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Scientometric Portrait of G. Thanikaimoni: a Palynologist of high repute

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ABSTRACT

The present paper is an output of a study carried out to know the scientific work done by Dr. G. Thanikaimoni in the field of Palynology. The choice of the protagonist is based on his immense contributions at a young age to the field of Palynology. The study shows that Dr. G. Thanikaimoni has published 35 single authored and 21 multi-authored papers during 1965-1991. The paper examines his contributions in the fields of Botany, Palynology and Paleoenvironmental studies, magnitude of his collaborations, and year-wise distribution of his productivity. The paper also highlights the unfinished works left behind by him, due to untimely death at the prime of his career that took five years to be published.

KEYWORDS: Scientometric portrait; Scientometrics; Scientist; Publication productivity; Research collaboration; Thanikaimoni; Palynology

1. INTRODUCTION

A researcher's scientific productivity is often estimated by the quality and quantity of publications during the person's academic career. Scientometric studies deal with the biographical study of the individual career of scientists and researchers and correlates this with the bibliographical analysis of publications or academic and scientific achievements. This analysis provides a quantitative estimate of one

scholar's productivity over a given period of time that enables us to understand his/her scientific caliber.

In this paper we analyse the scientific works of Dr. G. Thanikamoni, popularly called "*Thani*" (called GT henceforth in this paper), a reputed palynologist (Palynology: study of pollen grains) whose career was abruptly cut short by unfortunate death when he was at the peak, and his role in the advancement of science in India and elsewhere.

2. BIOGRAPHICAL SKETCH OF Dr. G. THANIKAIMONI

Born on the New Year's Day of 1938 in Madras, GT received the Master of Science degree in Botany in 1962 from the University of Madras. He was a recipient of the prestigious Fyson Prize in Natural Science, reserved for truly outstanding Indian naturalists.

Soon afterwards he took a position in the newly-founded (1960) Palynology Laboratory of the Institut Français de Pondichéry (IFP) under the direction of Dr. Ph. Guinet. Within a few years GT's scientific and administrative abilities made him the head of the Palynology Laboratory.

In 1970 he was granted a doctoral degree by the University of Montpellier, France for his thesis on the pollen studies of the plant family Palmae (=Arecaceae). He did extensive research on many plant families, their botanical, palynological characters and also focused on their phylogeny. He later focused his attention on fossil pollen as well. In 1983 he convened a workshop for French and Indian palynologists in Pondicherry with the goal of clarifying the taxonomy of angiosperm pollen previously described from Tertiary horizons of tropical Africa and India.

His meticulous collection and documentation of Pollen Morphological literature resulted in the production of five volumes ^[1] (three more were published after his demise) of the “Bibliographic index to the pollen morphology of angiosperms” that continue to be a major source of palynological reference for students and researchers.

This distinguished scientist’s life met an abrupt and unfortunate end in 1986 when he fell a victim to hijackers at Karachi, Pakistan, when he was on the way to attend an international conference on Marine Palynology in Massachusetts, USA.

Several Obituary notes of GT have been published in various journals (*Pollen et Spores*, 1986 ^[2]; *Science & Culture*, 1987 ^[3]; *Grana*, 1987 ^[4]; *Geophytology*, 1987 ^[5]). Wikipeda ^[6]. *CAP Newsletter*, (1986) ^[7], *Taxon*, (1978) ^[8]).

The Palynological Society of India decided to pay a respectful homage to the memory of Dr. G. Thanikaimoni through a publication, “G. Thanikaimoni Memorial Volume” in *Journal of Palynology*, Volumes 23 & 24 (1987-1988) ^[9].

It is interesting that the series of five bibliographic indices were analyzed by Skvarla *et al* in 1989 ^[10] with respect to instrumentation in pollen studies as revealed by these volumes.

3. Timeline

- 1938: Ganapathi Thanikaimoni was born on January 1.
- 1962: Earned a Master of Science degree in Botany from University of Madras.
- 1962: Won the Fyson Prize.

- 1970: Earned doctorate degree from University of Montpellier, France.
- 1972: Received worldwide recognition for his compilation of morphology of angiosperm pollen.
- 1983: Convened workshop for Indian and French palynologists at French Institute of Pondicherry.
- 1986: Died on September 5 in a plane hijack.

4. OBJECTIVES OF THE STUDY

- ✚ To study the year-wise distribution of his research productivity during his active research life.
- ✚ To measure and compare the growth rate of his research contributions Domain-wise.
- ✚ To examine the Scientific Productivity.
- ✚ To identify the Channels of Communication.
- ✚ Year-wise, quinquennium-wise and domain-wise productivity.
- ✚ To know the status of Researchers and their collaboration.

5. REVIEW OF RELATED LITERATURE

As there are many numbers of articles available on scientometrics, a review of closely related literature is presented. Recently individual scientists including the Nobel Laureates are becoming the focus of scientometric studies rather than gross statistical "macro" data (Schubert and Glanzel, 1992) ^[11]. Besides Nobel Laureates there are numerous scientometric studies on other scientists in various disciplines. Kalyane *et al* (1994) ^[12] studied the works of C.S. Venkata Ram, which revealed solo research authorship pattern. The research by (Kademani, Kalyane & Balakrishnan (1994) ^[13], Kademani, Kalyane & Kademani, (1994) ^[14], Kalyane & Samanta (1995) ^[15], Kalyane & Sen (1996) ^[16], Keshava, Lokeshappa & Ganjihal (2010) ^[17],

Kalaiappan, Kaliyaperumal & Rajasekar (2010) ^[18] are examples of scientometric studies.

6. METHODOLOGY

The information for this study was mainly collected from publication lists available at the Palynology lab of IFP and the details that appeared in the journals like *Pollen and Spores*, *Taxon* and *Journal of Palynology* in addition to interactions with his contemporaries and family members.

For analysis, End note database has been used to enter all the required bibliographical data such as name of the authors, title, and source of documents, year and volume of publication, issue number, and article type. They were collected and recorded on a spread sheet with pre-designed columns. The data so collected were tabulated and analyzed in order to obtain results in respect of the stated objectives.

7. RESULTS AND DISCUSSION

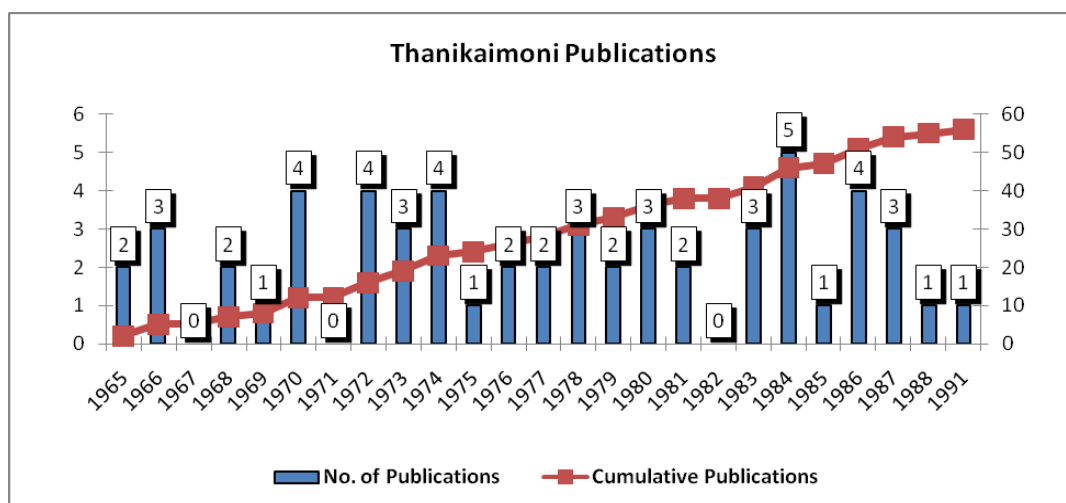
7.1. Year-wise distribution of G. Thanikaimoni publications

Table 1 and Figure 1 show that GT had made a total of 56 publications from 1965 to 1991. Five of publications were posthumous, from 1986-1991. There were no publications, at least none that we could retrieve, in 1967, 1971, and 1982 (as also 1989 and 1990 after his demise, though the last was in 1991). Highest productivity was in 1984 with the output of 5 publications. The year-wise distribution of the number of publications is provided in Table 1.

Table-1
Year wise distribution of G. Thanikaimoni's publications

| Year | No. of Publications | Percentage | Cumulative No. of Publications | Cumulative Percentage |
|------|---------------------|------------|--------------------------------|-----------------------|
| 1965 | 2 | 3.57 | 2 | 3.57 |
| 1966 | 3 | 5.36 | 5 | 8.93 |
| 1967 | 0 | 0.00 | 5 | 8.93 |
| 1968 | 2 | 3.57 | 7 | 12.50 |
| 1969 | 1 | 1.79 | 8 | 14.28 |
| 1970 | 4 | 7.14 | 12 | 21.43 |
| 1971 | 0 | 0.00 | 12 | 21.43 |
| 1972 | 4 | 7.14 | 16 | 28.57 |
| 1973 | 3 | 5.36 | 19 | 33.93 |
| 1974 | 4 | 7.14 | 23 | 41.07 |
| 1975 | 1 | 1.79 | 24 | 42.86 |
| 1976 | 2 | 3.57 | 26 | 46.43 |
| 1977 | 2 | 3.57 | 28 | 50.00 |
| 1978 | 3 | 5.36 | 31 | 55.36 |
| 1979 | 2 | 3.57 | 33 | 58.93 |
| 1980 | 3 | 5.36 | 36 | 64.28 |
| 1981 | 2 | 3.57 | 38 | 67.86 |
| 1982 | 0 | 0.00 | 38 | 67.86 |
| 1983 | 3 | 5.36 | 41 | 73.21 |
| 1984 | 5 | 8.93 | 46 | 82.14 |
| 1985 | 1 | 1.79 | 47 | 83.93 |
| 1986 | 4 | 7.14 | 51 | 91.07 |
| 1987 | 3 | 5.36 | 54 | 96.43 |
| 1988 | 1 | 1.79 | 55 | 98.21 |
| 1991 | 1 | 1.79 | 56 | 100.00 |
| | 56 | 100.00 | | |

Figure-1
G. Thanikaimoni-Publications



7.2. Domain-wise arrangements of Contributions

The publications of GT consist of 21 journal articles, 14 books, 10 book chapters, 9 conference papers, 1 thesis and 1 note during 1965-1991.

We have classified his research communications in the following domains in Table 2.

A = Archaeology / Paleoenvironmental studies

B = Bibliography / Appraisal / Review

C = Botany

D = Palynology / Pollen morphology

Below Table shows that during 1965-1991, GT had made maximum contributions (51.79%) to the domain of Palynology/ Pollen Morphology (29 out of 56). It is remarkable to note that a majority of his publications (35 out of 56) were sole-authored by him in various domains. The collaborative coefficient and the number of authors per paper (0.36 and 2.22 respectively) are highest in the domain of Archaeology/ Paleoenvironmental studies, understandably as this field requires inputs from various sources.

Table-2
Publication Productivity and Authorship Pattern of G. Thanikaimoni in various domains

| No. of Authors | Domains | | | | Total No. of Paper | % | TA | % |
|----------------|---------|-------|------|-------|--------------------|--------|----|--------|
| | A | B | C | D | | | | |
| Single Author | 4 | 11 | 4 | 16 | 35 | 62.50 | 35 | 36.84 |
| Two Authors | 2 | 2 | 0 | 7 | 11 | 19.64 | 22 | 23.16 |
| Three Authors | 1 | 0 | 0 | 3 | 4 | 7.14 | 12 | 12.63 |
| Four Authors | 1 | 0 | 1 | 2 | 4 | 7.14 | 16 | 16.84 |
| Five Authors | 1 | 0 | 0 | 1 | 2 | 3.57 | 10 | 10.53 |
| Total | 9 | 13 | 5 | 29 | 56 | 100.00 | 95 | 100.00 |
| % | 16.07 | 23.21 | 8.93 | 51.79 | 100.00 | | | |
| CC | 0.36 | 0.08 | 0.15 | 0.27 | | | | |
| A/P | 2.22 | 1.15 | 1.60 | 1.79 | | | | |

A = Archaeology / Paleoenvironmental studies. B = Bibliography / Appraisal / Review. C = Botany. D = Palynology / Pollen morphology. CC = Collaborative Coefficient. A/P = Authorship per Paper. TA = Total Number of Authorship.

7.3. Scientific Productivity

Communication and collaboration between researchers are of great importance in the development of subject areas and in the dissemination of research results. Collaboration is an intense form of interaction that allows for effective communication as well as sharing of competence and other resources (Ajiferuke et al., 1988) [19].

The Publication productivity of GT in chronological order is shown in Table 3. Here we have used Age of Productivity Life (APL), which is the arrangement in the order of “career age” as years, as an important parameter in addition to the calendar years of publication. The last column provides a cumulation of all the publications till the given APL and year.

He made contributions almost throughout his career, except in three years (1967, 1971 and 1982) during his life (of course there were no posthumous publications in 1989 and 1990). The total productivity life of the author spans 27 year starting from the age 27. He is the main author in 50 papers and co-author in 6 papers.

Table-3
Publication productivity of G. Thanikaimoni in Chronological order

| APL | Year | Single and Multi authors | | | | | MT | TP | AA |
|-----|------|--------------------------|-----|-------|------|------|----|----|----|
| | | One | Two | Three | Four | Five | | | |
| 1 | 1965 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 27 |
| 2 | 1966 | 2 | 1 | 0 | 0 | 0 | 1 | 3 | 28 |
| 3 | 1967 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| 4 | 1968 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 30 |
| 5 | 1969 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 31 |
| 6 | 1970 | 3 | 1 | 0 | 0 | 0 | 1 | 4 | 32 |
| 7 | 1971 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 |
| 8 | 1972 | 1 | 3 | 0 | 0 | 0 | 3 | 4 | 34 |
| 9 | 1973 | 1 | 1 | 1 | 0 | 0 | 2 | 3 | 35 |
| 10 | 1974 | 1 | 2 | 1 | 0 | 0 | 3 | 4 | 36 |
| 11 | 1975 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 37 |
| 12 | 1976 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 38 |
| 13 | 1977 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 39 |

| | | | | | | | | | |
|-------|------|----|----|---|---|---|----|----|----|
| 14 | 1978 | 2 | 0 | 1 | 0 | 0 | 1 | 3 | 40 |
| 15 | 1979 | 0 | 2 | 0 | 0 | 0 | 2 | 2 | 41 |
| 16 | 1980 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 42 |
| 17 | 1981 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 43 |
| 18 | 1982 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 |
| 19 | 1983 | 2 | 0 | 0 | 1 | 0 | 1 | 3 | 45 |
| 20 | 1984 | 2 | 0 | 0 | 1 | 2 | 3 | 5 | 46 |
| 21 | 1985 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 47 |
| 22 | 1986 | 4 | 0 | 0 | 0 | 0 | 0 | 4 | 48 |
| 23 | 1987 | 2 | 1 | 0 | 0 | 0 | 1 | 3 | 49 |
| 24 | 1988 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 50 |
| 25 | 1989 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 |
| 26 | 1990 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 52 |
| 27 | 1991 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 53 |
| Total | | 35 | 11 | 4 | 4 | 2 | 21 | 56 | |

APL – Age of Productivity Life. MT – Total multi-authored papers. TP – Total publications. AA – Biological age of the author.

7.4. Channels of Communication

Distributions of GT's 56 publications are provided in Table 4. He has made the maximum number (7) of his publications in *Pollen and Spores*. It is very evident that almost all his publications have been in highly ranked international journals.

Table-4

Dissemination of the channels of communication used by G. Thanikaimoni

| No | Channels for communication | No. of papers |
|----|---|---------------|
| 1 | Pollen et Spores | 7 |
| 2 | Mémoires et Travaux de l'E.P.H.E | 2 |
| 3 | Adansonia, Série 2 | 1 |
| 4 | Annals of the Missouri Botanical Garden | 1 |
| 5 | Bibliotheca Botanica | 1 |
| 6 | Bulletin de l'École française d'Extrême-Orient | 1 |
| 7 | Bulletin Institut Foudam Afrique Noire | 1 |
| 8 | Bulletin du Jardin botanique national de Belgique | 1 |
| 9 | Comptes Rendus de l'Académie des Sciences | 1 |
| 10 | Canadian Journal of Botany | 1 |
| 11 | Geophytology | 1 |
| 12 | Grana | 1 |

| | | |
|----|----------------------------------|----|
| 13 | Journal of Palynology | 1 |
| 14 | Mémoires archéologiques E.F.E.O. | 1 |
| | Total | 21 |

7.5 Quinquennium-wise Productivity

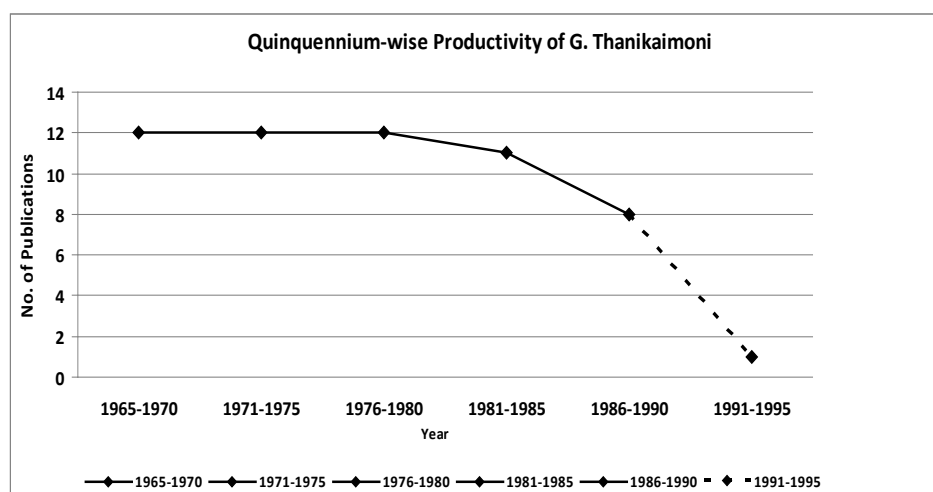
Table 5 and Figure 2 describe quinquennium-wise productivity which consists over six quinquenniums from 1965-1991. As the productivity in the 6th quinquennium is only of one year, it does not reflect the exact productivity for the complete 6th quinquennium (1991-1995). It can be seen that the productivities in 1st, 2nd and 3rd quinquennia occupy the first place with 12 publications each.

Table-5
Quinquennium-wise Productivity of G. Thanikaimoni publications

| Q | Per iod | Number of Publi cations | Cumu lative | % No. of Pub lications | Sin gle aut hor | Cumul ative single | % Sin gle | Multi- auth ors | Cumul ative Multi- auth ors | % Multi- auth ors |
|---|------------|-------------------------------|----------------|------------------------------|--------------------------|--------------------------|-----------------|-----------------------|---|----------------------------|
| 1 | 1965-70 | 12 | 12 | 21.43 | 10 | 10 | 28.57 | 2 | 2 | 9.52 |
| 2 | 1971-75 | 12 | 24 | 21.43 | 3 | 13 | 8.57 | 9 | 11 | 42.86 |
| 3 | 1976-80 | 12 | 36 | 21.43 | 9 | 22 | 25.71 | 3 | 14 | 14.29 |
| 4 | 1981-85 | 11 | 47 | 19.64 | 6 | 28 | 17.14 | 5 | 19 | 23.81 |
| 5 | 1986-90 | 8 | 55 | 14.29 | 6 | 34 | 17.14 | 2 | 21 | 9.52 |
| 6 | 1991-95 | 1 | 56 | 1.79 | 1 | 35 | 2.86 | 0 | 21 | 0 |
| | | 56 | | 100.00 | 35 | | 100.00 | 21 | | 100 |

Q= Quinquennium

Figure-2
Quinquennium-wise productivity



7.6. Researchers and their Collaboration

GT has collaborated with 25 researchers till 1988. The publication productivity of his research group (Collaborators) is shown in Table 6. It had been observed that C. Caratini had contributed maximum number of papers (8) published during 1973-1988. GT to his credit has (56/95) 58.94 percentage of total authorship credit.

Table-6
Authorship Credits of Researchers Collaborating with G. Thanikaimoni

| No. | Name | Domains | | | | Period of Association | TY | No. of Authorships |
|-----|---------------------|---------|----|---|----|-----------------------|----|--------------------|
| | | A | B | C | D | | | |
| 1 | THANIKAIMONI G. | 9 | 12 | 5 | 30 | 1965-91 | 27 | 56 |
| 2 | CARATINI C. | 4 | 0 | 1 | 3 | 1973-88 | 16 | 8 |
| 3 | BLASCO F. | 2 | 0 | 1 | 1 | 1972-75 | 4 | 4 |
| 4 | CHANDA S. | 1 | 0 | 1 | 0 | 1975-78 | 4 | 2 |
| 5 | LUGARDON B. | 2 | 0 | 0 | 0 | 1974-78 | 5 | 2 |
| 6 | TISSOT C. | 0 | 0 | 0 | 2 | 1981-88 | 8 | 2 |
| 7 | FERGUSON J. | 2 | 0 | 0 | 0 | 1983-84 | 2 | 2 |
| 8 | JAYAWEERA D.M.A | 1 | 0 | 0 | 0 | 1966 | 1 | 1 |
| 9 | ELSIK W.C. | 1 | 0 | 0 | 0 | 1970 | 1 | 1 |
| 10 | LEGRIS P. | 0 | 1 | 0 | 0 | 1972 | 1 | 1 |
| 11 | VASANTHY G. | 1 | 0 | 0 | 0 | 1972 | 1 | 1 |
| 12 | PIAS J. | 0 | 0 | 0 | 1 | 1973 | 1 | 1 |
| 13 | ROLAND-HEYDACKER F. | 1 | 0 | 0 | 0 | 1979 | 1 | 1 |
| 14 | VIBICHANARAW G. | 0 | 1 | 0 | 0 | 1979 | 1 | 1 |
| 15 | DRANSFIELD J. | 1 | 0 | 0 | 0 | 1983 | 1 | 1 |
| 16 | PAGE F.C. | 1 | 0 | 0 | 0 | 1983 | 1 | 1 |
| 17 | NILSSON S. | 1 | 0 | 0 | 0 | 1984 | 1 | 1 |
| 18 | GRAFSTROM E. | 1 | 0 | 0 | 0 | 1984 | 1 | 1 |
| 19 | VENKATACHALA B.S. | 0 | 0 | 0 | 1 | 1984 | 1 | 1 |
| 20 | RAMANUJAM C.G.K | 0 | 0 | 0 | 1 | 1984 | 1 | 1 |
| 21 | KAR R.K. | 0 | 0 | 0 | 1 | 1984 | 1 | 1 |
| 22 | ROLAND F | 1 | 0 | 0 | 0 | 1984 | 1 | 1 |
| 23 | CERCEAU M.T. | 1 | 0 | 0 | 0 | 1984 | 1 | 1 |
| 24 | DEROUET L. | 1 | 0 | 0 | 0 | 1984 | 1 | 1 |
| 25 | LE THOMAS A. | 1 | 0 | 0 | 0 | 1987 | 1 | 1 |
| 26 | SIVAK J. | 0 | 0 | 0 | 1 | 1988 | 1 | 1 |
| | | 32 | 14 | 8 | 41 | | | 95 |

A = Archaeology / Paleoenviromental studies. B = Bibliography / Appraisal / Review. C = Botany. D = Palynology / Pollen morphology. TY = Total years of collaboration.

8. DISCUSSION

It is very clearly evidenced (Table 3) that GT started publishing as a sole author at the young age of 27.

Although a higher proportion of GT's works were published as sole author, seen in the light of the prevailing conditions of the period, unlike the present internet age of communication and correspondence, it is remarkable that nearly 35 percentage of his research was in fact collaborative. Further, he entered the field when it was in its infancy in India and the tropics and GT was certainly one of the discipline builders of Palynology in India, which meant that a good amount of his early research was fundamental and hence more individual. His collaborative nature as a researcher is proved by the vast collection of publications and pollen slides that he had acquired on exchange basis from collaborators and deposited at the IFP (Anupama et al., 2010) [20].

9. CONCLUSION

The fact that GT's publications were materializing up to five years after his death proves the vast research material that he had left behind. Three more bibliographic indices were done after his death [21] [22], the last one by his wife K. Thanikaimoni along with a Dutch collaborator [23].

Publications are one way of understanding a person's contribution to science, but there are other actions also. The large collections of pollen reference slides and literature at the IFP that are used now by many students and researchers stand as testimonies to his commitment to science.

The authors dedicate this paper to the memories of Dr. G. Thanikaimoni, the protagonist, and his contributions to science, especially in the field of Palynology.

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