# God's Astronomer Jesuit Priest

# Father Pietro Angelo Secchi A Catchers Jale

Featuring the Forgotten Lives of the Men and Women who First Photographed the Heavens





# **Stefan Hughes**

# Contents

1	'Catchers Tales'		1
	1.1	Introduction	2
	1.2	Pope Francis I	4
	1.3	The Roman Catholic Church	5
2. 1	Րhe L	ife & Work of Father Secchi	6
	2.1	Jesuits - the Soldiers of God	7
	2.2	Exile in England and America	10
	2.3	Osservatorio del Collegio Romano	13
	2.4	Eclipse at Desierto de Las Palmas	19
	2.5	Understanding God's Kingdom	24
	2.6	End of his Time on Earth	32
3. /	Apper	ndices	34
	Α.	The Jesuits & Science	35
	В.	Secchi Classes	36
	C.	Glossary of Terms	40
4.	End Piece		42
	Family Pedigree: Father Pietro Angelo Secchi		43
	Acknowledgements		43
	Notes & Bibliography		43
	Inde	ex execution of the second sec	49
	The	Author	52

# 1. The 'Gatchers Tales' Catchers of the Light

# Father Pietro Angelo Secchi 'Servant of God'

The Forgotten Lives of the Men and Women who First Photographed the Heavens Their True Tales of Adventure, Adversity & Triumph



#### **1.1 Introduction**

The 'Catchers Tales', each feature a single life of one of the men and women who first photographed the heavens. Their lives are ones full of adventure, adversity and triumph - which would test the abilities of even the best author or screenwriter to recreate as a work of fiction. Sadly their names are largely unknown and all but forgotten - confined now to the closed pages of history. Through the 'Catchers Tale' you are about to read, they come alive once again.

These '*Catchers of the Light*', include the Scottish teacher from Dundee, Williamina Paton Stevens Fleming, who despite being abandoned, pregnant and alone in a strange country, gained employment as the housekeeper to a famous Harvard astronomer, and who became an eminent astronomer in her own right - even naming her son Edward Charles Pickering Fleming after her saviour.

Or of the young boy, Edward Emerson Barnard raised in the slums of Nashville, Tennessee during the American Civil War, and who dared to look up at the stars and dream, amid the cholera and death that surrounded him; and yet survived to capture some of the finest images of the heavens ever taken.

Or of the Irish Lord, William Parsons who married a rich heiress for her money, but in the end found true love, and the time to create a telescope in the grounds of his great estate, which enabled mankind to see for the very first time what the universe truly looked like.

Or of Milton Lasell Humason, who began his life driving mules up a mountain carrying the materials to build a Great Observatory, who then became its Janitor, then its Night Assistant and finally despite having no qualifications and little education - a Staff Astronomer there - working with his famous collaborator Edwin Powell Hubble, who together put a '*yardstick*' on the size of the Universe.

And of the fisherman's son from Estonia, Bernhard Voldemar Schmidt who blew off his right hand as a young boy in an experiment with gunpowder that went horribly wrong, but nevertheless lived to grind - literally single-handedly an optical system which is now aboard a Great Space Telescope, that has been used to find other '*Earths*' orbiting distant stars - and whose sad fate was to be left to die unrecognised and alone in a Lunatic Asylum.

These '*Catchers Tales*' tell their stories and those of the many others who had to overcome misfortune, disease, war, death, Irish Leprechauns and even very unfriendly Cannibal natives before they could even begin to take the even a single photograph.

Each '*Tale*' is divided into four chapters: an Introduction to the '*Catcher*'; a detailed account of their life and work; a series of Appendices covering several topic in more 'depth'; and an 'End Piece' which includes notes and a bibliography, a comprehensive index and acknowledgements and something about the Author.

The Author of the 'Catchers Tales', Dr. Stefan Hughes has spent ten years researching and writing on the History of Photography, as well as the forty years of experience and expertise needed to even begin this task, in a diverse career as an amateur and professional Astronomer, a qualified Genealogist and a Historian. As a young boy the Author, like Edward Emerson Barnard looked up at the stars and wondered, marvelling at the magnificent photographs he saw in the pages of his books - and especially the iconic 'Horsehead' nebula, longing to see it in his modest telescope - only to be disappointed. Forty years later he succeeded through the 'eyes' of the modern wonders of the Digital Camera and the GOTO telescope.

### 2. The Life & Work of Father Secchi



Father Pietro Angelo Secchi (1818-1878)

#### 2.1 Jesuits - the Soldiers of God

Pietro Angelo Secchi was born on the 18th of June 1818 at Reggio Emilia in the Northern Italian region of Emilia-Romagna, the son of a joiner, Antonio Secchi and his wife Luise Belgieri <sup>[3]</sup>. He began his education with his mother, who by all accounts was a practical middle-class woman, and apart from the usual lessons for a boy destined for life as one of '*God's Marines*' she also taught her son the crafts of sewing and knitting.

After studying for several years in the Gymnasium kept by the Jesuits in his native town, Secchi in his sixteenth year entered the Jesuit Order at Rome on the 3rd of November 1833. The Jesuits were a male religious order bound by an almost fanatical loyalty the Roman Catholic Church and its Pope. It had been founded in 1534 by Ignatius of Loyola (1491-1556) and six other young men, including Saint Francis Xavier (1506-1552) and the Blessed Pierre Favre (1506-1546)<sup>[4]</sup>. In 1540 the Jesuit Order was ratified by Pope Paul III.

The Jesuit Order or the Society of Jesus, known colloquially as '*God's Soldiers*' professed vows of poverty, chastity, and later obedience, including a special vow of obedience to the Pope. Rule 13 of Ignatius' Rules for '*Thinking with the Church*' went so far as to say <sup>[5]</sup>:

"That we may be altogether of the same mind and in conformity... if [the Church] shall have defined anything to be black which to our eyes appears to be white; we ought in like manner to pronounce it to be black"

The order was bound to obey its set of rules known as the 'Formula of the Institute of the Society of Jesus', whose opening lines read <sup>[6]</sup>:

"Whoever desires to serve as a soldier of God beneath the banner of the Cross in our Society, which we desire to be designated by the Name of Jesus, and to serve the Lord alone and the Church, his spouse, under the Roman Pontiff, the Vicar of Christ on earth, should, after a solemn vow of perpetual chastity, poverty and obedience, keep what follows in mind. He is a member of a Society founded chiefly for this purpose: to strive especially for the defence and propagation of the faith and for the progress of souls in Christian life and doctrine, by means of public preaching, lectures and any other ministration whatsoever of the Word of God, and further by means of retreats, the education of children and unlettered persons in Christianity, and the spiritual consolation of Christ's faithful through hearing confessions and administering the other sacraments. Moreover, he should show himself ready to reconcile the estranged, compassionately assist and serve those who are in prisons or hospitals, and indeed, to perform any other works of charity, according to what will seem expedient for the glory of God and the common good"

For the next six years Secchi applied himself diligently to learning; taking courses not only in Latin, and Theology, but also studying Philosophy and Humanism. During his time at the Jesuit's Collegio Romano, he had exhibited an extraordinary talent for the natural sciences, which led to his appointment in 1839 as one of its tutors in

Mathematics and Physics. Two years later he became a Professor of Physics at the Jesuit College at Loreto, Ancona in 1841.

In the autumn of 1844 Secchi returned to the Collegio Romano and began an intensive course of theological studies under several of its most distinguished teachers, including Carlo Passaglia (1812-1887), Professor of Mathematics, Philosophy and Theology; Giovanni Perrone (1794-1876), Professor of Theology; Frances Xavier Patrizi (1797-1881), Professor of Sacred Scripture and Hebrew; and Antonio Ballerini (1805-1881), Professor of Moral Theology. On the 12th of September 1847, he was ordained a priest and became Father Pietro Angelo Secchi – Jesuit and Scientist.

hundreds and thousands, almost startlingly, as suddenly as stars from a bursting rocket head, and as evanescent, for the whole thing is over in two or three seconds. The layer seems to be only something under a thousand miles in thickness, and the moon's motion covers it very quickly."



Flash Spectrum, 11th August 1999, Klaas Bakker



#### Total Solar Eclipse of 18th of July 1860 by Angelo Secchi

In 1860, Angelo Secchi made the journey from Rome to Desierto de Las Palmas, a remote area of south east Spain, 110 miles to the north of the city of Valencia; in order to photograph the total eclipse of the sun which was to take place there on the 18th of July that year. He brought with him the ageing 6-inch refractor by Cauchoix, and it was with this instrument he captured four photographs which showed the moment of totality, complete with the solar corona and prominences. Along with the those taken by Warren De La Rue and Leon Foucault these photographs represented the first images of a total eclipse since Berkowski's taken nine years previously at Konigsberg. Secchi's photographs of 1860, unlike his earlier ones of 1851, showed quite clearly the prominences and the corona.

## **3. Appendices**



**First Four Secchi Classes of Stellar Spectra** 

#### **Appendix A: The Jesuits & Science**

Saint Ignatius of Loyola founded the Society of Jesus with a view not to turn inwardly to God as did the monastic orders of Saint Benedict or Saint Augustine, but to go out into the world and promote his word through teaching, service to the Pope, and missionary work in foreign lands. In all of these areas they succeeded, but it was in teaching that they did their greatest work.

The fruit of their efforts in this direction was to ultimately lead to the great contributions made by astronomers such as Secchi at the Collegio Romano and later from 1891 onwards, by Johan Georg Hagen (1847-1930) at the Vatican Observatory

From the very foundation of the Jesuits the mathematical sciences occupied a place in the educational curriculum of the Order, although subservient to the teaching of Theology and Philosophy. In the 'ratio studiorum' (curriculum rules) initiated in 1566, the teaching of mathematics is included: "Concerning mathematics, the mathematician shall teach, in this order, the [first] six books of Euclid, arithmetic, the sphere [of Sacrobosco], cosmography, astronomy, the theory of the planets, the Alphonsine Tables, optics, and timekeeping. Only the second year philosophy students shall hear his lecture, but sometimes, with permission, also the students of dialectics."

The Jesuit Christoph Clavius (1537-1612) promoted the study of mathematics, physics and astronomy; and produced a series of textbooks which defined Jesuit scientific education not only in the Collegio Romano but in all Jesuit colleges. The influence of their scientific education was also felt in non Jesuit Universities.

Recent research has shown that even Galileo's lecture notes from his days as a student at the University of Pisa had their origins in the lectures given by Jesuit mathematicians at the Collegio Romano. The Collegio Romano attracted the best scientists in the Society, and Jesuit educators as far away as China turned to them for their judgment on scientific matters.

In 1610 there were four mathematicians on the faculty, Christoph Clavius, Christoph Grienberger, Paolo Lembo, and Odo van Maelcote. It is to these four men that other Jesuits and high church officials turned for a verdict on the new phenomena Galileo claimed to have discovered with his telescope.

Over the course of the next two centuries the Jesuits played an important role in smoothing out the injustices meated out to Galileo by their predecessors, taking a proactive stance on science education and research, notably in astronomy.

Amongst the many Jesuits the following were also important astronomers: Christoph Scheiner (1573-1650), Johann Baptist Cysat (1587-1657), Giuseppe Maria Asclepi (1706-1776), Christian Mayer (1719–1783), Francesco de Vico (1805-1848) and Angelo Secchi (1818-1878).



It was entirely fitting that the last work published by Father Pietro Angelo Secchi should be on the nature of the cosmos - a subject which he had devoted his entire life to. In his book '*Le Stelle*' he gave a popular account of the state of mankind's knowledge of the 'Kingdom of Heaven' - based on the observations, logic and theories of the eminent astronomers of the time, including himself. In it he described a Universe very different from that he had learned as a young Jesuit. Gone are any remnant of religious doctrine based around an Earth centred cosmology, that caused Galileo so much suffering; or the concept of a solid firmament upon which the stars are fixed. Instead it described one in which the stars were other '*Suns*' whose distances from our Earth were as incomprehensible as they are today.

In amongst these lay the '*nebula*' some of which were known to be made up of stars whilst others were clouds of glowing gas. The answers to bigger questions such as '*what makes the stars shine*'; Or '*how old are they*' and '*how big is the Universe*' were to be left to those who came after him. In the foreword to '*Le Stelle*' we find the following tribute to the life and work of Father Pietro Angelo Secchi (1818-1878) - 'God's Astronomer':

"The last work of P. Secchi, the Stars is almost as a statement of work the author and a summary of his generation's of knowledge of Astrophysics. Few astronomers indeed have addressed more subjects than P. Secchi, and his name would each need chapter of his book, if it had been written by another hand. In a career of twenty-seven years devoted to astronomical research, Fr. Secchi successively studied all celestial objects, especially that of the sun, and he still found some time to research terrestrial magnetism and meteorology. Therefore, it is almost as impossible to account in a few pages his work, and we would be better confining ourselves to a greater understanding of the role that P. Secchi played in modern science and the services he has rendered to it."

## 4. End Piece



Father Pietro Angelo Secchi - 'God's Astronomer'

# Index

# A

Absorption Lines, 25, 31, 40 Aguilar, Antonio Maria, 19 Antonio, Ballerini, 7-8, 19, 43

# B

Becquerel, Edmond Alexandre, 30 Belgieri, Luise, 7-8, 43 Berkowski, 16, 20 Bessel, Friedrich Wilhelm, 24, 30, 46

# С

Cauchoix Refractor, 16, 19 Cauchoix, Robert Aglae, 16, 19-21 Clavius, 35 Collegio Romano, 7, 9, 13-15, 21, 32-33, 35-36, 44-45 Corona, 13, 16, 19-20, 22, 41 Curley, Father James, 10, 13

## D

Dartmouth College, 22 De La Rue, Warren, 14, 19-20, 45-46 De Vico, Francesco, 10, 13, 35, 44-45

#### Index -

Desierto de Las Palmas, 19-20 Donati, Giovanni Battista, 30 Draper, Henry, 30, 37, 43 Drawings, 16-17, 43

### Ε

Eclipse, 13, 16, 19-20, 22-23, 41, 45-46 Electromagnetic Spectrum, 27, 40-41 Emission Lines, 29, 37 Exile, 5, 10

# Η

Harvard Classification, 37, 41, 43 Henderson, Thomas James Alan, 24, 30, 46 Huggins, William, 29-30

# I

Ignatius of Loyola, 7-8, 32, 35, 43

# F

Flash Spectrum, 19-20, 22 Fraunhofer, Joseph Von, 15, 19, 25, 28, 37, 40-41, 46

# G

Galileo, 5, 14, 26, 35, 39 Georgetown, 10, 13, 43 God's Soldiers, 7-8

## J

Jesuits, 7-10, 12-14, 32, 35, 43

Κ

Kingdom of God, 4

## 

Loyola, 7-9, 32, 35, 43-44

# Μ

Mars, 14, 16, 28 Maury, Matthew Fontaine, 5, 10, 37, 45 Merz, 13-15, 21, 25, 45 Merz Refractor, 13-15, 25 Monserrat, Professor, 19 Moon, 5, 13-17, 19-21, 30, 45

# Ρ

Passaglia, Carlo, 7 Patrick Henry, 10-13, 44 Patrizi, Frances Xavier, 7 Perrone, Giovanni, 7 Photography, 2-3, 13, 15-17, 19 Pianciani, Giambattista, 10 Pope Pius IX, 9-10, 32-33

# R

Rivabellosa, 19, 45 Rossi, Pellegrino, 10 Rutherfurd, Lewis Morris, 25, 30

# S

Secchi Classes, 5, 26, 34, 36-38 Secchi, Antonio, 7-8, 43 Secchi, Pietro Angelo, 1, 5-21, 23-26, 28-39, 41-46 Societa Spettroscopisti, 23 Society of Jesus, 7-8, 13, 35, 43-44 Spectroscope, 19, 25, 28, 41 Stonyhurst College, 10, 43-44 Sunspots, 18

# Y

Young, Charles Augustus, 19, 22, 46

### The Author

Stefan Hughes began his career as a professional astronomer, gaining a 1st Class Honours degree in Astronomy from the University of Leicester in 1974 and his PhD four years later on the 'Resonance Orbits of Artificial Satellites due to Lunisolar Perturbations', which was published as a series of papers in the Proceedings of the Royal Society of London.

After graduating he became a Research fellow in Astronomy, followed by a spell as as a lecturer, firstly in the Department of Engineering at Warwick University and then in Applied Mathematics at Queen Mary College, University of London. Then came a ten year long career as an IT Consultant, working on large technology infrastructure projects for an international software house.

In *'mid life'* he spent several years retraining as a Genealogist, Record Agent and Architectural Historian, which he practiced for a number of years before moving to the Mediterranean island of Cyprus.

During his time working as an Architectural Historian and Genealogist, he was a regular contributor to Family History and Period Property Magazines.

For the past ten years he has been imaging the heavens, as well as researching and writing the 'Catchers of the Light' - 'Featuring the Forgotten Lives of the Men and Women Who First Photographed the Heavens'.



The tale of 'God's Astronomer' - Father Pietro Angelo Secchi is the story of a young boy born to humble parents who like today's Pope Francis I grew up to become a Jesuit priest. Throughout his life he had to struggle with his conscience and his faith. As an astronomer and Director of the Observatory of the Collegio Romano, he clearly saw an imperfect 'Kingdom' of Heaven' with dark lines emanating from the stars and spots on the sun; but all too aware that similar radical ideas had brought other scientists into conflict with the church he loved with disastrous consequences. Would he suffer the same fate as Galileo did over two centuries before - forced to recant his beliefs to the world and to God.

### **The Catchers of the Light**

The 'Catchers' series of stories like Geoffrey Chaucer's famous Canterbury Tales are about the lives of ordinary people told against a common 'backdrop', his was a Pilgrimage and here it is Astrophotography; but both were of adventure, adversity and triumph - only the 'Catchers Tales' are true and based entirely on fact.

