again with a warm invitation to Waldbröl. Exhausted, we head north with a fully loaded trailer. Silence in the car - everyone is thinking about what they have experienced. We are happy that a colleague's work has been saved.

Acknowledgements We would like to thank the Spaich and Maderner families for passing on the Maderner Observatory to the next generation of scientists and for their kind benevolence.

Over the course of the past two years, we realized that the money we had planned was not enough and we looked for more supporters. We discussed how best to proceed and thought that we could try to reach out to the entire region. This idea was obvious because we defined the school observatory as an integral part of the regional educational landscape. Our fundraising attempts eight years earlier had been completely unsuccessful. We had written project plans and produced an expensive image brochure. We had asked for and received letters of support and recommendation from several research institutes around the world. These included the FORSCHUNGSZENTRUM JÜLICH, the Helmholtz Society in Berlin, the GERMAN CENTER FOR AIR AND SPACE, the UNIVERSITY OF HAWAII (USA), the UNIVERSITÉ DE MONTRÉAL (Canada), the LUDWIG-MAXIMILIAN UNIVERSITY of Munich and the INSTITUTO ASTROFISICO DE LA LAGUNA
in Tenerife (Spain). We had approached all the major German funding foundations (Tschira, Haereus, Bosch, Mercator, Krupp, Telekom...), had an appointment with the state parliament and were active at European level (ERDF fund and LEADER program) - all to no avail. Even a fundraising entrepreneur didn't want to help us. But back then, we only had a bare large telescope and we had to expect to be regarded as cranks without a sustainable concept. At least we now had a service building with a domed tower. So we could do something
"see". So in October, we started collecting company addresses in the region (aerial photos in GoogleMaps help to locate business parks...) and presented our work with a short project description and our flyer to company managers and owners. Of course, you usually don't get a reply to such mysterious emails and we always called the respective company after about ten days.

"Good afternoon, Dr. Thomas Eversberg from the German Aerospace Center in Bonn (that makes an impression). *I am the chairman of the Waldbröl school observatory. We are looking for companies that might be able to support our project and would like to ask whether your company can identify with our goals of getting schoolchildren interested in technical and scientific subjects. Could you please put me in touch with the management office?"*

Normally you are then redirected. And again: "*Good afternoon,... aerospace... blablabla... school observatory... schnassel... offspring... goals... blabla... support..."*

You need a mixture of speaking skills, conviction and persistence. You first have to learn this and overcome your insecurity... To get to the point: After around a year, our financial gap was closed by umpteen companies!

2019 - Interior fittings, student lab and Wedding

It was now time to carry out the interior work. We didn't need civil engineering and wood experts to plaster the walls, wallpaper and paint, we wanted to do it ourselves to save a lot of money. We started with the plastering last December. Thomas first tried his hand in one of the bedrooms, which you can s t i l l see in the joints today.

can. It was horrible ("*What kind of cheese is that?*"). But he thought "practice makes *perfect*" and the others shouldn't fare any better (just don't make a fool of yourself). Ralf, however, was way ahead of us in terms of craftsmanship and we repeatedly saw a benevolent smile on his face. We certainly had to endure a few jokes. Around 200 meters of joints were filled and at the beginning of the year we were joint masters. The last few meters looked great. Then came our least favorite job by far - the joint sanding. WHAT.A.MESS!!! Masked snowmen a t work. We motivated ourselves with the thought of pride when we had finished. Wallpapering, on the other hand, was a piece of cake. However, we had professional support in the form of Marc Simon (who did it completely voluntarily in his spare time). The floor was laid, the doors installed and the furniture put in place in March (we had dusted off tables, chairs and cupboards from the German Aerospace Center).

Ralf sanding.

Thomas, Ralf, Klaus & Gerrit

The glorious wallpaper superheroes:
"The Smile", "Dr. Hypno", "The Paste", "The Acrylator".

Two weeks later, we started work on the student laboratory. Its area on the eastern side of the service building was still in its raw state without foundations for the stations and without a solid floor. So first we had to dig the pits for the foundations of the telescope columns and pull cable ducts for the power and data connections between the telescopes and the working positions of the sliding cubes - the pickaxe is a wonderful tool. For the average office worker, such physical work is a pleasure, especially for the back ("*Can someone please tell me what this has to do with astronomy?*"). But the weather was fine and it was great fun for us. The three sliding cubes and 300 square meters of donated paving stones were already in place. We could already see the finished laboratory before our eyes.

Marius, Peter, Johannes, Thomas, Klaus & Ralf.

The paving is laid. Wojciech Walczak on the left.

In addition to the work on the student laboratory, we also had to reassemble the large telescope. Ten years ago, we had disassembled it into components again in order to check all the individual parts, rework or grease them if necessary and repaint them. That was all done in the meantime. We couldn't assemble the monster in the observatory because there wasn't enough space and no crane was available. So we took it back to Klaus' barn (our "assembly hall"). Piece by piece, we put everything back together in June. A typical exchange: "*What was that part again?" - "That belongs on the mirror flaps." - "No, I don't think so...!" - "Then put it aside for now*." After three days, we were able to "marry" the telescope to the dome again with the help of our great forwarding agents.

Assembly and marriage with the cupola tower.

Hans-Werner & Kurt.

Klaus & Florian Höffgen.

We also picked up the Bode observatory in Hanover. The dismantling team of Klaus, Ralf, Hans-Werner and Thomas, which had already proven itself in Mössingen, was supported this time by Martin Diederich. They always say that men need projects to keep them from getting bored. We fully support this thesis! In July, we dismantled the observatory o v e r a long weekend and moved everything to Schnörringen.

Dismantling the Bode observatory and unloading in Schnörringen.

Our aforementioned inquiries to regional companies continued. We approached a large number of companies and by the end of the year, several companies had pledged their support in the form of money as well as important "gifts in kind"!

Such telephone inquiries are an exciting thing. At first you are nervous because a personal approach is a completely different matter to an anonymous email. The person on the other end quickly realizes whether the caller is serious and can represent their concerns or is just stuttering around. You should therefore be very clear about the idea, the problems and the goals - and you should practise a certain aplomb beforehand. After a few phone calls, however, you'll have a routine and things will be relatively easy - and you'll have some very interesting conversations. On the one hand, you sometimes can't get past the "zero number" (the zero at the end of the telephone number often stands for the switchboard), but on the other hand you sometimes have the management on the line straight away. You learn a lot about the
"Corporate policy" and their self-image. Our sponsoring companies very quickly showed a certain understanding not only for the project but also for their corporate responsibility towards the region and its young talent. The decisive factor here is not the extent of the sponsorship but the willingness to assume responsibility within the scope of their own possibilities (many companies are also involved elsewhere). This in turn means that we may be left empty-handed because a company is already supporting other projects. However, we have received so much goodwill that our financial gap for the observatory could be closed.

In the meantime, all the paving had been laid in front of the service building and at the student laboratory. We were now able to install the rails and set up the three protective cubes. Marius did this in July and the cubes could be set up. Ralf in particular had made this his
"Hobby" and the majority of this work i s his responsibility. Thomas comments: "*We shouldn't just call the stations '1', '2' and '3', but 'Ralf 1', 'Ralf 2' and 'Ralf 2'.*
Ralf 3'."

Delivery and assembly of the prot
cubes.

The stations were now ready for operation and in October, Frank Bohlscheid from Hollenberg-Gymnasium inaugurated the school laboratory with five women from his Astro AG. One month later, Günter Dombrowski from Waldbröl Comprehensive School and his Astro AG attempted to track a transit of Mercury in front of the sun.

The school laboratory in operation.

In the summer, Thomas received an email from Leon Advena asking for an internship at the observatory. Unfortunately, we don't do internships, but assign procuration immediately. Thomas wrote something similar back to him with an invitation to come to the observatory. Leon did so and we learned that he had just graduated from high school and wanted to use a whole year to look at various companies as an intern. He also wanted to study physics in Siegen (!) and then astronomy (!!!) after his bachelor's degree in Bonn. Sometimes you really wonder how you earn such exciting young people. Of course, we didn't tell him that, but simply accepted him into the club the following year. So something had to be really nice with us. With Jonathan, Leon and Gerrit, as well as Damian and Marius, we now had several young people on board who could shape the future of the observatory.

Peter Stinner & Leon Advena in the school lab.

2020 - Funding applications and the pandemic

The only major construction site left was our large telescope. It was finally under its dome and some individual components had to be installed. These included the main and secondary mirrors, mechanical elements and the focal port with its three foci. Gerrit and Jonathan took care of the digital dome control by designing and assembling the corresponding circuit boards. After the intermediate floor had been installed by our carpenter, we were finally able to work in the tower. In January we started with the further assembly. Some parts had to be added to keep the mechatronics engineer busy. And the lifting table, which weighed several tons, had to be moved into the cupola room so that the main mirror could be installed. The five of us ended up crushing Peter's hand...

As we were now financed by the generous donations from the region, we were finally able to install the photovoltaic system for the roof in May. This made us self-sufficient in terms of power supply because it was designed so that the feed-in tariff could cover our costs (unfortunately this changed later). We also started looking for a kitchen. That wasn't easy because, with a maximum length of three meters, it had to have a sink, a fridge, a stove and a dishwasher. And it had to look different for everyone. "*I could donate a solid wood kitchen.*" - "*Oh, I don't know, too rustic.*" - "*Do we want one in white?*" - "*Looks too cold.*" - "And marbled...?" - "*Doesn't matter, as long as I don't have to build anything.*"

However, one important aspect of the observatory was still unresolved. All our telescopes are equipped with spectrographs as an introduction to scientifically oriented light analysis. These devices are relatively simple systems that can be used to teach the measuring principle and for standard measurements. However, our large telescope has so far lacked a spectrograph. In order to utilize the telescope even on relatively few clear nights, it should be an instrument with which the complete wavelength range of visible light (from blue to red) can be recorded in high quality with a single data acquisition (a so-called echelle spectrometer). This is generally not possible with the simple systems in the student laboratory. If scientifically relevant data and results are to be obtained on a regular basis, it is essential to purchase such a spectrograph.

As Klaus and Thomas had written a scientific textbook on this topic, the association had the

professional knowledge for the implementation of such a device. With such a spectrograph, we close the motivating educational chain from the small to the large telescopes. And our large telescope plays in a league in which relevant research work can be carried out. The instrument is therefore virtually predestined for the use of a spectrograph. Without such a measuring instrument, analytical and evaluative work is not possible. Otherwise, the large telescope at the school observatory could only be used for visual observations and sky recordings, which would not be expedient for our overall concept in two respects. Firstly, its capabilities could not be fully utilized and secondly, the educational objectives of the school observatory could not be fulfilled in many areas. However, large telescopes need large spectrographs for optical reasons and these are expensive. We calculated from experience that they would cost around 80,000 euros. That's why we were only able to tackle this issue now. You can't raise money for an expensive measuring instrument if the telescope to be used is not yet ready for operation.

Our vehicle was to be an application for funding from "LEADER Oberberg". The "Oberberg region: 1000 villages - one future" was a so-called LEADER region in North Rhine-Westphalia. LEADER is a funding program for rural areas financed by the EU and the state of North Rhine-Westphalia. Several towns and municipalities in the Oberberg region are part of a common area. We contacted the LEADER office with our request and learned that the application deadline was mid-January 2020 and that educational topics were still underrepresented. The catch, however, was that 35% of the requested funds had to come from our own resources. At 80,000 euros for a spectrograph, that would be 28,000 euros - but we didn't have that! However, it was also possible to obtain this 35% from another funding body. So we submitted combined funding applications to both LEADER Oberberg a n d the Hans Hermann Voss Foundation. *"Tell me, if one application fails, the other doesn't make sense. Quite a risk, isn't it?" - "Yes, but we have to have fun!".* Fortunately, both applications were successful and we were able to start researching the large telescope.

But then came Corona... the Covid-19 pandemic also stopped our work. Nothing worked in April. It wasn't until the end of July that we resumed work in small groups. But we had to cancel the first meeting of the "Oberberg Astronomy School Network". Of the 35 schools contacted, 17 had registered to take part in the meeting in April. Our planned opening together with all sponsors in September was also not feasible until further notice.

We now concentrated our work entirely on the large telescope and the dome - well, and there was also some repetitive external work to be done.

Hans-Werner Eürskens

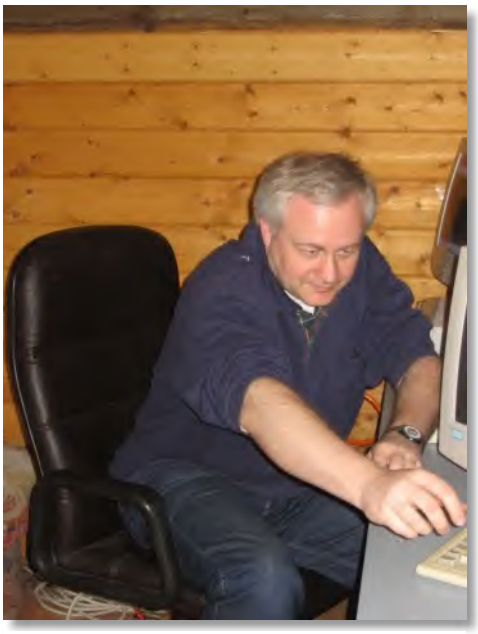
Work on the dome

Johannes Stinner is a regular guest with us and has been a regular helper in various civil engineering projects. We suspected that he was a tunnel builder or miner in his previous life. No matter whether it was earthworks or green cuttings, Johannes was there.

Johannes Stinner in civil engineering.

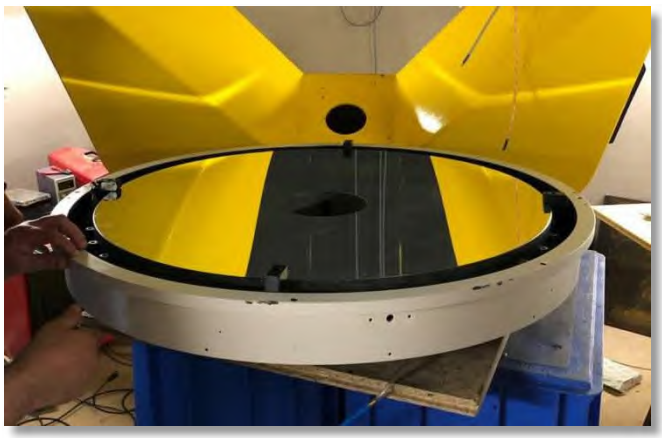
Thomas Eversberg as window cleaner

2021 - Farewell and an astronomical school network



Uwe Schröder.

The new year began sadly for us. Our club member and physicist Uwe Schröder passed away completely unexpectedly. He had already started an astro club at his school in Gelsenkirchen and naturally wanted to use our observatory with his offspring. This event made us realize that many club members should keep an eye on their own horizons and that we must pass on our project to the next generation as soon as possible...



The 0.8-meter primary mirror in its mirror cell.

In the summer were all active club members for the second time against Covid-19 vaccinated and we were able to continue our work in small teams again We took care of ourselves further the main telescope. It should as quickly as possible operational as quickly as possible. Thomas realized an electromechanical control system for the mirror flaps. This could also be implemented purely electronically via a program to implement this, but for easier easier maintenance and simpler understanding future generations of pupils, this seemed the better way.

The storage of the main mirror on its air cushion caused us major problems. Plastic cushions don't last forever and after around forty years we couldn't avoid an expensive replacement from the manufacturer.

Expensive telescopes need expensive spare parts. Almost exactly two years after the first "marriage" between our main telescope and the dome building, we were finally able to install the second one in July.

"marriage" between the main telescope and its optics celebrate. The primary mirror and the secondary mirror were inserted into the telescope.

View of the primary mirror in the telescope. The mirrored secondary mirror can be seen below the mirror opening.

In August, we started work on the large station in the student laboratory. The foundation wall for the protective building was laid, the foundation for the telescope was concreted and a wooden support structure was built. A heavy mount was installed under the corresponding 3.5 m dome.

The concrete telescope column supports the large telescope in the school laboratory.

Our principal, German and Latin teacher and association member Frank Bohlscheid presents astrophotos he took himself to colleagues in the school network. We've always wondered when he actually sleeps.

When we canceled the first meeting of the Oberberg Astronomy School Network in April 2020 due to coronavirus, we had no idea that we would have to postpone the meeting for a whole 18 months. After three waves of infection, 35 teachers and some students from 18 schools in the region finally met in November to get to know the facility. The teachers in our association in particular presented their own working group concept and exemplary astronomical experiments. We also presented the observatory as a platform for a joint learning concept in which schools can exchange ideas and support each other. In our opinion, the primary goal is always to make the work fun, not only for the pupils but also and especially for the teachers. We therefore discussed how networking can best be implemented. Together we decided to hold a workshop in the school laboratory to introduce teachers to the use of the telescopes and to set up an online forum for the school network as an exchange and information platform.

OBERBERG

TIPP DES TAGES
Zum Abschluss der Waldbröler Orgelfestwoche ist heute, 19.30 Uhr, in der evangelischen Kirche ein sinfonisches Orgelkonzert von Josef Rheinberger zu hören.

Das astronomische Klassenzimmer

Im Observatorium von Schnörringen geht die Schülersternwarte in den Regelbetrieb

VON ARND GAUDICH

Schnörringen. Steht Astronomie auf dem Stundenplan, müssen die Lehrer nicht in die pädagogische Trickkiste greifen. Die Wissenschaft von den Gestirnen sei für seine Schüler faszinierend und damit auch motivierend, berichtet der Direktor des Waldbröler Hollenberg-Gymnasiums, Frank Bohlscheid, aus seiner Astro-AG. In der Sternwarte Schnörringen sprach er am Mittwoch vor Kollegen. Lehrer und Lehrerinnen aus 18 Gesamtschulen und Gymnasien waren der Einladung des Initiativkreises Schnörringen Telescope Science Institute (STScI) zur Gründung des „Schulnetzwerks Astronomie Oberberg" gefolgt – das jetzt loslegt.

Der gemeinnützige Verein STScI habe schon in seiner ersten Satzung fixiert, das damals noch im Bau befindliche Observatorium auch als Schülersternwarte nutzen zu wollen, sagte der Vereinsvorsitzende Dr. Thomas Eversberg.

Im großen Kuppelturm erklärte Dr. Klaus Vollmann (r.) den Lehrern, wie das Hauptteleskop funktioniert. Fotos: Gies

„Das kriegt man hin"

Nach sechs Jahren Bauzeit ist die Sternwarte so gut wie fertig, und nach einein halbjähriger Verzögerung war jetzt der Start des Schulnetzwerkes möglich. Wegen der nicht allzu großen Räume und den Unwägbarkeiten durch Corona habe der Verein im ersten Schritt nur 37 Gymnasien und Gesamtschulen angeschrieben, die meisten aus Oberberg, einzelne etwa auch aus Köln und Wissen. Mit den 35 Vertretern der 18 Schulen, die reagiert hatten, war das Observatorium voll. Das Netzwerk soll allen Schulformen offenstehen, sagt Eversberg: „Vielleicht können auch Grundschulen mitmachen, die sich bereits mit dem Thema Astronomie beschäftigen."

Dass die Sternkunde zwar eine mit viel Technik verbundene Wissenschaft, aber eben kein Hexenwerk ist, zeigte Hollenberg-Direktor und STScI-Mitglied Bohlscheid auf. Selbst Lehrer für Latein und Deutsch, habe er sich in sein Hobby Astronomie eingearbeitet und schaut nun mit seiner Astro-AG auf viele Lichtjahre entfernte Sterne und die Planeten in Erdnachbarschaft. Er zeigte Fotos von Saturn und Jupiter, aufgenommen durch ein Teleskop und einer daran angeschlossenen Minikamera. „Toll ist, dass sich besonders Mädchen an meiner Schule für die Sternkunde begeistern."

Physiklehrerin Claudia Riester vom Engelskirchener Aggertal-Gymnasium hatte vier Oberstufenschülerinnen mit nach Schnörringen gebracht, um eine mögliche Teilnahme am Netzwerk auszuloten. Sophia Wick aus dem 11. Jahrgang lauschte gespannt den Einführungsvorträgen. Sie habe zu Hause selbst ein Teleskop. Mit dem Profi-Gerät der Sternwarte zu arbeiten, sei schon ein kleiner Traum.

Neben Bohlscheid berichteten zwei weitere Vereinsmitglieder und Lehrer, wie Astronomie im Schulleben verankert werden kann. Günter Dombrowski, Leiter der Astro-AG an der Gesamtschule Waldbröl, versicherte „Das kriegt man hin" und zeigte das Foto eines sterbenden Sterns in einem Ringnebel – von oberbergischem Boden aus in rund 3000 Lichtjahren Entfernung eingefangen. Peter Stinner, Leiter der Astro-AG am Gymnasium Wissen, musste nicht mehr viel Überzeugungsarbeit leisten.

> **Toll ist, dass sich besonders Mädchen an meiner Schule für die Sternkunde begeistern**
>
> **Frank Bohlscheid**
> Der Leiter des Hollenberg-Gymnasiums Waldbröl hat an seiner Schule eine Astro-AG

Nach einem Rundgang durch die Anlagen des Observatoriums merkten sich 17 Lehrer sofort für einen Lehrgang an den Teleskopen vor. Ein fantastischer Start, meinen Astrophysiker Dr. Thomas Eversberg und Dr. Klaus Vollmann. Die beiden Initiatoren der Sternwarte und ihre Vereinskollegen verstehen sich als Lernpartner für das Schulnetzwerk Astronomie Oberberg, das sich nun selbst organisieren soll. Das STScI will Lehrer mit Fortbildungen, Vorträgen, einem Online-Forum zum Austausch, einer Lernplattform und einem Lexikon im Netz unterstützen – und den Schulen mit ihren Teleskopen den ganz tiefen Blick in das Universum ermöglichen.

Schulen, die sich am Netzwerk beteiligen wollen, finden alle Infos auf der Homepage der Sternenforscher. **www.stsci.de**

From experience, we are skeptical of reporters, whether on TV or in print. You never know whether reports about us will contain some kind of nonsense. Some write nonsense, others report that we are "bankrupt". Many media prefer to report the improbable not as improbable but as sensational... Fortunately, we soon had a serious partner on the media side. Arndt Gaudich from the Oberbergische Volkszeitung (OVZ) researches carefully and consults with us on unclear points or complicated questions. After all, the OVZ supplies regional articles to the Kölner Stadtanzeiger, so we are also known in the wider area. Inaccurate information to the public can be problematic.

2022 - Farewell and new generation

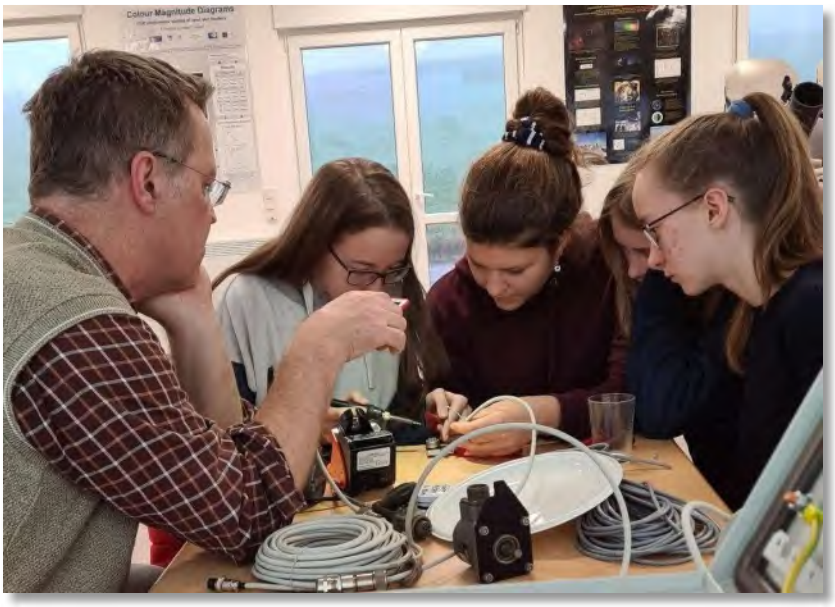
Siegfried-Hans Nimmert

Once again, we had to say goodbye to valued colleagues. After a long illness, our founding member Siegfried-Hans Nimmert. Hans was active at observatories for many years and, together with us, founded the initiative group for our school observatory. He was a master carpenter and reinforced concrete construction master as well as an expert in optics and celestial mechanics and passed on his knowledge to the next generation of astronomers for many years. He is a role model for our future work.

Wolfhard Schlosser.

We have also lost another great friend of the school observatory after a long illness. Prof. Dr. Wolfhard Schlosser was a founding member and honorary president of our association. Wolfhard Schlosser was a scientific generalist and observational astronomer. He was a teacher at the Ruhr University Bochum and worked on a wide variety of topics
from comet research to space-based telescopes and archaeoastronomy. He was the leading scientist in the investigation of the Nebra Sky Disk. He also wrote the book "ASTRONOMISCHE MUSTERVERSUCHE Sekundarstufe II". It is a compendium for practical application in science lessons and, in our opinion, the world's best work in this context. We use it today in our school astronomy network. Wolfhard Schlosser declared our observatory to be the best in the world because of its geographical position.
"Reference Observatory of the Nebra Sky Disk" and he became Honorary Chairman of our association much later. His motto was always: *"I want you to become better astronomers than I am"*. This is part of our mission statement today.

Our kick-off event for the school astronomy network last year bore its first fruits despite the pandemic. Lucia Gröger, Lilly Meyer as well as Sophia and Katharina Wick regularly visited the observatory as a team and we accompanied them in some important work (e.g. realization of the control of the large telescope, digital measurement of the CCD cameras).



Katharina Wick, Lucia Gröger, Lilly Meyer and Sophia Wick soldering plugs for the control system of our large telescope. The electronics technician explains how it works.

Simon Gier then joined our team in January. Simon is a programmer and IT specialist and immediately designed a new digital infrastructure for the entire observatory.

He discovered that our entire IT consisted of isolated stand-alone solutions and that our systems could not be networked. Live streams of telescope recordings could not be presented in the seminar room and we were unable to offer laboratory and observation activities online. Students outside of the AGs could not be reached. To change this, we successfully applied for funding from the "100xDigital" support program of the German Foundation for Commitment and Volunteering. With these funds and Simon as project manager, we digitized the observatory to meet professional standards.

In the summer, the time came for our two new telescope domes, which we wanted to install on the two secondary stations. Hans-Werner had restored the 3.2m dome purchased from Saarland for our upper secondary station in the student laboratory and it was now ready for use. And with a grant from a foundation, we were able to buy another dome for our station north of our service building.

The 3.5m dome for our upper substation.

The primary mirror of our large telescope is relatively thin, but still weighs 80 kg. To maintain the nominal mirror shape when the telescope moves, it rests on an air cushion whose air pressure is adapted to the respective telescope position.
becomes. High pressure for observations at the zenith (high weight load), lower pressure for observations on the horizon (lower weight load). The air pressure is permanently adjusted via sensors under the mirror, an electronic system and a pump depending on the telescope orientation. The original control system was outdated and no longer worked properly. Our IT all-purpose weapon Simon has therefore designed and implemented modern electronics to take over this task.

Simon Gier at the control cabinet.

OBERBERG

Das Tor ins Weltall öffnet sich bald

Hobbyastronomen in Schnörringen fiebern der „First-Light-Party“ in der Sternwarte entgegen

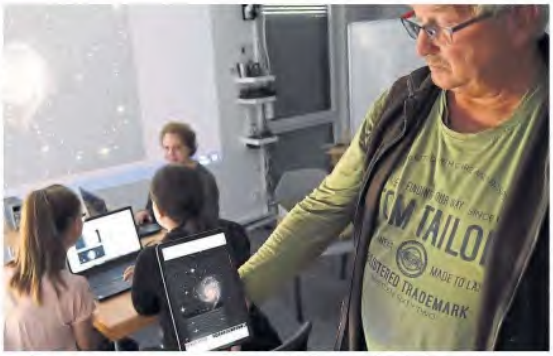
VON ARND GAUDICH

Schnörringen. Das „Einscheinern“ ist etwas für Ausgeschlafene. Dr. Klaus Vollmann verbringt derzeit seine Nächte damit, das Hauptteleskop in der Sternwarte von Schnörringen für den tiefen Blick ins Weltall haargenau zu positionieren.

Wie so etwas gemacht wird, hat der 1858 in Köln geborene Astrophysiker Julius Scheiner bereits vor 125 Jahren publiziert. Die nach ihm benannte und sehr komplexe Methode aber lässt sich auf das Waldbröler Riesenteleskop mit seiner Brennweite von zehn Metern nicht so ohne Weiteres anwenden, musste Vollmann nach der dritten erfolglosen Arbeitsnacht feststellen. Immer wieder, wenn er das Teleskop auf einen Stern ausgerichtet und den in das Fadenkreuz des Okulars genommen hatte, driftete der Himmelskörper nach einer gewissen Zeit aus dem Zentrum der Optik. Doch in der Nacht zum Samstag ist Vollmann der Vollendung der Präzisionsarbeit ganz nah. In den frühen Morgenstunden bleibt der angepeilte Stern für 30 Minuten genau dort, wo er ihn haben will. „Jetzt geht es nur noch um Zehntelmillimeter.“

Den 1,3 Tonnen schweren Ritchey-Chretien-Reflektor unter der großen Kuppel des Observatoriums exakt parallel zur Erdachse zu bringen, soll einer der letzten wichtigen Schritte zur „First-Light-Party“ sein. Schon bald wollen die Schnörringer Hobbyastronomen die Inbetriebnahme des Herzstücks der Anlage feiern – und die ersten Bilder von Lichtjahre entfernten Sternen, Nebeln und Galaxien per Kamera und Computer einfangen.

Immer wieder hatte sich der Moment verzögert. Immer neue Herausforderungen stellten sich dem Atmosphärenphysiker Dr. Klaus Vollmann und dem Astrophysiker Dr. Thomas Eversberg, die das Teleskop vor 14 Jahren gebraucht kauften. Um das Gerät herum ist ein Projekt erwachsen, das in Fachkreisen längst bundesweit Beachtung gefunden hat. Unter dem Dach des von ihnen gegründeten „Initiativkreises Schnörringen Telescope Science Institute“ (STScI) ist in den vergangenen Jahren das als Schülersternwarte konzipierte Observatorium gewachsen.



Die Jugend forscht mit: Im Telescope Science Institute helfen (o.v.l.) Simon Gier, Lucia Gröger und Sophia Vick nun Dr. Klaus Vollmann. Ralf Schmidt zeigt das Foto eines weit entfernten Himmelskörpers (M.). Eine neue, kleine Kuppel (u.l.) soll das Schülerlabor erweitern. Fotos: Dierke, Ralf Schmidt

Neben dem Hauptteleskop gibt es im Außenbereich das Schülerlabor mit bislang drei einsatzbereiten Teleskopen. Eine vierte Station für ein etwas größeres Teleskop ist in Arbeit. Ein Unternehmer aus Alferzhagen will für sie in Kürze den Unterbau liefern, auf den eine kleine, gebraucht gekaufte Kuppel gesetzt werden soll. Das Freiluft-Labor wurde Schulvertretern aus der Region im vergangenen November vorgestellt. Corona geschuldet, habe sich das Schulnetzwerk jedoch seitdem nicht etablieren können.

Ein bereits geplantes Teleskop-Training habe wegen schlechten Wetters nicht stattfinden können, bedauert Vollmann: „Das wollen wir nach den Sommerferien nachholen.“

Trotzdem gehören zwei Schülerinnen bereits zur Stammannschaft, die sich an den Samstagen regelmäßig an der Sternwarte trifft: Sophia Wick und Lucia Gröger, beide 17 Jahre alt und künftige Zwölftklässlerinnen am Aggertal-Gymnasium Engelskirchen, sind fasziniert von der Möglichkeit, das Universum erkunden zu können. Wick will nun mit Unterstützung der Schnörringer Forscher eine Facharbeit für Physik schreiben und dafür herausfinden, wie sich das große Teleskop und der Kuppelturm synchron miteinander bei jeder Geschwindigkeit drehen können.

Peter Stinner, Leiter der Astro-AG am Gymnasium Wissen, hat mit Simon Gier ein weiteres junges Gesicht für das Projekt gewonnen. Der 24-Jährige ist Fachinformatiker und nunmehr Projektleiter, um im Observatorium IT-Technik zu installieren. Dafür wurden gerade erst 20 000 Euro aus dem Fördertopf der Deutschen Stiftung für Engagement und Ehrenamt bewilligt, sagt Vollmann. In der Vergangenheit wurde die Sternwarte bereits von einer Reihe von Institutionen unterstützt. Bald soll eine Tafel im Außenbereich auf alle 130 Förderer hinweisen.

ISS im Vorbeiflug fotografiert

Für September hat sich Besuch von der Universität Sydney angekündigt, wo die Schnörringer den Bau eines Spektrografen in Auftrag gegeben haben. Mit dem Gerät soll die Zusammensetzung des eingefangenen Lichts analysiert werden. Die Australier wollen in Schnörringen Details für die Konstruktion des High-Tech-Geräts abstimmen.

Bei aller irdischen Arbeit, die noch zu erledigen ist, verlieren die Hobbyastronomen das Firmament nicht aus den Augen. Ralf Schmidt, der aus Marienheide-Kalsbach regelmäßig nach Schnörringen kommt, zeigt am Tablet-Rechner von ihm aufgenommene Bilder. In prächtigen Farben leuchten Galaxien und Nebel aus schier unvorstellbaren Entfernungen.

Jungforscher Simon Gier kontert mit einer Aufnahme, die er quasi in der Nachbarschaft aufgenommen hat: Vor einem Ausschnitt des von Kratern übersäten Mondes sind ganz klein die Konturen der Internationalen Raumstation ISS zu erkennen. Beide können es kaum abwarten, welche Einblicke ins Universum das große Teleskop liefern wird.

Axel Schmidt also joined us in the summer. As an amateur astronomer, he immediately proved to be a great asset to the association with his practical ideas and relaxed ma brought in. He proves his worth at school events in particular, where he reaches the next generation in the best possible way.

Axel Schmidt as mentor

The next milestone came in August. We started so-called "engineering runs" to test our large telescope and then went into regular observation mode. We achieved "first light", i.e. the first image of an object in the sky. We chose the famous ring nebula in the Lyra Messier 57.

All optical parameters were confirmed with this photo with an exposure time of only a few minutes. This was particularly evident in the round star images up to the edge of the image field and in the detection of two background galaxies. A wonderful milestone.

We installed a planetarium program on the control computer with which the telescope position can be moved to on a digital sky map using the mouse. In our This was already possible in the student laboratory. With the programs installed on the control computer, we started some additional work for the telescope positioning as well as various procedures to finally set up the telescope for the observations.

We had a few technical problems. We spent weeks looking for faults in the cabling and the encoders until Patrick Staden turned up. Patrick is an electrical engineer and one day he discreetly disappeared into the dome room only to come out again a short time later to tell us that he had fixed the first problem. Since then, we have tended to lock him in the relevant room when we have technical difficulties. If he comes out of the room at some point, everything is fine...

Patrick Staden works on the telescope electrics and is supported by his assistant Fion.

2023 - Achieved the goal ?

After Lucia Gröger and Sophia Wick from Engelskirchen accompanied their teacher to the first meeting of our school network at the end of 2021, they regularly supported our work almost every Saturday. They quickly learned how to use the telescopes in our student laboratory and produced remarkable photographs of various celestial objects. celestial objects. They quickly developed into valuable colleagues in our circle and joined the association together with Axel, Simon and Patrick at the next annual general meeting in March. In terms of content, little changed for us because all of them not only observed themselves but also acted as mentors for other students. However, the structure of the association did change - our average age dropped to around 40!

Sophia Wick and Lucia Gröger.

Surprisingly, we suddenly received an invitation to a conference in Berlin. The German Foundation for Engagement and Volunteering, which had funded our digitalization, invited all projects in the "100xDigital" support programme to an exchange. The aim was for the funding recipients to present their projects and results to the public and exchange ideas. The costs for travel and accommodation were covered. We sent Lucia and Sophia to this conference. The first message via signal messenger from Berlin: *"We've arrived here at the DSEE Convention, it's really cool here!" ... "What do you mean, it's really cool?" - "It's kind of underground in a huge room and there's a buffet and everything. There are two photographers walking around and we're generally asked from all sides whether we need anything else, whether we need a notebook and a pen." - "Buffet is already good. Have fun, you two."*

As the association grew, new initiatives also emerged. Patrick put our observatory on the list for the Germany-wide Girl's Day to make young girls aware of STEM subjects. All 10 places on offer were quickly filled, so he increased the number to 15. These were also quickly filled.

Our Girl's Day guests discuss the size of the solar system.

We finally decided to officially open the observatory together with our sponsors on May 6 - exactly 15 years after the purchase of our large telescope.

Our opening guests at the unveiling of the sponsor plaque.

Program for the opening of the Waldbröl school observatory on 6.5.2023

GEMEINNÜTZIGER INITIATIVKREIS
SCHNÖRRINGEN TELESCOPE SCIENCE INSTITUTE E.V.

Ringweg 8a, 51545 Waldbröl – Fon 0178-1366304 – Web www.stsci.de – Email mail@stsci.de

Programm

Bis 13:00 Uhr – Zwangloser Rundgang für die „frühen Vögel"

Musik vom *„Engelskirchener Trio"*

13:00 Uhr | Begrüßung (Thomas Eversberg - STScI)
| Grußwort von der Stadt und dem Kreis (Larissa Weber & Friedrich Wilke)
| Ansichten eines Profis (Prof. Dr. Anthony Moffat – Montréal/Kanada)
| Animation: *„15 Jahre in 4 Minuten"* – Der Aufbau der Sternwarte

13:30 Uhr | Das „Schulnetzwerk Astronomie Oberberg" (Frank Bohlscheid - STScI)
| Schulastronomie (Günter Dombrowski & Peter Stinner - STScI)
| Astronomie am STScI aus Schülersicht (Lucia Gröger & Sophia Wick - STScI)
| Rechenschaftsbericht an die Förderer (Klaus Vollmann - STScI)

Musik vom *„Engelskirchener Trio"*

14:15 Uhr | Feierliche Würdigung der Unterstützer - Enthüllung der Stahltafeln

Meet and Greet – Gespräche, Imbiss & begleiteter Rundgang

Ende offen

Vorsitzender: Dr. Thomas Eversberg – Geschäftsführer: Dr. Klaus Vollmann
Volksbank Oberberg – IBAN DE29 3846 2135 1024 9740 10

Ladies and gentlemen, dear guests,

My name is Thomas Eversberg and I am the chairman of STScI e.V. I would also like to welcome you to your Waldbröl school observatory. I deliberately say <u>your</u> observatory because it could only be built with your help. You can see that after many years we have almost completed the entire infrastructure. This year, the two secondary stations with their domes will be built and we will install a large measuring device for our large telescope. We will then be fully operational and of course happy with what we have achieved. I think it's great and we'll show and explain it all to you in more detail later.

Some of you may be wondering how we actually managed to do this. As a rule, we answer that you need
must "burn", because the central prerequisite for successful projects is always enthusiasm. Be enthusiastic and do it well! Albert Einstein said: "We act as if comfort and luxury were the most important requirements of life. But all we need to be happy is something we can be enthusiastic about." And it is precisely this enthusiasm that Klaus Vollmann and I, the initiators of this project, have had since we were children. Astronomy was the ocean we wanted to discover. And so we have been pushing each other forward for almost 40 years, culminating in a professionally equipped school observatory with the largest telescope in NRW and a powerful group of like-minded active people.

Some of you may think that the honor goes to the people who built the observatory. But I think it's easy to do something like this if you're passionate about astronomy. You, on the other hand, are not necessarily passionate about it, but you might say: "I have no idea exactly what they are doing, but they are doing it for our children and I trust them to do it well". But trusting them is by far the more difficult part of our interplay because who knows what kind of people they are!

And because of your trust in our idea, you deserve the honor and not us. And that is precisely why we invited you. I could now highlight many supporters. Instead, I would like to mention just two people as examples. These two motivated us to go down this path even before we bought the large telescope in 2008, the actual nucleus of our observatory.
One is Susanne Mittler-Vollmann, Klaus Vollmann's wife, who showed a great deal of tolerance - and incidentally gave up a new kitchen in favor of buying a telescope.
The other is my uncle Abdelali Aouati, who obviously realized at the time that we absolutely had to buy the telescope and motivated me accordingly.

Their goodwill gave us the strength to make the observatory a reality. We received new energy with every idealistic, financial and material support, which still motivates us in the association. On the aforementioned sea, we always sailed close to the wind to make fast progress. But sailing close to the wind always means the risk of capsizing. But we didn't capsize because the wind came from you - and we obviously steered well. Those were 15 years full of uncertainty and tension, but also full of humor and hope.

But that's what it's all about: hope. Hope for the future of a project that serves the next generation.

Thank you very much!

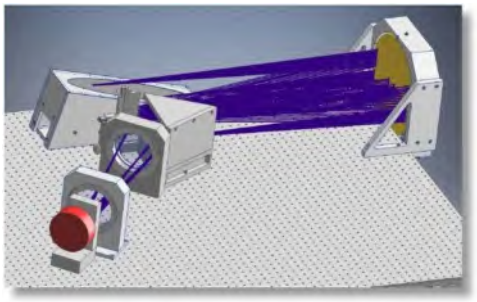
Fion Staden was the youngest guest to unveil the sponsorship plaque.

possible but pointless...

This celebration was another milestone in our work. We were happy and proud of what we had achieved, met old acquaintances and friends of the observatory and experienced the great interest and general enthusiasm of our guests while listening to music by Joseph Haydn (our club member Lucia on the flute). And chips with currywurst were greeted with general cheers.

But of course we knew that we would never actually finish.

- Over the next few months, the components of the professional spectrograph had to arrive from Australia, be set up and connected so that measurements with the large telescope could be made at a professional level.



CAD design of our spectrograph.

- The two secondary stations should be set up in the course of the year to round off our offer to the next generation.

- We also had to take care of the damaged gap in the large dome. It squeaked and tugged at the dome, so we were afraid to open it. Who knew whether we would be able to close it again. The estimate was expensive and hardly affordable. But anyway, we've solved all our problems so far.

What happens afterwards depends on whether our offer is accepted by the schools and the region and thus whether our hopes are fulfilled. We are not only thinking about school events, but also have cultural aspects in mind. That would be lectures, film events, even art. We are dependent on an echo from the region, because we are nothing on our own.

"Well, I'd like to have a science movie theater with our projector..." - Cinema??? - "Of c o u r s e , every sensible city has a movie theater." - "Waldbröl doesn't have a Kono." - "Exactly..."

What drives us

Have we achieved our goal with the foreseeable completion of the observatory? Not at all, because our goal is a fluid one - in particular, of course, the ongoing promotion of young talent over the coming decades. To do this, we need an echo from the "*Oberberg Astronomy School Network*", i.e. permanent cooperation with the schools. We now want to start regular educational operations. In addition, work on the infrastructure will continue. In the meantime, the next generation is supporting us locally and has significantly rejuvenated the STScI as an operating association. We are now smoothly handing over responsibility for the project because none of us old geezers want to tell the young people what to do.
"Well, I don't think club chairmen and managing directors should be allowed to be older than 65." - "Excuse me? That's pretty soon." - "Exactly!"

People keep asking us how we were actually able to build the school observatory and they assume that we were financed from the start. We are met with great astonishment when we deny this. If you want to build something new, pursue a special idea because you are passionate about it, then you should expect that the financial situation will always be precarious. You always sail close to the wind and hope that the boat doesn't tip over. But you can only make progress if you sail close to the wind. At least that's how it worked out for us.

Norbert Reinecke comments: "*Klaus and Thomas have overcome almost all the organizational hurdles alone since the purchase of the large telescope. Sometimes perhaps even flying blind and taking risks, but as we know, the gods are with the brave. Really all the stops were pulled out in the course of the project. Even the methods of "psychological warfare", which I am very familiar with, did not really seem to be alien to them, judging by the steadily growing success in raising donations and material resources for the construction and equipping of the planned observatory. My measurable contributions to this project were rather modest: Participation in regular meetings as well as discussions with a more legal background. However, my real contribution to the association from the very beginning was to support the two of them in an uncomplicated way whenever possible and to do my best to balance and smooth out any dissonance in the group in the interests of the two of them. In reality, however, I became rather inactive from 2015 to mid-2019 due to three consecutive rather threatening illnesses and was unable to really experience many important stages of the observatory. Looking back, the whole project seems to me to have been "galloping madness"*

to be. If we had known about the hurdles and difficulties 15 years ago, perhaps no one would have gone down this path. Correction: Thomas and Klaus might have been crazy enough and would have tackled this risky construction site in the same way even if they had had visionary abilities...and maybe the rest of us too. We amateur/professional astronomers are all kind of crazy. And that's a good thing!"

Leon Advena says: "*When I offered my modest help with the Schnörringen Observatory in September 2019, I didn't know much about what had been going on in Schnörringen for a long time. Although I had already gotten a rough idea of the project from a newspaper article some time earlier, my first deeper insight into the objectives, the idea and the dimensions of the observatory took place on the day I paid my first visit to the site. I was particularly surprised and impressed by the fact that the observatory is not a facility that only serves as an observation site for its club members, but that its primary target group is interested schoolchildren. This idea has inspired me ever since and is one of the reasons why I am very happy to be involved in the further development of the observatory. As a pupil - even though that time was not so long ago - I would never have dreamed of the possibility of observing with the largest telescope in North Rhine-Westphalia and would not have had to think twice about whether I wanted to take advantage of the opportunity to observe with this very instrument. In addition, the warm welcome I received when I first came to Schnörringen and also during the time that followed was a great motivator to work at the observatory. Last but not least, the ever-present cheerful hope for the commissioning and use of the facility as a major goal should of course also be noted. Finally, I would like to pay tribute to the great achievement that Thomas and Klaus, as well as all the other members of the association, h a v e brought about with this major project."*

We, Klaus and Thomas, met in a gambling den in 1985. But we almost met ten years earlier. Thomas rode his moped up to the Hagen observatory in 1975. He was enthusiastic about astronomy and dreamed of having a telescope. He met a club member outside the observatory and asked the man: "*Can I join you? - "Yes, but you need money for that.*" Thomas didn't have any. He got on his moped and was lost to the observatory forever. It's quite possible that Klaus was learning the basics of ephemeris calculation from Hans Nimmert in the observatory building

as Thomas drove back down the mountain. During the planning in Schnörringen, we swore that something like this would never happen to us. If young people show an interest in anything at the observatory, they are very welcome. It must not be about money. In our view, it is important that young people develop an interest in something and are enthusiastic about it. Of course, this can also be something other than astronomy. The decisive factor is commitment to a cause and to other people, so that you share this cause with others. We happen to be driven by a passion for astronomy. Our idea is not necessarily to attract astronomers, but to get young people interested in the STEM disciplines (science, technology, engineering and mathematics). Astronomy is ideally suited to this. With us, you can calculate, program, do manual work and learn about various areas of physics (optics, mechanics, measurement technology, etc.). In reality, however, we want to teach even more fundamental things at the observatory. These are virtues such as respect, tolerance, perseverance, integrity and honesty.

A partial solar eclipse.

Time and again, we are shown respect for our work. Of course, this makes us very happy and motivates us immensely. Most people think that the honor goes to the people who built the observatory. However, we believe that it is easy to do something like this if you are enthusiastic about astronomy. The sponsors, on the other hand, are not necessarily passionate about the stars, but often say: "*I have no idea what exactly they are doing, but they are doing it for our children and I trust them to do it well*". This is by far the more difficult part of our interplay. And that's why our supporters deserve the credit and not us!

Today, we no longer own any of the observatory; we have donated our property to the association and handed it over to future generations. We are said to be idealists. That may be true. We respond with Carl Schurz:

"Ideals are like the stars.
They are unreachable, but they guide our path."

Leon Advena, Frank Bohlscheid, Günter Dombrowski, Jonathan Eichner, Hans-Werner Eürskens, Thomas Eversberg, Simon Gier, Lucia Gröger, Gerrit Grutzeck, Damian Himmel, Marius Himmel, Felix Macht, Hans Nimmert, Norbert Reinecke, Axel Schmidt, Ralf Schmidt, Patrick Staden, Peter Stinner, Klaus Vollmann, Sophia Wick

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