Carlo and Gianluigi in 1985

G: *The last time Halley's Comet passed near us was in 1910, and so next year we will be able to see it again, since its period is about 76 years.*
C: *I read somewhere that it's spectacular, with a huge tail full of colors.*
G: *Unfortunately, this time it won't be like that. Its visibility to the naked eye will be limited to a very short period and it will be so faint that you will have to search for it in order to see it.*
C: *However, the next passage will not be until 2062: we must therefore make sure that, even though this appearance is not particularly favorable, this opportunity is not missed.*
G: *In Cagliari there are many members of the Associazione Astrofili Sardi who have amateur telescopes that provide great satisfaction.*
C: *I wonder how much they cost…*
G: *But look, with a certain manual skill and without spending too much, you can also build telescopes capable of showing Saturn's rings, Jupiter's moons, and much more.*
C: *Really???*

And so we ordered the optics to build a Dobsonian model telescope, using a design found in an astronomy magazine. A 20 cm plastic tube, a wooden structure enhanced with a nice thrust bearing, some supports made on a lathe, a bit of patience for collimating the optics, and the little jewel was ready.
However, using it was not easy, due to the difficulty of aiming at objects. Only the Moon, given its size, caused no particular problems, and this allowed us to see its wonderful craters. Discovering that inside them there were even smaller ones was exciting and stimulating. Also, discovering that by looking at the stars with the naked eye we had unknowingly come across Saturn who knows how many times was another powerful stimulus to learn how to recognize the constellations, distinguish planets from stars, know where the countless celestial wonders that cannot be seen with the naked eye are located, and therefore know where to point the telescope.

Friday 18 October – 7:00 p.m. – Meeting for those interested in astronomy – Via Zanardelli – ARCI Headquarters

About ten people from Lanusei attended the meeting, and the first decisions were to organize observation nights immediately, promoting the initiatives and at the same time beginning to study so that we could tackle what until then we had considered mysteries: coordinates, magnitudes, star charts, sidereal time, black holes, the expansion of the universe, and an infinite number of other curiosities which, rather than decreasing, increased as we went deeper.
In order to use the telescope properly, it was necessary to find a panoramic place with a 360° view and far from sources of light pollution, that is, far from lamps which, instead of illuminating the ground, disperse much of their light upwards, ruining the magic of a starry night. Fortunately,

there are many dark areas around Lanusei and in a short time we identified a clearing on Monte Perdedu, south of the town, on private land whose owner made it available to us.
Observation evenings began, which, in addition to the first core group of enthusiasts, involved many citizens. Our curiosity and that of our guests made us immediately understand that building a telescope is a small thing compared to the complexity of knowledge needed to answer the public's questions, which range from motion in the skies to the physics of stars, from extraterrestrials to the origin of the universe, from space exploration to the existence or non-existence of a creator.
We were forced to study and stay up to date to improve our knowledge and satisfy what were, first and foremost, our own curiosities as well.
The Moon, Saturn, Jupiter and a few other celestial objects are always astonishing even for those who are not experts in astronomy and perhaps are observing for the first time. Nebulae, galaxies and other planets, on the other hand, are rather disappointing with a small telescope.
We wondered how wonderful it would be to observe with a larger telescope…
The curiosity to learn more and more about the science of the skies led us not to miss the rare occasions in which, in Sardinia, something related to astronomy was happening, and so we took part in various public events organized by amateur astronomers in Cagliari. We saw the wonderful photographs they produced with telescopes not much larger than ours, but with a different mount. They taught us that we have a splendid sky that must be protected and valued. They also gave many answers to our questions. In one of these conferences, a professional astronomer showed—also with the help of slide projections—how they had built the largest telescope used by the Associazione Astrofili Sardi, fortunately also focusing on many technical mechanical details of the construction. Among us there were several workers and there was no shortage of specialized mechanics who knew factory equipment well (lathe, milling machine, welder, etc.), so, looking at each other, we came to the conclusion that such a work was well within our reach.
The group of enthusiasts, which also included many women, grew stronger and stronger, and this solid core allowed us to immediately design and explore the feasibility of our dream. However, being outside the main circles of national astronomy, and since the undertaking was not simple, we had no money and no mechanical project to work from, so for a while we sifted through all the magazines in search of ideas. We were aware that we were doing something important. It is difficult to meet someone who is not fascinated by the mysteries of the cosmos, but almost everyone believes that this field of study and the related observations are reserved exclusively for scholars of scientific subjects. We, from the beginning, went in the opposite direction. We felt it was not right for such incredible beauty—for this half of the landscape—to remain exclusive to a few, and our intention was to create a work that would be available to anyone with curiosity, the will to know, and the desire to look around.
To observe Halley's Comet (which, when it reappeared rising from the southern skies, was very low on the horizon), we climbed Monte Tricoli. The sky was clear, but the wind moved the telescope and prevented a decent view. We solved the problem by placing the instrument inside the van of a radio technician. The cold and the wind were quite disturbing, and the comet, especially when compared to many others we saw in the following years, was not particularly fascinating, but this did not dampen the enthusiasm of many people. Whenever we observed a new object, the first impulse, the first instinct, was to share these emotions with as many people as possible, allowing especially the elderly, the poor, and the excluded to enjoy these wonders.
If we truly managed to build an astronomical observatory, we could also become a reference point for all school groups. During our public observations, children did not want to detach themselves from the telescope. All the stimuli were there.

The clearing on Monte Perdedu seemed like the ideal place. We explained our projects to the owner and he gave us permission to build. Enthusiasm grew even more and observation evenings multiplied.
In an astronomy magazine an article caught our attention that spoke about the Associazione Reggiana di Astronomia and the observatory with its self-built telescope. What struck us most was their attitude toward the people of their territory. We realized they had been doing for years what for us was still a vague dream. After many contacts and fruitless attempts, perhaps a concrete path was opening. At the first opportunity, on our first trip to mainland Italy, we went to visit them. Without an appointment, without an address, with only the name of the town: Castelnovo di Sotto, in the province of Reggio Emilia. As soon as we arrived, we asked where the observatory was and went there. Fortunately, the observatory was open.
There were two men talking: the guest praised their activity while the association member explained that it was beautiful and interesting, but over the years their activity had led them to use almost all their free time for that purpose. We were welcomed very kindly, invited to sit and join the conversation. As good inland Sardinians, we were a little reserved, even though we were particularly eager to see the telescope, located in another room under the dome. When we explained that we were Sardinians, that that day we were coming from Naples and that after the visit we had to go to Florence, Gianni—this was his name—called the president of the ARA who looked at us as if we were Martians! We talked about our projects and about the article that had brought us to them. When they let us into the dome, the first impression, seeing the telescope, was astonishment and disbelief in the face of such an imposing work: too big for us; we had never seen anything like it! Discouragement and admiration. Maybe we could aim to create something comparable on a smaller scale. So that the visit would not be completely useless, we asked whether they had any drawings of the telescope. They pulled out a large folder, packed full of extremely detailed mechanical drawings regarding every part of the construction: astonishing!
Our hosts told us about the excellent quality of our sky, the enormous value of darkness and the need to do everything possible to protect it, because without darkness any telescope becomes useless. They also told us about the difficulties encountered in the various phases of construction and about many other issues—astronomical and otherwise—showing an impressive culture and humility. Faced with our feeling inadequate to manage an observatory like theirs, they introduced us to a bricklayer who calmly gave lessons at the high school.
We left carrying with us the drawings of the complete polar axis, its support and the related conical bearings. Thanks to this visit, the idea that was maturing was to try to adapt the shaft and its support from some large pump no longer in use at the Arbatax Paper Mill. We also took their association's bylaws, and once back in Lanusei we examined all the material, including photos. It truly seemed too big a work for us, but we started anyway with what we could do.
With the fundamental contribution of the Mereu company, which donated the cement, and of Antonello Cabiddu, who put in so much, so much effort, we built a five-by-five-meter platform on Monte Perdedu, prepared with the iron bars in the correct position for the pillar on which to mount the telescope.
For the construction of the polar axis, a fundamental and extremely expensive part of the telescope, we decided to speak with the head of department of the Mechanical Workshop of the Arbatax Paper Mill, Giordano Laurini. After explaining our intentions and seeing the availability of machinery no longer reliable for production, given the continuous-cycle work, we asked to have something adaptable to our purposes. He did not answer immediately, but being a technician he wanted us to bring him the drawings first, so he could get a more precise idea and then talk to the director, Antonello Murroni.

The examination of the bylaws and founding deed of the Reggio Emilia Association, from which we intended to take inspiration, confronted us with further problems, perhaps due to an excessive component of individualism. From reading the deed it seemed that anyone who joined the association would automatically receive all rights, becoming an equal member to those who had actually built the telescope and the observatory. We then phoned another of the leaders in Castelnovo, expressing our doubts, and for the second time perhaps we were considered aliens. Pieraldo candidly answered that: “If someone joins the association, even 15 years from now, they immediately become ‘owner’ of the observatory as much as you!” For them this was normal, having always been accustomed to cooperation, social struggles, and mutual aid. For us it was not easy to digest, but after some time we considered it a great achievement.

Passing by one of the lathes of the Mechanical Workshop of the Paper Mill we saw Giovanni Usala working on a piece of special steel weighing more than a hundred kilos and very similar to a polar axis! It was exactly that! The head of department had given him the drawings with the order to build them at the original size, like those in Castelnovo! The only words he said to us when the work was finished were: “Organize yourselves to take away that piece!” Enthusiasm through the roof. We now felt we could make it.

In 1989 we officially founded the Association through a notarial deed. The Municipality of Lanusei, with the then mayor Virdis, became a founding member of the Associazione Ogliastrina di Astronomia and had the specific task of building the building that would house the telescope.

With membership fees we began to have some resources to purchase materials needed for further construction. The money was not enough, however, so, with our ideas now clear and very determined, we opened a public fundraising campaign, which many far-sighted people from Ogliastra joined positively.

Since we had passed the test with the construction of the polar axis, our colleagues from Emilia immediately sent us the rest of the drawings (the complete design by Ferdinando Caliumi), eager as they were to see the work finished, both so that they could observe with an improved copy of their instrument, but above all so they could do so under a dark and unpolluted sky.

To house the instrument under construction—a Newton-Cassegrain telescope with a 400 mm diameter and 1800 mm focal length—we needed a larger space than what we had begun to build on Monte Perdedu.

We spoke again with the owner of the site, who this time expressed doubts because the construction had to be carried out by the Municipality of Lanusei and, in order to reach the observatory, his land had to be crossed for about 300 meters. For this reason he feared that in the future at least part of his land might be expropriated. We thus found ourselves needing to identify another suitable location. In hindsight, without any regret, also because in that area new houses were beginning to be built and we experienced that, although people want to live in the countryside to escape stress and chaos, then, for reasons unknown, they discover they are afraid of the dark and, to protect themselves, they light everything up like daytime with terrifying floodlights capable of canceling the night! We thanked Gianni Mucelli anyway for allowing us to use the platform for as long as necessary.

With the funds available we bought the iron to build the base of the telescope: 30 mm sheet metal cut with a pantograph in a workshop in Tortolì, SARMO of Carletto Pilia. For construction we were hosted in Lanusei, in Carmine Arzu’s workshop, who also donated 3 and 5 mm sheet metal to build the fork. In this work, Marco Cucca, a founding member, and Mario Piras, a highly specialized mechanical fitter, distinguished themselves, preventing us from making some major mistakes.

By now we were at a good point. We had so much material that we no longer knew where to put it. The municipality made available to us part of the ground floor of the former nursery in Via Marconi, which was in dreadful condition. Goodwill was not lacking and in a short time, thanks to a great deal of volunteer work by members who were increasingly numerous and specialized in the most diverse tasks, the large room became a welcoming and decent place.
To avoid further obstacles, the choice of the new site on which the observatory would rise had to fall on public land. A suitable location could be Monte Tricoli, whose summit lies in the Municipality of Gairo. There was already a road to reach it easily and a wonderful 360° panorama, although slightly disturbed by RAI antennas. In fact, we had already applied to the Municipality of Gairo two years earlier, presenting a project donated by surveyor Pompei for the construction of a small three-meter-diameter observatory suitable for observations with small telescopes. Result: they did not even reply, even though the request specified that the initiative was not for profit and would be available to schools and the population.
We were still very uncertain about how to build the observatory, especially its roof. We did not think we could build a large dome and at first we tried other routes, also following the advice of an air force lieutenant, Bruno Mariani, our very active member stationed at the military base of Perdasdefogu. Inside the base there were sliding roofs that had once been used to protect telescopes—or rather, beautiful and very expensive theodolites. They were no longer used and there was the possibility that one of these roofs could be granted for use. Mayor Virdis requested a meeting with the general who commanded the base at the time, specifying the reason and referring to the positive collaborative relationship between the base and the territory.
The response was more than prompt and soon we were invited to a working breakfast at the facility. In addition to a group of members, the meeting was also attended by Mayor Virdis, Lieutenant Mariani and the president of the Associazione Reggiana di Astronomia, Silvano Pagliarini, who followed us constantly. It was a very interesting day, also because they involved us in their activity, allowing us to watch in the radar room an exercise in which they used the cine-telescopes that can be seen along the eastern coast of Ogliastra.
The general was very supportive, and after lunch he put us in touch with a captain, a physics graduate and astronomy enthusiast, who, in addition to listening to us, explained minute details about the optics of their telescopes… explanations that surely only Pagliarini was able to follow!
We left very confident and happy with the overall experience. Unfortunately, nothing came of it because shortly thereafter there was a change in leadership at the base and the new general was distrustful and never even responded to a new request for a meeting. No sliding roof. We had to start building the dome, at least in our heads.
Mayor Virdis proposed identifying on Monte Armidda the suitable place to build the observatory. With the forestry commanders and the president of the Associazione Reggiana di Astronomia, who in the meantime had returned to visit us, after several walks we identified the suitable place, in the Municipality of Lanusei just a few meters from the Municipality of Gairo. Surveyor Baldussi donated the new project: a five-by-five-meter dome room and an eight-by-five-meter meeting room. The wait was rather long, especially for the approval of the project by the Office for Landscape Protection, while the Forestry and the Municipality of Lanusei were fairly quick and collaborative.
The chosen site was not connected by any road, and to reach it one had to climb along a firebreak strip. Nearby, the Mereu company of Lanusei had an active work site to repair and then asphalt the road from Sarcerei to Perda Liana and the Tonneri. The site manager, Franco Farci, diverting for one morning a large bulldozer from the road works, made the chosen place accessible to

normal cars. This increased our awareness that we could make it, and that all obstacles could be overcome, even knowing that we had undertaken something perhaps greater than ourselves.
An important thing to mention in this regard is the total collaboration between workers from Lanusei and Tortolì. For those who make parochialism their banner, it still seems incredible that so many highly specialized workers from Tortolì dedicated countless hours of volunteer work to build a large telescope that would be installed in the mountains of Lanusei. Not to mention the entrepreneurs who made beautiful mechanical workshops available, equipped with sophisticated and indispensable machine tools, with an invaluable spirit of collaboration.
To understand how indispensable collaboration and the joining of forces were to the realization of our project, it is enough, as an example, to recount the various phases that led to the construction of the main telescope tube. To begin, we bought two sheets of metal 3 mm thick and brought them to the workshop of Alberto Zanet, former COMECA, in Arbatax. The mechanical carpentry work was done by Antonio Monni, from Lotzorai, a worker at the Mechanical Workshop of the Paper Mill. First it was necessary to do the calculations to establish the dimensions of the sheets that would have to become a tube of 500 mm diameter and 1800 mm height. Once prepared, the sheets were joined by welding, paying the utmost attention to avoid deformations. Then it was the turn of the rolling machine, a machine suitable for bending sheets as needed to make them into tubes. The new weld definitively closed the sheets and the tube was ready. At this point two plates, 15 mm thick, had to be welded in the previously calculated position. On these plates two small shafts had to be mounted on which the telescope would rotate: everything had to achieve extreme precision or else, once finished, it would not be possible to balance it. After these steps, the work was suspended because rings had to be made on a lathe for the ends of the tube. This work was carried out by another lathe-miller at the Paper Mill, Giacomo Carta, from Arbatax, again using Zanet's lathes. On these rings the supports for the mirrors would later be mounted, respecting measurements requiring precision around one hundredth of a millimeter. These half-meter-diameter rings were then welded to the tube with all possible precautions to avoid the deformations that are commonplace in welding. Giacomo Carta then built the "spider" and the "tailpiece" with all the housings needed to accommodate the "cell" that would later contain the primary mirror. Many other parts were built by Luigi Vacca, also a turner at the Arbatax Paper Mill and also from Tortolì, while many others we built in the workshop of the ENAIP vocational school in Lanusei, with the fundamental contribution of an instructor, Gino Coda, who immediately became one of our "very active" members.
The exact point where the observatory had to be built was identified and, so that it would be oriented correctly, one night we climbed up equipped with flashlights and plumb lines to trace a line indicating the north-south direction. Once the North Star was identified, we kept one of the plumb lines as still as possible, while the other line was placed a few meters further south. The lines were illuminated with flashlights while a member, sighting from the south, had one moved until they were perfectly aligned with Polaris at the moment it crossed the meridian. At that point, in correspondence with the plumb lines, stakes were driven into the ground to define the alignment needed for the building.
While everything was proceeding quickly on the project side, a major problem arose with the municipal administrators when, to our great astonishment and dismay, we found the lock forced on the premises in Via Marconi that we had restored. Perhaps we had done too good a job making it welcoming, and the municipality had decided to give it to someone else. This episode, obviously, did not please us at all, also because a similar incident had happened when we had restored another room in Via Zanardelli. On that occasion too, the lock had been forced and the room had been assigned to the Justice of the Peace.

In that difficult moment, however, good fortune did not abandon us and another “miracle” happened that allowed us to go on and calmed our irritation: one of our members, Tonino Piga, made available to us his artisan workshop and cellar, and there we could finish the assembly. Drilling, threading, welding, various alignments were our constant occupation for many long months.
In the meantime the municipal administration of Lanusei had changed. At first we were worried that attention toward us would drop, but we were reassured immediately, especially because Mayor Armando Loi and councilor Umberto Martinelli shared the project and gave decisive impetus to the construction of the building.
Not everything went smoothly. At the beginning, despite the goodwill of Pinuccio Ligas, the work proceeded with exhausting slowness, which lasted until the Municipality began managing the construction site and, with the entry of some new workers, everything changed. In fact, until then it was we who urged and protested because there was no progress, while once the site was entrusted to Alfredo Vacca, “Siu” Giovanni Vacca and Dino Mulas, the trend reversed: it was they who scolded us because the shutters and the entrance door were not yet ready. They made us work “overtime” and at the vocational school they said our member Angelo Pisci attended more than a few teachers!
As for the mechanical work, we were able to easily overcome all obstacles and in fact the telescope was well advanced. With electronics, however, we were in great trouble. The instrument we were building had to automatically track the stars with a motor that had to have the correct speed to keep them always in the same position, thus canceling the effects caused by the Earth’s rotation. Our colleagues from Reggio Emilia had sent us a plastic envelope with an incomprehensible diagram and many tiny pieces of equally mysterious electronic material that should have given commands to the motor.
The first assembly of the Associazione Ogliastrina di Astronomia, held at the Via Marconi headquarters, saw not only members but also many citizens interested and curious about this initiative. Fortune had it that two electronic technicians were also present: Antonello Monni from Telecom and Alvaro Scarozza from the military base of Perdasdefogu. What was a mystery for us was daily bread for them, and so, in a short time, even the tracking mechanism was ready. Another inconvenience occurred due to the lack of funds to buy a gear wheel and its worm screw, but fortunately we remedied it with an ingenious system consisting of a smooth 400 mm diameter wheel driven by a stainless-steel band.
The dome still had to be built. The Reggio Emilia design did not seem reliable to us because our area is periodically struck by violent gusts of wind, so we made the necessary modifications to make the structure stronger. The first attempt to build the circular track to be cemented on the roof and the corresponding four-meter-diameter ring that would become the base of the dome took place in one of the workshops in Tortolì, but we did not obtain good results. The rolling machine was not suitable for profiles and we only managed to twist the iron.
The ENAIP instructor in Lanusei assured us that the iron could be bent with a small rolling machine they had. We tried it and indeed he was right: it worked, although on that occasion Gino Coda had to use all his professional experience, because it is not at all easy to build two circles four meters in diameter starting from twisted “C”-shaped iron.
For the vocational school, hosting us was a big commitment. The dome had to be built in two parts, otherwise it would not come out of the shutter door. Therefore, assembly had to be done outside. The director of the school, Cirillo Mameli, was enthusiastic about our initiative and did everything necessary to facilitate the work, following us later until installation on Monte Armidda.

Our requests for help and collaboration certainly were not finished. Everything still had to be painted and the dome had to be clad. The body shops of Lanusei, the Manca twins, were immediately available to paint the telescope mount, the base and the fork, naturally in red to show gratitude toward all the workers who had built it. The main tube instead was painted by Peppe Caredda in the workshop of Giorgio and Bruno Arzu, in Arzana.
On the same mount the so-called guide scope had to be placed, a refractor telescope 2.25 meters long and 150 mm in diameter. We had the money for the lens and, again following the advice of the Reggio Emilia amateur astronomers, we ordered it from a Venetian specialist, Romano Zen. The tube, however, was built by one of our members who specialized in gutters, Cesare Orrù, while the front and rear rings were again made by turners and millers from Tortolì.
To purchase the primary mirror, which cost six million lire, we did not have the necessary funds. We did, however, need to balance the telescope and we knew the mirror weighed about 20 kg. This time the help came from one of our member stonemasons, who built a granite wheel of the same dimensions as the mirror, i.e., 400 mm in diameter and 100 mm high: installing it, while waiting for the real primary mirror, allowed us to balance the telescope.
Another tinsmith from Lanusei, Francesco Demuro, contributed by offering us at least 30 square meters of 0.8 mm galvanized sheet metal needed to cover the dome. This work, experimental for all of us, taught us that there exist triangles in which the sum of the angles exceeds 180°.
For the further coating of the dome in fiberglass, a merchant from Lanusei, Mario Asoni, took care of it. Thus, in the external courtyard of ENAIP, with the volunteer work of many members and several hundred 5 mm rivets and small rollers that dried immediately when using fiberglass, the dome was ready to be installed.
On the side of a Bremak off-road vehicle of the Municipality of Lanusei we fixed vertically the track on which the dome would rotate. It was the first special transport to the observatory: a four-meter-diameter ring that was quite conspicuous and had to be cemented perfectly level, avoiding any eccentricity.
The slab was not perfectly level, so the professionalism of mechanics and carpenters was again tested. Metal shims of many sizes and finally welding after countless checks. At that point we were finally ready to free Tonino Piga's workshop and the courtyard of the ENAIP vocational school.
On the agreed day, with the ever-present surveyor Pisano driving the municipal vehicle, after various acrobatics we managed to load the telescope mount and fork. Very heavy: almost a ton of steel machined to one hundredth of a millimeter. It could not pass through the observatory door, so it had to be installed before the dome, which in turn had to be installed immediately afterward to protect everything from possible rain. We then headed to ENAIP where we had an appointment with Luciano Carta, driver of Claudio Asoni's company, who provided a very powerful crane truck. Even just loading the dome onto the truck was a very delicate and spectacular job. The maneuvering space was minimal because there were electrical cables that did not allow calm maneuvers. The transport was an unforgettable moment, with a convoy of cars and the dome, protruding greatly from the truck, which on our roads seemed even bigger—very white and shining in the sun—causing the astonishment of all passers-by.
Part of the base had already been cemented onto a pillar 90 cm in diameter. The upper part is a large iron plate prepared for mounting the telescope, which was first strapped with the large crane and gently lowered into position. Six large bolts, a 30 mm star wrench, and part of the telescope was safe. During this assembly phase we realized a serious unforeseen problem: the truck could not come any closer even by a centimeter, and the crane, at maximum extension and fully extended outward, could not reach the center of the opening where the dome should be placed.

After the initial disappointment, being specialized in the art of making do, we found the solution. The dome, after its beautiful journey from the truck to the observatory roof, was placed on two large planks. About two meters were missing to reach its track. One of the two slings that balanced it was therefore removed and the remaining sling was tightened at an overhang, while from the opposite side, using ropes, we pulled the dome until it corresponded with the track below. We then levered it to remove the planks and the dome was reunited with its track amid applause, hugs and a notable dose of enthusiasm! We wanted to see it rotate immediately but it refused, for the simple reason that in our euphoria we had forgotten to remove the sling still under tension!
A lot of work had been done, but we certainly could not allow ourselves to relax because there was still much left. The observatory was now closed, we had the keys, all the walls were plastered, but the floor tiles were missing and the municipality had closed the construction site. We certainly could not install the telescopes yet if we still had to use cement, grinders, drills and other tools that would send sand and dust flying.
After purchasing the floor tiles, Alfredo, “Siu” Giovanni and Dino came to our rescue again and, this time as volunteers, they laid the screed and then tiled the floor; thus solving a major problem, because a historic shortage in our association was not having masons among the members.
The solidarity race certainly did not stop. Once the floor was finished it could be washed and whitewashed but above all the final measurements could be taken for the staircase to access the dome and for internal doors and windows. Once again Carmine Arzu built the staircase for us and additionally also the one that would later be used to reach the telescope eyepiece through which the various celestial objects would be observed. A special staircase, with wheels, suitable for observing the sky at all latitudes and from any position.
For the windows and internal doors, however, Egisto Matta and Gianni Vacca took care of them and above all worked on them, while Giorgio Cau completed their work by donating double glazing to us.
While constantly thanking everyone for this generosity, we felt an ever-growing responsibility. All the commitments and promises we had made had to be kept, and surely many were waiting for us at the turning point. It must not end like many initiatives that, after initial enthusiasm and a significant use of public resources, are then abandoned.
A fixed thought for our members was focused on the funds still missing to complete the observatory. At least two things were indispensable, both very expensive, at least for us. The first was having electrical power available. A new line had to be built: a pole line several hundred meters long that cost at least 30 million lire. The second was the already mentioned purchase of the primary mirror.
Very hopeful, we submitted a request for a contribution to the Fondazione del Banco di Sardegna aimed at purchasing the mirror. The application included a detailed project, already 90% completed, and was accompanied by an account of all our good intentions regarding its future management. Result? They did not even reply.
For electricity, our members skilled in electronics had temporarily solved it by making it possible to run the telescope motor with power from car batteries. From the Sardinia Region, and more precisely from the Department of Agriculture, they had also promised us solar panels similar to those used in sheepfolds: 600 watts, which we are still waiting for…
The assembly of the main telescope tube was full of satisfaction, without any difficulty. Everything went well to the millimeter. From the two pipes inserted into the dome to allow the placement of a sturdy hexagonal iron bar to which to hang the hoist, to all the bolts that fit into place as if they had always been there. Working in a clean environment, with new tiles, with the smell of fresh wall paint and with all the measurements matching, was extremely pleasant. Once the slings

supporting it were removed, there was still concern about balancing it, and instead that too was normal and the counterweights installed were fine.
However, there was another concern looming. The plans for the future of the observatory were very ambitious: we truly planned to make it accessible to everyone and especially to school groups of all levels. In anticipation of this, for years we had contacted all the physics, mathematics and astronomical geography teachers we knew. We were very happy to entrust them with scientific and outreach management. We would also take advantage of it to enrich our own knowledge and our collaboration would certainly not fail. Everyone was happy, everyone available, everyone eager to see the work finished—but then, the more the work progressed, the more everyone had other commitments and many, after two decades, never even showed up as guests.
With the 150 mm refractor we could, in the meantime, begin observations. Even though it was our work, we still needed to become familiar with it. We were used to tiny telescopes and this beast impressed us. In order to use electrical power, we found a way to bring our car as close as possible to the dome. The hood was opened and a strong cable was connected to the battery, and on the other side, through a hole made in the southern wall of the sub-dome, this cable powered a transformer which in turn supplied the motor. The device built to give the motor the correct speed worked perfectly. A little more practice to learn how to point such a large instrument, and then we could begin observing seriously.
It goes without saying that we had never made such high-resolution observations. Looking at the Moon, a predictable comment was that it seemed we could see the American flag and the astronauts' footprints. An infinity of extremely detailed features literally kept us glued to the eyepieces. Jupiter and Saturn were also incredibly beautiful and rich in never-before-seen details. Nebulae and galaxies, however, did not correspond to our expectations. That type of lens was not suitable for observing these faint nebulosities. We needed the 400 mm mirror.
Another woman from Lanusei, Virginia Lai, worked yet another "miracle." Having learned about our activity and our financial difficulties, she advised us to submit a request for a contribution to the Regional Department of Public Education and then personally followed the procedure until its positive outcome. We could hardly believe it: 10 million!
We immediately ordered the mirror, again from Romano Zen in Venice, and again under the supervision of our colleagues from Castelnovo di Sotto. Mirrors are built to order, based on the required characteristics.
Another miracle happened when an Enel employee, Viviana Lai, informed us that since we opened the observatory a few days a week, the service was considered "staffed," and this meant that having electricity would cost us three million, not 30. With the contribution Virginia had obtained, we could also cover that expense and in no time the connection request was filed.
A legendary red Diane spent many more nights with its hood open near the dome, but by then electricity was a done deal.
Looking down from Monte Armidda, we could see the new electric poles advancing toward us steadily. We thought we were finished with manual work, but that was not the case. In fact, the last pole was planted about 60 meters from the observatory and from there we had to take care of it ourselves. With pickaxes we dug into the rock to create the trench needed to bury the electrical cable, on very cold days with freezing rain. The excellent cannonau of Leandro Manca, besides his arms and his pickaxe, with a little granduledda, contributed not a little to the success of the digging. And there was light.
For the electrical system we had adaptable professional skills within our group. Angelo, Alvaro and Leandro got to work and, despite the difficulties inside the dome, in a short time light and

outlets reached every corner of the observatory. It was a dream and a great emotion to see for the first time the red dimmable lamps working in the dome. A soft light that does not disturb observations and reduces (without eliminating!) the number of inevitable bumps into the telescope.
A phone call from Venice informed us that the mirror was ready. However, we did not feel comfortable having it shipped by post. Too delicate and too expensive. We had to go and pick it up. Silvano Pagliarini offered, since he regularly spent his vacations in Ogliastra, fascinated by the transparency and darkness of our sky, to coordinate the transport of the mirror with his holidays.
Arriving at Zen's workshop he expected to find the mirrors packed and ready for transport, but the manufacturer was so pleased with the quality of his work that, finding himself in front of an expert, he wanted to show it, mounting the mirror on the bench and carrying out all the tests that highlighted the precision of the workmanship, with great satisfaction for both.
For Silvano's arrival in Ogliastra, with his wife Maurizia and the mirror, we had planned a "snack" in the Selene forest. Granduledda, roast sheep, pecorino, pistoccu, abundant cannonau, amaretti, aquavit… the rich meal obviously suggested avoiding handling the mirror that evening…
Even removing the packaging was emotional. There was almost no space around the table and everyone craned their necks to see. What can we say: the primary mirror and the two secondary mirrors were of a disarming beauty, not only optical.
For installation almost everything was planned. With the hexagonal iron bar and hoist set up on the dome, we oriented the telescope to the zenith, strapped the tailpiece from inside the tube, removed three bolts and lowered everything onto a small table placed underneath. When we removed the fake mirror, that is the granite wheel, we discovered that the real mirror did not fit into its cell. Terror. Had Giacomo made a mistake in the measurements? No. It was Zen who had built the mirror one centimeter larger, which is a nice gift because it gathers even more light, but at that moment the anxiety was huge. Fortunately, we had not skimped on materials. The iron we had rolled to build the cell was 10 mm thick and this allowed a new turning on the inside until it could accommodate the mirror.
Once assembly resumed, everything proceeded smoothly and we verified that all the mechanical work was accurate. In fact, the centering of the mirror was done with a dial indicator, a mechanic's tool that measures one hundredth of a millimeter, and when we then centered the secondary mirror there was no longer any need to adjust anything: optical and mechanical alignment coincided. Pinpoint stars, tight double stars clearly separated, galaxies showing spiral arms, Moon and planets like a fairy tale.
The science teachers still did not collaborate, and the immediate consequence was that we had to welcome and teach the lessons ourselves to the many guests and school groups. Facing a class from the Liceo Classico Siotto in Cagliari brought strong emotions and took more than one person's voice away. The beauty of our sky and the sharpness of the observations helped a lot, but there was always the awareness of managing something perhaps too big for our limited cultural means.
In that period, the scientific contribution of a young member, Mauro Pirarba, passionate about mathematics, physics and astronomy, was fundamental. In a short time the observatory cabinets (donated by Pinuccio Angius) filled with books and magazines that, when consulted, provided ample answers to many uncertainties. Listening to Mauro while he entertained guests enriched us too, and this greatly contributed to everyone's cultural growth. Another of his prerogatives was wanting to share with all members the new things he learned from magazines and books, and therefore, if there were no guests, time was used to increase our knowledge.

Another contribution, also fundamental, came from the solid collaboration relationship that was created immediately with the Associazione Astrofili Sardi and in particular with its president, Marco Massa. We, perhaps because of the repeated successes we had achieved, felt in some way “arrived” and almost able to offer advice, but after Marco Massa’s first visit we realized we had not even begun to learn. That evening we had to take astrophotos. With our usual observations everything went well, we noticed no anomaly and we felt ready for this new adventure. After a small tracking test on a star observed through an eyepiece with an illuminated reticle, Marco asked for the 30 mm star wrench because the first thing was that the telescope’s polar alignment was wrong and needed to be redone. The telescope’s polar axis must be perfectly parallel to the Earth’s axis of rotation and in our case there were differences, unnoticeable during normal observations, but disastrous for astronomical photography. And so we were taken by the hand and every visit of Marco Massa, Nino Muscas and the other members of the Associazione Astrofili Sardi of Cagliari has been—and is—a breath of new knowledge.

Some decades later

Tens of thousands of people have visited over the years the Ferdinando Caliumi Astronomical Observatory, at 1150 meters above sea level on Monte Armidda, in the municipalities of Lanusei and Gairo.
Many enthusiasts have used all their free time to ensure that this work was created and managed in the spirit that animated the promoters of the initiative. Improvements made—both in instrumentation and in the management of observation evenings—have been countless. The warm handshakes and compliments from guests tell us that our time has not been used badly. We see that many have used their time to achieve financial, economic, political success or power and personal affirmation. They can look down at us from their money and their power and think, to be kind, that we are strange, a bit outside the norm. We think that if a person is happy with their work, with what they manage to create with their hands or with their activity, they can consider themselves satisfied and happy with how they used their time. And that is our case.
After a few decades we still consider the observatory a newborn. The improvements still possible, both in terms of instruments and organization, may in the future be unlimited, but the starting foundations are excellent. In many municipalities of Ogliastra, the technicians responsible for public lighting recommend and require anti-light-pollution lamps and this will even lead to an improvement of our already splendid sky. Many former students, at the end of their university studies, return to Lanusei, and the fact that some are passionate about astronomy and attend the observatory, bringing in their knowledge, bodes well for a solid future full of satisfaction.