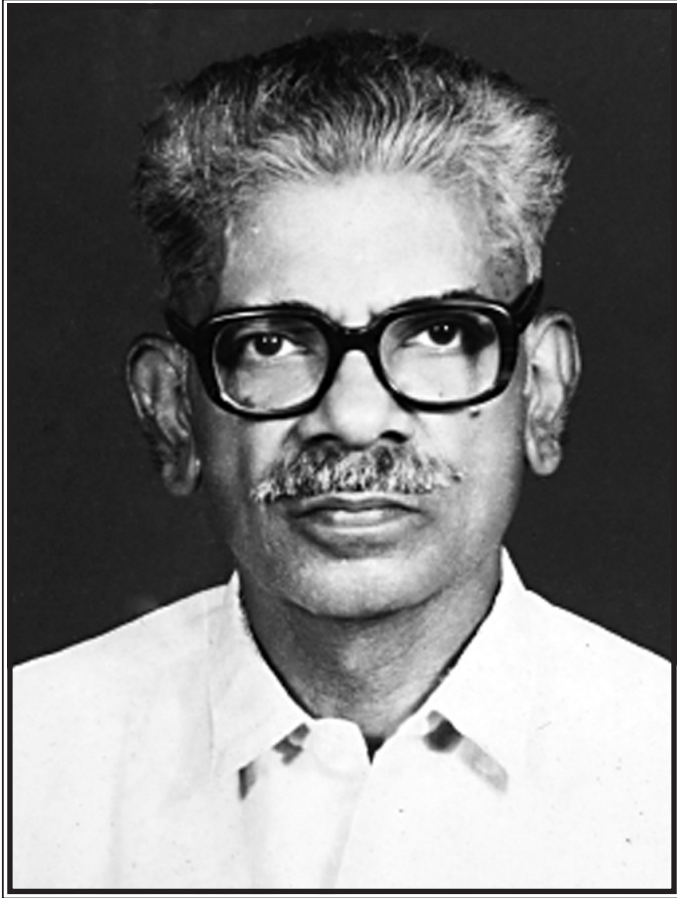


APPAJI GILBERT SATHYANESAN

(03 October 1926 – 05 August 2013)



A. P. [Signature]

APPAJI GILBERT SATHYANESAN (1926- 2013)

Elected Fellow 1982

FAMILY BACKGROUND

APPAJI GILBERT SATHYANESAN was born on the 3 October 1926 at Neyyoor in the erstwhile Travancore State. He was the fifth child in the family of 5 sons and one daughter. His father, Mr. Job Thangiah Sathyanesan was a teacher in an English High School. His mother, Mrs. Agnes Sathyanesan was a home maker. Young Sathyanesan married Jayantha Emoni Evans (Parassala, Kerala) on 17-10-1957, the daughter of Mr. Sam Evans, an educationist who founded a group of schools. They were blessed with two sons. The elder is Mr. Job Evans Sathyanesan, an officer in Union Bank of India who married Mrs. Mahil Vidhya Ebalin, a teacher. The younger is Mr. Arun Prakash Sathyanesan, an agriculture executive. His wife Mrs. Latha Joseph is also a teacher. Each of them has two sons. Jayantha Emoni passed away on 21 September 1993 after brief illness. It was a personal shock to Dr. Sathyanesan, as he had narrated to me fond memories of her. He remembered how she taught him preparing curries, particularly fish curry, if ever she had to go away. Soon he recovered bravely, looked after his family and continued with his mundane activities till his death on 5 August 2013.

The family background and his relatives had greatly influenced his character and personality, as he had revealed later. Dr. Sathyanesan's maternal grandfather was Dr. Manuel, a missionary doctor. Those days when doctors and hospitals were rare and women did not prefer to be examined by male doctors, his grandfather trained his grandmother as nurse and midwife to attend to the village women in distress. His paternal grandfather was district magistrate in the service of the Travancore Maharaja. He had won several awards from the Maharaja Moolam ThirunnaI who was allowed full salary as pension after retirement. His grandmother was a kind and highly motivated women with social concern in serving the poor and needy. She used to collect run-away village boys doing petty jobs in the town eating whatever they get and sleeping in shop verandah. She provided living space and cooking facilities. She guided them with motherly love, taught them basic cooking and made two of them cook every day alternatively, for others. She made them not to eat or sleep outside. They felt secure and safe. They were provided sealed boxes to save their money. She arranged get together with their parents. The grown up boys were given training in workshops, factories, handicraft centres, and in carpentry and masonry works so that they could learn a trade and establish themselves. This was found to be a great success. Dr. Sathyanesan saw all these happening before him and

inculcated these qualities of serving the hapless and poor during his career and post retirement years. In Tamil, 'Sathyanesan' means great lover of truth or man of truth. He stood to practicing truth all his life, in spite of adversities of every kind.

EARLY SCHOOLING AND UNIVERSITY EDUCATION

Dr. Sathyanesan had his primary and upper primary education (Standard I to VIII) in Munnar High School, Munnar (1932-40), and secondary school education (Standard IX to XI) in St. Joseph's High School (1941-43) in Trivandrum of the erstwhile Travancore state (now in Kerala). He remembered his school days, 'we had good amount of extracurricular activities, both on sports and academic side. So we had more contact hours with the teachers. There were both foreign and Indian teachers and each one excelled the other, and could be taken as ideal models'.

He completed his intermediate course in Scott Christian College, Nagercoil during (1944-46). He had his university education in Annamalai University, Chidambaram. He joined B.Sc course with Zoology and Botany (1946-48) and won the Founder's Zoology Prize for standing first in Zoology. He passed B.Sc. (Honours) in Zoology (1949-51) with distinction. He took his MA in Zoology in 1952 and M.Sc. by research in 1954 from the same university. The research course was supported by the ICAR Assistantship.

In Annamalai university department of Zoology, he came under the magic spell of Prof. RV Seshaiya, FNA who shaped his future academic career. It was he who introduced Dr. Sathyanesan to Endocrinology which formed the base of his future research career. He remembered his 'Guru' fondly. 'Prof. Seshaiya was a simple person, very considerate, well-read versatile scholar, and a teacher-par excellence. He solved personal problems of the students, built a *Gurukul* system. Those days very few opted for university studies. Every week end and on holidays, he took his students for field study to Porto Novo (Parangipettai), where Vellur river joins the Bay of Bengal. It had a rich estuarine and marine fauna. He brought plankton collections from the sea, demonstrated to students, identified different microorganisms and larvae and made slides out of them. He used to come early to the laboratory and left late. Whenever he wanted to show something new to the students, he called them from the hostel, irrespective of time. He was a rare role model to emulate. Prof. Seshaiya was the founder father of the Centre of Advanced Study in Marine Biology. When Sathyanesan was a student in late 1950s, Professor Seshaiya purchased few acres of casuarina forest in the outskirts of Porto Novo close to the estuary with an old British-built guest house for the university, from the municipality. This was the nucleus of the present Centre of Advanced Study in Marine Biology. The battle of Porto-Novo was fought between Robert Clive and Eire Coot at the site of the Institute and a memorial plate could still be seen there'.

No wonder, Dr. Sathyanesan imbibed these qualities of his Guru and practised them in his academic and personal life. I recall, he used to talk about his Guru with reverence whenever he got opportunities to us and went non-stop with his narration.

PROFESSIONAL CAREER

Soon after his university education in Annamalai, Dr. Sathyanesan took up the first teaching assignment in Andhra Christian College, Guntur, Andhra Pradesh for a brief period. In 1954, he joined Banaras Hindu University for Ph.D. under the guidance of Prof. AB Misra, D.Sc. (Oxford) in Department of Zoology, supported by a Govt. of India Manpower Development Fellowship (1954-57). His Ph.D. thesis entitled "studies on the reproductive cycles of some freshwater and their pituitary" was evaluated by authorities on the subject, Dr. Emil Witschi (USA) and Dr. GJ Van oordt (The Netherlands) who highly commended the work. About 17 years later after the award of his Ph.D. degree, he was awarded D.Sc. of BHU in 1974. The D.Sc. thesis entitled, "Studies on the hypothalamo-hypophysial neurosecretory complex of some fishes" was evaluated by acclaimed scientists in the subject Dr. JM Dodd (UK), Dr. M Gabe (France) and Dr. Howard A Bern, FNA (USA) who commended on the work greatly.

In 1957, Dr. Sathyanesan was appointed as Lecturer in Department of Zoology, BHU (1957-67). He was awarded a post-doctoral fellowship of the Population Council of the Rockefeller Foundation, New York (1962-66). He worked in Columbia University New York, Washington University Seattle where he taught Physiology as well, and in Wayne State University Detroit, USA. He returned to BHU and soon joined the Institute of Medical Sciences at the Surgical Research Laboratory (now the Centre of Experimental Medicine and Surgery) as Senior Research Officer (1967-81) and later Senior Scientist and Head of the Centre of Experimental Medicine and Surgery (1981-82). Later he returned to the Department of Zoology as Professor of Zoology (1982-86) and superannuated as Head of the Department (1984-86). After the retirement, he joined the Central Marine Research Institute of the ICAR, Ernakulam as CSIR Emeritus Scientist (1987-91).

AS A TEACHER AND SCIENTIST

Dr. Sathyanesan excelled as a teacher and research guide. He took special interest in teaching under graduate students and made all types of teaching models to create interest in learning. Students were allowed to clear their doubts. He took time to give special coaching before examinations both in theory and practical. Postgraduate students were given plenty of references for extra reading. He never went to lecture classes without adequate preparations.

Research was his passion. He believed teaching and research complemented each other. Dr. Sathyanesan used to come to the laboratory early and leave it late. He observed no vacation and holidays. He took difficult work as his own for investigation. He selected students from all over the country for research. He had a good collection of books and reprints in his library where his own students and students from outside come for referencing. He was very informal and available always to his students. After lengthy discussions, students were given the research problems in the beginning itself to save their time. They were encouraged to refer library and make collection of their reprints. When new ideas or techniques relevant to the research were discussed, these were incorporated. It was a mutual learning process. Students were given training in writing papers from the very beginning. He was responsible for organizing weekly seminars in Surgical Research Laboratory when the students had to present their findings or give talk on areas related to their research. They were exposed to the difficulties in publishing papers in standard journals from the beginning. Students would have few publications by the time they submitted thesis which helped them to compete and get good positions. He trained a number of students from other institutions in learning techniques and availing the facilities. Dr. Sathyanesan had guided 15 students for their Ph.D. in BHU. After retirement as CSIR Emeritus Scientist, he guided two more research students for Ph.D. We are proud of our teacher and for the sacrifices he made for our betterment.

AWARDS AND HONOURS

Dr. Sathyanesan had been associated with several scientific societies like Indian Science Congress, Indian physiological society, comparative endocrinology societies and so on. He served as experts in a number of committees, panels and boards of the Government bodies, universities, research institutes and colleges, and also served as peer reviewer for national and international journals. He was honored with the Hari Om Ashram Trust Award of the ICAR in 1976. In 1982 he received Dr. SL Hora Memorial Award of the Indian society of Ichthyologists. He was elected as a Fellow of the INSA in 1982. In 1985, he was awarded the Rafi Kidwai Memorial Prize. In 1988, he conferred the Eminent Zoologist Medal by the Zoological Society of India.

SCIENTIFIC CONTRIBUTIONS

Dr. Sathyanesan was one of the pioneers who laid the foundation for Comparative Endocrinology in India. He started his research career with the study of annual reproductive cycle of Indian freshwater fishes and demonstrated the pituitary control of fish gametogenesis. He showed elegantly correlative changes in pituitary gonadotropes and stage-specific changes in the gonads. The comparative studies of the pituitary glands had shown that in certain fishes (*Clupeiformes*, eg. *Hilsa*), the embryonic oropharyngeal duct persisted in the adults, as an open channel between the buccal cavity and pituitary. He had reported it in a primitive marine

teleost *Megalops cyprinoides* in 1992. These deviations in the development of the pituitary can be a good model system for direct interaction of water-borne ions with pituitary cells (prolactin and ACTH cells) concerned with the regulation of osmoregulation.

The 'Master Gland' status of the pituitary was eroded since late 1930's and the brain (hypothalamus) acquired the status of the central regulator of the pituitary and peripheral endocrine glands through integrating inputs from the external and internal environments. Dr. Sathyanesan was one who sensed this paradigm change and shifted the focus of research to the brain neurosecretory system in fishes in relation its regulatory role on the pituitary. During the 4 years' postdoctoral research tenure in the USA, he initiated research on the hypothalamo-hypophysial neurosecretory system of rare primitive cartilaginous and bony fishes, a wide gap that was unfilled in comparative neuroendocrinology of lower vertebrates.

He joined the laboratory of Prof. Aubrey Gorbman, the doyen of Comparative Endocrinology, first in Columbia University, New York and later in Washington University, Seattle. He spent one summer at the Friday Harbor Marine laboratory in the San Juan Island, Washington in the Pacific close to Canada. I recollect his words that getting entry to the Harbor Station during the peak summer was very difficult and a mere chance. Here, he submitted a project to study the little known hypothalamo-hypophysial neurosecretory complex of the rare deep sea primitive chimaeroid fish *Hydrolagus colliei* (ratfish), endemic to that area of the Pacific and a deep sea marine teleost midshipman *Porichthys notatus*. He secured entry and began his work. The ratfish were found in bottom of the Pacific and trawling impacted their death and the intestine eviscerated. Dr. Sathyanesan instructed the trawling operators for gradual step-up trawling to avoid sudden change in air pressure. In this manner, he could get live fish on board for research. He conducted hypophysectomy on *Porichthys* on board in a make-shift lab, which was watched curiously by many including Dr. Grace E. Pickford and Dr. Libbie Henrietta Hyman, famous zoologists. He was one among the few who could do a successful hypophysectomy technique in fishes. The demonstration of the neurosecretory system and pituitary cytology in *Hydrolagus* are classic works and unchallenged even today. The next group of primitive fishes he investigated were the Holostean *Amia calva* and *Lepisosteus*, available only in the Great lakes and Chondrosteian *Acipenser fluvescens* (sturgeon) in the Pacific coast. This in view, he joined the laboratory of Dr. Walter Chavin, Wayne State University, Detroit.

On return to BHU, he continued the work on the hypothalamo-hypophysial neurosecretory system of many Indian teleost fishes. He masterly employed the *in situ* bulk staining technique, and simplified it, to demonstrate the three dimensional architecture of the system. Only a few in India know this technique, which I learnt from him. Those publications were rated by the journals as excellent contributions

and formed a part of his D.Sc. thesis. He dealt with in detail on certain finite features of the neurosecretory neurons, such as the CSF-contacting nature, relationship between ependymal tanyctes. The regenerative properties of the neurons and their ability to form a new neurohypophysis-like organ were elegantly shown in goldfish, *Porichthys and Rita*. These studies have remained novel work even today.

It has been widely believed that teleost fishes lack a conventional pituitary portal system like the tetrapod vertebrates and elasmobranchs and the function is taken over by direct innervation of the pituitary secretory cells. While investigating the neurosecretory system in teleosts, he came across capillary plexus reminiscent of primary capillary plexus of the median eminence of tetrapods and through elegant studies showed portal capillaries supplying the pituitary. He proposed that teleosts had tetrapod-like pituitary portal system along with the direct innervation of the gland. He had extensively studied the physiology of thyroid in fishes, especially on the heterotopic (ectopic) thyroids in mud eel and carps. He was one among the first to recognize the deleterious effects of water pollution and his later year research addressed the issue of environmental pollution and its toxic impact on fish life, reproduction and survival. He demonstrated the adverse impact of heavy metals, chemical fertilizers and pesticides on the endocrine and neuroendocrine physiology of fishes.

POST RETIREMENT ACTIVITY

The experience in Annamalai University changed his philosophy of life, he wrote to me. "The university had an organization called Social Service League. Those students and teachers who were socially concerned took part in its activities. While in B.Sc. in 1946, I joined a small group of 10 activists who visited every holiday hutments of Harijans. They lived in grass huts in small groups in the midst of vast paddy fields and worked for their upper caste masters who were the owners of the land. When we were walking towards them, they shouted 'swamy bhaste' It was a caution that we were untouchables and avoid going to them. It gave me a shock of my life. We used to spend the entire day, instructing and demonstrating to them how to keep the environment clean, dispose wastes, importance of cleanliness and personal hygiene, baby care, and so on. They were made to understand, if water was boiled and drunk and the flies were kept away, 60% of diseases could be prevented. They were made to believe that God had created all equal and it was man who made the caste system to benefit them. In order to demonstrate them, their wells were treated with bleaching powder, made tea in their vessels and food was shared with them. Those underprivileged could teach a lesson that unless they put their fingers into the mud, the privileged cannot put their fingers into the rice bowls. Every holiday, the activists went to different hamlets and never failed to pass on the message that all were born equal. The great satisfaction was that things had improved a lot and still there was scope for improvement."

This experience in mind, after retirement from the CSIR emeritus scientist tenure he settled down finally in Muttom, a beautiful fishing village 10km from Kanniyakumari with a view to serve the rural population. He started with awareness campaign about causes of diseases, basic medicare, cleanliness and hygiene, causes of pollution, importance of environment, growing trees, and so on. Habitual addicts were introduced to the addiction centre, many family disputes were solved. Awareness about the importance of biodiversity, environment pollution, global warming, ozone depletion, water conservation, growing trees and so on were brought about through audio-visual aids, meetings in villages, seminars in schools and colleges and writing in vernacular magazines and newspapers. Even after the death of his wife, he stayed in the village till 2008 when his health failed and could not live alone. At Muttom he had the misfortune to witness the devastating action of 'tsunami'. He was deeply involved in the rehabilitation work.

Due to illness, he changed his residence to Nagercoil and stayed with his son's family. Here he regularly contributed articles to Tamil journals to create awareness among people on various subjects. With the support of Dr. RR Daniel, FNA and local academicians belonging to all disciplines, he founded a registered academic society called Kanniyakumari Academy of Arts and Science (KAAS) to encourage younger generation to initiate research and publish papers. This academy is functioning well to fulfill his dream.

MY MEMORIES

Those who had come in contact with Dr. Sathyanesan would agree wholeheartedly that he was a simple, self-disciplined, honest, kind and straight forward human being. We had experienced his warmth and affection abundantly. Unfortunately, he was mistaken for his uprightness and frankness! He was always ready to help and apologized when he was wrong or if one thought one's feeling was wounded. He was a strict disciplinarian, punctual and transparent all along. He hated procrastination and forgetfulness. He practised 'Shramadhan' and respected manual labour. I remember an incident. In the laboratory, the storekeeper wanted to remove the top of an empty petrol drum to be used for keeping animal feed. The workshop assistant wanted to postpone the work that day due to lack of time. Dr. Sathyanesan appeared in the scene, took the iron cutting chisel and hammer from him and completed the work in 15 minutes. He had a beautiful garden without a gardener. He and his wife worked in it. He used spade and other implements very easily. Gardening was his hobby. He had not possessed a four wheeler though he had an international driving license. He used his bicycle throughout.

He was a man of strong will power and determination. He did not like excuses and wanted the work to be completed then and there. He used to say that whenever he went against his conscience he wouldn't get sleep. This forced him to put

dissenting note in meetings and selection committees. He had to pay for all these later. But truth prevailed finally. He maintained very cordial relationship with his subordinates and gave priority to solve their problems and certain cases he took himself to the authorities for redresses. The lower grade employees liked him so much. As an example, during the Class IV employees strike in the Institute of Medical Science when Dr. Sathyanesan started cleaning the animal house, they never allowed him to do that, instead they cleaned breaking the strike. When he came to BHU campus after retirement, he stayed with us and we witnessed a stream of visitors, his old colleagues and other employees meeting him and inviting him to his home.

He was an upright man and stood for truth and justice. When he was Professor in Department of Zoology and its Head, he was given charge of the B.Sc. admission work. He found many fake certificates produced by applicants. Not only the admission was denied to such applicants, but also he inquired into the source of such certificates and threatened the concerned authorities with criminal action. He was threatened by student leaders and goons but did not budge to them even an inch and confronted them, 'if you shoot me I will become a martyr'. Even today we remember this incident and the admissions were freed from the menace of fake documents for all time.

To us, he was a source of inspiration to work more like him and earn recognitions through hard work. He used to say, "there is no short cut in research, it is like 'tapasya'". He could be pleased only by hard work. Otherwise one had to face the fury which he displayed abundantly. Nothing could please him but beautiful slide preparations. On seeing them he would smile and explain what they revealed and the implications. We used to say he had eyes like a powerful camera that captured any unusual things that would be the theme of a paper. He was consulted by many doctors and teachers for his opinion on certain histopathological samples.

All his students have become professors and scientists in various institutions of fame in the country. Some of them have retired. We have tried to keep up his academic legacy to the best of our efforts and pass on the baton to the next generation of students who are also now professors and scientists in India and abroad. The fatherly affection was there when he invited us every year without any break for a Christmas treat!

LAST DAYS

Dr. Sathyanesan survived three heart attacks of which two were major, through his disciplined life and regular exercises. He had undergone cataract operations for the eye problem. Lately he suffered a paralytic attack which partially immobilized him. However, he recovered slowly and walked with the help of a walker for a while, but with his determination and will power, he could again walk on his feet. When I met

him the last at his son's house in Nagercoil, he was on foot and active as usual. We had lunch together and he saw me off! He was blessed with a beautiful handwriting but after the attack could not use his right hand for writing. As he told me later, he practised with his left hand for writing and could write legibly once again. Just before his death he had undergone a surgery for the hernia problem. He could recover the surgical trauma but by then the heart was weak and finally succumbed to the fate in the early morning of 5 August 2013. Even in adversities, his fighting spirit did not let him down!

ACKNOWLEDGEMENTS

I express my gratitude to Prof. DM Banerjee, INSA for inviting me to write this memoir of my mentor and revered teacher Dr. AG Sathyanesan, MA, M.Sc., Ph.D., D.Sc., Fellow of the INSA and former Professor and Head, Centre of Advanced Study, Department of Zoology, Banaras Hindu University. He had also provided materials for this write up. I record my deep appreciation and thanks to Prof. SK Saidapur, FNA for his involvement in deciding the assignment to me. I have had 37 years of long association with my mentor which itself had given me the needed inputs, through conversation during the research days, family meetings and letters. I felt myself lost and shocked when I received the telephonic call from his son Mr. Arun Prakash Sathyanesan on 5 August 2013 morning that his beloved father was no more. I acknowledge Mr. Arun's help in having the photograph and some valuable inputs about his father's last days.

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