

Our former president **Abdul Kalam's teacher** served as the first Principal of a College in Madras . Can you guess the name of the great teacher? Can you guess which College it is?

Yes. You are correct.

It is DG Vaishnav College, Arumbakkam, Chennai. Shri.Tothadri Iyengar, Mathematics teacher of our former President served as the Principal of this College during its inception in the year 1964.



Shri.T.Totadri Iyengar  
Principal  
01.06.1964 to 31.05.1966



*Shri.S.R.Govindarajan*

**World University Service Centre with Danish grant! Polio Drop campaign with Candian help!!**

Prof.S.R.Govindarajan , former Principal of DG Vaishnav College, during his tenure as President of World University Service Centre was able to raise a huge grant to the extent of **Rs.1.8 Million** from Danish Government for constructing the building for World University Service Centre. This note-worthy diplomacy in securing grants humbled the then Chief Minister of Tamil Nadu, Thiru. AnnaDurai and the C.M. was pleased to donate the land upon which the World University Service Centre stands today at Chetpet.

Prof.SRG became an elected member of American Physical Society, APS, even during 1948. He also became a member at IoP, Institute of Physics, London In 1952.

The Canadian International Development Agency, came forward to give 4 million dollars to meet the cost of hundred of projects in his District, including rehabilitation of mothers and discharged patients from mental hospitals. Free **Polio drop campaign** was initiated in our state with the help of **Canadian Government** under the leadership of SRG.

**A moment to feel proud to know how our DG Vaishnav College is intricately bound with many many human welfare schemes!!**

**Case of affiliated Colleges having a Department, that University did not have, though it awarded the Degree**

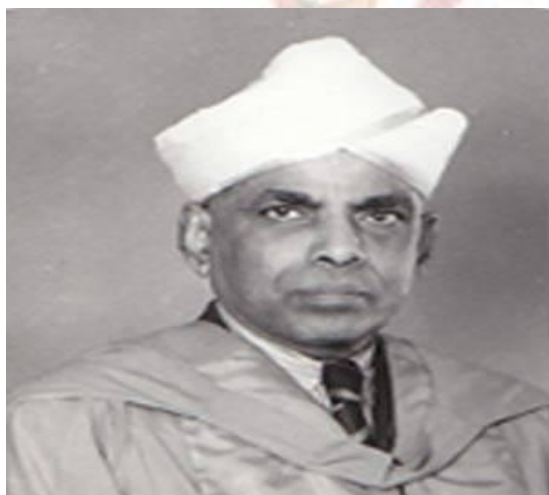
Many of the affiliated Colleges of University of Madras - Pachaiyappa's College, Presidency College, Madras Christian College and Loyola College had Physics Department for years, though our University did not have one for a long time!! (till 1952)

**My Student is more precious than my Nobel prize!**

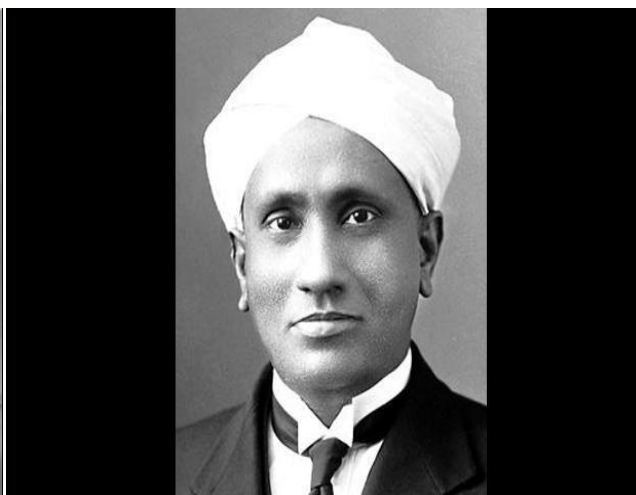
It was during the period of the great academician Dr.Lakshmanasami Mudaliar as Vice Chancellor of University of Madras, he felt the necessity to start Physics Department in our University. He approached Sir.CV Raman, Physics Nobel Laureate, who was then in Bangalore to shift to Madras University. Due to his academic and research commitments, Sir CV Raman could not accept this invitation. He suggested the name of his beloved student and a genius Prof.G.N.Ramachandran, whom his teacher Raman felt is more precious than the Nobel prize!

Ramachandran is credited with establishment of the Department of Physics (Currently Centre for Advanced studies in Crystallography and Biophysics) at the University of Madras in 1952. (Science Reporter May 2013 and

<http://www.vigyanprasar.gov.in/scientists/gnramachandran%20.htm> )



*Sir A. Lakshmanaswami Mudaliar*



*Sir C.V. Raman*

**Great minds who sowed the seed for Madras to gain a place in the map of  
International Physics Research**

Can you believe that the Department of Physics, University of Madras was first located in a single room of the main building in Marina beach?

The Department was started with two faculty members. Prof. Alladi Ramakrishnan (courtesy - <http://www.krishnaswami-alladi.com/old-website/tps/>), expert in theoretical Physics was the first to join this Department in April, 1952.

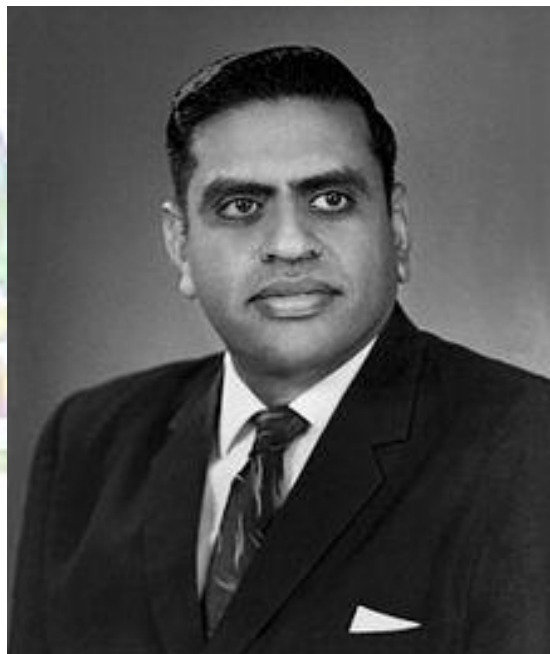
Prof. GN Ramachandran, joined in October, 1952 as an experimentalist.

Prof. GNR's lab was located at AC Tech campus, **Guindy, a suburb of Madras.**

<http://www.vigyanprasar.gov.in/scientists/gnramachandran%20.htm> )



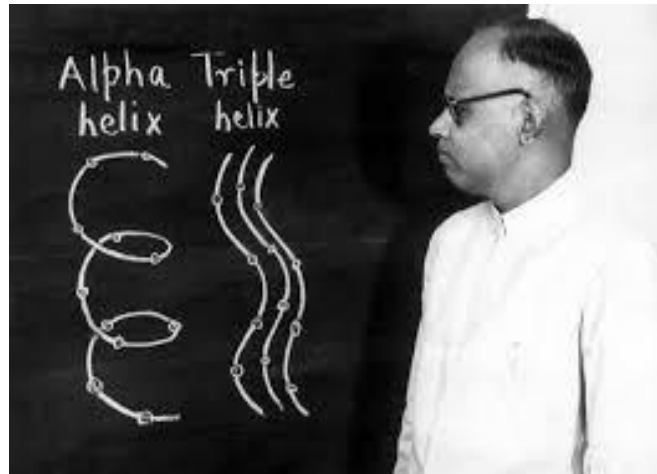
*Prof. GN Ramachandran*



*Prof. Alladi Ramkrishna*

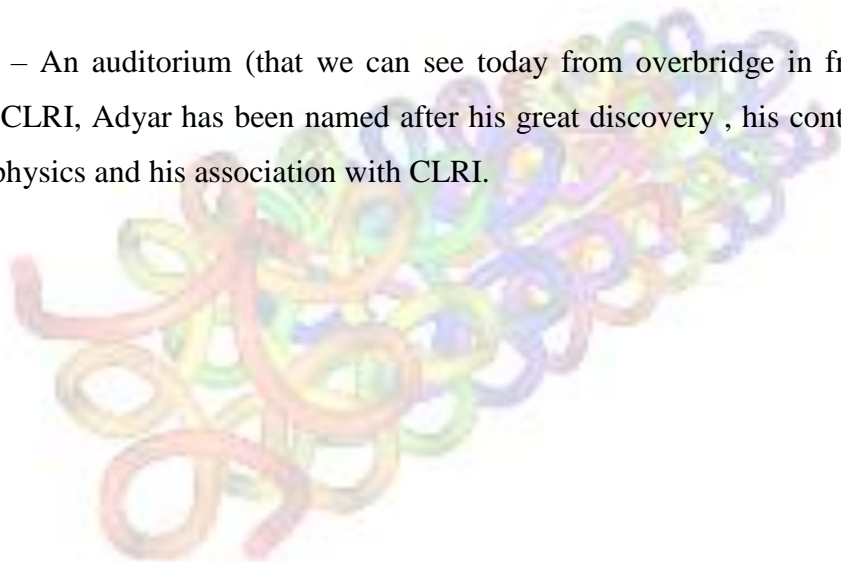
**Can you believe this?**

Madras University was formally awarding Ph.D. Degrees for research works done at Indian  
Institute of Science, IISc, Bangalore initially!



Have you ever noticed **Triple Helix** , an auditorium in CLRI , that we can see today from  
overbridge in front of Cancer Hospital ?

**Triple Helix** – An auditorium (that we can see today from overbridge in front of Cancer Hospital) in CLRI, Adyar has been named after his great discovery , his contribution to the world of Biophysics and his association with CLRI.





## Good old Student Days in Olden times at Madras University



Prof.Alladi Ramkrishna with students of Theoretical Physics

Picture Courtesy - <http://www.krishnaswami-alladi.com/old-website/tps/>



**Let us remember the great men who changed the face of Madras through their great scientific contribution and made the world turn towards us!!**

**Prof Nayudamma** —He served as the Director of CLRI, Guindy during 1958-1971. Under his leadership, CLRI emerged as one of the most renowned centres of leather research. He ensured that the CLRI has an effective liaison with the leather industry thereby leveraging significant contributions in research & development and technology transfer. He was instrumental in the formation of Indian Hides and Skins Improvement Society, Indian Leather Fair Society, the Leather Club and the Coromandal Chemicals for promoting the interests of the tanners in India.

**What a futuristic thought ! – No wonder he was called as People’s Scientist**

Prof Nayudamma introduced the Adoption of Backward District’s Programme for changing the face of underdevelopment through the application of science and technology. He had established the “**Centre for Development Alternatives**” in Madras with the aim to evolve alternative development models and technologies relevant for Agro-based industries and other rural economical activities.



***The People’s scientist Nayudamma - “Be a Sport, you will get your chance.”***



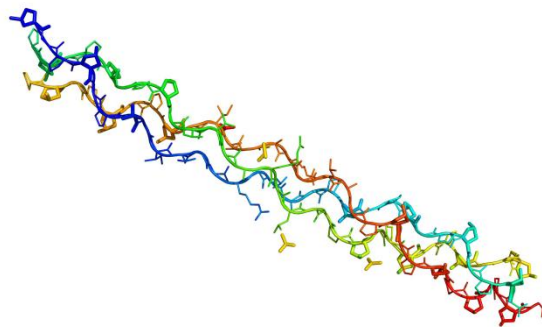
## Kangaroo tail travels to Madras

For his work on collagen, Prof GNR approached CLRI, Central Leather Research Institute that was newly formed then next to his campus. The then Director of CLRI, Prof.Nayudamma provided Prof.GNR with Kangaroo tail tendon from Australia, as CLRI was working on research areas of similar interest between the two countries.

Prof. GN Ramachandran began his work on modeling collagen from fiber diffraction in 1952 - 53 when J.D. Bernal, a pioneer in X-ray crystallography, visited him in Madras and suggested that the collagen structure was one of the greatest unsolved problems. Nobel laureate Prof. Linus Pauling (of vitamin C & Alpha Helix fame) had proposed a structure for collagen while other Nobel Prize winners such as Sir Lawrence Bragg (X-ray diffraction) and Francis Crick and James Watson (DNA double helix) were trying to crack the collagen molecule. However, in 1954, it was our **Ramachandran arrived at the triple helix model of Collagen** ( a kind of protein).

This is such a breakthrough work, that till date it has its applications in the field of Biotechnology. Unfortunately, he missed Nobel prize for his great work, though he was nominated.

<http://www.thehindu.com/2001/04/30/stories/13300788.htm>





**Anna Mani, the iron lady - who was instrumental in designing instruments in independent India!**



Anna Mani was the seventh of eight children in her family. During her childhood, she was a voracious reader. She was impressed by Gandhian thoughts. Inspired by the nationalist movement, she took to wearing only khadi garments. She wanted to pursue medicine, but she decided in favour of physics because she liked the subject. **In 1939**, she graduated from the **Presidency College in Madras**, with a B.Sc Honors degree in physics and chemistry.

After graduation, she worked under Prof. CV Raman, researching the optical properties of ruby and diamond. She authored five research papers, but she was not granted a Ph.D. Her completed Ph.D. dissertations remain in the library of Raman Research Institute, indistinguishable from other bound dissertations. Madras University, which at that time formally granted degrees for work done at the Indian Institute of Science, claimed that Mani did not have a M.Sc. degree, and therefore could not be granted a Ph.D. Then she moved to Britain to study physics, but she ended up studying meteorological instruments at Imperial College London. **Anna Mani** represents the confluence of the modernising aspects of science, nationalist, and gender ideologies. She is a success story to which few women (or men) could aspire. She transcended the delimited cultural and physical spaces available to her and created not only a room of her own, or a laboratory of her own, but also a whole workshop, a mini-factory of her own. In the industrial suburbs of Bangalore, Mani headed a small company that manufactures instruments for measuring wind speed and solar energy.

C-WET (Centre for Wind Energy and Technology) library at Pallikaranai, Chennai has been named as **Prof. Anna Mani information Centre**. After returning to India in 1948, she joined the Meteorological department in Pune. She retired as the deputy director general of the Indian Meteorological department in 1976. She worked on several projects on harnessing wind energy and believed that the development of wind and solar energy in India required detailed knowledge of solar fluxes and wind patterns in different regions of India.

Abha Sur, Resonance, November, 2008 & [https://en.wikipedia.org/wiki/Anna\\_Mani](https://en.wikipedia.org/wiki/Anna_Mani)  
& <http://www.thehindu.com/2001/10/14/stories/1314078b.htm>

"In an age when most women didn't make it past high school, would it be possible for an Indian woman to obtain a Ph.D. at one of America's finest public universities and also make seminal contributions to her field?"



*Janaki Ammal, the pioneering Botanist, cytogeneticist*

Janaki Ammal was arguably the first woman to obtain a Ph.D. in botany in the U.S. (1931), and remains one of the few Asian women to be conferred a D.Sc. (honoris causa) by her alma mater, the University of Michigan. She is best remembered for co-authoring the monumental work, "Chromosome Atlas of Cultivated Plants."

Janaki Ammal obtained the bachelor's degree from Queen Mary's College, Madras and an honours degree in botany from Presidency College, Madras in 1921. Under the influence of teachers at the Presidency College, Ammal acquired a passion for cytogenetics. Ammal taught at Women's Christian College, Madras with a sojourn as a Barbour Scholar at the University of Michigan in the US where she obtained her master's degree in 1925. Returning to India, she continued to teach at the Women's Christian College. After her doctorate Janaki returned to India to take up a post as Professor of Botany at the Maharaja's College of Science, Trivandrum. She worked for a brief period at the BARC before settling down in Madras in November 1970 as an Emeritus Scientist at the Centre for Advanced Study in Botany, University of Madras.

<http://www.thehindu.com/sci-tech/agriculture/sugarcane-and-janaki-ammal/article6503564.ece>

<http://scroll.in/article/730186/remembering-dr-janaki-ammal-pioneering-botanist-cytogeneticist-and-passionate-gandhian>

## **The Great Trigonometrical Survey of India starts at a hillock in Madras**

After capturing vast Bengal and Srirangappattinam, they needed geography of India for all their activities (for revenue, military needs mainly) to rule the vast area!

British surveyor William Lambton, a geographer helped Britishers to understand the topography of our country and began The Great Trigonometrical Survey of India.

He started this mega project at St.Thomas Mt., Madras (Pirungi/ Bringi malai originally, transformed to Parangi malai) on 10 April 1802. The flat plains with this hill at the north end and Perumbauk hill at the southern end served as his baseline!

<http://www.frontline.in/static/html/fl1909/19090660.htm>  
[http://www.new1.dli.ernet.in/data1/upload/insa/INSA\\_1/20005b5b\\_22.pdf](http://www.new1.dli.ernet.in/data1/upload/insa/INSA_1/20005b5b_22.pdf)

### **St.Thomas Mt. helps Mt.Everest to gain its position :)**

The Great Trigonometrical Survey of India started at St.Thomas Mt.in 1802 by William Lambton lasted for several decades. A 12km baseline at Madras later helped him form the Great Indian arc of the Meridian by forming more and more triangular areas and integrate them through triangulations. After the death of Lambton in 1823, his successors carried out the survey, which finally ended at Himalayas. This survey started in Madras helped to establish that Himalayas is higher than Andes (believed otherwise then). Mt.Everest gained its position as the highest point on earth!

### **Madras and Greenwich connect**

The Madras observatory on the banks of River Cooum at Nungambakkam served as Greenwich of India in earlier days. It started its work on meridian observation on 9, Jan, 1793 with its primitive instruments.

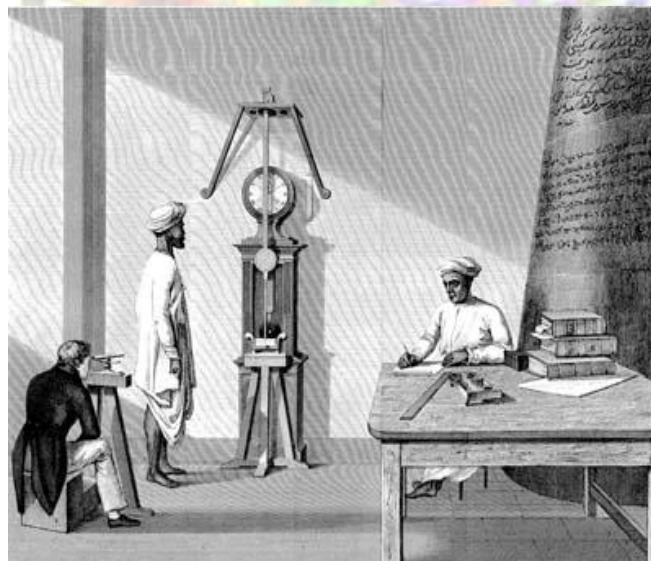
## The Madras Observatory

The Madras Observatory was (the first of its kind in India) established in 1792 to promote knowledge of astronomy, geography, and navigation in India by Sir Charles Okeley, the then Governor of Madras. The designer of the Observatory, Michael Topping, officiated as Astronomer until John Goldingham was formally appointed in 1794. The earliest formal meteorological observations were made there in 1793 and a register was maintained for the same, as well, a record of temperature measurements too. Hourly meteorological observations started in 1840. Madras observatory was issuing Madras Daily weather report from ( October 1893 ) and maintained records of storms. Madras observatory was supplying time signal too!!

The earliest astronomical observations made at Madras-

The longitude of Fort.St.George was determined by Thomas Howe in July, 1755 from the data collected from the eclipse of the first satellite of JUPITER.

Major Hirst observed the and recorded transit of Venus at Fort St.George in 1761



*Illustration of the measurement of the acceleration of gravity with an invariable pendulum in Madras by John Goldingham, 1821. JG with a telescope assessing the lags in the swings of Kater's pendulum against the pendulum of the Haswell clock. Thiruvengkatachari (his Second Assistant) is reading the clock; Shrinivasachari (his First Assistant) is jotting notes. (Source: Goldingham J, 1822, Philosophical Transactions of the Royal Society of London, 112, 127–170).*

[http://www.imdchennai.gov.in/mds\\_obsy.htm](http://www.imdchennai.gov.in/mds_obsy.htm) ; <http://adsabs.harvard.edu/full/1991JRASC..85..97A>

<http://madrasmusings.com/Vol%2022%20No%207/looking-back.html>

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### **CEG - College of Engineering**

Towards the end of the 18th Century as more land began to come under the East India Company rule, the need for surveying them to assess revenue grew. Due to the harsh climatic conditions, Indians had to be trained to conduct these surveys, which led to the establishment of the **Madras Survey School**. It was started on May 17, 1794, on the suggestion of **Michael Topping, the earliest astronomer and geographical and marine surveyor in Madras**. The school was the first of its kind in the country.

This survey school began in Fort St. George. There were no instruments or ways to survey the land back then. The British needed the locals to learn these techniques to help them in their work. The first batch of surveyors were then taken in as apprentices of the East India Company for about seven years. From 1836 to 1846, the surveyors who had passed out of this school were given higher posts in an office that later became the city's Public Works Department (PWD).

Owing to the demand for civil engineers at that time, the school, though recognised as early as 1842, became the Civil Engineering College around 1860 and the campus was shifted to Kalasmahal, the palace of the Nawab of Carnatic in Chepauk. The first department, on the authorisation of the Government, was started in 1861. Commissioned officers and civilians began to be trained as engineers.

The college evolved into a primary technical institution in the Madras Presidency and came to be called as College of Engineering (CEG) in 1894.





Due to the lack of space, College of Engineering CEG moved out from Chepauk to a site south of the Adyar River and Guindy Park. This land of 200 acre or more was less than two miles from the Saidapet Railway station. So, in 1920, the College of Engineering moved to its present location, the oldest part of which is now popularly referred to as the 'red building' or the dean's office. It was started by first Indian principal Nagarathnam Iyer in 1925. The CEG was an independent college till 1978, after which it became the principal seat of the Anna University. The survey school that was started with eight students in a building near Fort St. George by Michael Topping in 1794, thus became the Civil Engineering School and was then rechristened as College of Engineering.

<http://www.thehindu.com/features/metroplus/survivors-of-time-college-of-engineering-guindy/article2671458.ece>

<http://ceg.annauniv.edu/history.html>



The first Superintendent of the Madras Observatory (MO), John Goldingham, a shining scientist. Goldingham was appointed the first designated Astronomer of the MO in 1802. Born in London in 1767, he was hired by Michael Topping as his deputy in 1788. Goldingham was a trained mathematician, who was equally proficient in astronomy and engineering. Goldingham was directed to build the observatory in Madras in 1792 because of his civil engineering skill. He became the Presidency's Civil Engineer in 1800. He headed the Madras Survey School, which subsequently grew into the Madras Engineering College, Guindy. He died in 1849. Goldingham made the earliest formal meteorological observations at the MO in 1793. He established a register at the Observatory to record detailed long-term barometric-atmospheric pressure readings. The data are available for 1796-1843. Goldingham maintained this register until 1825. Goldingham obtained barometric-pressure readings at sunrise, 1000 h, 1200 h, 1400 h, and at sunset every day. From these data, he calculated daily mean and monthly values of pressure corrected to temperature using the thermometer connected to the barometer. Additional notes included in this register refer to occurrences and strengths of storms in 1796-1821. For example, the register has details of low-atmospheric pressures that occurred in May-June 1813, October 1818, and in May 1820. The Madras Observatory became internationally known for its general star catalogues published in two volumes by Goldingham.

**<http://madrasmusings.com/Vol%2022%20No%207/looking-back.html>**

## **Madras time**

A particularly significant contribution Goldingham made while at the MO was ascertaining the 'time' for India in relation to Greenwich Mean Time (GMT). Goldingham established the longitude of Madras in 1802 as 80°18'30" east of the Greenwich Meridian. Consequently, the MO's clock supplied the standard time for the whole of India. At 2000 h every day, a gun fired to announce that all was well with the standard time. The clock at the MO was directly connected to the gun and triggered its firing.

Indian Standard Time (IST) is the time followed at present throughout India, 5½ hours ahead of GMT. IST is calculated on the basis of an 82.5°E longitude from a clock tower in Mirzapur (near Allahabad). During the British period, India followed four different time schemes: for instance, in relation to time in Madras, the Bombay Presidency operated 49 min behind, the Calcutta Presidency operated 21 min in advance, and the Andaman Islands [Port Blair] operated 49 min 51 sec in advance. Goldingham in 1802 established Madras Time as GMT+05.30 h. Madras Time was then nominated to represent 'Indian Mean Time', then an 'unofficial' standard. Madras Time was later chosen as the 'Railway Time', enabling coordination of train timetables throughout India, because other areas followed their own time constructs. For instance, during the International Meridian Conference held in Washington D.C. in 1884, India had two distinct time zones: Bombay time and Calcutta time. On January 1, 1906, Indian Standard Time (IST) was established. Nevertheless, the other time zones continued until India's independence in 1947.

P.S: Kater ( Kater's Pendulum) and Madras connection – a beautiful read

<http://madrasmusings.com/Vol%2022%20No%207/looking-back.html>

## Astronomer from Madras



***Chinthamani Ragoonatha Chary***

**Chinthamani Ragoonatha Chary** (1822 or "17 March" 1828 – February 5, 1880) was an Indian astronomer who worked at the Madras Observatory along with N.R.Pogson. He was the first Indian Fellow of the Royal Astronomical Society and is known for his studies of variable stars and the discovery of *R Reticuli* in 1867. Chary's ancestors were Hindu astronomers who prepared Hindu astrological almanacs called *Panchangams*. He lived in Nungambakkam and joined the Madras Observatory in 1840 as a *coolie* under T. G. Taylor. In 1874, Chary wrote a treatise on the transit of Venus which was published in several local languages. He was the first Indian in modern history to make a significant astronomical discovery. Chary noted that the star which was observed by astronomer T. Moottooswamy Pillai with a Meridian Circle on February 9, 1864 was not visible when observed in January 1866 but could be spotted on January 18, 1867.

*Exerpts from Dr.K.V. Thiruvengadam on childhood in Royapuram, the practice of medicine in the last century and the unique doctor-patient bond*

In North Madras where I was born, the only recreation we had at hand was the Royapuram beach, where we would watch ships drop anchor and set sail again; coming in less than a mile out, close enough for us to read their names. This continued till the 1950s, when the Port Trust took over the area.

On a rainy full moon night in 1942, a lone Japanese bomber began to approach the Sivaswamy Bridge, skilfully making it past the barrage of bullets from the anti-aircraft guns. The lights had gone off all over the city, but the bomber could be seen, diving straight for the harbour. It dropped the bomb, but missed its target.

The schools in the North were modest, though the standard of English taught there was usually very high. I studied at the Muthialpet High School. In fact, the reading of *A Tale of Two Cities* moved more than a few of us to tears.

### **A 'clinical sense'**

The practice of medicine in the early part of the last century was largely in the hands of LMPs — a title you acquired after a modest course, nowhere nearly as thorough or rigorous as a degree in medicine. But, most of their sign boards proclaimed 'Physicians', or 'Surgeons'. There were no facilities for sophisticated investigations to diagnose illnesses; so it was to the smell, sight and behaviour of disease that we turned. Essentially, we used what could be termed a 'clinical sense'.

Physicians prescribed medication based on their experience, and not merely the evidence. There were only two places you could get an X-ray taken — one on Poonamallee High Road, and the other on Edward Elliotts Road. But, it could be said that we managed pretty well with such limited resources.

Teaching medicine, at a time with no audio-visual aids, was also very different from what it is now. Some of our professors would actually enact the symptoms of various diseases before us — the tremors, the gait, the deformities, everything. A significant initiative that was taken to integrate various schools of medicine and therapy, to bring them together and study them holistically, was the Kilpauk College of Integrated Medicine. It was a radical new way of looking at medicine. The college made way for the Kilpauk Medical College in 1960.

### **THE ENTRY OF ANTIBIOTICS**

It was somewhat late into the Second World War that antibiotics such as penicillin first reached Madras. Around 1949, I remember the professor of medicine at Stanley cautiously bring out a minuscule vial of chloromycetin, the drug for typhoid, handling it with something approaching reverence. Some of the most significant lessons in medicine for a doctor came from the general wards of Government hospitals. The patients there had no recommendation letters or gifts, only their sacred trust in your abilities. Most of the time, once they were discharged, they would have no money to return to their villages. So, a few of us would collect money to send them home. We didn't have to go looking to treat the poor in slums; the slums came to us.

*(As told to CHITHIRA VIJAYAKUMAR);*

<http://www.thehindu.com/features/metroplus/memories-of-madras-a-legacy-of-healing/article645909.ece>



In 1906 Ramanujan joined Pachaiyappa's College, Madras. His aim was to pass the First Arts examination which would allow him to be admitted to the University of Madras. He attended lectures at Pachaiyappa's College, but became ill after three months study. He took the First Arts examination after having left the course. He passed in mathematics but failed all his other subjects and therefore failed the examination. This meant that he could not enter the University of Madras. In the following years he worked on mathematics developing his own ideas without any help and without any real idea of the then current research topics other than that provided by Carr's book.

Continuing his mathematical work Ramanujan studied continued fractions and divergent series in 1908. At this stage he became seriously ill again and underwent an operation in April 1909 after which he took him some considerable time to recover. He married on 14 July 1909 when his mother arranged for him to marry a ten year old girl S Janaki Ammal. Ramanujan did not live with his wife, however, until she was twelve years old.

Ramanujan continued to develop his mathematical ideas and began to pose problems and solve problems in the Journal of the Indian Mathematical Society. He developed relations between elliptic modular equations in 1910. After publication of a brilliant research paper on Bernoulli numbers in 1911 in the Journal of the Indian Mathematical Society he gained recognition for his work. Despite his lack of a university education, he was becoming well known in the Madras area as a mathematical genius.

In 1911 Ramanujan approached the founder of the Indian Mathematical Society for advice on a job. After this he was appointed to his first job, a temporary post in the Accountant General's Office in Madras. It was then suggested that he approach Ramachandra Rao who was a Collector at Nellore. Ramachandra Rao was a founder member of the Indian Mathematical Society who had helped start the mathematics library. He writes in [30]:-

A short uncouth figure, stout, unshaven, not over clean, with one conspicuous feature-shining eyes-walked in with a frayed notebook under his arm. He was miserably poor. ... He opened his book and began to explain some of his discoveries. I saw quite at once that there was something out of the way; but my knowledge did not permit me to judge whether he talked sense or nonsense. ... I asked him what he wanted. He said he wanted a pittance to live on so that he might pursue his researches.

Ramachandra Rao told him to return to Madras and he tried, unsuccessfully, to arrange a scholarship for Ramanujan. In 1912 Ramanujan applied for the post of clerk in the accounts section of the Madras Port Trust. In his letter of application he wrote [3]:-

I have passed the Matriculation Examination and studied up to the First Arts but was prevented from pursuing my studies further owing to several untoward circumstances. I have, however, been devoting all my time to Mathematics and developing the subject.

Despite the fact that he had no university education, Ramanujan was clearly well known to the university mathematicians in Madras for, with his letter of application, Ramanujan included a reference from E W Middlemast who was the Professor of Mathematics at The Presidency College in Madras. Middlemast, a graduate of St John's College, Cambridge, wrote [3]:-

I can strongly recommend the applicant. He is a young man of quite exceptional capacity in mathematics and especially in work relating to numbers. He has a natural aptitude for computation and is very quick at figure work.

On the strength of the recommendation Ramanujan was appointed to the post of clerk and began his duties on 1 March 1912. Ramanujan was quite lucky to have a number of people working round him with a training in mathematics. In fact the Chief Accountant for the Madras Port Trust, S N Aiyar, was trained as a mathematician and published a paper On the distribution of primes in 1913 on Ramanujan's work. The professor of civil engineering at the Madras Engineering College C L T Griffith was also interested in Ramanujan's abilities and, having been educated at University College London, knew the professor of mathematics there, namely M J M Hill. He wrote to Hill on 12 November 1912 sending some of Ramanujan's work and a copy of his 1911 paper on Bernoulli numbers.

Hill replied in a fairly encouraging way but showed that he had failed to understand Ramanujan's results on divergent series. The recommendation to Ramanujan that he read Bromwich's Theory of infinite series did not please Ramanujan much. Ramanujan wrote to E W Hobson and H F Baker trying to interest them in his results but neither replied. In January 1913 Ramanujan wrote to G H Hardy having seen a copy of his 1910 book Orders of infinity. In Ramanujan's letter to Hardy he introduced himself and his work [10]:-

I have had no university education but I have undergone the ordinary school course. After leaving school I have been employing the spare time at my disposal to work at mathematics. I have not trodden through the conventional regular course which is followed in a university course, but I am striking out a new path for myself. I have made a special investigation of divergent series in general and the results I get are termed by the local mathematicians as 'startling'.

Hardy, together with Littlewood, studied the long list of unproved theorems which Ramanujan enclosed with his letter. On 8 February he replied to Ramanujan [3], the letter beginning:-

I was exceedingly interested by your letter and by the theorems which you state. You will however understand that, before I can judge properly of the value of what you have done, it is essential that I should see proofs of some of your assertions. Your results seem to me to fall into roughly three classes:

- (1) there are a number of results that are already known, or easily deducible from known theorems;
- (2) there are results which, so far as I know, are new and interesting, but interesting rather from their curiosity and apparent difficulty than their importance;
- (3) there are results which appear to be new and important...

Ramanujan was delighted with Hardy's reply and when he wrote again he said [8]:-

I have found a friend in you who views my labours sympathetically. ... I am already a half starving man. To preserve my brains I want food and this is my first consideration. Any sympathetic letter from you will be helpful to me here to get a scholarship either from the university or from the government.

Indeed the University of Madras did give Ramanujan a scholarship in May 1913 for two years and, in 1914, Hardy brought Ramanujan to Trinity College, Cambridge, to begin an extraordinary collaboration. Setting this up was not an easy matter. Ramanujan was an orthodox Brahmin and so was a strict vegetarian. His religion should have prevented him from travelling but this difficulty was overcome, partly by the work of E H Neville who was a colleague of Hardy's at Trinity College and who met with Ramanujan while lecturing in India.

Ramanujan sailed from India on 17 March 1914. It was a calm voyage except for

**<http://www.ramanujanmuseum.org/aboutramamujan.htm>**