

# JUBILEE SOUVENIR

FR. MATTHEW POTHEN  
THEKAEKARA



STORY OF A  
PRIEST—SCIENTIST

**“ Who the day before He suffered,  
took bread into His holy and venerable hands,  
and with His eyes lifted up towards Heaven unto  
Thee, God,  
His Almighty Father, gave thanks to Thee,  
He blessed it, broke it, gave it to His disciples, saying :  
‘ Take and eat ye all of this,**

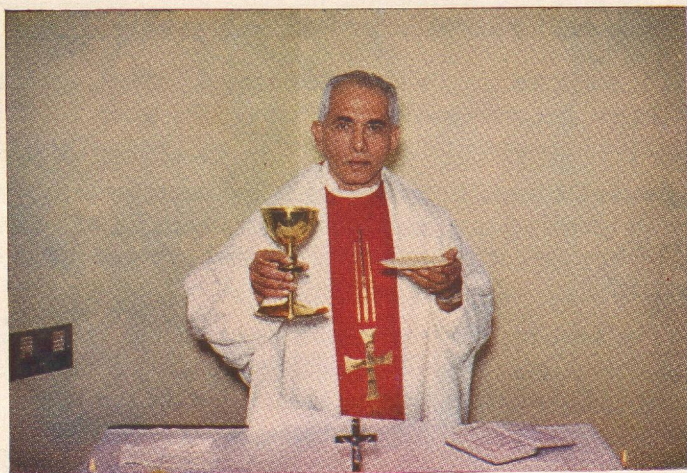
**FOR THIS IS MY BODY ’.”**

The priest, garbed in white vestments, genuflects, raises the chalice in the manner of his Lord and Master and intones:

**“ In like manner, after He had supped,  
taking also this excellent chalice into His holy and  
venerable hands, and giving Thee thanks,  
He blessed and gave to His disciples, saying :  
‘ Take and drink ye all of this,**

**FOR THIS IS THE CHALICE OF MY BLOOD OF THE NEW AND  
ETERNAL TESTAMENT, THE MYSTERY OF FAITH, WHICH  
SHALL BE SHED FOR YOU AND FOR MANY UNTO THE  
REMISSION OF SINS.**

**As often as you do these things, you shall  
do them in remembrance of Me’.”**



IT WAS ASCENSION DAY AND REV. MATTHEW P. THEKAEKARA  
CONTINUES TO CHANT THE 6.30 A.M. MASS

It is Ascension Day and Rev. Matthew P. Thekaekara continues to chant the 6.30 a.m. Mass for the Sisters of Providence at Ascension Church in Halethorpe, Maryland, U.S.A.

Father Matthew, as he is affectionately called by his parishioners, is resident priest at the Halethorpe Catholic Church.

The Mass over, the man of God, with his cleric's Roman collar still in place, drives 30 minutes 'down the road' to Goddard, the leading scientific satellite centre in the United States. The 15-mile-long drive witnesses the transformation of a priest into a physicist.

'Man's venture into space,' Rev. Thekaekara says, 'is part of his restless urge to over-reach, to grope for the infinite.' In a way, the priest's observation justifies his vocation and avocation. He is a living example to show how religion and science supplement and complement each other.

Yet when asked if he finds conflict between the life of a priest and the life of a scientist, Dr. Thekaekara affirms honestly and humbly: 'It would seem so since both careers require a total dedication.' But he manages to devote enough time to each career and finds no conflict between religion and science since both are ways of understanding the same universe and its creatures and serving and glorifying the same Creator.

The magic figure of 1.940 calories per square centimetre per minute will not mean much to the man on the street. A school-boy will nonchalantly round it off to the next highest figure.

But to the world's physicists this figure means that they will have to literally figure again. For it represents a new value of the life-giving energy from sun to earth, the so-called solar constant.

(The solar constant simply tells us how much energy comes from the sun. It is used by scientists to determine the sun's energy and to discover what happens within the sun.)

The generally accepted figure for solar energy reaching the earth has been 2 calories a square centimetre a minute. This

was based largely on estimates made by Dr. Francis S. Johnson when he was at the U. S. Naval Research Laboratory, using early postwar rocket data and other observations.

Through observations from a rocket plane, from high-flying jets, balloons and spacecraft, and by other means, it has been determined that the sun shines substantially less bright than had been supposed.

It is now believed that the intensity of visible sunlight is 8 per cent lower than the generally accepted figure. Also, the estimate for the solar constant has been revised downward by 3 per cent.

The implications of these new estimates bear on problems as diverse as designing protective coatings for spacecraft and determining what caused the ice ages and other major climatic changes.

Weather forecasting, solar driven power packs in satellites and theoretical physics will be changed dramatically by the revised figures.

Despite the basic importance of the solar constant, its determination has long posed a challenge to observational ingenuity. The reason is that a large portion of solar radiation, in its visible and invisible wavelengths, is absorbed in the atmosphere or reflected by particles before it descends even to the highest mountain tops.

Dr. Thekaekara was the principal investigator in a major project designed to measure the sun's energy and determine the solar constant from very high altitude experiments.

Father Thekaekara's interest in the solar constant was sharpened after he started working for the Goddard Space Flight Centre (GSFC) full-time in 1964. He took part in a series of experiments to create sunlight in a test chamber. A total of 127 mercury-xenon lamps were used to duplicate, in miniature, the energy of the sun.

Gradually, Father Thekaekara's studies made him suspect that the amount of the sun's energy reaching the earth was less than had been calculated. His studies revealed that the internationally accepted standards were wrong.

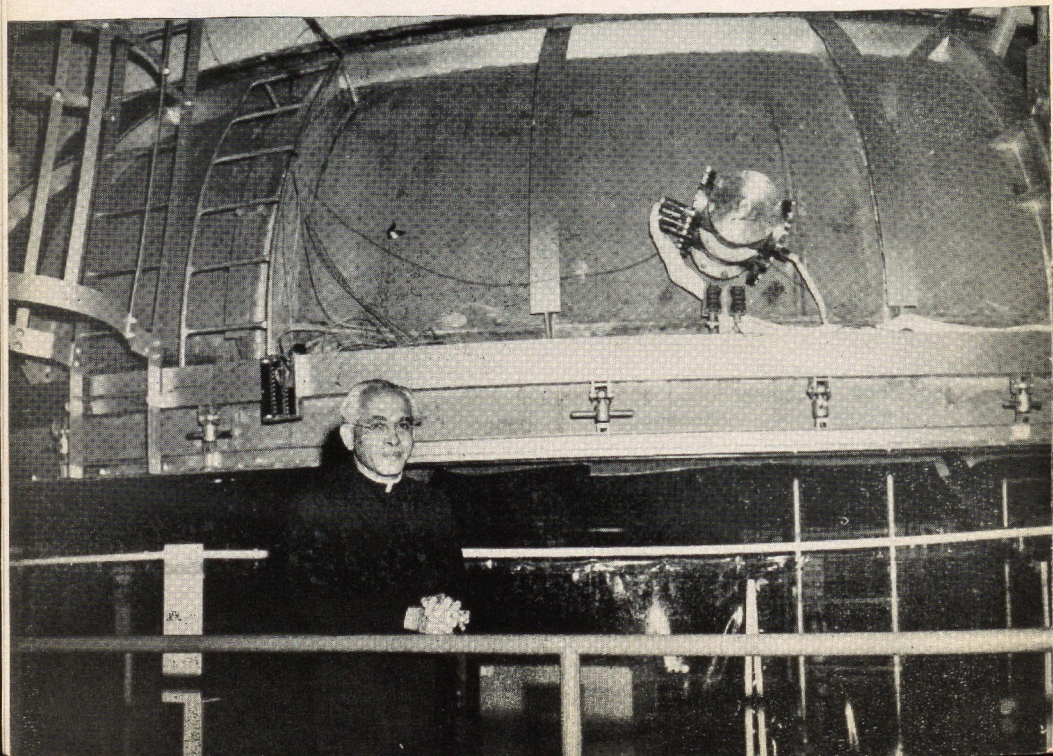
'I asked the National Aeronautics and Space Administration (NASA) to back me in experiments to check the constant. They agreed.'

NASA is the U.S. Government's premier space research organisation. Goddard Space Flight Centre in Maryland, near Washington, D.C., is one of the very major units of NASA.

'I led a team of about 30 scientists and engineers and we used a Convair-900 for the job,' he recalls.

The four-engine jet aircraft NASA-711 *Galileo* was fitted out as a flying observatory with a large variety of instruments, four for total irradiance and five for spectral irradiance. The instruments incorporated the best available techniques in precision radiometry. The instruments complemented each other in wavelength range, spectral resolution and measuring techniques. They were independently calibrated with reference to reliable energy standards. The measurements were made from an altitude where the errors inherent in earlier ground-based measurements could be avoided.

AT GODDARD SPACE FLIGHT CENTER—IN THE BACKGROUND IS THE SPACE SIMULATION CHAMBER—"CREATING SUNLIGHT IN A CHAMBER"





FOURTH FROM RIGHT—DR. THEKAEKARA

It was the first time such a large variety of instruments and techniques were used to study the solar irradiance. It was also the first time a detailed and accurate mapping of the sun's spectrum in the range of 0.6 to 15 microns was possible.

The scientist-priest and his team worked up to an altitude of 38,000 feet and used balloons and satellites in their research.

Another programme was carried out to measure the solar constant. It was a joint effort by a team at the Jet Propulsion Laboratory of the California Institute of Technology in Pasadena and Dr. Andrew J. Drummond of the Eppley Laboratory in Newport, Rhode Island.

The combined results were evaluated by a committee of government and academic scientists, headed by Dr. Thekaekara.

With 'solar curve' calculations—a graph of energies emitted across the solar spectrum—Dr. Thekaekara and Dr. Drummond both agreed on a new figure of 1.940 calories per square centimetre per minute instead of a figure nearer 2 as the sun's energy above the earth's atmosphere.

When the revision of the solar constant was presented at the First International Meeting of the Solar Energy Society at the National Science Centre in Melbourne, Australia, last year, it caused a stir among the world's leading scientists.

The announcement was greeted with surprise and acclaim from the press and the public. News stories relayed by the Associated Press were reported in major newspapers around the world.

The following are the captions of some of the news stories:

- 'The Answer is 1.940' (*Herald*, Melbourne).
- 'The Sun, by the Scientists' Latest Calculations, Shines Less Brightly Than They Once Believed' (*New York Times*).
- 'Sun's Energy is Less Than Thought' (*International Herald Tribune*, Paris).
- 'New Discovery on Sun's Energy' (*The Indian Express*, Bombay).
- 'Tests Show Lower Flow of Energy From the Sun' (*Washington Post*).

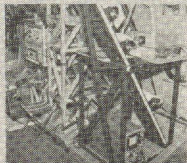
FLYING OBSERVATORY: NASA-711 GALILEO

## ONVAIR 990A SOLAR CONSTANT-SOLAR SPECTRUM EXPERIMENT

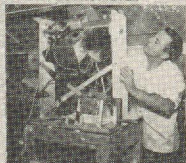
GSFC 322  
BLOCK  
INTERFEROMETERS



GSFC 322  
PERKIN-ELMER  
SPECTROPHOTOMETER



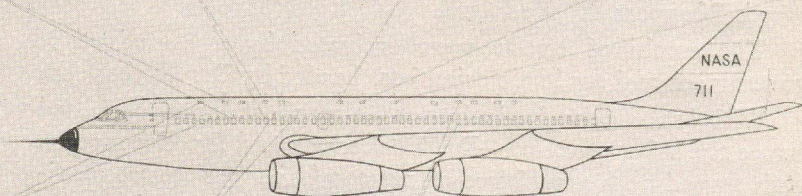
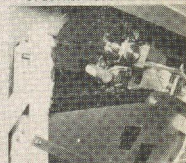
GSFC 713  
FILTER WHEEL  
SPECTROMETER



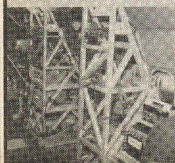
GSFC 713  
ELECTRONIC SCANNING  
SPECTROMETER



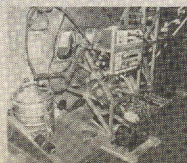
GSFC 713  
LEISS  
SPECTROPHOTOMETER



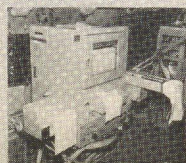
GSFC 322  
ANGSTROM & HY-CAL  
RADIOMETERS



GSFC 322  
CONE  
RADIOMETER



AMES RES CNTR  
CARY 14  
SPECTROPHOTOMETER



6 FLIGHTS MADE IN AUG. 1967  
FROM MOFFETT FIELD CALIF.  
TOTAL OF 13 HRS. OBSERVATION TIME  
FLIGHT ALTITUDE - 38,000 FT.  
ABOVE: - 99.9% OF WATER VAPOR  
79% OF AIR



A GROUP OF COLLEGE PROFESSORS AND FR. THEKAEKARA  
AT THE COMPUTER CENTER, G.S.F.C.

Radio and television networks in Australia reported the event widely. In India, All India Radio announced the news in their principal English and language broadcasts, hailing Father Thekaekara as an Indian-born American scientist.

One result of the project—the exact calculations will enable NASA spacecraft on deep probes of space to better survive the hazards of space travel, which includes extreme temperature changes.

Father Matthew has other significant scientific achievements to his credit.

In 1956-57, while at Johns Hopkins University, he made precision measurements on the wavelengths and intensities of xenon and krypton under different discharge conditions. His spectrum charts and tables became part of the 'American Institute of Physics Handbook,' and are being used as standard reference material by workers in this field.

At Johns Hopkins, his research on the xenon spectrum uncovered some of the problems connected with the variability of wavelengths and the suitability of spectral lines as standard of length. These findings were so basic that in subsequent years they became part of the graduate course in spectroscopy at the university.

Father Thekaekara was one of the founder-members of the National Capital Section of the Optical Society of America. As Vice-President and later President of the Section, he organised a programme which is still continuing with great success after ten years.

Between 1960 and 1964, Dr. Thekaekara was the Director of several conferences for college professors and institutes for high school teachers under the sponsorship of the National Science Foundation.

Since 1964, Father Thekaekara has toiled regular hours as a research physicist in stimulating solar and high energy environments to test satellites at Goddard before they are launched.

IN DECEMBER 1970 HE RECEIVED THE GODDARD EXCEPTIONAL PERFORMANCE AWARD FROM DR. JOHN F. CLARK, DIRECTOR, GODDARD, SPACE FLIGHT CENTER





RECEIVES SPACE ENVIRONMENT AWARD OF THE U.S. INSTITUTE OF ENVIRONMENTAL SCIENCES AT SPECIAL BANQUET CEREMONY AT LOS ANGELES, CALIFORNIA

Honours have sat lightly on the shoulders of the Goddard priest-scientist. In December of 1970 he received the Goddard Exceptional Performance Award. The citation read: 'For outstanding performance in leading and co-ordinating the solar research that obtained revised engineering standard values of solar spectral and total irradiance.' He was granted the NASA Superior Achievement Award for his work on solar irradiance. The U.S. Institute of Environmental Sciences singled him out for the Space Environment Award.

Another and greater honour is knocking at the doors of the learned priest. The U.S. Institute of Environmental Sciences has nominated Dr. Thekaekara for the National Medal of Science—one of the greatest honours a grateful country bestows upon its scientists in recognition of their contribution to science and humanity.

Despite his preoccupation with science, Father Thekaekara's first love is for his priestly vocation. He rises at 4.30 a.m., says Mass at 6.30 and departs for work. After work, he drives back to Ascension parish, where he spends the evening in parochial duties and study. On Sundays, he says Mass for the parishioners.

What made the boy Matthew, with a scientific bent of mind, become a priest?

Father Matthew himself gives the answer :

'Everyone who decides on the priesthood does so because of a strong conviction that this is what God wants him to do.'

He affirms further : 'A vocation is the call of Christ, a call just as real as in the case of Peter and John and Matthew when Christ walked the earth—a call spoken in such emphatic, compelling tones and heard so deep within the heart and mind that it is impossible to doubt it.'

And how does one prepare for the call? 'One is prepared for it slowly by reading, by prayer, by talks with priest-friends, by

WITH PASTOR FR. SPRAKER (CENTER), ASSISTANT PASTOR AND PARISHIONERS AT ASCENSION PARISH

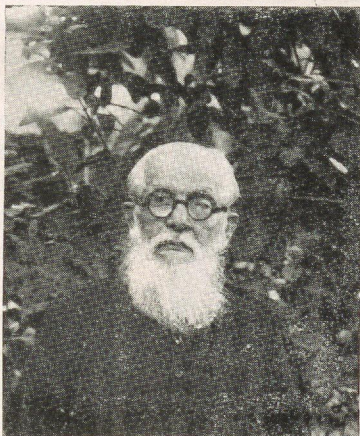


the very atmosphere of the family. One tries to run away from it, to pretend it is not coming. But when it comes, it is a shattering experience.'

And when did the Master give young Matthew the call ?

' I can vividly recall when it happened for me and where. Perhaps my first name being Matthew may have been one of the reasons why I am a priest.

' My priest-uncle—his name was Matthew—was a towering personality. As Vicar (pastor) of the Cathedral, my home parish in Changanacherry, and municipal president (mayor) of the town, he was one everybody looked up to. Above all, he was a good priest, a friend of the poor and a great devotee of the



PRIEST-UNCLE—  
FR. MATTHEW THEKAEKARA

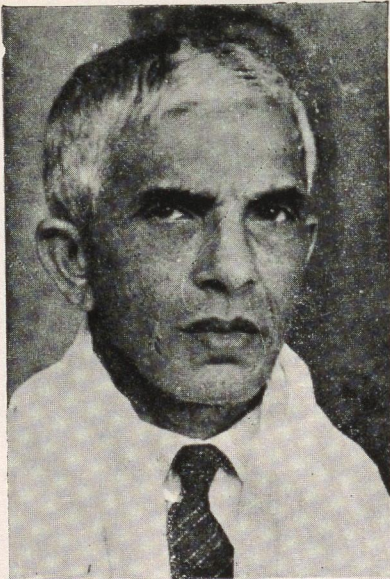
Blessed Sacrament. He had a priest-uncle who was also named Matthew. In fact, there is a tradition that in every generation there was a priest in the family. And for St. Thomas' Christians, tradition is a glorious unparalleled heritage.'

And in this glorious tradition, young Matthew was ordained a priest on November 21, 1946, at the sub-Himalayan hill seminary of the Jesuits, St. Mary's in Kurseong, by Bishop Oscar Servin of Ranchi. (November 1971 marks the Jubilee, an event,

his 85-year-old rightly proud father, members of his family, friends, relatives and well-wishers are longingly looking forward to.)

The glitter and glory of Goddard seems a far cry from Changanacherry, a centrally located town in the former princely state of Travancore on the south-western palm-fringed coastal strip of India, now Kerala, where the future priest-scientist was born in 1914. His father, Pothan Thekaekara, was a school-teacher, who claims his family heritage back to the times of St. Thomas, the Apostle of India. His mother, Mariam, was a pious woman belonging to another ancient family, Kannampuzha, timber merchants by profession.

Pothan was not endowed with riches. He possessed a house, some acres of paddy-land and a teacher's income of Rs. 25 a month to support himself, his wife and two sons, Matthew and George. But he was happy and contented and set high standards and code of conduct for his small family. Young Matthew grew up in this atmosphere of intense faith and hard work.



MR. POTHAN THEKAEKARA

Pothan departed from tradition when he sent his son to a non-parochial primary school. But Pothan Sir, as he was endearingly called by friends and students, was far ahead of his times. He envisioned a time when his son will mix, mingle and move with men of all climes and characteristics. And young Matthew lived up to his father's exacting expectations.

Pothan moulded his son's future with care and confidence. 'My father's influence during my early years is perhaps the

greatest blessing God gave me,' Dr. Thekaekara says. 'He had a strong faith in God's providence, a great love of prayer. Even after I left home to start my studies for the priesthood, his influence continued. He has been my most regular correspondent during all these forty years when I lived at great distances from home, in Tamil Nadu or the Himalayas, in France, and for the last nineteen years in the United States. One has to strive hard to be worthy of such a man. *Noblesse oblige.*'

The family faced a sad event in the death of Mariam, Matthew's mother, at the early age of 26. Matthew was then six and George four. In the words of Matthew: 'The most poignant memories are of the day a messenger came home to tell grandmother and us that she had died, of the boat draped in black in which they brought her body home, my father holding me tight with tear-filled eyes, of the funeral procession and what seemed to me then, an immense crowd of people, and of the grave site in the dear little churchyard. Father arranged to have a Gregorian Mass said for the repose of the soul. George and I used to go with him early morning each day for that Mass. From that time I started the habit of hearing Mass every day. We used to go often where mother was buried, pray there and put flowers on the grave. I still feel strongly that she watches me from Heaven and takes care of me.'

Four years later, Pothan walked up to the altar with a new bride, Rosamma from Mecherikunnel, a family of ancient traditions. Rosamma was an ideal wife and a loving and endearing mother. She stepped in Mariam's place very gracefully and the Thekaekara home once again echoed to the laughter of the children. Pothan Sir has four surviving children by this marriage—Jose Francis, Mary (Thankamma), James Ignatius and Lucyamma.

Matthew graduated from high school with a special undergraduate exemption granted by the Department of Education. Throughout his school and college career he stood first or near first in all classes and won several medals and prizes, in particular the Jubilee Medal for English and the Medal of the Academic Francaise for French. He passed his B.A. (Physics) from the University of Madras with first rank, in university in physics, second rank in French and third rank in English. He established

a university record in the total marks obtained, which still stands unsurpassed. He passed his M.Sc. in physics in first class with distinction.

While at school, the traits of his future vocation were slowly becoming manifest. He was an active member of the Servants of St. Thomas' Society which conducted Sunday Bible classes for children. He participated in spiritual get-togethers and annual retreats which strengthened his piety and sanctity.

At 17, Matthew had just completed his undergraduate work at St. Berchman's College, Changanacherry, when the lure of the cassock became irresistible.

Matthew sought admission at the Jesuit Novitiate at the Sacred Heart's College, Shembaganur, in 1931 and spent the next four years studying for the priesthood.

After taking his minor vows, Matthew enrolled in St. Joseph's College, Tiruchirapalli, and took his bachelor's degree in 1937 and master's degree in 1939.

He was back at Sacred Heart's College, where he continued his studies for the Ministry, leading to a degree of Licentiate in Philosophy. After further studies and ordination in 1946 he spent one year in France.

The years 1941 to 1947 were a period of prolific writing. Matthew contributed articles to three major religious magazines, *Eucharistic Congress*, *The Morning Star*, and *Our Lady of Mercy's Message*. He wrote weekly editorials for the *Herald*, the chief Catholic weekly of India published from Calcutta. Outside India, he was a regular contributor to magazines in the United States and France. He wrote innumerable pamphlets and books—the total list of publications during this period runs up to 500 titles.

From 1948 to 1952 he taught at Loyola College, Madras, where he became the head of the department of physics.

Father Thekaekara left for the United States in 1952. While engrossed in his priestly vocations in Baltimore, Maryland, he continued his interest in scientific writings and studies. In 1956,

he received his doctor's degree in the intricate field of atomic spectroscopy from the Johns Hopkins University, where he was elected to Phi Beta Kappa. Since 1955, he has published over 50 scientific publications.

In 1955 he founded the U.S. Branch of the All India Catholic University Federation (AICUF-U.S.) for Catholic Students from India studying in the U.S.A.—was national chaplain 1955-1964, conducted national and regional get-togethers, meetings and receptions—also edited and published a monthly AICUF-U.S. newsletter.



FR. MATTHEW WITH LATE ARCHBISHOP MATHEW KAVUKATT AT AN AICUF GET-TOGETHER RECEPTION IN HONOUR OF THE VISITING ARCHBISHOP

Dr. Thekaekara became a U.S. citizen in 1962, after rising to the post of chairman of Georgetown University's physics department.

Father Thekaekara's efforts in space physics came to the attention of Goddard when he led a summer conference for college professors there from 1962 to 1964.

A linguist, Father Matthew speaks and writes with fluency in English, French, Latin, Tamil and Malayalam. He also has

a fair, working knowledge of Hindi, Sanskrit, Greek, German, Hebrew and Aramaic. In fact, he taught Sanskrit for sometime in India.

An uberous writer, the 57-year-old priest has covered such wide areas as *Planning for India*, *Spectrum of Xenon* and *The Story of Jesus*—the latter book written especially for children. And to top it off, he writes poetry. Titled 'Meditations for All Seasons and the Mass,' a large collection of his poems is published in the U.S.A.

Discussing the goal of science, Dr. Thekaekara says: 'Simply beating the other country is not the compelling motive for American or Russian space scientists. We fight disease and poverty . . . climb the most difficult peaks . . . now even dig the deepest hole . . . build planes bigger and bigger that fly faster and faster . . . but not to grab headlines.'

'The final object of the intellect,' says the poet-philosopher-physicist, 'is to always grope and reach for things. Man can never be satisfied. . . .'

And the man of God asserts, 'Man's true nature is to over-reach. I think space is just one aspect of it being impossible for us to be satisfied, of groping for the infinite, for God.'

(Reprint from THE NEW LEADER)

