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Prof. C.V. Subramanian, a doyen of Mycology in India - A dedication on his 90th Birthday*

D. J. Bhat¹ and B.P.R. Vittal²

¹128/1-J, Azad Housing Society, Curca, P.O. Goa Velha-403108, India

²B-16, Sivakami Flats, 25 Sivakamipuram Ist Street, Chennai-600041, India

Chirayathumadom Venkatachalaier Subramanian, affectionately referred to as CVS, is an internationally renowned and most distinguished mycologist of our country. We deem it a rare honour to present a brief profile on the life and work of this great personality on the eve of his 90th birthday, in Kavaka - the transactions of Mycological Society of India, founded by him in 1973.

EARLY LIFE AND EDUCATION

C.V. Subramanian was born on 11th August 1924 in Ernakulam, Cochin State (now Kerala). His father, C.M. Venkatachaliar, a lawyer and leader of the Cochin Bar, passed away when CVS was only 11. The young CVS was brought up and educated by his mother T.D. Parvathi Ammal, to whom he later dedicated the massive volume, '*Hyphomycetes*' (Subramanian, 1971a). CVS had his early education at Sree Rama Varma High School, Ernakulam (1931-1939) and Maharajah's College, Ernakulam (1939-1941). He did B.Sc. (Hons.) with a first class and first rank and M.A. from the Presidency College, Madras (1941-1944). CVS later joined the Madras University Botany Laboratory (UBL) to work for his Ph.D. Degree under the supervision of Prof. T.S. Sadasivan. He was awarded the Ph.D. Degree (1948) for his thesis on "Soil conditions and wilt diseases in plants with special reference to *Fusarium vasinfectum* Atk. on cotton". Subsequently he received the D.Sc. (1957) Degree from Madras University for his published work on "Floristic and taxonomic studies on Fungi Imperfecti".

PROFESSIONAL CAREER

Starting his career as a Senior Lecturer in Madras University in 1951 and promoted to a Readership in 1953, CVS successively held the post of Professor of Plant Pathology at the Indian Agriculture Research Institute (IARI), New Delhi (1958-60) and Professor & Head of the Department of Botany in the University of Rajasthan (1960-64). Subsequently, he moved to the University of Madras as Professor of Botany and later became Director of Centre for Advanced Study in Botany (1964-85), the post which he held until retirement.

Early in his career (1948-50), CVS was recipient of an ICI research fellowship of the National Institute of Sciences of India (now, Indian National Science Academy) which enabled him to carry out a detailed work on soil Fusaria. At that young age, he attended the VIIth International



Professor C.V. Subramanian

Botanical Congress in Stockholm in 1950 and visited several centres in Europe and discussed mycology with leading scientists. He did post-doctoral work on soil mycology, with S.D. Garrett, F.R.S., at the Botany School, Cambridge, and on taxonomic mycology with E.W. Mason, at the Commonwealth Mycological Institute, Kew, in the UK, during 1950-51.

MAKING OF A SCIENTIST

In his childhood days, CVS used to collect plants from the wild and raise them in the garden of his house, an exercise which was fondly encouraged by his mother. He loved the algae and when he was in the final Honours Course, he used to visit the University Botany Laboratory (or UBL) on Sundays to examine algae with guidance from his colleague K. Ramakrishnan. In fact, CVS wanted to work with M.O.P. Iyengar, the distinguished algologist and botanist. A trip to Krusadai Islands near Rameswaram in southern India further stimulated his interest on algae. CVS was greatly benefited from late Iyengar's guidance and advice as a botanist. Professor Iyengar used to call him home to show the algae on which he was working even after retirement. On one occasion, he said: "Subramanian, whatever the name you may give for your fungus, your description must be accurate". For B.Sc (Hons.), in the Presidency College, Madras, CVS did a small piece of dissertation work on the physiological anatomy of *Acanthus ilicifolius*, a common halophyte of the salt marshes of west coast of India. In a general sense, CVS is a passionate botanist.

*A detailed feature on Professor C.V. Subramanian was recently published by his students in *Current Science*, Vol. 106 (10): 1438-1444 (dated 25 May 2014), under section 'Living Legends in Indian Science'. The present write-up is an abridged version of the same article.

After graduation, on the advice of his teachers, Subramanian opted for mycology. Professor T.S. Sadasivan, Director of the University Botany Laboratory, Madras, took CVS as his first research student in 1944. On the suggestion of K.M. Thomas, the then Government Mycologist at the Agricultural College and Research Institute, Coimbatore, he was assigned a topic for research which focused on soil conditions and wilt diseases in plants with special reference to cotton. In a sense, working on soil-borne plant diseases, CVS began as a plant pathologist and subsequently developed into a mycologist. With him, plant pathology and mycology remained inseparable. He often used to tell us: the Stockholm International Botanical Congress and subsequent Botanical Congresses which he attended brought together botanists, mycologists and plant pathologists. He opined that the founding of the International Society of Plant Pathology (ISPP) and the International Mycological Association (IMA) are merely devices of convenience aimed at better communication and discussions among the communities. For him science, a quest for truth, is a big umbrella under which numerous branches evolved and grew. CVS always used to tell us, ...there is only one science and that says it all 'from smaller than the smallest to larger than the largest'.

SIGNIFICANT RESEARCH CONTRIBUTIONS

Subramanian's major contributions in mycology are on fungal floristics and taxonomy.

FUNGAL ECOLOGY

Subramanian's early researches were on soil mycology, i.e. (autecology) of *Fusarium oxysporum* f. sp. *vasinfectum*, a notorious cotton wilt pathogen, which caused devastating effect in cotton growing areas of Udumalpet in Tamil Nadu and other parts of India. He demonstrated that the fungus was an enduring facultative pathogen and competitive colonizer of substrates in soil. Controlling such pathogens is not an easy task. His studies on *F. lateritium* f. sp. *udum* and its recognition as a root inhabitant have relevance in the management of this soil-borne pathogen. His studies on soil Fusaria and elucidation of the 'wild type' in the genus *Fusarium* highlighted the dual phenomenon in conidial fungi. He published a series of papers on the occurrence and status of Fusaria in Indian soils (Subramanian, 1950a;b;c). Jointly with K. Natarajan (soil-inhabiting), B.P.R. Vittal, K Sudha (leaf-litter), S. Raghukumar (marine), and B.C. Lodha, K.V. Chandrashekara (coprophilous), CVS made significant contributions to our knowledge on fungal succession and floristics. His remarkable observation was that fungi appear on these substrates, depending on the availability and release of nutrients. Following colonization, substrates are degraded, for example, with solubles, cellulose, and finally lignin, in a succession. Jointly with M. Udayan, with S. Sankaran, and with J. Savitha, CVS studied the fungi growing in industrial effluents discharged from paper

industries, oil refineries and cooling towers and the possibility of using them in bioremediation.

FUNGAL FLORISTICS AND TAXONOMY: EXPLORATION OF NEW/INTERESTING TAXA

With knowledge of fungi, especially the conidial fungi, derived from examination of hundreds of type and other material housed at the herbarium of the Commonwealth Mycological Institute (CMI), Kew, in 1950 and later, CVS pioneered studies on hyphomycetes in India. Realizing the importance of studies on taxonomy, biology and distribution of tropical fungi and the application of knowledge gained from such study to human welfare, CVS carried out detailed investigations on diversity, distribution, ecology, and conservation of fungi of India and South East Asian countries, and elsewhere in S-E Asia, during the past six decades.

CVS collected fungi from varied habitats in the tropics and described numerous fungi and the major collecting localities of CVS and his students in India included the following: the Nilgiris, Pulneys, Bandipur, Thirumala and Nandi-hills and Chennai and Bengaluru in the Eastern Ghats and plains, Agumbe, Sampaje, Kodagu, Waynad, Palakkad, Silent Valley, Kalakkadu and Mundandorai in the Western Ghats in southern India, and Kumaon hills of Himalayas in northern India. In later years, he travelled extensively in south-east Asia and collected samples of fungi in Singapore, Malaysia, Thailand, Taiwan and Western Australia. Apart from exploration and inventorying for fungi, the discovery and description of over 130 new genera of hyphomycetous and coelomycetous conidial fungi and *Ascomycota* and many new species in these groups by CVS significantly strengthened our knowledge on the distribution and taxonomy of these fungi. The remarkable myco-diversity of the Western Ghats and Eastern Ghats in India and other areas in south-east Asia, as revealed by these studies, is a reflection of the diversity of fungus flora in the tropics. CVS is deeply indebted to H. Santapau, the distinguished botanist, who graciously rendered Latin translations of diagnoses of his new genera and species from 1952 onwards until his passing away.

CVS's pioneering work on exploration of hyphomycete flora of India resulted not only in the discovery and description of numerous new and interesting species of fungi but also eventually culminated in writing of the monograph *Hyphomycetes*, published by Indian Council of Agricultural Research in 1971. This volume was a prelude to his own and his students' numerous later such studies which together brought out a wealth of knowledge on fungi of India and further enthused several younger students on mycology and cemented a lasting connectivity with the second and third generation mycologists in India. The accuracy and the exhaustive synonymy are part of the work which is widely used by mycologists throughout the world to this day. Many

friends have been suggesting a revision of this work. CVS has been fittingly described by D.L. Hawksworth, former Director of International Mycological Institute, Kew, UK, in 2005 as “**the uncontested father of mycology**”. In this enduring work, CVS named several new genera and new species of fungi in Sanskrit which was considered as a novel and bold step. Many of his associates and students followed the trend which highlighted our ancient language, Sanskrit, at the global level. Some of the Sanskrit generic names proposed by CVS for fungi are the following: *Angulimaya*, *Ashtaangam*, *Bahusaganda*, *Bahusandhika*, *Bahusakala*, *Bahusutrabeja*, *Drumopama*, *Dwayabeeja*, *Dwayaloma*, *Koorchaloma*, *Kutilakesa*, *Lomachasaka*, *Nalanthamala*, *Paathramaya*, *Prathiigada*, *Prathoda*, *Tharoopama* and *Vakrabeeja*.

CONCEPTS, CORRELATIONS AND CLASSIFICATION

The discovery and description of numerous unknown, known, rare and interesting species of fungi are part of Subramanian's significant contributions to taxonomic mycology. The formulation of concepts and of terminology of conidiogenesis and the application of these to development of a hierarchical system of classification of hyphomycetes vis-à-vis their teleomorphs have engaged the attention of CVS for many years. His contributions to hyphomycetology are well appreciated in the recently published volume ‘The Genera of *Hyphomycetes*’ (Seifert *et al.*, 2011):

Subramanian proposed a hierarchical system of classification in 1962 and refined the earlier concepts of conidiogenesis proposed by Costantin in 1880, Vuillemin in 1911, Mason in 1936 and Hughes in 1953. Realizing that conidium ontogeny and ‘spore types’ are true biological features, CVS put forward a pragmatic system of classification of *Hyphomycetes*. He recognized and defined 6 basic spore types, viz. blastospore, gangliospore, porospore, phialospore, arthrospore and meristem arthrospore and made these spore types as the basis of 6 corresponding families: *Torulaceae*, *Bactridiaceae*, *Helminthosporiaceae*, *Tuberculariaceae*, *Geotrichaceae*, and *Coniosporiaceae*. He observed that, based on conidium ontogeny, the bulk of the genera of *Hyphomycetes* could be accommodated within these families (Subramanian, 1971a).

First proposed in 1962, he revised the hierarchical system of classification of hyphomycetes in 1983, in his second book ‘*HYPHOMYCETES: Taxonomy and Biology*’ (Subramanian, 1983).

Further, on the basis of participation of the wall/wall layers of conidiogenous cell in conidiogenesis, CVS recognized five types viz. totitunicogenous, penititunicogenous, demiseptatunicogenous, novitunicogenous, and eutunicogenous, support for which came from studies by using transmission and scanning electron microscopy.

Subramanian (1971b; 1972a; b) paid special attention to phialidic conidial taxa and carefully looked at the nature of conidial chains and correlations arrived between the ‘slimy’ and ‘dry’ nature of the conidia and thereby development of false or pseudo-chains and true conidial chains. He felt that the slimy and dry nature of conidial chains are innate biological features in fungi and therefore important in taxonomy. His presentations on ‘phialide’ at Kananaskis-I in 1971 and ‘phialidic anamorphs and their relationship to teleomorphs’ at Kananaskis-II in 1979, together contributed immensely to our understanding of the heterogeneity of the phialide. Underlining the taxonomic significance of the concept of heterogeneity of the phialide and its value in predicting anamorph-teleomorph connections, is a view strengthening the patterns of secondary metabolism with which phialo-conidiogenesis appear to be linked (Subramanian, 1979). A synthesis of all these ideas is presented in his work ‘*HYPHOMYCETES: Taxonomy and Biology*,’ published by the Academic Press, London, in 1983. Written by CVS, as a Jawaharlal Nehru Fellow, this book was released by the former Prime Minister, Indira Gandhi.

MONOGRAPHS, REVISIONS

Revision of graminicolous Helminthosporia taken up in 1958 resulted in a joint publication with B.L. Jain on the genus *Drechslera*, a position followed by M.B. Ellis in his treatment of the genus. However, later work led to segregation of the genus. Subramanian also published a monograph of the coelomycetous genus *Discosia*, jointly with K R C Reddy (Subramanian and Reddy, 1974).

DEVELOPMENTAL MORPHOLOGY AND TAXONOMIC REVISION

One of Subramanian's outstanding mycological works is the re-assessment of Aspergilli and their teleomorphs (Subramanian, 1972c), an important step in the understanding of this ubiquitous group of moulds. Following this revision, jointly with C. Rajendran, CVS studied the developmental morphology of a range of taxa in the *Eurotiales*. These studies confirmed Subramanian's earlier taxonomic treatment of Aspergilli and assignment of teleomorphs to distinct genera: *Edyullia* Subram., *Sclerocleista* Subram., *Chaetosartorya* Subram., *Syncleistostroma* Subram. (= *Petromyces* Malloch and Cain), and *Warcupiella* Subram. The study revealed the true nature of these fungi and extraordinary variations in developmental morphology of Eurotialen ascomata: *Edyullia* with naked asci, *Chaetosartorya* with free peridiate ascomata, *Warcupiella* and (*Hamigera* Stolk & Samson with its ‘*Penicillium*’ anamorphs) with locules in a stroma, *Fennellia* Wiley & Simmons, and *Petromyces* with peridiate ascomata embedded in stromata, the stroma in the former being plectenchymatous and psedoparenchymatous in the latter. These studies of the *Eurotiales* are perhaps the most detailed and authoritative work of this group and are based on study of type and

authentic cultures of the various taxa (courtesy Dorothy Fennell, mycologist at Peoria, USDA). Subramanian accommodated the anamorph of *Warcupiella* in a distinct genus, *Raperia*; the close relationship of *Warcupiella* to *Hamigera* is now strengthened by von Arx's recognition of *Raperia* as a repository for the anamorph of *Hamigera*.

Jointly with D.J. Bhat, Subramanian studied the developmental morphology of anamorph and teleomorphs of several taxa of the *Hypocreales* and these studies supported the cohesiveness of the *Hypocreales* (now *Nectriales*) as a distinct taxonomic group. The studies on eurotialen and hypocrealean taxa suggested that systematic investigations on developmental morphology would reveal the correct taxonomic identity and true phylogenetic relationships of fungi in the *Ascomycota*.

CORONOPHORALES OF INDIA

Jointly with G. Sekar, Subramanian (Subramanian and Sekar, 1990) wrote a monograph on the *Coronophorales* of India which makes an important contribution to our knowledge of this little known group of the *Ascomycota*. These are primarily wood- and bark-inhabiting saprobic fungi whose taxonomy has been under debate. From studies on freshly collected samples from India and elsewhere CVS recognized 14 genera, of which 12 in the Family *Coronophoraceae* (= *Nitschkiaceae*) and 2 in the *Bertiaceae*. The *Coronophoraceae* have cupulate ascostromata whereas those with non-cupulate ascostromata are placed in the *Bertiaceae*. Later molecular studies have confirmed the observations made by CVS on the taxonomy of the *Coronophorales* (Huhndorf, *et al.* 2004; Spatafora, *et al.* 2006).

TAXONOMIC REASSESSMENT OF THE GENUS SPORIDESMIUM LINK

The anamorph genus *Sporidesmium* Link is represented in the tropics by numerous species. Description of several species of the genus from the tropics by M.B. Ellis (Ellis, 1971; 1976) and the continuing discovery and description of many more species, especially in the tropics, called for a re-assessment of this interesting genus complex of dematiaceous hyphomycetes. The study of type or other material of a number of species placed in this group by Ellis and other students led Subramanian to a critical appraisal of the taxonomy of this genus (Subramanian, 1992b). Morphological and developmental criteria such as euseptation/pseudoseptation of conidia, the nature, regularity and other features of percurrent proliferation of conidiophores, and the presence or absence of conidiophores, were considered important diagnostic features. Subramanian used these criteria in his re-assessment in which he retained in *Sporidesmium* only those 26 species found strictly congeneric with *S. atrum* Link (= *S. ehrenbergii* M B Ellis), the remaining in *Sporidesmium sensu lato* were re-disposed in: 3 in *Polydesmus* Mont., one in *Sporidesmiella* Kirk, 12 in

Ellisembia Subram. gen. nov., 5 in *Stanjehughesia* Subram. gen.nov., 9 in *Repetophragma* Subram. gen.nov., and in 13 in *Penzigomyces* Subram. gen.nov. *Sporidesmium arengae* Matsushima was placed in a new genus *Acarocybellina* Subram., *Sporidesmium casuarinae* Matsushima in a new genus, *Gangliophora* Subram., and *Sporidesmium guadacanalense* Matsushima in a new genus, *Hemicorynesporella* Subram. Ribosomal and RPB2 DNA sequence analyses of representatives of the *Sporidesmium* complex carried out by Shenoy *et al.* (2006) ascertained the possible familial position of these genera and suggested that *Sporidesmium* is not monophyletic.

EVOLUTION OF FUNGI

Subramanian highlighted the relevance of gene-centred approaches in taxonomy by stressing the importance and relevance of epigenetic inheritance (Subramanian, 2007). Epigenetic systems offer additional heritable variations subject to selection. As noted by Lindegren, "The general data on which the modern conception of the gene is based are intensively selected data...The search for precisely segregating genes compels the selection of genetical material. In our work on *Neurospora* we were unable to classify the progeny of over two-thirds of our matings." There is now much re-thinking on the subject and even a growing enthusiasm to delve deeper into epigenetic inheritance. Jablonka and Lamb (1995) in their thought-provoking book, argue for an epigenetic perspective, and 'a return to a wider view of heredity, which encompasses multiple inheritance systems.' CVS always highlighted the leads available from fungal chemistry, molecular biology and evolution, in addition to morphology. Evolution is closely linked to natural selection, self-organization and emergence, besides epigenetics.

STRENGTHENING THE BASE OF TAXONOMY AND MYCOLOGY IN INDIA AND ASIA

Despite impacting a pivotal role in the well-being of humans and health of earth's ecosystems, fungi are regarded as orphans, within the biological sciences. The former Director of the International Mycological Institute, Kew, D.L. Hawksworth (2003) lamented that fungi lack close relatives, often misunderstood, ignored or overlooked and only few shed tears. CVS (Subramanian, 1982; 1983; 1986; 1992a) took keen interest in redressing the identity crisis in mycology and vigorously pursued its cause in national and international fora and actively campaigned for conservation and utilization of fungal resources and mycogenome potentials. Much before the Rio Summit 1991, CVS advocated *in situ* and *ex situ* conservation of fungal biological resources, establishment of culture repositories and trained manpower in fungal taxonomy, in the tropics. Establishment of the International Mycological Association Committee for Asia (presently, Asian Mycological Congress) with country-representatives from all Asian and south-east Asian countries, where CVS played a major role, has been one bold redresser step.

Under his leadership, India conducted two meetings of the IMACA, so far. D.L. Hawksworth acknowledged the significant role played by Subramanian in developing mycology in Asia in particular and at global level in general. In an earlier occasion, Hawksworth wrote: "...the current and upcoming generation of mycologists in India, and in all tropical countries, will embrace Prof. Subramanian's vision, and work towards its fulfillment through BioNet-INTERNATIONAL and other initiatives now being set in train" (Janardhanan *et al.* 1997).

It was the personal appeal from CVS to the former Prime Minister of India, Mrs. Indira Gandhi that led to abandonment of a hydroelectric project in the Silent Valley in the Western Ghats and conservation of the whole area as a bio-reserve. As President of the International Mycological Association (IMA) during 1977-1983, he secured a special status for Mycology in the International Union of Biological Sciences, at the General Assembly of the IUBS in Helsinki in 1979. As President of the IMA, CVS was closely involved in the organization of IMC3 in Tokyo in 1983.

MYCOLOGICAL SOCIETY OF INDIA

Subramanian established the Mycological Society of India (MSI) in 1973, in the august presence of a galaxy of mycologists from India and abroad, during the International Symposium on 'Taxonomy of Fungi' held at the CAS in Botany, University of Madras. CVS founded the journal KAVAKA (= Fungus, in Sanskrit), the transactions of the MSI, and also edited the journal since its inception till 1998. Fascinated by the beauty of *Amanita muscaria*, the 'fly agaric', CVS incorporated the magenta colour of the mushroom as background of the cover page of the journal Kavaka.

ACADEMIC DISTINCTIONS

Subramanian's academic distinctions have been recognized both in India and abroad. He is a recipient of many honours and awards which include the Pulney Andi Gold Medal of the University of Madras in 1944, Shanti Swarup Bhatnagar Award for Biological Sciences in 1965, Birbal Sahni Medal of the Indian Botanical Society in 1972, Rafi Ahmad Kidwai Prize of the ICAR in 1972-73, Jawaharlal Nehru Fellowship in 1976 and E.K. Janaki Ammal National Award for TAXONOMY by Government of India in 2000. He served as Vice President (1971-77) and President (1977-83) of the International Mycological Association, a rare distinction conferred on an Indian Mycologist. He was a member of the Executive Committee of the International Union of Biological Sciences (1979-82). He is a Corresponding Member of the Belgian Royal Academy of Foreign Sciences (1978) and an Honorary Member of the Mycological Society of America and the British Mycological Society. He is an elected Fellow of the Indian Academy of Sciences, Bangalore, the Indian National Science Academy (INSA), Delhi, and the National Academy of Agricultural Sciences (NAAS), New

Delhi. He was Chairman of the Editorial Board (Plant Sciences) of the Indian Academy of Sciences for over a decade (1976-1988).

CVS AND HIS STUDENTS

Subramanian mentored 24 doctorate and several post-doctoral researchers on fungi, who are now spread all over the world. An active school of mycology grew around him at the Centre of Advanced study in Botany, University of Madras, which made significant contributions on fungal systematics, floristics, and ecology. Working in different parts of the country and abroad, his students excelled in their spheres and brought laurels to themselves and to the country.

Those days when academic overseas visits were sparse, Subramanian arranged a British Council and UGC sponsored scholar-student exchange programme for colleagues and pre-doctoral and post-doctoral students between India and abroad. He also facilitated visits of his post-doctoral students outside the Exchange Programme. Several scientists viz. F.C. Steward, S.D. Garrett, P.H. Gregory and mycologists to the First International Symposium on Taxonomy of Fungi held in 1973, came to Madras. Several students from CAS in Botany, University of Madras, went to the CMI, Kew, for training.

Subramanian is 'a complete mycologist'. His knowledge of fungi extended much beyond the *Hyphomycetes*. He read extensively. He was one of the first to grasp the importance of 'diversity' studies in different ecological habitats. As mentioned earlier, he guided students on fungi growing on leaf litter, herbivore dung, marine and mangroves and industrial effluents. His vast collection of reprints and monographs on fungi, neatly arranged in numerous almirahs in the Botany Department of University of Madras was easily accessible to anyone. From world over, students of mycology sought reprints from CVS. Those days when blackboards were used in class-lectures, he would insist on neat, black and white transparencies. We are really fortunate to have been groomed by him.

EPILOGUE

Reminiscing his younger days, Subramanian told us once that his alma mater, Presidency College, Madras, accommodated people of all backgrounds, without prejudice of caste, creed and wealth, that is 'unification of language, culture and the arts', in a true sense. CVS not only had a great liking for classical Carnatic music but could play an instrument (= mridangam). He wouldn't miss performances of great musicians especially in the annual music festival in Chennai.

Along with his wife, Srimathi Subbalakshmi (= Lakshmi, to CVS's mycologist and scientist friends), Subramanian presently lives in Nungambakkam, Chennai. Mrs Subramanian has played host to students and colleagues, and especially mycologist and other friends. Kind and compassionate, resourceful and pragmatic, she has

remained an affectionate life companion in all his doings. She has travelled widely and CVS dedicated 'Hyphomycetes. Taxonomy and Biology' to her! Their two sons, C.S. Venkatachalam and C.S. Seshadri, are engineers.

Influenced largely by Swami Vivekananda and the many great men of science, the life and thought of Subramanian are influenced both by Vedanta, the ancient Indian philosophy, and modern science. His current interests focus on the role of internal factors in evolution. Astutely philosophical, an avid reader and keen observer that he is, CVS spends his time in the enjoyment of literature, philosophy, science and music. He concludes: "Mine is a life of learning... learning in enjoyment, from students, with students, the never ending pursuit." We respectfully wish him sound health and a good life.

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