



JAMES RIZZO, who lives in Malta and is author of *Robert Stirling's Models of the 'Air Engine'*, one of several Stirling Engine publications held by Galston Parish Church. James was granted unprecedented access to measure and inspect the Stirling engines presented to the University of Edinburgh and the University of Glasgow. James and a colleague, Marie Laurie, have presented the church with a specially prepared scroll of the full text and drawings of the 1816 patent application at morning worship, having been created by artist Simon Laurie. James and Marie have also presented a powered model of the 1816 Robert Stirling concept, 28x18cm in size.

ILLUSTRATIONS

P2 Robert Stirling, Cloag Farm, Stirling signature
P3 Jean Rankin, Stirling Memorial
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P10 Famous Glasgow Scholars
P11 NASA Logo, Radioisotope Generator Model
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ACKNOWLEDGEMENTS

'Kirk News' No. 149
'Galston Parish Church An Historical Synopsis'
by Irene Hopkins
'Blades of Grass' publications
Stewart Mills Collection, Robert Sier
James Rizzo, Willie Kidd, John Connell
'Ayrshire nights entertainment:
A descriptive guide to the history,
traditions, antiquities of the county of
Ayr', by John Macintosh of Strath
Cottage, Galston

The National Library of Scotland
University of Glasgow
University of Edinburgh
Hunterian Museum
Bob Cataldo, NASA engineer
Websites: Koichi Hirata@bekkoame.ne.jp
www.airsport-corp.com

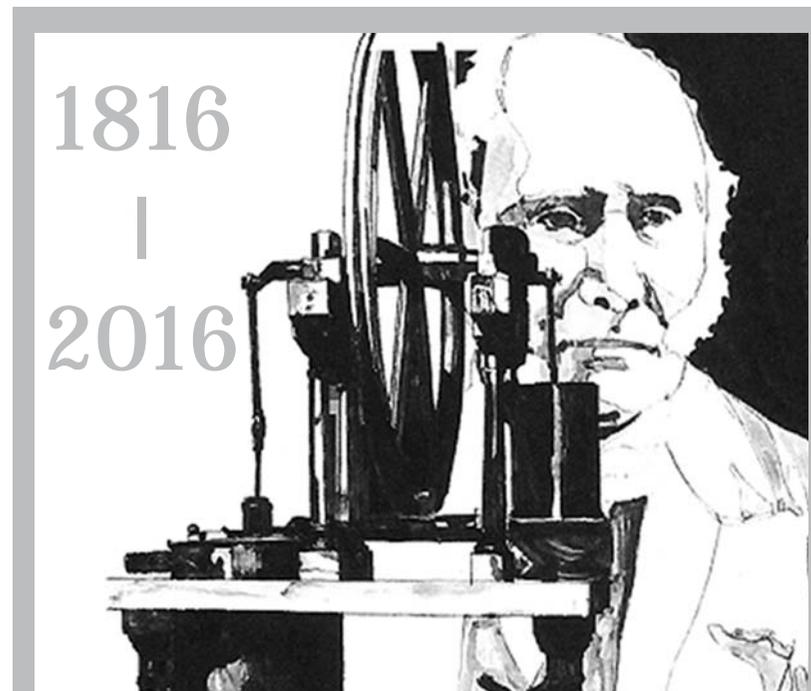
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***A Galston Parish
Church Leaflet
produced
to celebrate the
Bicentenary of the
Stirling Engine
on Doors Open Day,
Sunday
4 September 2016.***

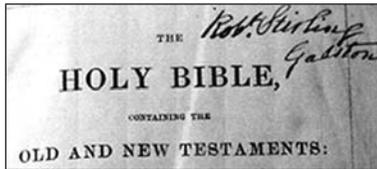
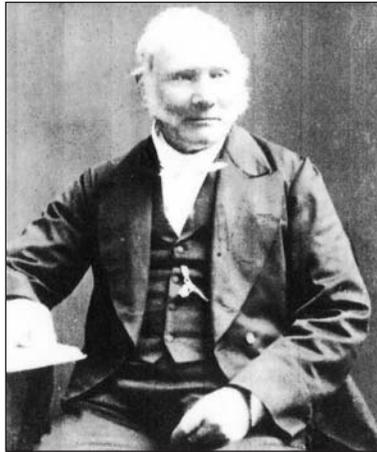


**Celebrating the
BICENTENARY
of the
STIRLING
ENGINE**

ROBERT STIRLING was born at Cloag Farm, near Methven in Perthshire on the 25th October 1790. He was the third of the eight children born to Patrick and Agnes Stirling who had been married in Methven Parish in 1785.

Although his ancestors were mainly from farming stock there had always been a thread of interest in machinery and mechanical things running through the males of the family. His grandfather, Michael Stirling, is accredited with inventing a rotary threshing machine in 1758 at his farm of Craighead near Dunblane. Michael's son, Patrick, assisted his father in the maintenance and repair of these threshing machines which could do the whole crop of a large arable farm. One of Patrick's brothers, James, rode a power driven bicycle through the streets of Dunblane in 1810, and Patrick's son James, brother to Robert, became a Civil Engineer with interests in a foundry in Dundee. So Robert Stirling was surrounded by mechanics from birth.

From 1805 to 1808, he attended Edinburgh University, studying Latin, Greek, Logic, Mathematics and Law. In November 1809 he studied Divinity at Glasgow University and completed five sessions before returning to Edinburgh in 1814 to complete his training for the ministry. In 1815 the Presbytery of Dunbarton agreed that he was competent to preach and a licence to do so was granted the following March. He was presented by The Commissioners of the Duke of Portland to the Presbytery of Irvine, and after examination was ordained Minister of the Second Charge of Laigh Kirk, Kilmarnock on



sensor to near absolute zero.

So, in 2016, from a basic model hand built by a Stirling Engine enthusiast using the heat from a cup of hot water to drive that piston to turn that flywheel, and, through many and various innovative developments - including use of a variation of the concept of the Stirling Engine in space exploration techniques employed by NASA - we may marvel at the innovative technical and engineering skill of the Rev. Dr. Stirling some 200 years ago!

Today, in recognising that well respected Minister of the Church of Scotland and his extraordinary skills:

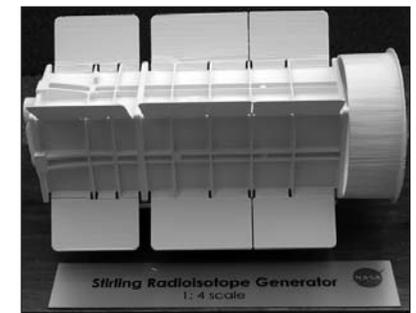
- ◆ we may find on the internet, a web-site in which the University of Glasgow provides pictures of eight famous Glasgow Scholars including James Watt, John Logie Baird, William Thomson (Lord Kelvin) and - yes - the Rev. Robert Stirling.

- ◆ in October 2014, the name of Robert Stirling was inducted into the Scottish Engineering Hall of Fame, based in Glasgow.

- ◆ in December 2015, the Institution of Mechanical Engineers - with their headquarters in London - honoured Robert Stirling by presenting an Award to the model Stirling Engine made and gifted by him to the University of Glasgow in 1827. That model - and award - can be viewed today within the gallery area of the Hunterian Museum at Glasgow University.

While principally recognising his faithful and caring Ministry, the Memorial Plaque to Robert Stirling within the entrance hall to Galston Parish Church, may also be considered to reflect his technical skills in the words:

WELL DONE GOOD AND FAITHFUL SERVANT!



been used to drive water pumps, sewing machines and turntables prior to development of the electric motor.

Also, Stirling and Steam grew up together early in the Industrial Revolution and - indeed - the Rev. Dr. Stirling developed his engine partly in response to the human suffering from steam boiler explosions; workers of that time were cheap and liability was nil. Cast iron was the material of the day and in incorporating such metalwork, Stirling Engines did not fare so well as steam engines; the fuel efficiency of the Stirling engine was also unimportant when coal was virtually pence per ton and so, steam engines prevailed.

However - today - with the advance of materials and technology - there are variations of Stirling engines which already touch our daily lives. As an engine which is bi-directional, that is if temperature difference is applied, rotation is produced and so it makes a refrigeration unit; liquefied gases such as liquefied oxygen or nitrogen have been produced using Stirling type engines. Another example is found in satellite weather pictures, produced by courtesy of a tiny Stirling type cryo-cooler which is used in the satellite to cool an image



Famous Glasgow Scholars

			
William Thomson (Lord Kelvin)	James Watt	William John Macquorn Rankine	Rev Robert Stirling
			
Rev John Kerr	Adam Smith	John Logie Baird	Joseph Black



the 19th September, 1816.

However during this period of study, Robert had not ignored his love of machinery and of invention and he had been busy before coming to Kilmarnock working on an engine known as The Heat Economiser and continued to do so after his induction. On 27th September, 1816, Robert Stirling applied for a patent for his heat engine. This patent was registered at Trades House on the 20th January 1817. Robert's brother, James, had been closely associated with the project and he took forward the idea to use in his own foundry business. He also encouraged his brother to look even further forward into the future of engines.

Meanwhile Robert had made the acquaintance of Thomas Morton in Kilmarnock. He too was brimful of ideas and had already set up a workshop at Morton Place. He was interested in astronomy, an interest that Robert Stirling began to share. Thomas Morton gladly allowed Robert Stirling the use of his premises both then and over the next twenty years.

Robert married in Kilmarnock on the 10th July 1819, Jean Rankin, daughter of William Rankin, wine merchant in Kilmarnock, and Jean McKay. She had been born in Kilmarnock on 27 June 1800, so was only 19 when they married. They had seven children: Patrick, born



VESTIBULE MEMORIAL: *The plain double wooden doors of Galston Parish Church lead into a compact square vestibule laid with black and white tiling, put in place in 1920, a gift from John Littlejohn who lived in Nelville, Galston, a coalmaster and an Elder in the Kirk. On the wall facing is a memorial plaque dedicated to Robert Stirling, erected in his memory by the Kirk Session, members of the congregation and others.*



29th June 1820 in Kilmarnock; Jane, born 25th September 1821 in Kilmarnock; William, born 14th November 1822 in Kilmarnock; Robert, born 16th December 1824 in Galston; David, born 12th October 1828 in Galston; James, born 2nd October 1835 and Agnes, the youngest of the family, 22nd July 1838, both born in Galston.



In the summer of 1824 Robert Stirling became the minister of Galston Parish Church, some five miles from Kilmarnock. The manse was built in Brewland Street in 1790

to replace the one in Old Manse Close. Dr Stirling built himself a workshop in the garden. It was said that anyone passing late at night could see the glow of an oil lamp and hear the clink of metal coming from his workplace as he continued with his great love of engineering as a dedicated hobby.

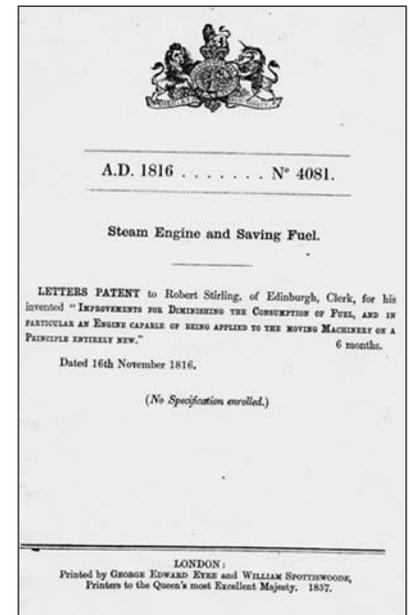
At the time of his death a contemporary wrote "his small, neat, dapper figure would be sorely missed as he marched about his Parish. Often his lips appeared to be moving apparently talking, seemingly to himself, as if his brain could not shut down and he was wrestling with some problem or other. He did not only hold to the comfortable and better set up homes of the town but was a true friend to the poor and hopeless, often bringing comfort in a material as well as a spiritual way. His sermons were well thought out and delivered with fire, but he did not talk "above the people's heads" but seemed to be able to reach hearts and souls."

It was also said that if he had entered the world of science he would likely have achieved great fame and fortune but his chosen occupation was the ministry and in it he achieved great respect and devotion. Men quoted that if his name had been spelt with an "e" then it would fully have described the man, a person of sterling quality in all aspects. Much has been written of his great scientific achievement in the invention of the Stirling Engine but what of the man himself? The book "History of Galston Parish Church" published in 1909 gives us

STIRLING ENGINE: 200 years since that Patent of 1816, there are many who may ask what is a Stirling Engine and how does it work?

As an external combustion engine, it is similar to a steam engine and in fact it competed with steam engines for many years, however, the type of fuel used is not critical as it can run on anything which produces heat. When a confined body of gas - air or helium or whatever - is heated, the pressure of that gas rises; that increased pressure can push on a piston to drive a flywheel, following which the body of gas - if cooled - will incur a drop in pressure which will allow the piston to return to its starting position. That same cycle can be repeated over and over, using the same body of gas. That is all there is to it, no ignition - no carburation - no valve train - no explosions! Consequently, a great many people have difficulty in understanding that basic Stirling Engine - it is so much simpler than conventional internal combustion engines.

Robert Stirling's radical engine unit which has a high thermal efficiency and a large number of inherent advantages, such as flexibility in the choice of fuel - including sunshine - has been subject to on-going research and development throughout those years during which variations have



accepted. Money left over after the erection of the new memorial was lodged with the Church of Scotland for future maintenance. The new stone was erected on 16 December 2014 and on 3 May 2015 was dedicated in church and at the graveside by Rev. Alastair Symington, Locum Minister of Galston Parish Church since February 2013 and a Chaplain-in-Ordinary to HM The Queen in Scotland. He said at the graveside:

"Paul said: What is sown as a perishable thing is raised imperishable. Sown in humiliation, it is raised in glory; sown in weakness, it is raised in power; sown a physical body, it is raised a spiritual body. We learn from scripture that, since the time of Abraham, God's people have set apart holy ground for the burial of the dead. Our Lord Jesus Himself was interred in accordance with Jewish burial customs before His resurrection and ascension to the right hand of God. We now gather in His name, that by the reading of God's Word and by prayer, we may rededicate this gravestone and resting place of the Reverend Doctor Robert Stirling. The Lord is my Shepherd; I shall not want. He maketh me to lie down in green pastures; He leadeth me beside the still waters. He restoreth my soul. He leadeth me in the paths of righteousness for His name's sake. Yea, though I walk through the valley of the shadow of death, I will fear no evil; for Thou art with me. Thy rod and staff they comfort me in the presence of mine enemies; Thou anointest my head with oil, my cup runneth over. Surely goodness and mercy shall follow me all the days of my life, and I will dwell in the house of the Lord forever. Amen. In the name of the Father and of the Son and of the Holy Spirit. By the authority vested in me as a Minister of the Gospel, I re-dedicate this resting place of God's servant, Robert, faithful Minister of Galston and scientist of world renown. Let us pray: Eternal God, You are the God of the living and not of the dead. We ask Your blessing on this resting place, dedicated to Your glory that we may continue to hold it in reverence and respect and may continue too to care for it with love. We pray that those who have fallen asleep in Your faith may waken in Your love, and that this holy place here may have been for Robert the gateway to life eternal. Give us here the grace to follow Your saints in the life of faith and fellowship and find at the last the heavenly joys prepared for those who love . . . and now the peace of God which passes all understanding keep your hearts and minds in the knowledge and love of God and the blessing of God Almighty, Father, Son and Holy Spirit rest and remain with each one of you. Now and for evermore. Amen."



some insight into the man.

About the year 1832 he preached at a sitting of the General Assembly in Edinburgh. His text was Psalm 91 vv 14-16 "because he hath set his love upon me, therefore will I deliver him; I will set him on high, because he hath known my name. He shall call upon me and I will answer him; I will be with him in trouble; I will deliver him and honour him. With long life will I satisfy him, and show him my salvation." That was a text very appropriate to the man himself. He not only lived to attain his jubilee as a minister he was, for some years before his death, the Father of the Church of Scotland.

But he did not prevaricate. If he saw injustice he spoke out, if he saw a need he was there, if he held a strong view he told it out. For example he was involved with the troubles of the Disruption and showed sympathy to their cause. In May 1842 he and nine others were suspended for nine months by the General Assembly for holding Communion with the deposed ministers of Strathbogie. Much to the dismay of the General Assembly his reputation did not suffer from this act. Indeed it was increased among the congregation of his Parish and also among ordinary people for the part he played at that time.

Then in 1848-49 a terrible calamity came upon the town of Galston and of the surrounding countryside. The scourge of cholera laid its deadly hand on the folks. It was then that Dr Stirling showed his true mettle. Then he proved his true courage as a man of Christ. Fearlessly he went about the homes struck down by cholera. He ministered to the physical and spiritual wants of the sufferers. He toiled among them night and day, he tended them, he prayed with them and he buried them. When the threat of disease was finally lifted and things could get back to normal "some 50 parishioners assembled in the



STIRLING CHAIR: *This Victorian chair sits in the back corner of the Chancel near the Organ. A brass plaque on it says 'The Robert Stirling Chair, presented by Mr Adam Currie to the Ministers of Galston Parish Church'. Unfortunately it does not say why it was presented but a search of Kirk Session Minutes tells us that it was in 1875. It sat in the study of the Manse in Brewland Street until 2005 when it was moved for safe keeping to the church and there it still sits*



STIRLING PULPIT AND ENGINE MODEL: *The pulpit sits in the Chancel and was a gift of the family of Robert Stirling. It is made of Austrian oak and was made by a local craftsman, Provost John Yeudall, Elder and townsman. It greatly reflects his skill and craft and has well stood the test of time. A memorial to Dr. Stirling is carved on the side. In the space beneath the pulpit now stands a half-size model of a Stirling engine, presented to the church by Willie Kidd of Ayr, a Stirling Engine enthusiast.*

Black Bull, Galston” and presented him with a service of silver plate and a gold watch in recognition of his great concern for the town.

He became involved also with educational matters in the town and supported in particular, Mr Charles Blair, a manufacturer and philanthropist. Mr Blair had set up Blair School in Polwarth Street and Dr Stirling gave it his full backing, both in spiritual matters and also by donation of the Stirling prizes. After his death these prizes continued and were not done away with until the late 1980s. As well as Blair School he took an interest in the Sabbath School that had been set up by Henrietta Scott of Cessnock Castle at the Cross in Galston. For many years his daughter, Jane Stirling, taught there Sunday by Sunday. She later also assisted in the soup kitchen set up to support poor people through the winter.

Dr Stirling died in 1878 and is buried in the Cemetery in Galston. His family in 1909 presented the church with a beautiful Austrian Oak Pulpit to grace the newly added chancel. It still takes pride of place there.

And what of his family? Jane didn't marry but continued to help her father in many ways. She also was a very intelligent lady and as a

woman at that time had no recourse other than to assist her brothers in their schemes. She died in Ayr. Patrick and James became railway engineers. William was a civil engineer working on the railway systems of South America. Robert was also a railway engineer and working in Peru while David became a minister, like his father before him, and served the Parish of Craigie for many years. Indeed the Rev David Stirling was the Moderator of the Committee set up to elect an assistant and successor to his father. Agnes, the other daughter was a talented artist but gained no general renown. She married John Hunter, manager of Dalmellington Iron Works in 1860.

But Dr. Stirling's gravestone did not take pride of place in Galston Cemetery. It was allowed to lapse into disrepair and was not worthy of this good and gracious man. It was time to address the matter and once again show honour to a true Christian.

CEMETERY GRAVESTONE: The original gravestone of Robert Stirling in Galston Cemetery was edged by metal railings and had fallen into disrepair, a fact highlighted by Ian Pollock of Newmilns in a letter to the Kirk Session in January 2013. The Kirk Session agreed this should be remedied and a committee composing of Robert Murray (Session Clerk), John Connell and the aforementioned Ian Pollock was appointed on 8 May 2013 with research leading to plans being prepared for replacement of the stone. Funding for the project was addressed, donations totalling £3699.19 came from far and wide and an offer from Co-operative Funeralcare to carry out the work was

