

# And Angelo Secchi Prayed

Faith and Astronomy illuminating the  
way to Truth

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Jesuit and Scientist* (Brill, 2019)

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## FOREWORD:

A few years ago I decided to study the life and the works of Angelo Secchi. I knew he was a famous astrophysicist and a Jesuit priest; but I did not find much about him, and I suspected that some of the things written about him were not correct. This made me even more curious about him! I started to look for old documents about Secchi. I began to read his books, letters, diaries, notes—and I found that he had led a very interesting life, with great difficulties but also great successes.

He loved the stars, the earth, the sea—and he loved the Lord, their Creator. He was devoted to the Pope and was always obedient to him. He loved people, and he wanted to improve their lives using scientific advances and technological inventions. He liked to consider science as a gift of the Lord and a benefactor of humankind. What an extraordinary man!

So then I wrote a book about Father Secchi, and those who read it were happy to discover many interesting new things about this wonderful scientist. Christina Graney was among those readers and she was inspired to write this beautiful book for younger people. She has been so skillful in presenting Father Secchi to young boys and girls as someone who

can be their friend. I hope that they will learn from Father Secchi how to love the Lord, to study nature, and to pray in every circumstance of their lives.

*Ileana Chinnici, April 5, 2022*





*«[Faith and science] are rays of the same Sun, aimed at illuminating the way to Truth to our blind and weak minds. Deprived of this noble purpose, these studies are mere curiosities and often just result in pain or, at least, unrewarding struggles. It is stimulating to consider how it is wonderful to show the Creator's work, even when any other excitement fades away; this raises the mind over the materiality of the calculations and makes these struggles a sublime and divine work.»\**

—Fr. Angelo Secchi, S. J.

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\* NOTE FROM THE AUTHOR TO THE READER:

Words in *italics* are a person's own if the words are enclosed by «brackets», like here. Words in *italics* are the author's suggestion of what a person could have been thinking if the words are not enclosed by brackets.





## Introduction

Angelo Secchi was an Italian priest and scientist. He was the director of the Collegio Romano Observatory from 1850 until his death in 1878. He worked in the areas of astronomy, astrophysics, and meteorology at the observatory, but he also undertook tasks for the Pope and his friends in an astounding number of different fields of study. He worked on projects concerning lighthouse illumination, earth measurement, water clarity measurement, timekeeping, and weather forecasting. The Secchi disk, which is used for measuring the clarity of water, and the SECCHI (“**Sun-Earth Connection Coronal and Heliospheric Investigation**”) tools used to look at and collect information about the sun and its atmosphere on the NASA STEREO Mission, were named for him.

Angelo Secchi lived in a very difficult time in Italy. Italy was in the process of changing from a peninsula of separate small political states to a unified country. In the process, Angelo Secchi experienced the persecutions of

anti-clericalism (blaming ordained members of the Catholic church for problems) and the invasion of his home by the Piedmontese Army from northern Italy which was trying to force the Pope to give up control of Rome and the Papal States. As the director of an observatory run by the Catholic Church and as a famous man, he had to keep the new government, his friends, other scientists, his provincial (his Jesuit boss-mentor), and the Pope all satisfied with what he was doing. Trying to keep all these people happy was very stressful, and at times it was impossible.

But Angelo Secchi was a man of faith and he prayed his way through trials, disappointments, joys, successes, and concerns.

**A**ngelo Secchi was born in Reggio, Italy on June 28, 1818. He was baptized the next day as Angelus Franciscus Ignatius Balthasar. He was the youngest child in his family by far—seventeen years younger than his next sibling! His father, Giovanni Antonio Secchi, was a widower when he married Angelo’s mother, Luigia Belgieri, and he was about sixty years old when Angelo was born. Angelo was close to his mother and probably learned his first prayers from her.

*Mama says that we all have a mother in Heaven.  
Our Mother is the Queen of Heaven and her  
name is Mary. I ask Mary to pray for my family  
all the time.\**

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And Angelo Secchi prayed,

*Hail Mary, full of grace, the Lord is with thee.*

*Blessed art thou among women, and blessed is  
the fruit of thy womb, Jesus. Holy Mary, mother  
of God, pray for us sinners, now, and at the hour  
of our death.*

*Amen.*

*Pray for us O Holy Mother of God, that we may  
be made worthy of the promises of Christ.*

*Amen.*



*Reggio, Italy*

**A**ngelo became a student at the Jesuit school in Reggio when he was nine years old. He was a good student and was especially talented in the study of the Greek language. He was a student there for about six years.

*I like my Greek classes a lot. Greek is interesting, and important because much of the Bible came to us written in Greek. We also use it at Mass.*

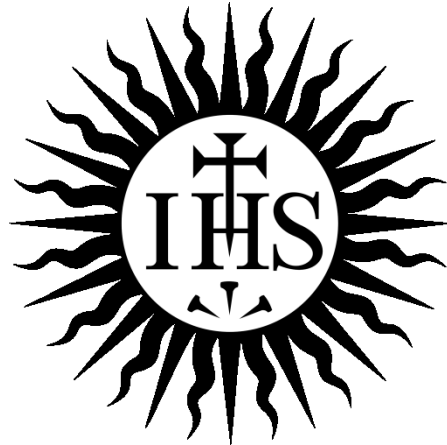
And Angelo Secchi prayed,

*Kyrie eleison, Christe eleison, Kyrie eleison.*

*(Lord have mercy, Christ have mercy, Lord have mercy.)*

## The Jesuits

The Jesuits, also known as the Society of Jesus, are an order of Catholic men who take vows of poverty, chastity, and obedience to their superiors in the order, plus an additional vow of obedience to the worldwide mission. Some Jesuits are priests and some are brothers. They live together, work together, and pray together.



*The Seal of the Society of Jesus, which features the first three capital letters, in Greek, of the name Jesus (IHΣΟΥΣ), along with the cross, the three nails of the cross, and the “Jesuit Sun” consisting of 32 alternating rays, 16 straight and 16 wavy.*

The prayer of the Jesuits is organized according to the *Spiritual Exercises* of St. Ignatius of Loyola, the founder of the order. The *Spiritual Exercises* help people discover what leads them to God. Like St. Ignatius, Jesuits strive to “find God in all things”. For this reason, Jesuits work all over the world in all sorts of jobs.

Many Jesuits work in education. Jesuits do research in many fields of study and share what they learn. The Jesuit order sponsors and provides teachers for many colleges, high schools, middle schools, parishes, and for retreat centers

where people spend time away from their usual activities in order to concentrate on deepening their faith. Other Jesuits work as missionaries around the world. Indeed, the Jesuits' fourth vow requires them to go anywhere in the world they are needed, to accept any mission given by the Pope. They go to help the poor, teach people about Christ, and work with people who are oppressed.

Since there are so many Jesuits in so many places doing so many different things, there is a way of organizing everyone. In this organization, Jesuits live together in groups called communities. Each community has a leader (the local superior), each group of communities has a leader (the Provincial), and the whole order has a leader (the Superior general or Father general). The leaders guide the Jesuits who are in their care, and the Jesuits in the communities owe obedience to their leaders. In this way, the Jesuits discern (figure out) what is best for each Jesuit, the whole Society of Jesus, and the mission of helping everyone "find God in all things."

Wherever the Jesuits serve and whatever mission they undertake, they do it "for the glory of God."





**A**ngelo Secchi entered the novitiate (a period of study and work) of the Society of Jesus on November 3, 1833. His mother and father had to give permission for him to join because he was fifteen years old at the time.

*I can hardly believe it, but Mama and Papa signed the paper. I already feel a bit homesick but I am excited and thankful. I am learning to be a Jesuit.*

*There are a lot of things for me to learn. I hope I can keep up with all the studying. And I hope I never get lost in Rome. It is so big!*

And Angelo Secchi prayed,

*A psalm of thanksgiving.*

*Shout joyfully to the LORD, all you lands;*

*serve the LORD with gladness;*

*come before him with joyful song.*

*Know that the LORD is God,  
he made us, we belong to him,  
we are his people, the flock he shepherds.  
Enter his gates with thanksgiving,  
his courts with praise.  
Give thanks to him, bless his name;  
good indeed is the LORD,  
His mercy endures forever,  
his faithfulness lasts through every generation.*

*—Psalm 100:1-5*

In 1837, Angelo Secchi began his studies at the Collegio Romano (the Roman College). Mathematics and physics were his best subjects, and he continued studying and teaching them for the rest of his life.

*The world is a beautiful place, full of patterns, all made by God and waiting to be discovered.*

*Physics and mathematics are ways to discover how God put everything together. Through my studies of theology and philosophy, and physics and mathematics, I hope to find God in all things.*



The Collegio Romano

And Angelo Secchi prayed,

*My soul proclaims the greatness of the Lord;  
my spirit rejoices in God my savior.*

*For he had looked upon his handmaid's  
lowliness; behold, from now on will all  
ages call me blessed.*

*The Mighty One has done great things for me,  
and holy is his name.*

*His mercy is from age to age  
to those who fear him.*

*He has shown might with his arm,  
dispersed the arrogant of mind and heart.*

*He has thrown down the rulers from their thrones  
but lifted up the lowly.*

*The hungry he has filled with good things;  
the rich he has sent away empty.*

*He has helped Israel his servant,  
remembering his mercy,*

*According to his promise to our fathers,  
to Abraham and to his descendants forever.*

*—The Magnificat, Luke 1:46-55*



*Loreto, Italy*

**O**n October 16, 1841, Angelo Secchi arrived at the Illyrian College of Loreto (we would call it a high school) to teach physics and mathematics. He liked doing experiments, and he helped his students make demonstrations for people to come and watch, a bit like what we call a “science fair”.

*The students learn so much by building and using their own experiments because they must think things through. And as they do, they learn physics, practical skills, the beauty and order of the world, and the greatness of the Creator.*

And Angelo Secchi prayed,

*I will extol you, my God and king;*

*I will bless your name forever and ever.*

*Every day I will bless you;*

*I will praise your name forever and ever.*

*Great is the Lord and worthy of much praise,  
whose grandeur is beyond understanding.  
One generation praises your deeds to the next  
and proclaims your mighty works.  
They speak of the splendor of your majestic  
glory, tell of your wonderful deeds.  
They speak of the power of your awesome acts  
and recount your great deeds.  
They celebrate your abounding goodness  
and joyfully sing of your justice.*

*—Psalm 145:1-7*



**A**ngelo Secchi was ordained to the priesthood for the Jesuit order on September 12, 1847.

*Now I am a priest after a long journey of study, prayer, and practice. May God help me to behave right since I am now able to serve at his banquet, the Holy Eucharist.*

*I'm sure Mama is proud and happy, but now I am unlikely to be able to spend any time with her. But this sacrifice must be made for the higher good of the service of God.*

And Angelo Secchi prayed,

*He told a parable to those who had been invited, noticing how they were choosing the places of honor at the table. "When you are invited by someone to a wedding banquet, do not recline at table in the place of honor. A more distinguished*

*guest than you may have been invited by him, and the host who invited both of you may approach you and say, 'Give your place to this man,' and then you would proceed with embarrassment to take the lowest place. Rather, when you are invited, go and take the lowest place so that when the host comes to you he may say, 'My friend, move up to a higher position.' Then you will enjoy the esteem of your companions at the table. For everyone who exalts himself will be humbled, but the one who humbles himself will be exalted."*

*—Luke 14:7-11*

In 1848, the army of the King of the Piedmont (the area north of Rome) took over much of the land that had been controlled by the Pope. The army approached Rome. On April 26, 1848, Angelo Secchi and other Jesuit priests left Italy to go to Stonyhurst College in Lancashire, England to escape riots and animosity toward Jesuits. Angelo Secchi wrote to his mom:

*«The sacrifice we made to God, me by consecrating myself and you by letting me enter the Society of Jesus, must be complete.... This stay is highly instructive.... Here among other acquisitions, I learn a new language, new customs, and I can gain much more knowledge in the sciences of my competence, that is, natural sciences.... Please pray the Lord in order to give me patience and constancy in every event.»*

And Angelo Secchi and his mom prayed,  
*Our Father, who art in heaven,*  
*hallowed by thy name,*  
*thy kingdom come, thy will be done,*  
*on earth as it is in heaven.*  
*Give us this day our daily bread;*  
*and forgive us our trespasses,*  
*as we forgive those who trespass against us.*  
*And lead us not into temptation, but deliver us*  
*from evil.*  
*Amen.*



Italian Peninsula, 1843



*Kingdom of Italy and Papal States, 1870*

**O**n October 18, Angelo Secchi wrote to his mother again to let her know that he and some of his Jesuit brothers would continue on to Georgetown College in Washington, D.C. in the United States of America, because of a typhoid outbreak in England. In this way, Angelo Secchi continued moving farther and farther from his mother and his home country.

*«Since the Lord is pleased to put us on the road of sacrifices, we must go forth merrily, being sure that he will give us aid and grace to take advantage from them for our spiritual good. The day fixed for the departure from the port of Liverpool is at present the twenty-third, or a few days later, and when you read these lines I shall just be navigating the Atlantic Sea, headed on to the United States.... I'm going to find an even newer people, descended from this one: great*

*things are said of their greatness, and after I  
have seen them, I will certainly not fail to write  
you about them, if before arriving I do not be-  
come lunch for the fishes.»*

And Angelo Secchi prayed,

*Glory be to the Father, and to the Son  
and to the Holy Spirit.*

*As it was in the beginning,*

*is now, and ever shall be, into the age of ages.*

*Amen.*



**O**n September 22, 1849, Angelo Secchi and some of the other Italian Jesuits left Georgetown to return home. Upon his return to Rome, he was assigned to be the director of the Collegio Romano Observatory because the previous director, Fr. DeVico, had died.

*It is now safe to return, thanks be to God! Fr. DeVico brought the six-inch lens from the Cauchiox telescope at the Rome observatory to Georgetown and kept it safe, so I know I'll have something to start with in case the revolutionaries have disturbed the observatory. Now I must re-establish the observatory and use it to the glory of God.*

And Angelo Secchi prayed,

*“Give thanks to the LORD for he is good,  
his mercy endures forever!”*

*Let that be the prayer of the LORD's redeemed,  
those redeemed from the hand of the foe,  
Those gathered from foreign lands,  
from east and west, from north and south.  
Some had lost their way in a barren desert;  
found no path toward a city to live in.  
They were hungry and thirsty;  
their life was ebbing away.  
In their distress they cried to the LORD,  
who rescued them in their peril,  
Guided them by a direct path  
so they reached a city to live in.  
Let them thank the LORD for his mercy,  
such wondrous deeds for the children of Adam.*

*—Psalm 107:1-8*

**O**n February 2, 1852, Angelo Secchi made his solemn profession in the Society of Jesus.

*Now I am 33 years old, the age at which Our Savior died for us. I have presented myself and been accepted as a permanent member of the Society. May the pattern of Christ and the example of St. Ignatius of Loyola guide me as I continue my life as a Jesuit priest.*

And Angelo Secchi prayed,

*O Lord Jesus Christ,  
who appearing on this day among men  
in the substance of our flesh,  
was presented by your parents in the temple,  
whom the venerable and aged Simeon,  
illuminated by the light of your Spirit,  
recognized, received into his arms, and blessed,*

*mercifully grant that, enlightened and taught by  
the grace of the same Holy Spirit,  
we may truly acknowledge you  
and faithfully love you,  
who live and reign with God the Father  
in the unity of the same Holy Spirit,  
one God forever and ever. Amen.*

*—The collect prayer for the  
Presentation of Our Lord  
(feast celebrated on February 2)*

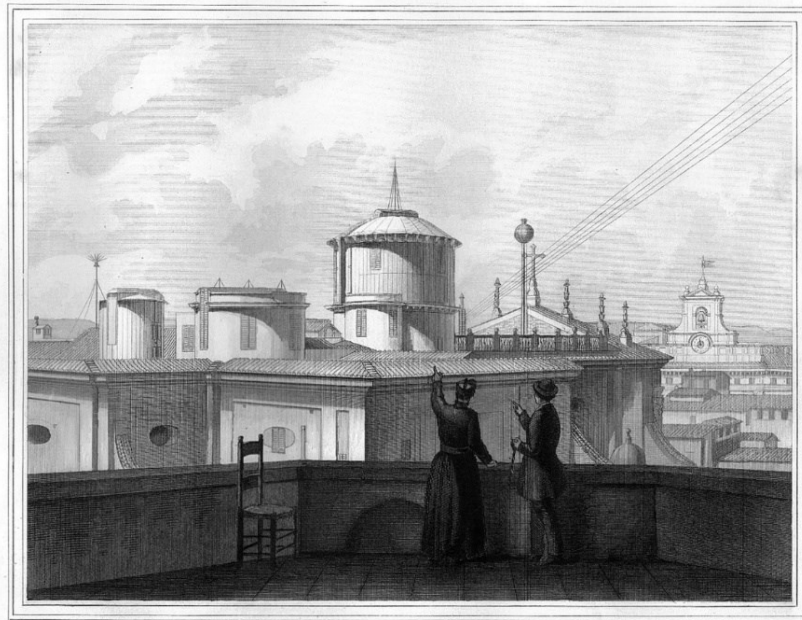
In 1854, Angelo Secchi moved the Collegio Romano Observatory to the roof of St. Ignatius Church and began installing equipment for observing the heavens, the weather, and the Earth's magnetic field.

*«The understanding of the sciences is... a gift from God, and this is one of the gifts of the Holy Spirit. We could then, courageously but rightfully, ask for this gift from God, when in our studies we share the same purpose of every Christian: namely not the vanity to compete with other scientists, nor the pride and arrogance that comes after surpassing them, but only to ask the light of intellect for understanding the Lord's works, for knowing his greatness and our obligations.»*

And Angelo Secchi prayed,

*There are different kinds of spiritual gifts but the same Spirit; there are different forms of service but the same Lord; there are different workings but the same God who produces all of them in everyone. To each individual the manifestation of the Spirit is given for some benefit. To one is given through the Spirit the expression of wisdom; to another the expression of knowledge according to the same Spirit; to another gifts of healing by the one Spirit; to another mighty deeds; to another prophesy; to another discernment of spirits; to another varieties of tongues; to another interpretation of tongues. But one and the same Spirit produces all of these, distributing them individually to each person as he wishes.*

*—1 Corinthians 12:4-11*

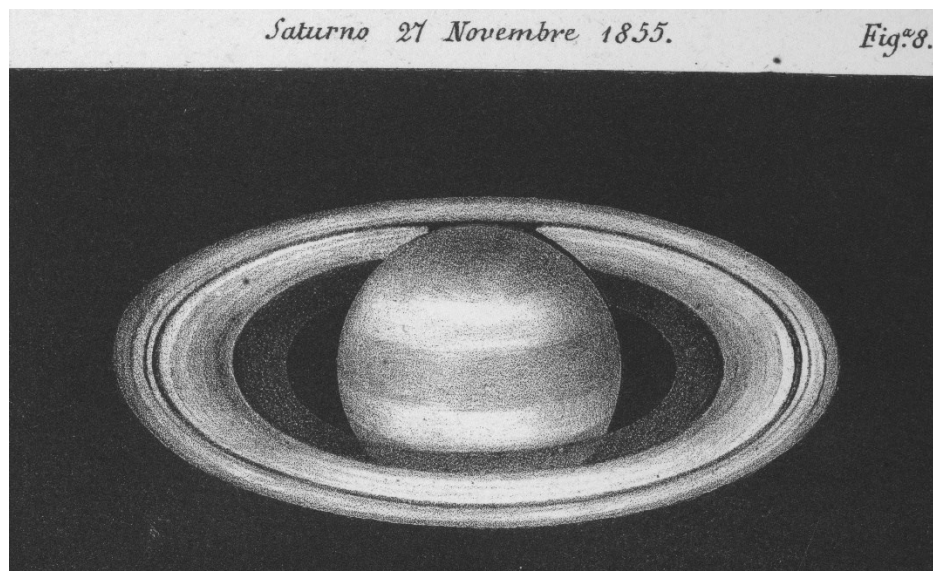


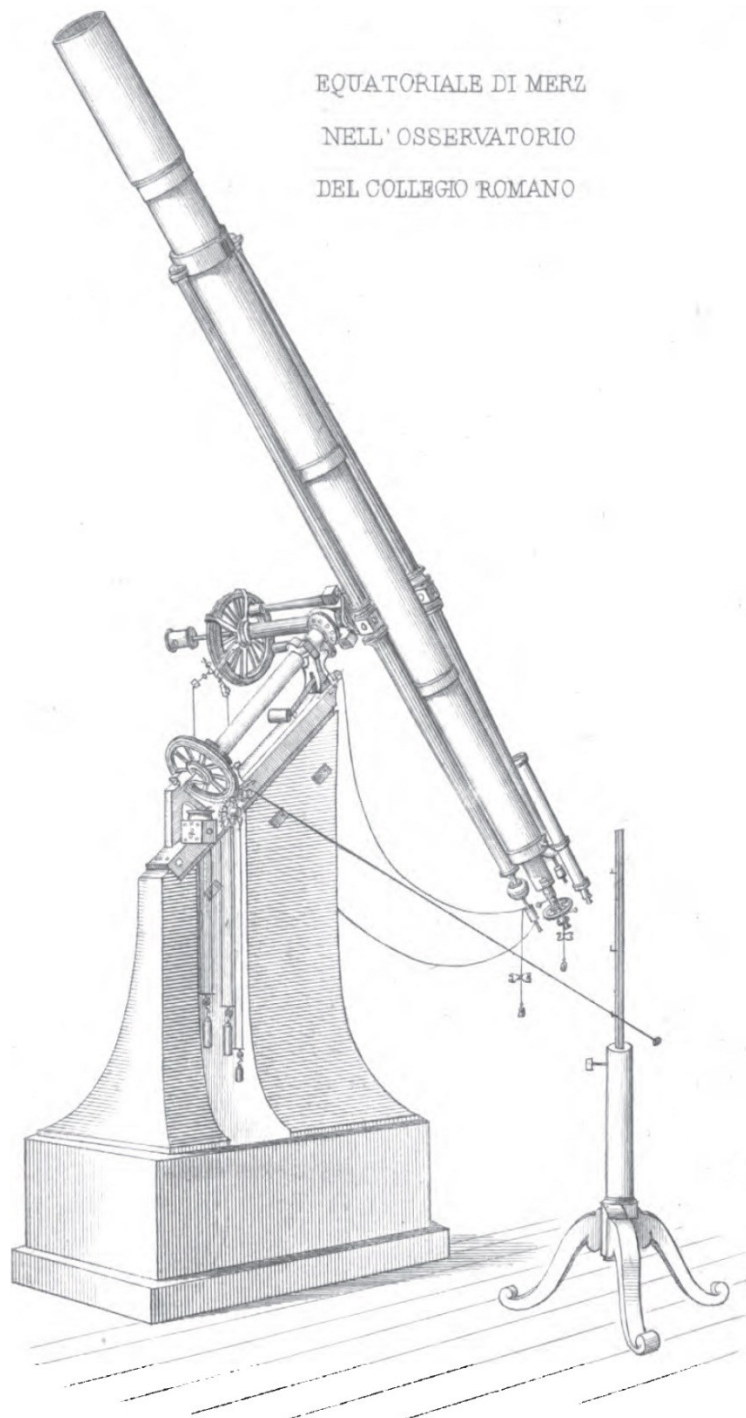
OSSERVATORIO DEL COLLEGIO ROMANO  
sulla Chiesa di S. Ignazio.

*Above is an image of the Collegio Romano's structures on the roof of St. Ignatius Church in Rome, Italy. Scientific instruments to study the heavens, the weather, and magnetism were kept inside the structures.*

*The large round structure at the center housed the main telescope. The ball seen near the cross was dropped at precisely six seconds before noon so everyone could keep their clocks set to the correct time!*

*Below is one of Angelo Secchi's illustrations of the planet Saturn.*





*The main telescope in the Collegio Romano observatory.*



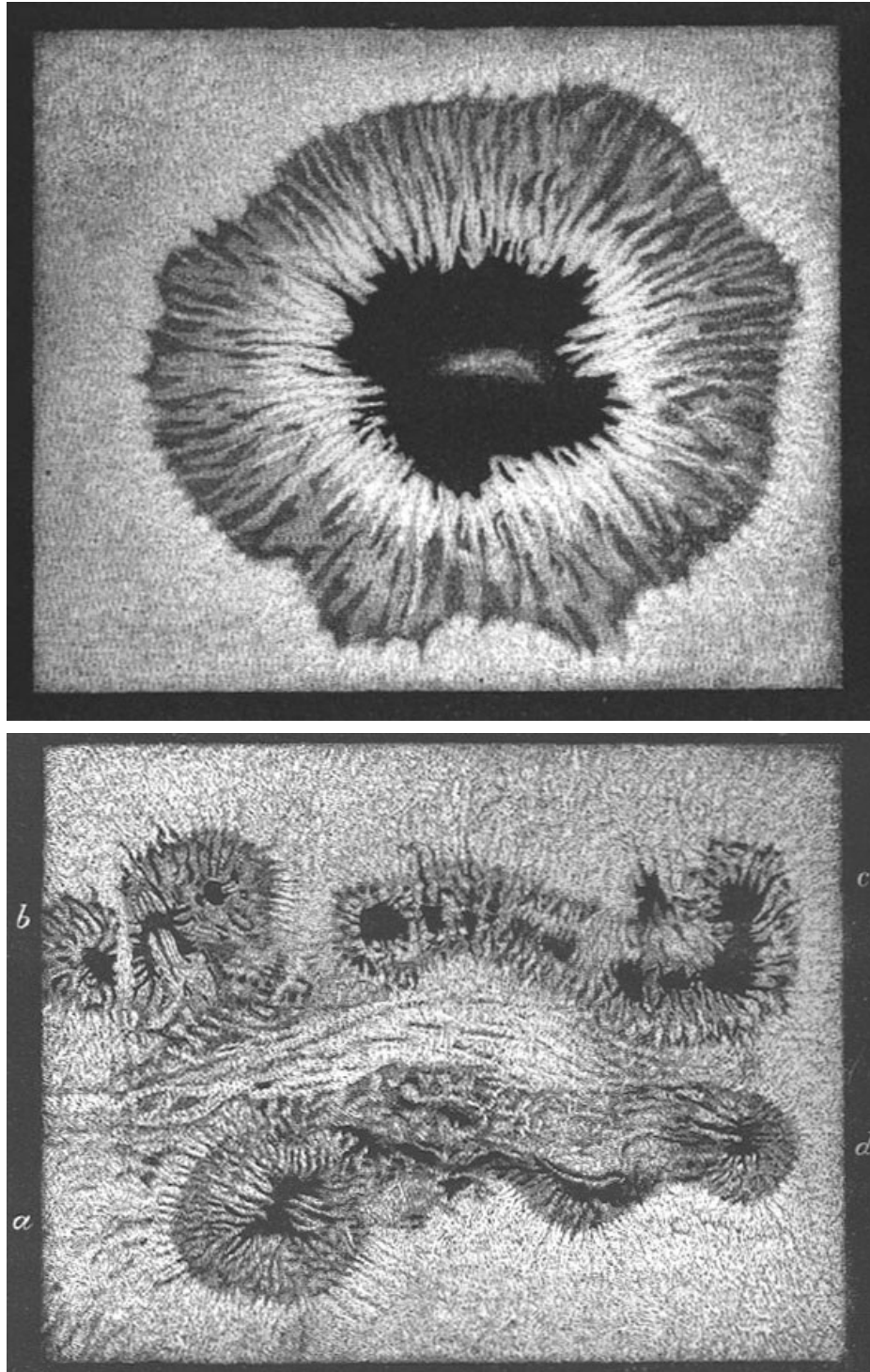
### **The Collegio Romano Observatory**

In 1863, Otto Wilhelm Von Struve of the Pulkovo Observatory in St. Petersburg, Russia, described the Collegio Romano Observatory and its equipment:

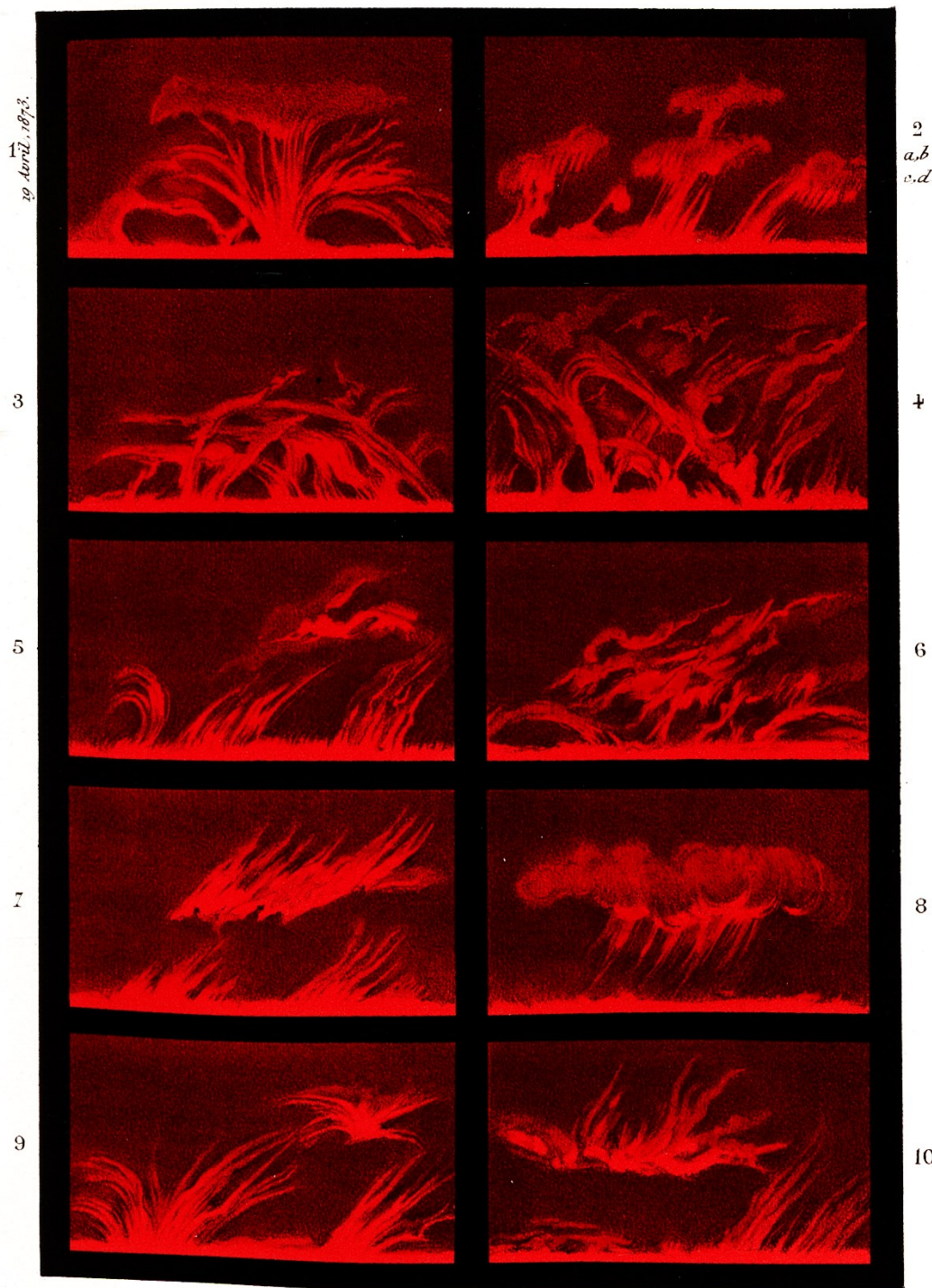
*«The observatory is provided with a very complete collection of meteorological instruments and other physics devices. Among the astronomical instruments, it is worthwhile to mention a refractor of nine inches, whose excellent optical qualities are proved by many very precise measurements of double stars.*

*In addition, there is an old Cauchoix refractor of six inches, now used to draw the sunspots, and a meridian circle of two feet in diameter, by Reichenbach and Ertel... the observation rooms are located within huge thick towers that once were intended to support the huge dome of a church.»*

Angelo Secchi used the scientific instruments of the Collegio Romano to study weather, the heavens, and magnetism. The Sun was particularly interesting to him.



*Some of Angelo Secchi's sunspot drawings.  
Sunspots are darker areas on the surface of the Sun.*



*Angelo Secchi's drawing of gases on the edge of the Sun.  
These formations are called solar prominences.*





*Measuring the Appian Way.*

From November 1854 to April 1855, Angelo Secchi organized the work of measuring a baseline along the Appian Way (a straight road built by the Romans in 312 B.C.). This line would be used for measuring distances along the Earth for map-making. The work required precision and accuracy in measurement and had to be done outdoors. The team achieved great precision, measuring the baseline to be 12,043.14 meters with a margin of error of less than two millimeters, and they matched the previous measurement to within about a third of a meter, which showed that the measurements were probably correct.

*«The difficulties posed by this measurement were very considerable, but with the system that we adopted, we could easily overcome them. Since the end points of the baseline, as well as the daily points, are made in masonry [stone] and remain*

*on-site, at any time we can use the whole baseline  
or a portion of it for geodetic [Earth-measuring]  
purposes.»*

And Angelo Secchi prayed,

*Where were you when I founded the earth?*

*Tell me, if you have understanding.*

*Who determined its size; do you know?*

*Who stretched out the measuring line for it?*

*Into what were its pedestals sunk,*

*and who laid the cornerstone,*

*While the morning stars sang in chorus*

*and all the sons of God shouted for joy?*

*—Job 38:4-7*

In June 1856, Angelo Secchi was appointed the director of the Meteorological Service of the Papal States. He established weather observing stations in Rome, Ancona, Bologna, and Ferrara which recorded information about temperature, pressure, humidity, and wind conditions, and shared the information among themselves. In this way, weather was forecast, and storm warnings were printed in newspapers as necessary.

*«Science is useless if it is not beneficial, and meteorology is fortunately one of those sciences from which mankind may receive great and useful service.»*

And Angelo Secchi prayed,

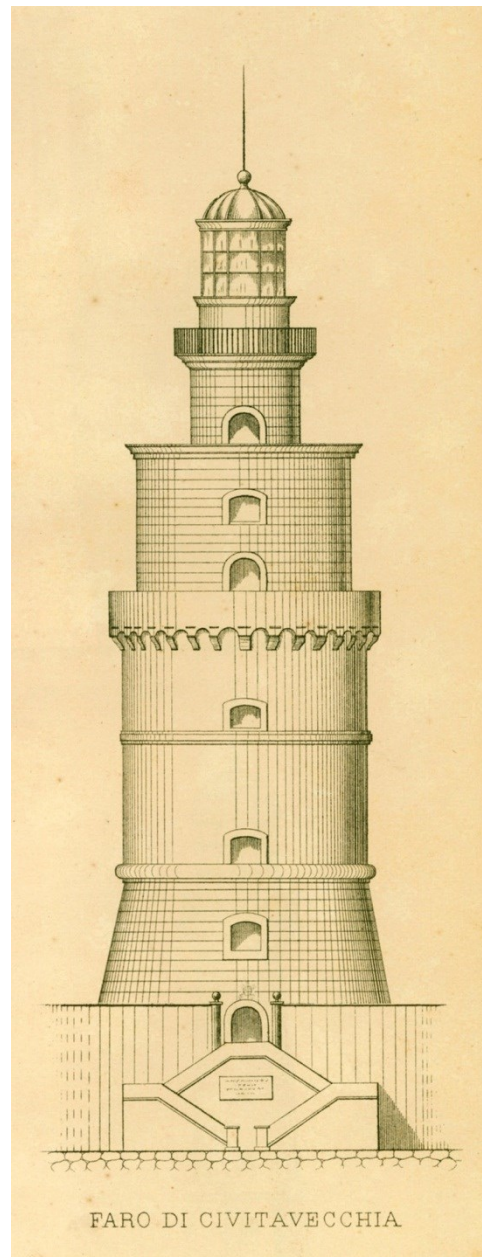
*Do not be afraid any longer, little flock, for your Father is pleased to give you the kingdom. Sell your belongings and give alms. Provide money*

*bags for yourselves that do not wear out, an inexhaustible treasure in heaven that no thief can reach nor moth destroy. For where your treasure is, there also will your heart be.*

*— Luke 12:32-34*



In 1858, Angelo Secchi traveled through France and England studying lighthouses. The Pope had asked him to join a committee working to repair damaged lighthouses and build additional ones to protect ships coming to ports of the Papal States. Angelo Secchi met scientists, visited lighthouses and observatories, and discussed his research during his travels. In this way, he showed that the Pope supported scientific research.



*1877 drawing of a Papal States lighthouse after it had been renovated.*

He also achieved his practical goal; he purchased new lamps for the lighthouses of the Papal States.

*«The lamps have been negotiated at a price of one hundred [thousand] francs on the spot, without any other considerations for either shipping or installation; and given the quality of the work that will result, I believe it was a good deal.»*

And Angelo Secchi prayed,

*You are the light of the world. A city set on a mountain cannot be hidden. Nor do they light a lamp and then put it under a bushel basket; it is set on a lampstand, where it gives light to all in the house. Just so, your light must shine before others, that they may see your good deeds and glorify your heavenly Father.*

*—Matthew 5:14-16*

In 1859, Angelo Secchi published *Quadro fisico del sistema solare secondo le più recenti osservazioni* (*Physical description of the solar system including the most recent observations*). He wrote this book to provide students with information about the most recent discoveries in the physics of the solar system.

*«May this effort benefit young people by stimulating them to follow these studies, and to admire and honor the Creator, whose work I hope they will come to know, better and better, from this book.»*



And Angelo Secchi prayed,

*The heavens declare the glory of God;*

*the sky proclaims its builder's craft.*

*One day to the next declares that message;*

*one night to the next imparts that knowledge.*

*There is no word or sound;*

*no voice is heard;*

*Yet their report goes forth through all the earth,*

*their message, to the ends of the world.*

*God has pitched a tent there for the sun;*

*it comes forth like a bridegroom*

*from his chamber,*

*and like an athlete joyfully runs its course.*

*From one end of the heavens it comes forth;*

*its course runs through to the other;*

*nothing escapes its heat.*

—*Psalm 19:1-7*

**B**y 1863, Angelo Secchi became aware of the importance that spectroscopy was going to have in the field of astronomy.

*«Spectral studies of celestial bodies have a double importance: first to ascertain the existence and the nature of their atmospheres, and second to find answers to some very interesting cosmic questions, especially those related to the proper motions of stars.»*

And Angelo Secchi prayed,

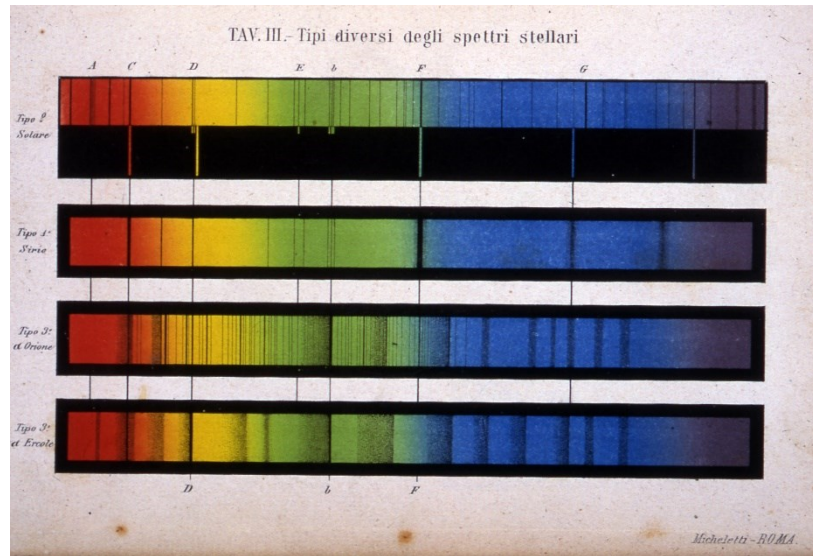
*«May he [the Holy Spirit] visit our minds all opened to him.... May this gift be accompanied by the highest Grace that renders us friends of God.... Paraclete Counselor, console our souls from the bitterness that is often the fruit of our struggles in studies... precious gift of the Highest Undivided Trinity... living source of every*

*science... fire of true love of those whom you  
always link to your charity... light up our minds  
with your light and our hearts with your ardor  
and give us fortitude and courage.... Let our  
studies be aimed at more and more knowing the  
divine Father, the Redeptor Son, and you.»*

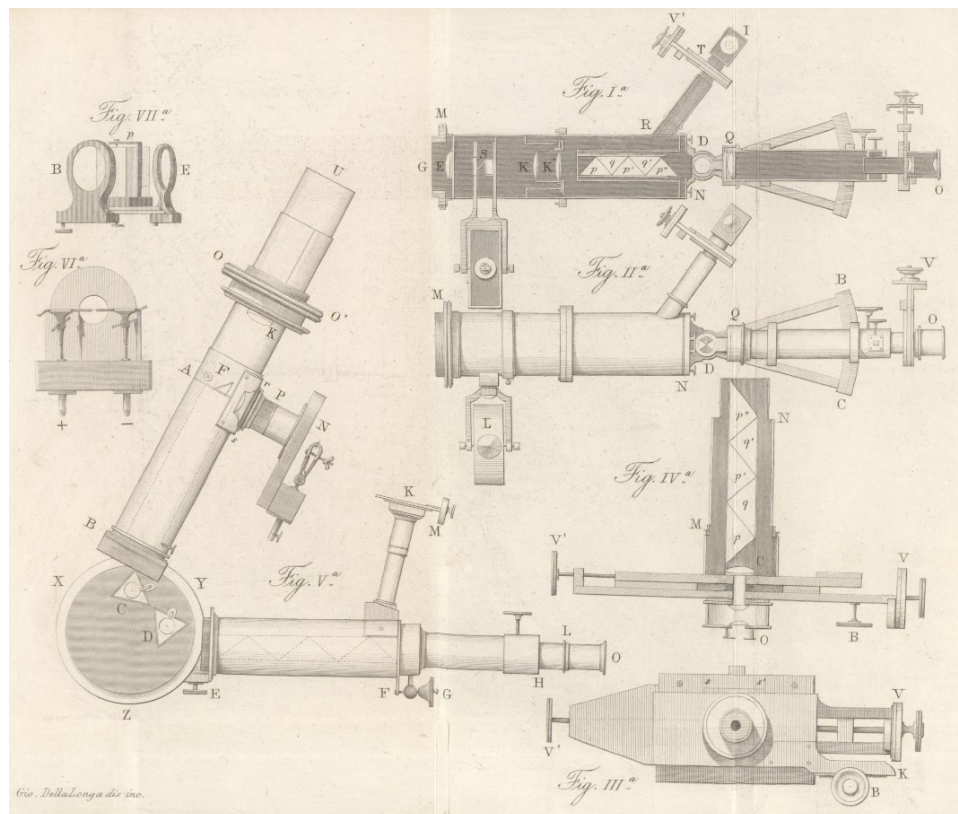
## **Angelo Secchi and Astrophysics**

Angelo Secchi was a pioneer in the field of *astrophysics*. Astronomers have studied the positions of stars in the sky for thousands of years. But learning more precisely *where* stars are does not tell us *what* they are. Astrophysics is the study of the physical characteristics of stars, in other words, *what they are*.

Spectroscopy, the study of light using a telescope with a prism, is one way astrophysicists find out what stars are. The prism separates white light into the colors of the rainbow, the spectrum. Each color is bent a different amount so all the colors of the visible spectrum can be seen. Isaac Newton said that the colors of the rainbow are red, orange, yellow, green, blue, indigo, and violet. Those and all the colors in between are in the visible spectrum. In starlight, certain colors can be absent because they are absorbed by materials in the atmospheres of a star. These absent colors leave dark areas in the star's spectrum called "spectral lines".



Above is an image Angelo Secchi created of the spectra of stars of three different types. The black lines show what the surface of the star is made of. Our sun is of the type on the top. Below are some of his diagrams showing spectroscopes and prisms.





Angelo Secchi adjusted his spectroscope by switching prisms and putting them in different places in his telescopes until he got good images that he could measure and compare. Then he made a catalog showing the spectra of many different stars. For each star, he studied how dark the spectral lines were and where they were in the spectrum. The dark spectral lines show what elements and molecules are in the atmospheres of the stars. He noticed that, even though the spectrum of each star was somewhat different than all the others, there are enough similarities to put the stars into groups according to their spectral lines.

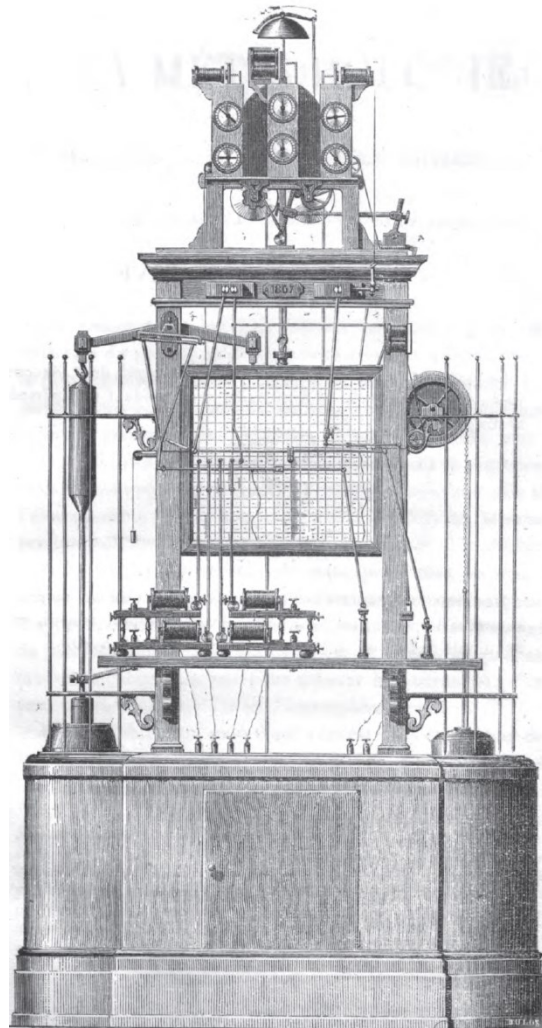
Agnes Mary Clerke, who corresponded with many astronomers and wrote about advances in astronomy, explained why Angelo Secchi was so important to the development of astrophysics:

*«To Father Secchi is due the merit of having executed the first spectroscopic survey of the heavens. Above 4,000 stars were passed in review by him, and classified according to the varying qualities of their light.*

*His provisional establishment (1863-67) of four types of stellar spectra has proved a genuine aid to knowledge through the facilities afforded by it for the arrangement and comparison of rapidly accumulating facts. Moreover, it is scarcely doubtful that these spectral distinctions correspond to differences in physical condition of a marked kind.»*

On March 1, 1867, Angelo Secchi arrived in Paris, France to install his meteorograph (which recorded temperature, pressure, humidity, wind speed, and rainfall all at the same time) in the scientific instruments section of the *Exposition Universelle* (Universal Exposition).

There the countries of the world showed off their newest accomplishments in art, agriculture, and science. Angelo Secchi's meteorograph won the *Grand Prix* (Grand Prize) of the exposition and won kudos for the Papal States.



*Angelo Secchi's meteorograph.*

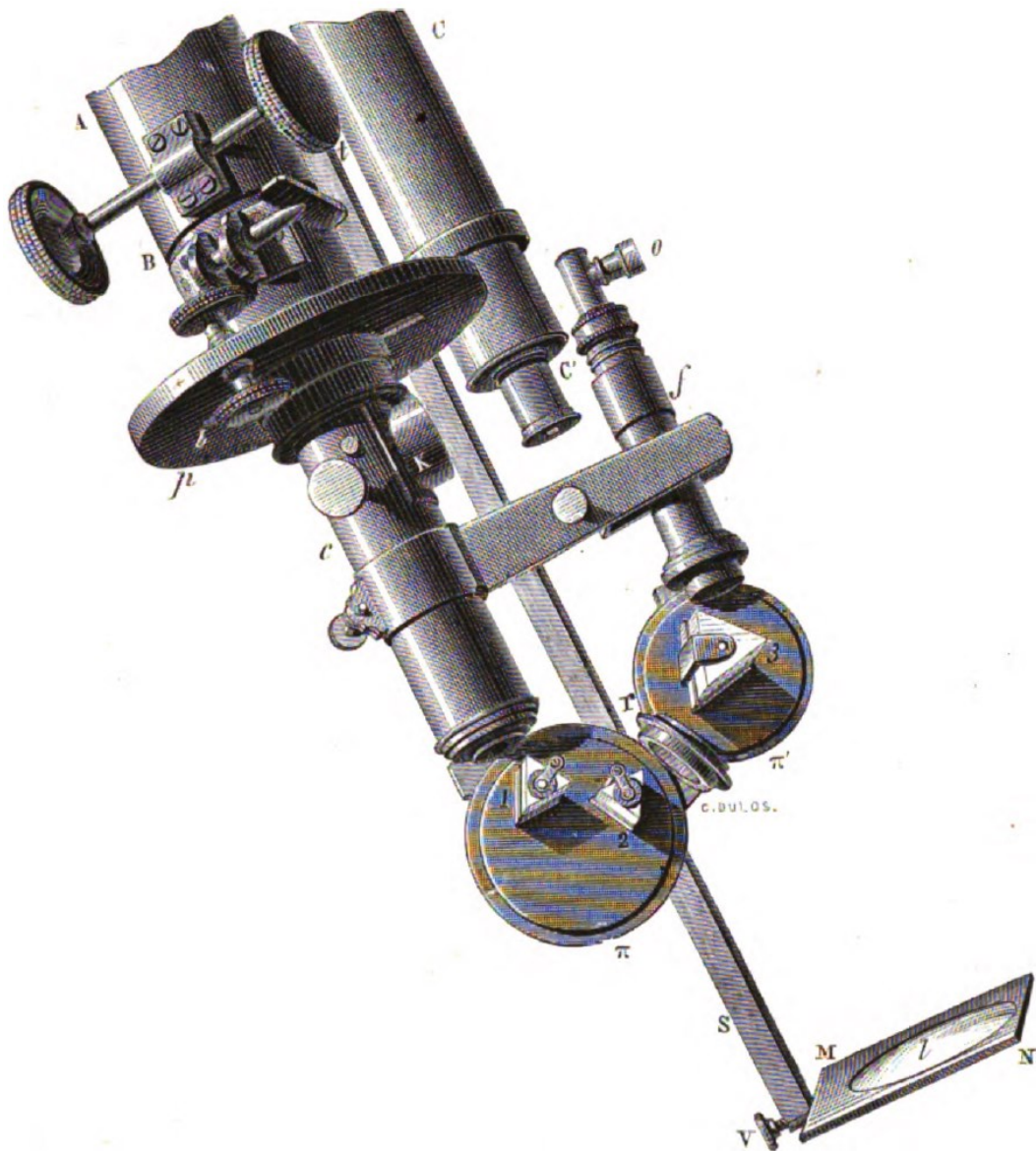
*«The purpose of this machine is to record simultaneously all weather events with uninterrupted and mutually compared graphical indications.... [Other machines] that are now in use... do not have the benefit of bringing together on one machine and on a single sheet of paper the diagrams of multiple instruments, and thus directly comparing the various phenomena in order to deduce the relationships and influences. Such an ensemble was the main purpose of this recorder, specially designed to this comparative study which for brevity I will call a meteorograph.»*

And Angelo Secchi prayed,

*One day [Jesus] got into a boat with his disciples and said to them, “Let us cross to the other side of the lake.” So they set sail, and while they were sailing he fell asleep. A squall blew over the*

*lake, and they were taking in water and were in danger. They came and woke him saying, “Master, master, we are perishing!” He awakened, rebuked the wind and the waves, and they subsided and there was a calm. Then he asked them, “Where is your faith?”*

*—Luke 8:22-25*



*A spectroscope attached to the main telescope at the Collegio Romano Observatory.*

**I**n August of 1868 Angelo Secchi explained his research at a meeting of the British Association for the Advancement of Science in Norwich, England.

*«Frauenhofer noticed the spectral lines in the Sun and then in other stars and Donati continued this study. Kirchoff suggested that these lines should show what the stars were made of. Huggins has described the spectra of many stars and has begun determining what substances they are made of. I have discovered how to look at the spectral lines of those stars that can only be seen through the telescope. All the stars up to the eighth magnitude cataloged by Schjelerup have been examined. With this significant body of information at hand, I propose a system of classification of four types: white stars, yellow stars, or-*

*ange or reddish stars, and dark red stars which...  
tend toward a violet color.»*

And Angelo Secchi prayed,  
*Praise, you servants of the LORD,  
praise the name of the LORD.  
Blessed be the name of the LORD  
both now and forever.  
From the rising of the sun to its setting  
let the name of the LORD be praised.  
High above all nations is the LORD;  
above the heavens his glory.  
Who is like the LORD our God,  
enthroned on high, looking down  
on heaven and earth?*

*—Psalm 113:1-6*



**O**n March 13, 1870 a newspaper in Florence, *La Nazione*, printed a false story saying that Angelo Secchi tried to steal from the Jesuits and was expelled from the order.

*Being a Jesuit made me hateful and suspicious to people before. And because my name is known, it has been difficult to escape politics. Now La Nazione has invented a story about me, creating enemies for me. The Lord must be my strength!*

And Angelo Secchi prayed,

*How many are my foes, Lord!*

*How many rise against me!*

*How many say of me,*

*“God will not save that one.”*

*But you, Lord, are a shield around me;*

*my glory, you keep my head high.*

*Whenever I cried out to the Lord,*

*I was answered from the holy mountain.  
Whenever I lay down and slept,  
the Lord preserved me to rise again.  
I do not fear, then, thousands of people  
arrayed against me on every side.  
Arise, Lord! Save me, my God!*

*—Psalm 3:2-9*

**T**wo days later, the same day Angelo Secchi wrote to the paper making clear that the story was false, Gabrielle Secchi, Angelo Secchi's niece, wrote him a letter because the family was worried about him. Angelo Secchi was a famous man, so she was a bit nervous about writing to him. She wrote,

*«I have already reached the age of eleven years and the respectable most Reverend Your Lordship may think that, after many cares and expenses incurred by Mom to educate me, at least I learned to pen a line.... My hand trembles for the awe inspired by a distinct personality like Your Lordship.... And I ask forgiveness if today, seeing my good Grandmother more and more worried about you, and also my Aunt, all in short, and being in the dark if... Uncle has written [to you], I begged my Mom to allow me to write to*

*you, trusting again in your kindness, and thinking about the joy that I would feel in being the first who will be able to inform and ensure your dear mother and all about your perfect health, as I hope.... If you would be pleased to address a single line to the family for its peace of mind, as it also, as you can imagine, is required at any time to know news about you.»*

And Angelo Secchi prayed,

*Look on my suffering and deliver me,*

*for I have not forgotten your law.*

*Defend my cause and redeem me;*

*preserve my life according to your promise.*

*Salvation is far from the wicked,*

*for they do not seek out your decrees.*

*Your compassion, Lord, is great;*

*preserve my life according to your laws.*

*Many are the foes who persecute me,  
but I have not turned from your statutes.  
I look on the faithless with loathing,  
for they do not obey your word.  
See how I love your precepts;  
preserve my life, Lord,  
in accordance with your love.  
All your words are true;  
all your righteous laws are eternal.*

*—Psalm 119:153-160*



*La Sapienza University*

**O**n September 20, 1870, the Piedmontese Army invaded and occupied Rome. A few days later the new government offered Angelo Secchi a job at La Sapienza University. The Jesuits feared that under the new government, they would lose freedom to teach as they thought right, so Angelo Secchi talked to his provincial. He hoped that the government would decide that,

*«My convictions of conscience would be respected and I would have no obligations to make any oaths and... could make the observatory what I wanted.»*

And Angelo Secchi prayed,

*Show us, Lord, your love;  
grant us your salvation.*

*I will listen for the word of God;  
surely the Lord will proclaim peace*

*To his people, to the faithful,  
to those who trust in him.  
Near indeed is salvation for the loyal;  
prosperity will fill our land.  
Love and truth will meet;  
justice and peace will kiss.  
Truth will spring from the earth;  
justice will look down from heaven.*

*—Psalm 85:8-12*



**O**n November 4, 1870, Angelo Secchi officially accepted the job at La Sapienza University at the urging of his provincial. The provincial was afraid that the new government would make Angelo Secchi teach in some new school otherwise.

*«Father General tells me to declare that I accept under conditions that respect my duties of conscience and my membership in the Society [of Jesus]; this is fine. I had already put these conditions as essential even before, ever since the beginning of the negotiations.»*

And Angelo Secchi prayed,

*Lord, teach me to be generous.*

*Teach me to serve you as you deserve;*

*To give and not count the cost;*

*To fight and not to heed the wounds*

*To toil and not to seek for rest,  
To labor and not ask for reward;  
Save that of knowing that I do your will.*

*—St. Ignatius of Loyola*

**O**n November 5, 1870, Angelo Secchi left Rome to go to Sicily to join a group of Italian scientists preparing to study a total solar eclipse which would happen on December 22. Angelo Secchi was the expert in solar spectroscopy. Although he was busy and worried about what was happening in Rome, he enjoyed the scenery on the trip.

*«From about eleven miles offshore, we admired the beautiful view of Etna, which is enchanting for its beauty.... Small towns and villages are scattered on the slopes. From half up there are woods; and at the top there is snow! Unique wonder in the universe.»*

And at Mass that day, Angelo Secchi prayed,

*In the beginning was the Word,  
and the Word was with God,  
and the Word was God.*

*He was in the beginning with God.  
All things came to be through him,  
and without him nothing came to be.  
What came to be through him was life,  
and this life was the light of the human race;  
the light shines in the darkness,  
and the darkness has not overcome it.*

*—John 1:1-5*



*Mount Etna*

**O**n November 20 and 26, 1870, Angelo Secchi wrote from Sicily to his friend Br. Francesco Marchetti, explaining his worries that he would have been sent away from the Observatory by the new government if he had not accepted their offer of a job at La Sapienza University and his sadness that his brothers in the Society of Jesus disapproved because he had not turned down the offer. It was a terrible political situation for all the Jesuits.

*«It is enough for me to live my vocation, and I am happy now to make some real sacrifice for it. In the face of God, I know that I have not done wrong, and this is my consolation. The rest will be what God wants.»*

And Angelo Secchi prayed,

*Beloved, do not be surprised that a trial by fire is occurring among you, as if something strange*

*were happening to you. But rejoice to the extent that you share in the sufferings of Christ, so that when his glory is revealed you may also rejoice exultantly. If you are insulted for the name of Christ, blessed are you, for the Spirit of glory and of God rests upon you.*

*—1 Peter 4:12-14*

In the end, the Superior General of the Society of Jesus decided that it would be better for Angelo Secchi to renounce the job he had so recently accepted. Angelo Secchi knew that the new government would not be happy with him, so on December 18, 1870 he asked his friend Marchetti to pack up the observatory.

*«Even without an official expulsion, it has become opportune for me now to withdraw from the observatory.... My renunciation... put me in a position that if these [people] are still in Rome I would not be tolerated there.»*

And Angelo Secchi prayed,

*Take, Lord, and receive all my liberty,  
my memory, understanding, my entire will,  
all I have and call my own.  
You have given all to me.*

*To you, Lord, I return it.*

*Do with it as you will.*

*Give me only your love and your grace;*

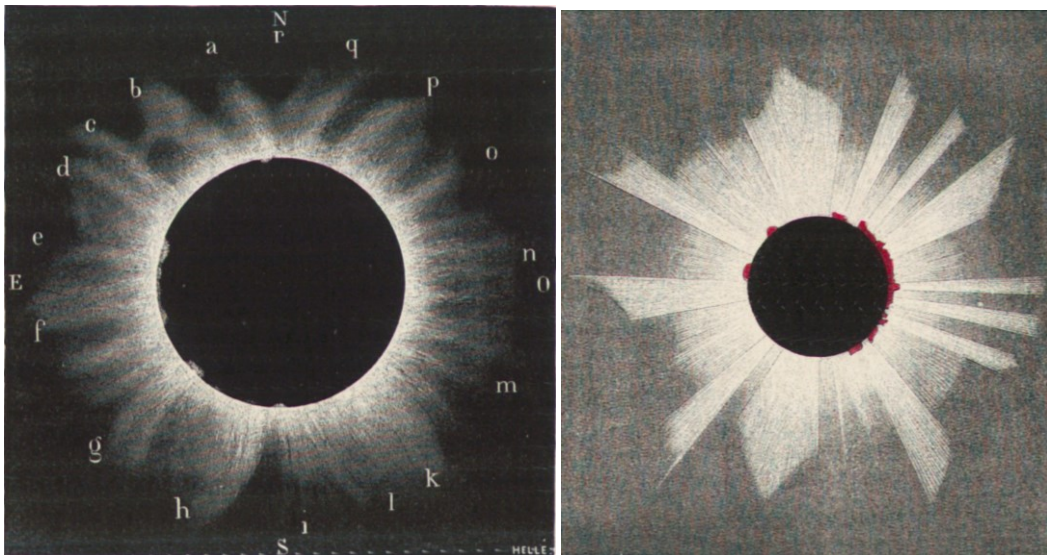
*that is enough for me.*

*—St. Ignatius of Loyola*



**O**n December 22, 1870, the total eclipse occurred. But Angelo Secchi saw little of it. It was cloudy.

*Such is the life of an astronomer. The Lord must want me to learn something today that does not have to do with the eclipse. I must think and pray about what God wants of me today.*



*Two of Angelo Secchi's illustrations of a total eclipse of the sun.*

And Angelo Secchi prayed,

*May it please the supreme and divine Goodness  
to give us all abundant grace  
ever to know his most holy will  
and perfectly to fulfill it.*

*—St. Ignatius of Loyola*

In April of 1873, a law was passed allowing the government of Italy to take property that was owned by the Catholic church. Angelo Secchi had been concerned for years that the observatory might be taken. Now it was legal for the government to do it. On April 10, 1873, he wrote to his friend, Pietro Tacchini, who was an astronomer at the Palermo Observatory, expressing his increased worries.

*«The Chambers [the law-making groups in Italy] have decided to free themselves from friars, and I am a friar, therefore, out! What is now my property will be that of others! I will be told to hit the road and, after forty years of hard work, in my old age I will have to go wandering, looking for a loaf of bread, perhaps in Australia or America.»*

And Angelo Secchi prayed,

*Save me, God,*

*for the waters have reached my neck.*

*I have sunk into the mire of the deep,*

*where there is no foothold.*

*I have gone down to the watery depths;*

*the flood overwhelms me.*

*I am weary with crying out;*

*my throat is parched.*

*My eyes fail, from looking for my God.*

*More numerous than the hairs of my head*

*are those who hate me without cause.*

*Those who would destroy me are mighty,*

*my enemies without reason.*

*Must I now restore what I did not steal?*

—*Psalm 69:1-5*

Since Angelo Secchi was a well-known astrophysicist, he could have gotten jobs at observatories outside of Italy. But his friend Tacchini wrote him an encouraging letter on April 14, 1873 because he wanted Angelo Secchi to stay at the Collegio Romano Observatory.

*«The idea of losing you saddens me... I believe that your observatory would be left to you, it would not be touched but maintained and, perhaps, even improved, so that you might devote the rest of your life to your precious research. For my part, you know that I would use all of the little [influence on the new government] that I can, in order to better arrange things for your benefit.»*

And Angelo Secchi prayed,

*A faithful friend is a sturdy shelter;  
he who finds one finds a treasure.*

*A faithful friend is beyond price,  
no sum can balance his worth.*

*A faithful friend is a life-saving remedy,  
such as he who fears God finds;*

*For he who fears God behaves accordingly,  
and his friend will be like himself.*

—Sirach 6:14-17

**B**ecause of his importance to the scientific community, and through Tacchini's help, Angelo Secchi continued to be the Director of the Collegio Romano Observatory until February 26, 1878, when he died. Pope Pius IX said of Angelo Secchi,

*«Father Secchi has always been able to match religious virtues with science, but the most singular ones that stood out in him were humility and obedience. We know how many times, when he was invited to accept honors and other charges, he always came to Us to ask for advice and guidelines. He never took a step without first hearing Our opinion and viewpoint. He really was an excellent religious.»*

And his brothers in the Society of Jesus prayed,  
*As the deer longs for streams of water,  
so my soul longs for you, O God.  
My soul thirsts for God, the living God.  
When can I enter and see the face of God?  
My tears have been my bread day and night,  
as they ask me every day,  
“Where is your God?”  
Those times I recall as I pour out my soul,  
When I would cross over to the shrine  
of the Mighty One, to the house of God,  
Amid loud cries of thanksgiving,  
with the multitude keeping festival.  
Why are you downcast, my soul;  
why do you groan within me?  
Wait for God, for I shall again praise him,  
my savior and my God.*

—Psalm 42:2-6



### **Note from the author to the reader**

Bible verses in *And Angelo Secchi Prayed* are taken from the *New American Bible*. The information for this book was drawn mostly from *Decoding the Stars: A Biography of Angelo Secchi, Jesuit and Scientist* by Ileana Chinnici. The idea to write it was a response to the work of the scientists and staff of the Specola Vaticana, the Vatican Observatory. Fr. Bernard Timothy, O.P and Fr. Peter Totleben, O.P. were instrumental in directing me to sources of the *Liturgy of the Hours* for the time period of Angelo Secchi's life. Many thanks to all of these folks for their help.

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