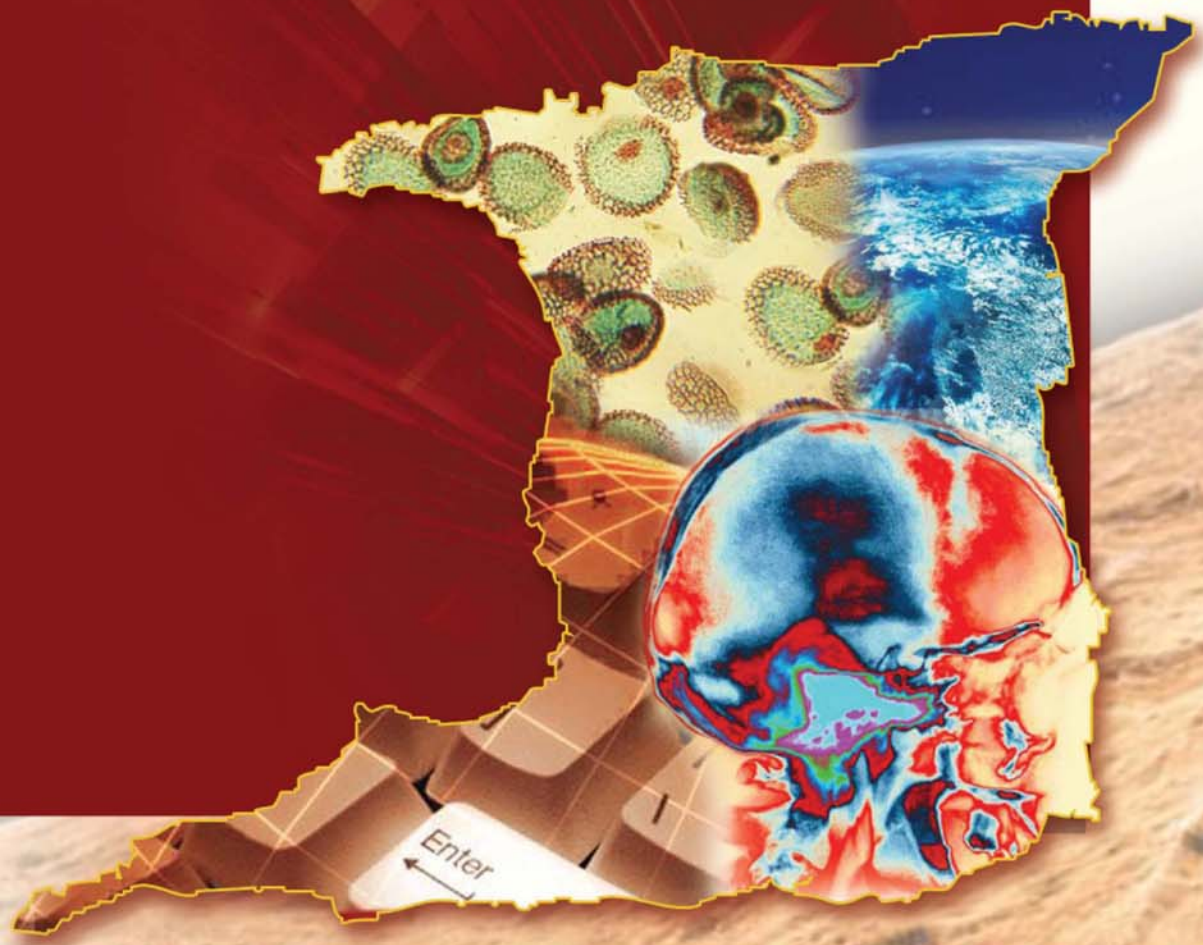
VOLUME 1

TRINIDAD & TOBAGO

ICONS

IN SCIENCE & TECHNOLOGY



TRINIDAD & TOBAGO

ICONS

IN SCIENCE & TECHNOLOGY

VOLUME 1

National Institute of Higher Education, Research,
Science and Technology (NIHERST)

2005

CREDITS

PHOTOS: Page 1-Bert Achong, Page 5-Ciprian Amoroso - Trinidad Guardian Publishing Co.
Page 31-Leonard Graf, Page 59-Joseph Pawan - St. Mary's College Past Students Union
Page 71-Elisha Tikasingh - Caribbean Epidemiology Centre

DESIGN & LAYOUT: PHOENIX PRODUCTIONS
63 Luis Street, Woodbrook, P.O.S., Trinidad.
Tel: 868 628 5403

PRINTED IN TRINIDAD AND TOBAGO

PUBLISHER: NIHERST
Mailing Address: NIHERST, P.O.Box 113, Trinidad, West Indies
Tel.: 868 622 7505

Website: http://www.niherst.gov.tt

ISBN: 978-976-95095-4-X

"Without heroes, we are all plain people and don't know how far we can go"

~ *Bernard Malamud*
(American Writer)

Contents

Acknowledgements

NIHERST wishes to thank all persons and institutions that contributed towards the publication of this valuable book.

We are especially grateful to the featured individuals, their families, secretaries and peers, whose co-operation with interviews and the supply of documents and photographs provided the essential raw materials for this publication.

Several libraries, educational institutions and alumni bodies also facilitated our research effort. They include the Trinidad Medical Library, the Main Library of the UWI Faculty of Medicine, the archives department of the UWI St. Augustine, and the Caribbean Epidemiology Centre. Fr. Ronald Mendes, Principal of St. Mary's College and Leela Gunness, Librarian; Sedley Joseph and Nestor Lambert of the St. Mary's College Past Pupils' Union; and Patrick Rabathaly of the Queen's Royal College Old Boys' Association also provided considerable support.

Professor Clément Imbert of the Department of Mechanical Engineering, UWI St. Augustine is specially acknowledged for his assistance in developing the profiles of the featured steelpan innovators.

NIHERST is indebted to the dedicated team who brought this work to fruition, namely researchers and writers Celeste Chariandy, Stacey-Ann Sarjusingh and Joanne Mitchell; editors Christiane Francois and Joycelyn Lee Young; and special advisers Hollis Charles, Avril Siung Chang, Claudette Ible, Althea Maund, Baidi Permanand, Professor Julian Duncan and Professor Winston Mellowes.

Finally, NIHERST thanks the Ministry of Science, Technology and Tertiary Education for endorsing the development of this important educational resource.

Introduction

"There is a single light of science, and to brighten it anywhere is to brighten it everywhere"

~ Isaac Asimov

'Trinidad & Tobago Icons in Science and Technology' presents the lives of 39 individuals who have attained a high level of distinction in their chosen fields in science and technology. Many of them are internationally recognized for their achievements as educators, healers, researchers, innovators, institution builders and policy makers.

Through these portraits, we also get an interesting snapshot of the history and evolution of the various disciplines and branches of science and technology in the West Indies from the late 1900s to the present day. We see from the earliest icons the predominance of medicine, as well as the study of pure or basic sciences and agriculture. This reflects the scientific as well as socio-economic trends of the time and shows where the emphasis and opportunities lay in terms of choice of profession and academic research for the scientifically-minded men and women of the last century. These were some of the most developed branches of science and technology at the time. Medicine offered careers that were as eminently practical as they were prestigious, and agricultural research was greatly facilitated by the existence of the world class research facility in Trinidad, the Imperial College of Tropical Agriculture.

As the 21st century approached, we get a glimpse, through the work of more recent icons, of the emergence of new fields of endeavour, as the pace of the production of knowledge, technology and innovation increased dramatically. Other options for work and research, in areas like computer technology, food technology and environmental management, became available to our scientists and engineers. We can expect that the national icons of tomorrow – our current generation of engineering, science and technology students - will be recognized in the future for contributions to areas such as information and communications technology, biotechnology and nanotechnology, and the energy-related disciplines.

What we will no doubt also notice in the years to come is a marked shift in the ratio of male to female icons in science and technology. In the last century, women, especially in the developing world, had much less access to higher education, and were generally not encouraged to study the sciences. However, in these rapidly changing times, many more girls and women are choosing and excelling in engineering and scientific studies and careers up to the highest levels. They will follow in the footsteps of the great women scientists who are honoured in this book.

'Trinidad and Tobago Icons in Science and Technology' also features the work of key players in the development of the steelpan since the 1940s when it was created. The evolution of the steel drum into a versatile and well-respected musical instrument that is now played and taught around the world, reflects the unswerving dedication and ingenuity of several pioneers. Most of these are now deceased. Of the living, three are responsible for the three most significant discoveries and technical innovations which furthered the development of the instrument. These men have been included here in order to show the validity of 'grassroots science' and the immense value and impact that it can have in creating new technologies and inventions. They took 'pan' from being a crude invention and refined it into what is arguably the most defining cultural characteristic of our country and a gift to the world.

The life stories of these national icons are now being recorded so that the important roles that they each played in developing our country and the world will not be unknown to, or forgotten by, the generations who now benefit from their pioneering efforts. 'Trinidad &Tobago Icons in Science and Technology' is both a tribute as well as a history book, which we hope will not just be a source of knowledge, but also a source of inspiration to our readers, and particularly to our new generation of students in engineering, science and technology.

Bert Achong

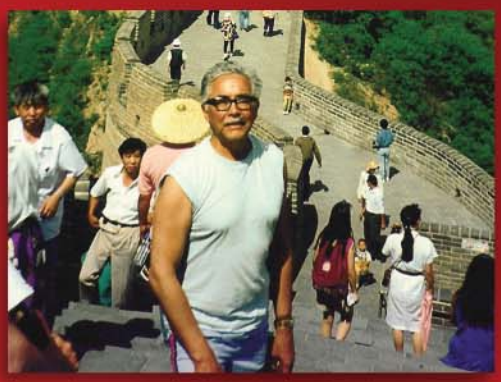
(1928-1996)

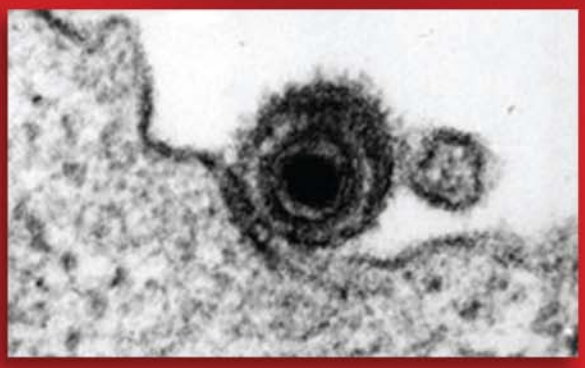
CLINICAL PATHOLOGIST

Dr. Bert Achong contributed to the discovery of the Epstein-Barr Virus (EBV) in 1964. This virus is associated with two human cancers and is considered 'the favoured explanation' of chronic fatigue syndrome. His findings provided insights into treatments of these illnesses. Examining human cancer cells in 1971 by electron microscopy, he discovered a "Foamy Virus". It was the first example of a retrovirus infection in man.

Bert Geoffrey Achong was born in Port of Spain, Trinidad on December 6th 1928. He was an outstanding student, who copped the national Jerningham Gold Medal for top performance in the Higher School Certificate Examinations in 1946. He also won the Science Scholarship from his alma mater, St. Mary's College.

He studied medicine at the University College in Dublin, Ireland and then trained as a clinical pathologist at Lambeth Hospital in London, England. He conducted electron microscopy work with Dr. Yvonne Barr and Sir Anthony Epstein, a leading researcher in viruses associated with cancer at the Bland Sutton Institute, Middlesex Hospital.





Top to Bottom:
1) Bert Achong pictured with his brother Carlton Achong in England
2) Achong at the Great Wall of China
3) Epstein Barr virus
4) Microscope used for study of viruses

The team studied in vitro cultivation of Burkitt's lymphoma (an African childhood tumour) and Achong's electron micrographs were critical in pinpointing particles of a herpes virus family. This virus then became known as the Epstein-Barr Virus or EBV. Achong's findings spearheaded further work in many research areas.

Apart from this major breakthrough, Dr. Achong also discovered the "Foamy Virus." This virus belongs to the family of retroviruses (viruses which contain RNA as the hereditary material in place of the more common DNA) and was the first example of this type of infection in man.

Dr. Achong wrote several scientific articles and books on his research and discoveries. Key among these was a book co-edited with Sir Anthony Epstein, "The Epstein-Barr Virus". He lectured at the Department of Pathology at the University of Bristol in England where he had the gift of inspiring students.

He was bestowed with the Doctorate in Science and the Doctorate in Medicine by the National University of Ireland, and was also a Foundation Fellow of the Pathology Faculty of the Royal College of Physicians of Ireland, and Fellow of the Royal College of Pathology, England.

For his contributions to science, Dr. Achong will forever be recognised as one of our region's gifted sons. He passed away at the age of 67 on November 20th 1996.

Nazeer Ahmad

(1932)

SOIL SCIENTIST

Professor Nazeer Ahmad is internationally recognised for his work on tropical soils. He has conducted soil surveys in over 85 countries investigating soil taxonomy, basic soil chemistry and soil management. His research on the fertility of clay soils and their nitrogen fixation and release properties is used extensively.

Nazeer Ahmad was born on January 27th 1932 in Dundee, Guyana. As a child, he helped his father on the family's subsistence farm. He attended the Novar Canadian Mission School and Berbice High School. After only three years in high school, he wrote the Cambridge School Certificate and was accepted at the Imperial College of Tropical Agriculture (ICTA) in Trinidad.

Though he wanted to study medicine, he welcomed the offer of a government scholarship to study at ICTA graduating with the Diploma in Agriculture (1951) and Postgraduate Associateship (1952). He completed a master's degree at the University of British Columbia, Canada (1955) and later his doctorate in soil science from Nottingham University, U.K. in 1957.

Ahmad was then appointed Head of the Division of Agricultural Chemistry in Guyana. He organised a country-wide soil and land use study to improve

Top to Bottom:
1) Professor Ahmad delivering a lecture
2) Berbice High School, Guyana
3) Professor Ahmad attending a conference
4) Soil profile

Guyana's agricultural productivity and later he did similar surveys throughout the Commonwealth Caribbean. His study of the efficiency of nitrogen uptake from artificial fertilizers in crop plants confirmed the importance of nitrogen in Caribbean soils and promoted the planting of leguminous plants for soil enrichment.

His pioneering work on the properties of clay soils gained him international recognition. He served as a consultant on soil and land use problems for many international agencies in almost every developing country in the world. His research was published in the definitive book "Vertisols and Technologies for their management" and in over 100 refereed publications.

From 1962 he provided 35 years service to the University of the West Indies (UWI), St. Augustine. He established new soil science courses in the Faculty of Agriculture, built well-equipped soil science laboratories and trained over 90 postgraduate students. He was appointed Fulbright Professor of Tropical Soil Science at the University of Illinois, USA (1982) and was named Professor Emeritus of Soil Science at UWI (1996).

Ahmad was Director of the National Agricultural Research Institute, Guyana (1995-2000) and served the International Board for Soil Research and Management and the International Society of Soil Science. In 1995, he became the first Caribbean scientist to receive the International Institute for Co-operation in Agriculture's Gold Medal in Agriculture for his outstanding research on the soils of Latin America and the Caribbean. Though retired, he is still active as an international consultant in soil science

Emmanuel Amoroso

(1901-1982)

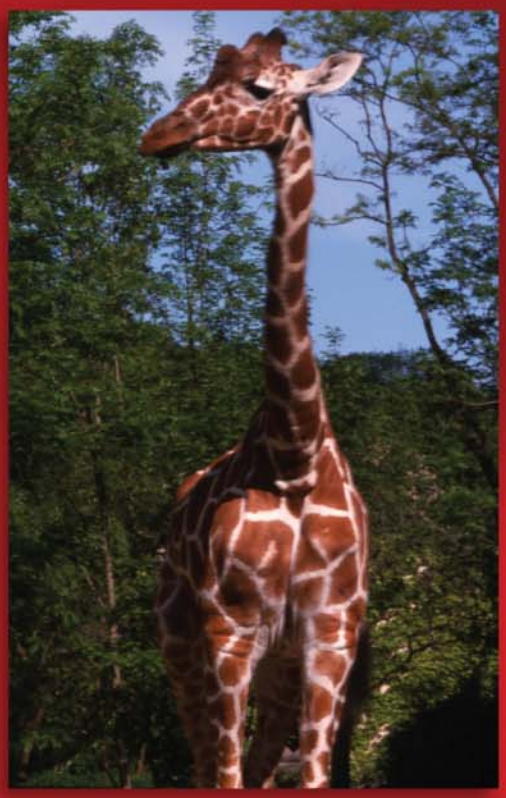
BIOLOGIST

Professor Emmanuel Amoroso gained international recognition as a reproductive biologist for his seminal work on the structure and function of the placenta. This research laid the foundation of the study of modern obstetrics and gynaecology and pioneered the development of the field of endocrinology.

Emmanuel Ciprian Amoroso was born in Woodbrook, Trinidad on September 16th 1901. He attended St Mary's College and participated in the arts and sports. He left after five years due to failing eyesight – a problem which persisted throughout his life. When it slightly improved, he studied on his own and taught at his alma mater.

He left for Ireland at age 21 to study medicine at the University College Dublin. He sold newspapers and tutored in order to defray financial expenses and even became proficient at boxing. He won all the academic prizes and graduated with a Bachelor of Science in 1926 and a Bachelor of Medicine and Surgery in 1929.

Amoroso spent two years in Germany studying at the Albert-Ludwigs University, Freiburg and Kaiser Wilhelm Institute for Cell Research, Berlin on



Top to Bottom:
1) University College, Dublin, Ireland
2) The giraffe-one of the subjects of Amoroso's later research.
3) Image of foetus and placenta in womb

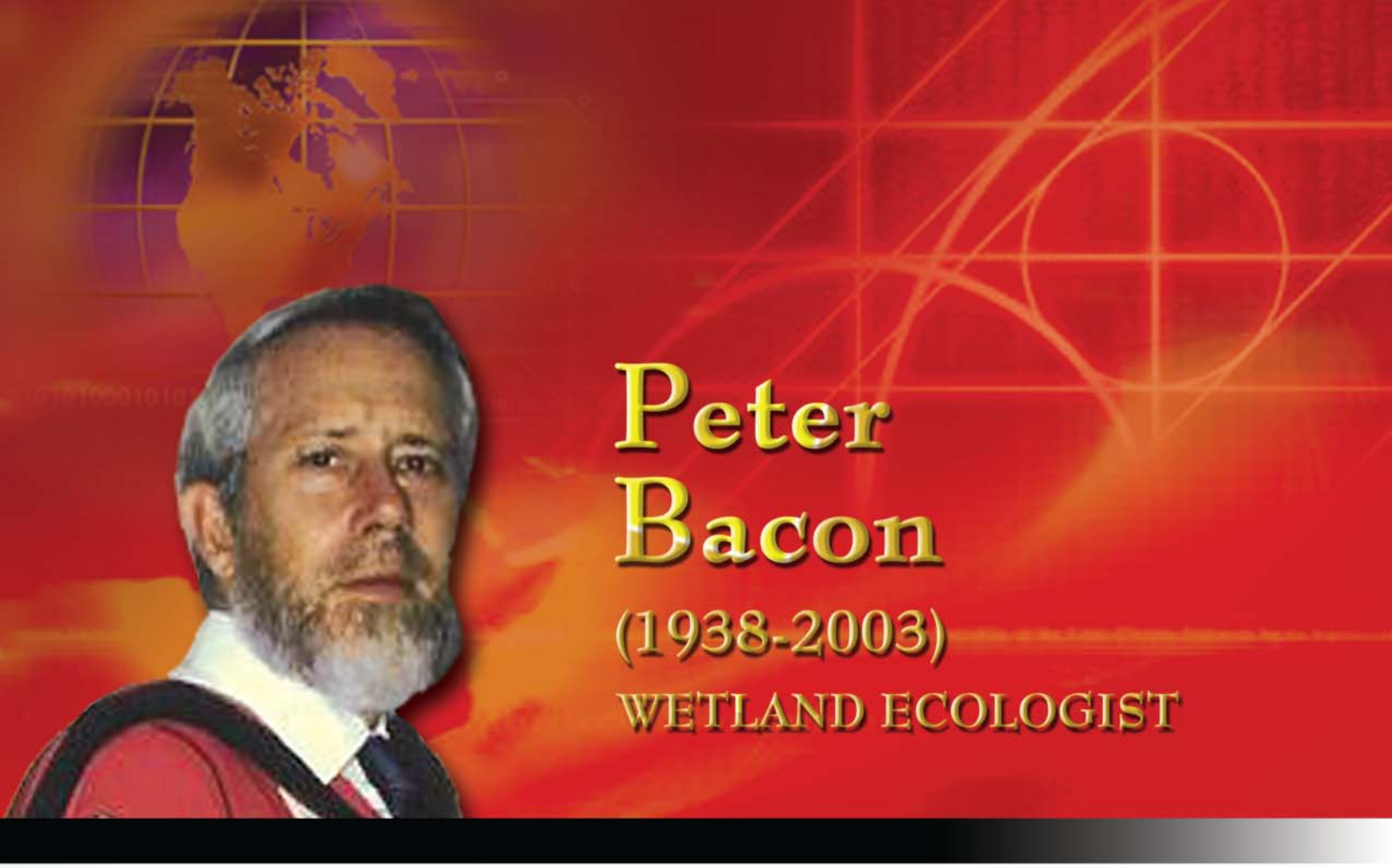
a Travelling Studentship from the National University of Ireland. In 1934 he received his doctorate from the University College, London.

He then joined the Royal Veterinary College as Senior Assistant, Histology and Embryology. The College focused on horse diseases but its research underwent unprecedented expansion to domestic and exotic animals through Amoroso's work. His research on cell structure and function improved understanding of organ development and reproduction. He advanced understanding of the role of placenta hormones in pregnancy, fetal development and fetal endocrinology. He also studied nervous and circulatory systems and investigated the valves of the jugular vein of the giraffe, camel and ostrich which prevent the rush of blood to the head as the animal lowers its neck to drink water.

Amoroso was appointed to the College's Chair of Veterinary Physiology from 1947 and held the post until retirement in 1968. He spoke six languages and mastered the art of lecturing. He is said to have created the finest department of Veterinary Physiology in England and was conferred the title of Emeritus Professor.

He received several honorary doctorates and in 1957 became the only West Indian elected a Fellow of the Royal Society of England. The British Government conferred upon him the title Commander of the Order of the British Empire (1969). His most cherished award was however the Trinity Cross from the Government of Trinidad and Tobago (1976).

Amoroso passed away on October 30th 1982.



Peter Bacon

(1938-2003)

WETLAND ECOLOGIST

Professor Peter Bacon was a well-known wetland specialist. An outstanding educator, he spent over three decades at the University of the West Indies (UWI), at Mona and St. Augustine, training young scientists. A certified Professional Wetland Scientist, his expertise in coastal and wetland ecology was highly valued at home and abroad.

Peter Robin Bacon was born on April 17th 1938 in Reading, England. After completing grammar school, he worked at the Museum of Natural History, England. He attained his Bachelor of Science (1961) and Postgraduate Certificate in Education (1962) from the University of London.

He taught at St. Mary's College and Trinity College, Trinidad while he pursued his doctoral degree at UWI St. Augustine. He produced a seminal thesis on the ecology of the Caroni Swamp and was the campus' first Ph.D. graduate in zoology in 1969.

Bacon lectured in zoology at UWI St. Augustine (1970-1980), the University of Calabar, Nigeria (1981-1982) and UWI Mona (1982-1993). He returned to UWI St. Augustine as Professor and Head of the Department of Life Sciences in 1993. He piloted research on the ecology of coastal wetlands and

Top to Bottom:
1) Professor Bacon at the Grand Canyon
2) Caroni Swamp
3) Night-time turtle nesting exercise
4) The Bacon family

invertebrates, coastal ecosystem management and developmental impact assessment in tropical islands.

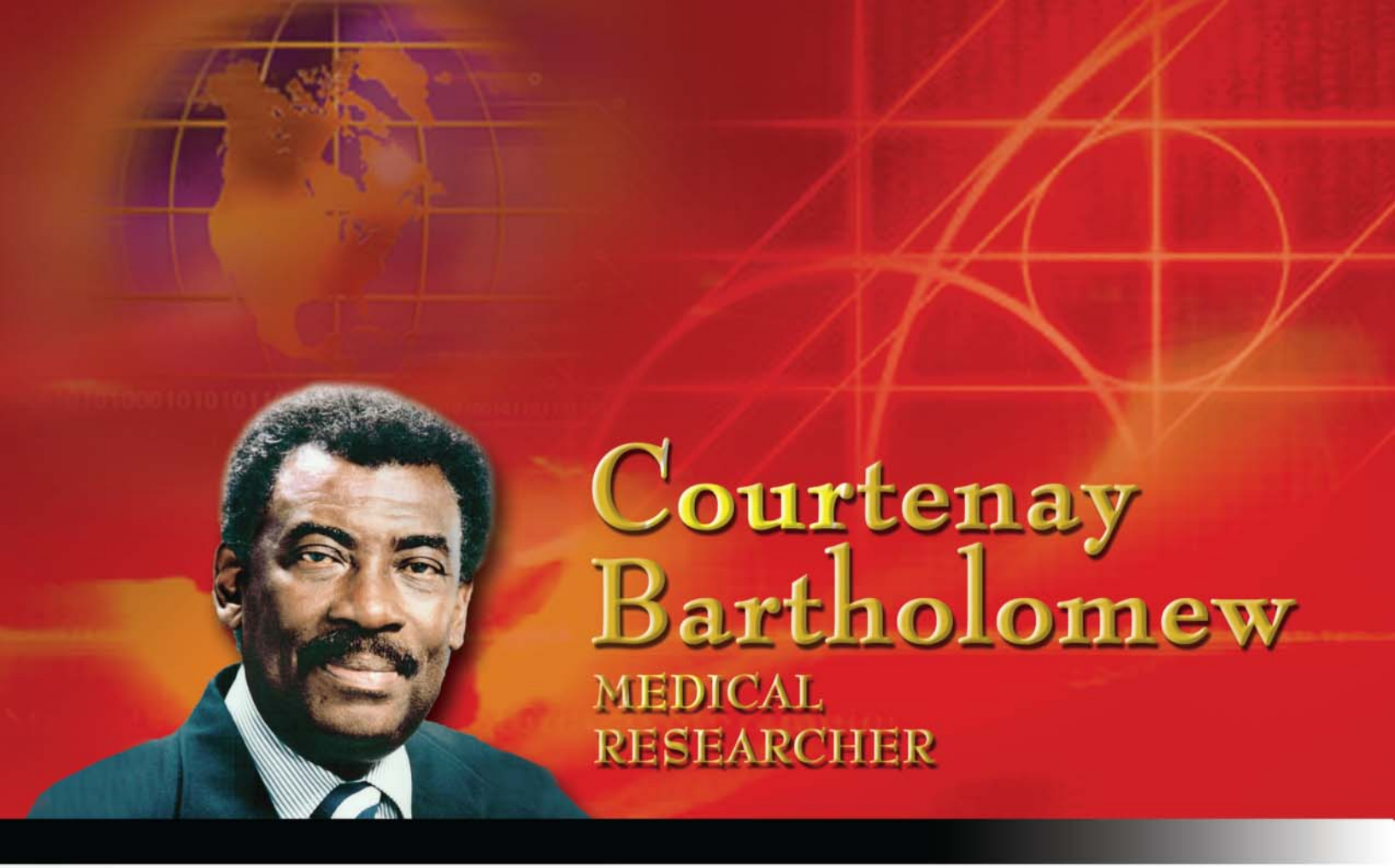
Bacon also supervised research on the Caroni and Nariva Swamps in Trinidad and wetland areas in Tobago. He was instrumental in providing improved facilities for the department's postgraduate students and was an architect of the Master of Science programme "Science for the Management of Tropical Environments".

Outside the University, he was a Regional Co-ordinator of the Wetland Restoration Group of the International Waterfowl and Wetlands Research Bureau and member of the UNEP/UNESCO Task Team on Impact of Expected Climate Change on Mangroves. He was a consultant to several international bodies including the International Union for the Conservation of Nature.

In Trinidad and Tobago, he served on the Wildlife Conservation Committee, the National Wetlands Management Committee, the boards of the Institute of Marine Affairs and the Asa Wright Nature Centre and was an active member of the Trinidad and Tobago Field Naturalists' Club.

Bacon researched the biology and conservation of leatherback turtles in the 1970s and 1980s which resulted in the publication of several articles. He was honoured by IOCARIBE for his dedication and service in establishing and conducting the Western Atlantic Turtle Symposium in Costa Rica (1983).

He authored several other scientific papers, manuals and books including "The Natural Resources of Trinidad and Tobago" and "Flora and Fauna of the Caribbean". With his wife Tyra, he co-authored nature conservation stories for children. He passed away on February 24th 2003.



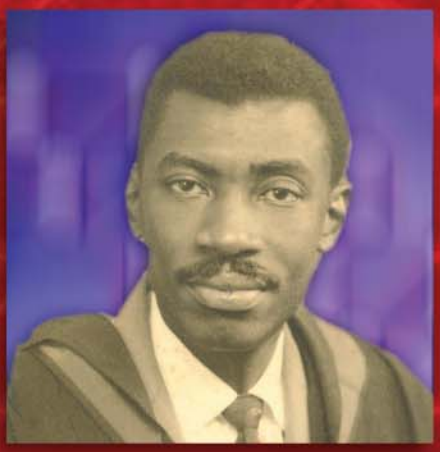
Courtenay Bartholomew

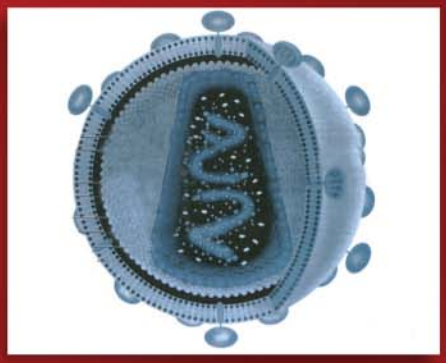
MEDICAL RESEARCHER

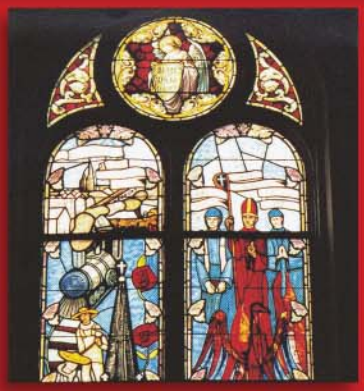
Professor Courtenay Bartholomew was the first Trinidadian-born Professor of the Faculty of Medicine of the University of the West Indies. He is currently the Director of the Medical Research Foundation of Trinidad and Tobago and Emeritus Professor of Medicine.

He has had an illustrious career spanning over four decades and is highly regarded as a clinician and medical researcher. He is especially reputed for his work on scorpion induced pancreatitis, viral hepatitis and on pioneering new approaches to the diagnosis of bowel disease in the Caribbean using endoscopic procedures. He has also been credited with the diagnosis of the first cases of AIDS in the English-speaking Caribbean.

Courtenay Felix Bartholomew grew up in Port of Spain, Trinidad. He attended Nelson Street Boys' R.C. School and then St. Mary's College where he came 4th in the island in the House Scholarship Awards of the Senior Cambridge Examination in 1948. He was an avid sportsman in cricket, football and table tennis and after obtaining the Higher School Certificate in languages in 1950, he worked for four years in Her Majesty's Customs before leaving for Dublin, Ireland to pursue medical studies. He graduated in medicine in 1960 from University College Dublin (UCD).







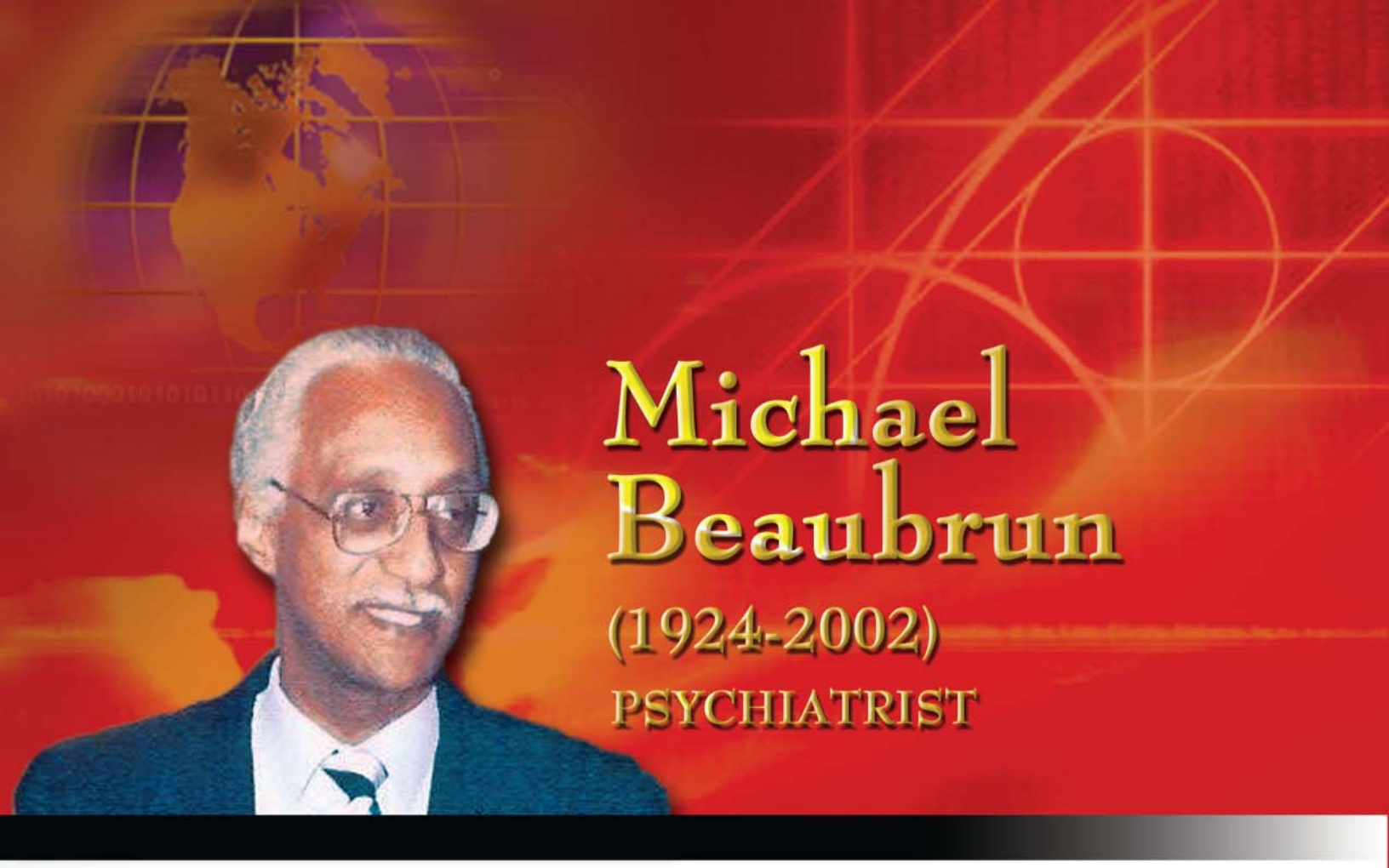
Top to Bottom:
1) University graduation day
2) AIDS virus
3) Professor Bartholomew at UCD Honorary Fellowship Ceremony, 2004
4) Stained glass window at the Cathedral of the Immaculate Conception, Trinidad

In 1964 he was the first West Indian to obtain a specialty degree in the subspecialty of gastroenterology from the Royal College of Physicians of Edinburgh and in 1965, he was awarded the Doctorate in Medicine (DM) from the National University of Ireland. He joined the Faculty of Medicine, UWI, in 1987 as the first lecturer in medicine to inaugurate the Medical School in Trinidad and Tobago. In 1983 he was awarded the MRCP degree (Member of the Royal College of Physicians of London) and was the only West Indian to be given this degree without examination. He is also the only West Indian to be awarded Honorary Fellowships from the three Royal Colleges (Ireland, Edinburgh and London). He has served as visiting clinical professor at the Liver Unit, University of Miami and the Gastroenterology Unit of the Royal Victoria Hospital, McGill University, Canada.

He was awarded the Chaconia Medal (Gold) by the Government of Trinidad and Tobago in 1975 "for long and meritorious service" and more recently in July 2004, he received the rare honour of Honorary Fellow of the Faculty of Medicine of UCD. He has also been appointed a member of the International Bioethics Committee of UNESCO.

He has seventy-five (75) publications in peer reviewed scientific journals and has written chapters in seven text books of medicine.

He has also authored seven books on his research on the Blessed Virgin Mary and has also spearheaded the restoration of three historical Catholic churches in Trinidad, including the design of twenty-five (25) stained glass windows.



Michael Beaubrun

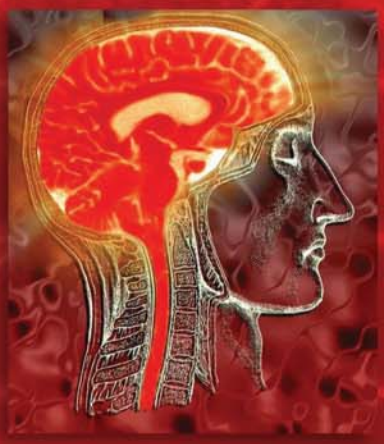
(1924-2002)

PSYCHIATRIST

Professor Michael Beaubrun was a remarkable individual who held many titles including Doctor, Professor and Senator. A psychiatrist by profession, Professor Beauburn made significant contributions to the fields of alcoholism and mental health. In 1956, his determination led to the introduction of Alcoholics Anonymous in the West Indies. Today, because of his foresight in implementing that pioneering project, thousands have been rehabilitated.

A Grenadian by birth, Michael Beaubrun was born on December 29th 1924. He attended Grenada Boys' Secondary School and in 1941, won the Grenada Open Island Scholarship. He completed one year of premedical science at Mc Gill University, then pursued his medical degree at Edinburgh University and his postgraduate studies in psychiatry at Maudsley Hospital, London.

Professor Beaubrun's career was decorated with achievements. He was the first Professor and Head of Department of Psychiatry at the University of the West Indies (UWI), Jamaica from 1964 to 1974. He also served as President of the World Federation for Mental Health from 1971 to 1975. During his tenure at the UWI, St Augustine from 1976 to 1988, he held the positions of



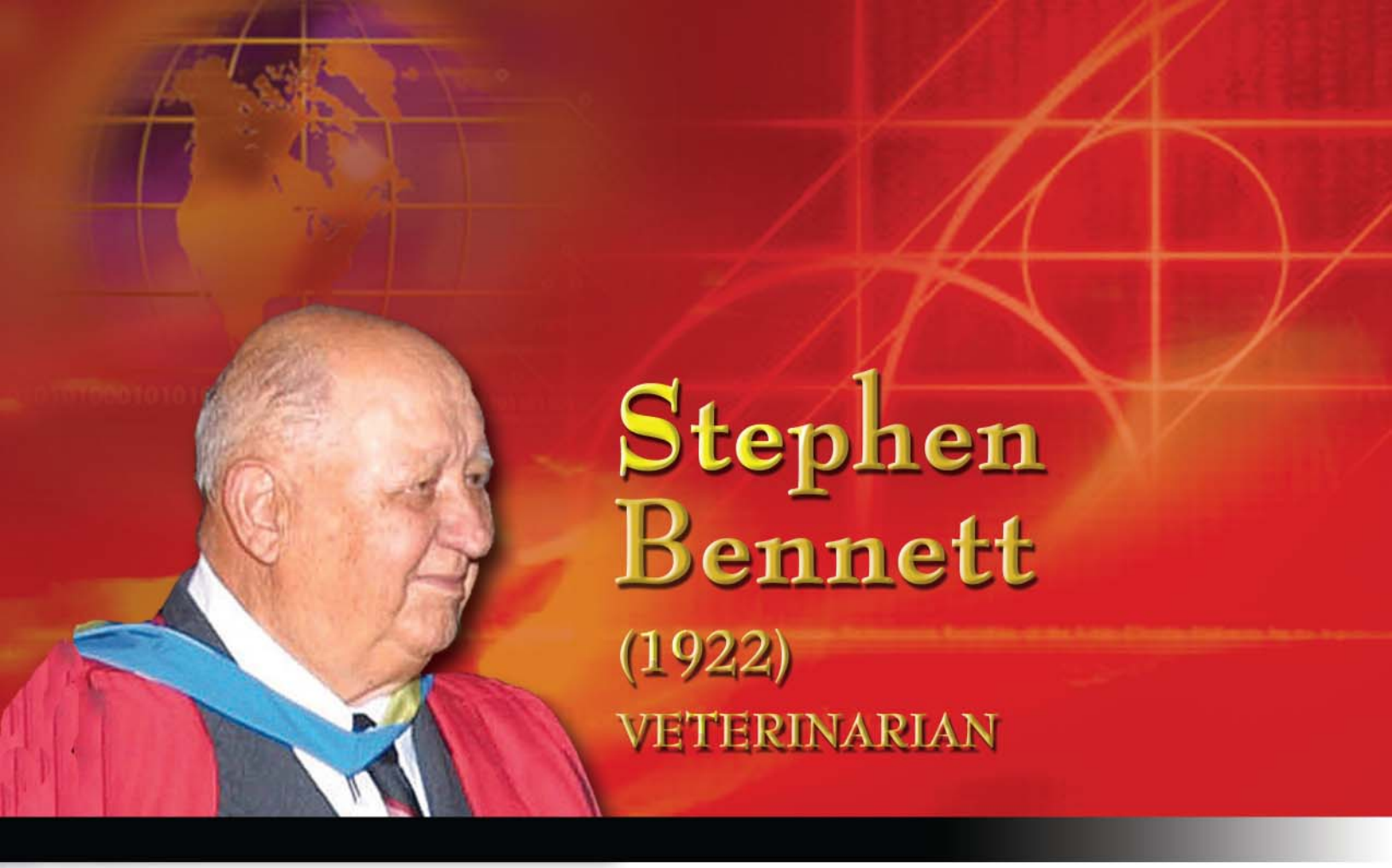
Top to Bottom:
1) Illustration of the human brain
2) Professor Beaubrun at CARIAD Conference 2002
3) Professor Beaubrun and his wife, Stella
4) Professor Beaubrun receives the Republic Day award

Campus Dean in the Faculty of Medical Sciences, Head of the Department of Medicine and Allied Disciplines, as well as Professor Emeritus of Psychiatry.

His career was not purely academic. He served as an Independent Senator in the first Republican Parliament of Trinidad and Tobago from 1976 to 1981. He was instrumental in the implementation of the new Mental Health Act and the Sectorisation Programme for Community Mental Health in 1975 and 1976 while serving as Principal Medical Officer – Institutions with the Ministry of Health, Trinidad. In 1975, he co-founded and directed the Caribbean Institute of Alcoholism and Other Drug Related Problems. He also functioned as Director of the St Ann's Hospital.

He received numerous awards for his achievements. These include the Chaconia Medal (Gold) of Trinidad and Tobago and the Edward W. Browning Achievement Award from the International Council on Alcohol and Addictions (1976). He also received the Spirit of the Caribbean Award (1984), the Scroll of Honour of the Trinidad and Tobago Medical Association, a Citation from the American Psychiatric Association, and Doctor of Science, Honoris Causa, from the UWI (1998).

Despite his extensive responsibilities Professor Beaubrun was a family man. He and his wife Stella successfully raised three children who are all high achievers. On December 20th 2002, this icon passed away leaving behind a rich legacy that will live on.



Stephen Bennett

(1922)

VETERINARIAN

Dr. Stephen Bennett is internationally famous for developing the prized meat-producing water buffalo named the buffalypso. The breed was successfully introduced to over 20 countries including Argentina, Costa Rica, Venezuela, USA and Italy. Dr. Bennett also pioneered veterinary practice in the Caribbean establishing services for racehorses, farm and domestic animals.

Stephen Bennett was born in Princes Town, Trinidad on January 28th 1922. At the age of ten, he became a professional jockey and developed an interest in animals. He attended St. Benedict's College (now Presentation College), San Fernando, where he took part in sports.

He studied agriculture at the Ontario Agricultural College (now University of Guelph), Canada and specialised in animal husbandry. He was an exceptional student and upon graduation in 1941 he won the prize for the highest total marks at the university. That year when forced to return home due to the outbreak of World War II, he worked on his father's dairy farm until he was put in charge of the Poultry and Livestock Division at Trinidad Leasehold Limited. After the war, he studied veterinary medicine at Colorado State University and graduated with a doctorate in 1948.

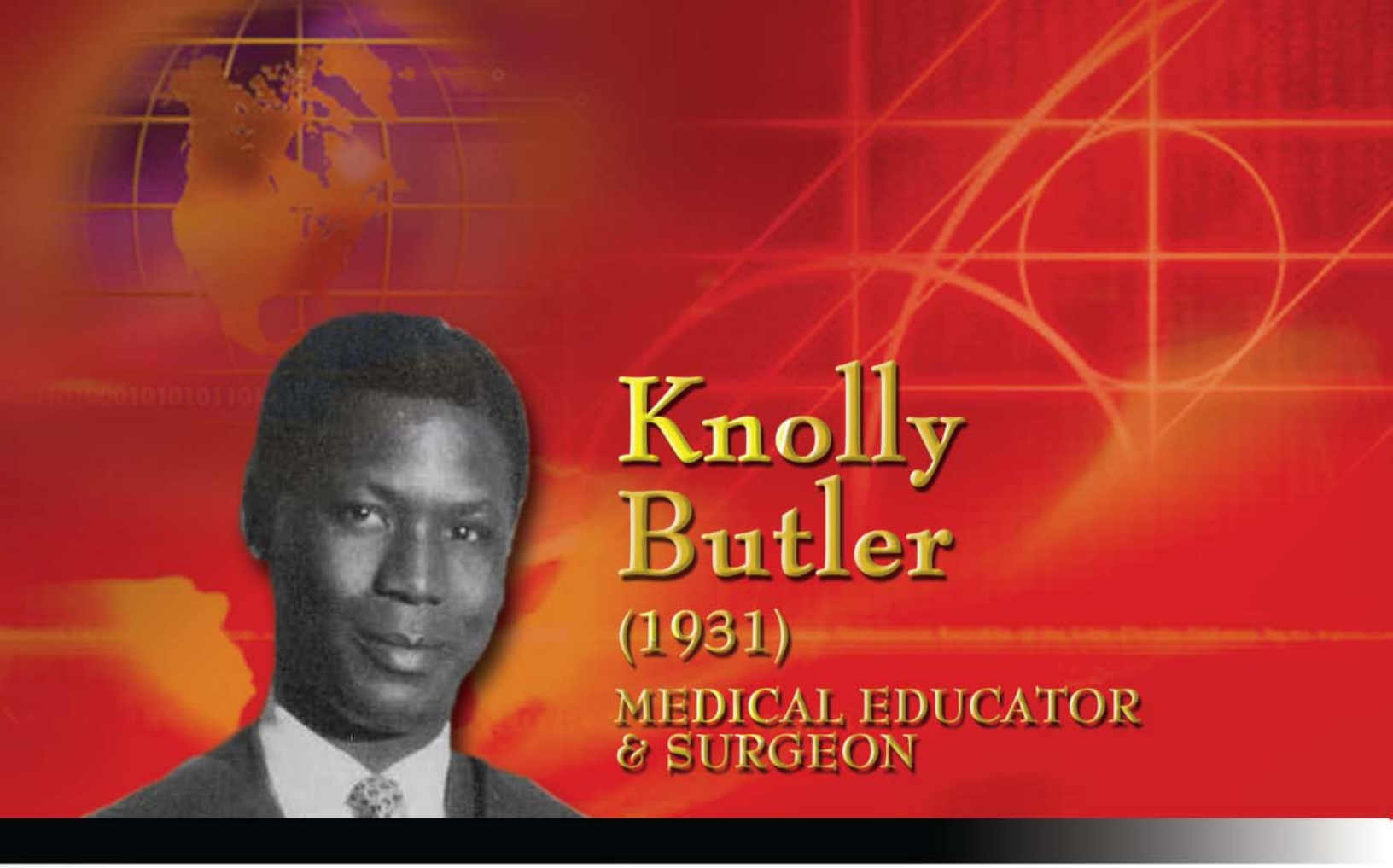
Top to Bottom:
1) Bennett on champion racehorse, Bachelor's Fort.
2) Dr. Bennett speaking at a conference
3) Dr. and Mrs. Stephen Bennett
4) Buffalypso produced by Dr. Stephen Bennett

Many people tried to dissuade him from entering this profession since "vets" in those days only treated horses and their days were numbered with the impending ascendancy of cars. This, however, did not discourage him. Bennett opened a private practice and together with Dr. William Jones he established a successful small animal clinic. He soon became known throughout the Caribbean for his unmatched skills as a "vet".

While at Caroni Limited he became interested in the water buffaloes that worked on the sugar estates. He soon realised the true potential of these tough, disease-resistance animals, and chose them for selective breeding. After years of research, he developed the buffalypso *(Bubalis bubalis)* in the early 1960s.

The buffalypso is a prized breed because of its thick skin that withstands parasites and its good quality beef and milk production. The skin is used in the manufacture of leather goods; its outer layer is used for belts and shoes and the thin inner layer for handbags.

Dr. Bennett received many awards for his contribution as a pioneer in veterinary medicine. They include the Chaconia Medal (Gold) from the Government of the Republic of Trinidad and Tobago (1984) and an Honorary Degree from The University of the West Indies (2001). For the development of the buffalypso he was made an honorary lifetime member of the American Water Buffalo Association.



Knolly Butler (1931)

MEDICAL EDUCATOR & SURGEON

Knolly Butler is Professor Emeritus of Clinical Surgery, University of the West Indies (UWI). He is an outstanding surgeon and educator who played a major role in developing the teaching of medical sciences at the UWI. In his 40-plus years of service as a medical educator, he has trained and mentored hundreds of doctors from the Caribbean region.

Born in Mayaro, Trinidad on August 3rd 1931, Knolly Alan Butler attended primary school in San Fernando and St. Benedict's College (now Presentation College), San Fernando. After his second year, he attended St. Mary's College, Port of Spain and later won an Island Scholarship.

He studied medicine at London University, England. He qualified in 1956 and won the Internal Medicine Prize in his final year. He then trained in surgery obtaining the Hallet Prize in 1958 and the Fellowship of the Royal College of Surgeons in 1960.

He returned to the Caribbean in 1963 to assume the post of Senior Surgical Registrar at the University Hopital in Mona, Jamaica. His department head was the prominent Guyanese surgeon, Sir Harry Annamunthodo.

Top to Bottom:
1) Butler graduates
2) Mount Hope Medical Sciences Complex
3) Professor Butler with Princess Anne
   (Prof. Butler to the left of Princess Anne)
4) Professor Butler (centre) with members
   of the Mt. Hope Task Force

With strong support from Sir Harry, Butler returned to Trinidad in 1967 to start a medical training programme. He initiated and developed the Eastern Caribbean Medical Scheme and was the head administrator in Trinidad for 23 years.

Between 1970 and 1971, he pursued vascular surgery at St. Mary's Hospital, London. He rose through the posts of Associate Dean, Vice Dean and later Dean of the Faculty of Medicine and was the Director of the School of Medicine at St. Augustine from 1983 to 1994. Two years after his retirement in 1995, he became the first Director of the Clinical Programme, a new UWI medical teaching programme in the Bahamas. He held the post until the end of 1999, one year after receiving the title Professor Emeritus.

Butler's skills as a teacher were in demand in the Bahamas, Jamaica and Trinidad. His love for teaching and his high standard as an examiner have not allowed him any vacation from the task. He still lectures two afternoons a week at the Mt. Hope Medical Sciences Complex in Trinidad. He is an examiner for both the Mt. Hope and Mona medical faculties and the postgraduate school at Mona.

He is a founding member and present Chairman of the Trinidad and Tobago Institute of the West Indies, a think tank, and a member of the Association of Caribbean Surgeons. In 1987, he received the Chaconia Medal (Gold) from the Government of Trinidad and Tobago for his outstanding contribution.

Rudranath Capildeo

(1920-1970)

MATHEMATICIAN

Dr. Rudranath Capildeo is renowned for his intellectual contribution to the fields of applied mathematics and physics. He is best known, perhaps, for his interest and understanding of Einstein's Theory of Special Relativity. His work resulted in new theories, such as the "Theory of Rotation and Gravity" or "Capildeo's Theory."

Rudranath Capildeo was born on February 2nd 1920 in Chaguanas, Trinidad. He lived at the famous "Lion House". A former national scholarship winner, he attended Queen's Royal College (QRC). He began studies in medicine at Oxford University, but switched to mathematics at the University College London due to illness.

He completed an intermediate Bachelor of Science degree and graduated with a Bachelor of Science in Mathematics (First Class Honours) in 1943. Capildeo returned to Trinidad and taught mathematics at QRC for a brief period. He furthered his studies at the University College London gaining a Master of Science and a Doctorate in Mathematical Physics in 1945 and 1948 respectively.

Top to Bottom:
1) Pundit Capildeo and Sogee- Dr. Capildeo's parents
2) The Capildeo Family with Rudranath standing far left
3) Rudranath Capildeo
4) "Lion House" in Chaguanas.

He was a gifted educator in mathematics and physics. He spent most of his teaching life at the University College London, but also taught at other institutions including Westfield College in London and the University of Khartoum, Sudan. He was the first principal of the Trinidad Polytechnic School.

Capildeo was considered an outstanding scholar whose ability to manipulate mathematical techniques enabled him to solve any problem. Relativity, vector algebra and mechanics engaged the mind of this scientist. The Flexure Problem in Elasticity (Ph.D. thesis), a topic with practical implication in aerodynamics, was one of several research works written by him. He also published a book on mathematics entitled "Vector Algebra and Mechanics: Theory, Problems and Solutions".

Regarding his interest in Einstein's theory of relativity, Capildeo stated that his purpose in researching this theory was not to contradict, but rather fortify, complete and review areas of uncertainty.

He studied law in London while researching Einstein's work, and was admitted to practise as a Barrister-at-Law in Trinidad and Tobago in 1958. He later founded and led the Democratic Labour Party (1960-1969), which helped draft the independence constitution of Trinidad and Tobago. Dr. Capildeo was Leader of the Opposition in Parliament while his former QRC classmate, Dr. Eric Williams was Prime Minister.

Dr. Capildeo received the country's highest national award, the Trinity Cross, from the Government of Trinidad and Tobago in 1969 for his outstanding achievements.

He died in England on 12th May 1970.

Ivan Chang-Yen (1947)

ANALYTICAL CHEMIST

Dr. Ivan Chang-Yen is one of the Caribbean's leading analytical chemists, who has taught, published and consulted extensively in his field for nearly three decades. He helped initiate the analytical chemistry programme at the University of the West Indies, St. Augustine in 1977 and has coordinated the programme since 1979. This programme has produced hundreds of graduates, who have excelled locally and abroad, and has led to the development of analytical programmes at the Mona and Cave Hill campuses.

Ivan Chang-Yen was born in Guyana on February 14th 1947. He attended Central High School, then Queen's College where he worked from 1966, while attending the University of Guyana part-time. After graduating with a Bachelor of Science in Chemistry and Biology in 1971, he worked as a research assistant in natural products for two years. Despite preferring biology to chemistry, he pursued his master's and doctoral degrees in analytical chemistry at the University of Bristol, England between 1974 and 1976.

After graduating, he returned to the Caribbean to lecture at UWI, St. Augustine, where he initiated the first analytical chemistry programme with

Top to Bottom:
1) Dr. Ivan Chang-Yen in a chemistry lab, 1985
2) Dr. Chang-Yen with Ecuadorian friends
3) An orchid plant

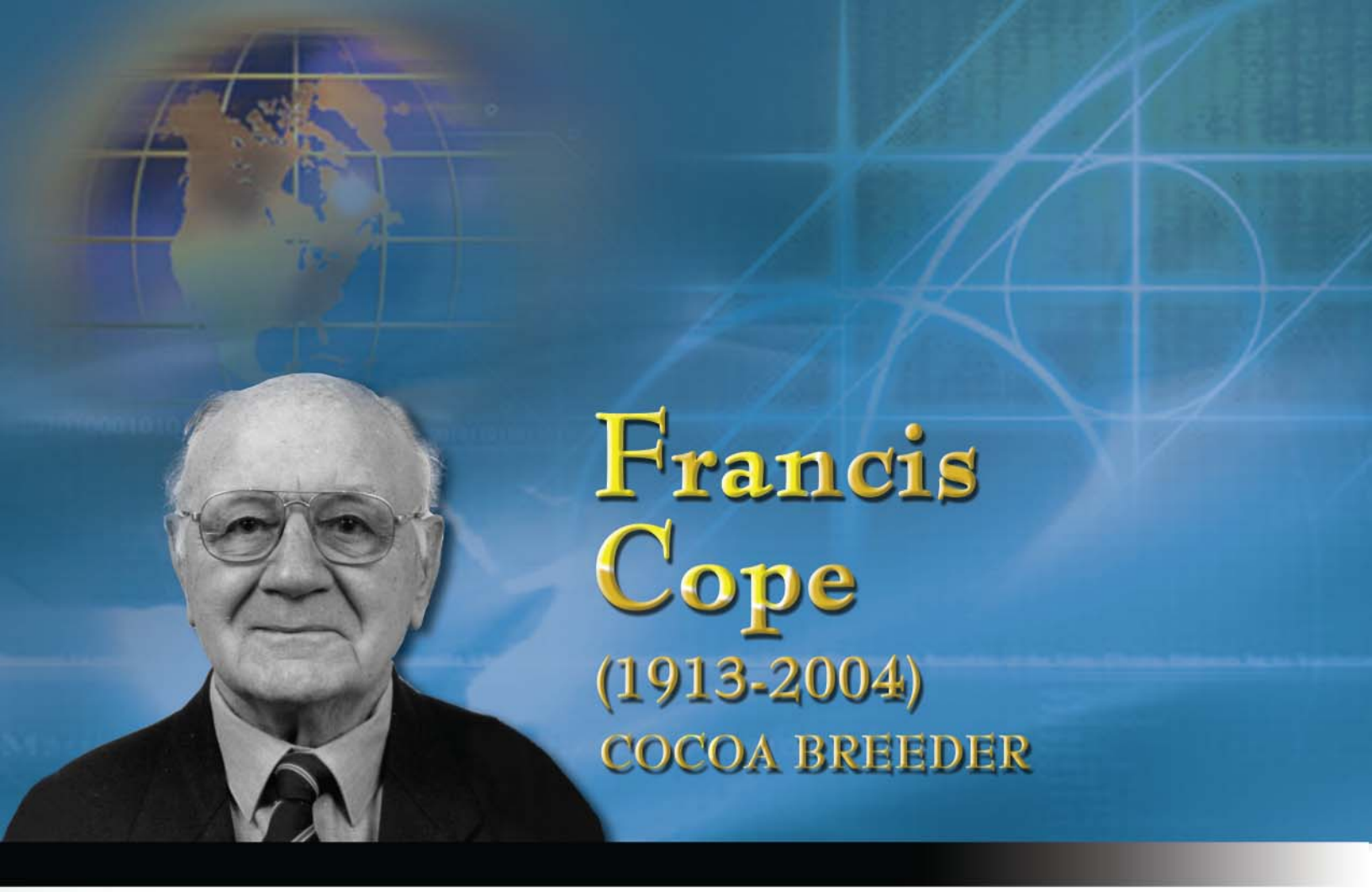
Dr. Philip Jones and continued with Dr. Lutchminarine Chatergoon. This programme continues to develop through close collaboration with local institutions and industries in order to prepare students with the necessary skills for the workplace.

Chang-Yen is well-known for his research in Trinidad and Tobago on heavy metals and for pioneering work on the fingerprinting of crude oils in land and marine environments. Other important work includes food safety and security; laboratory quality; lead pollution, poisoning and prevention, all of which have had significant social and environmental value locally and in the wider Caribbean.

His expertise has been used by the Institute of Marine Affairs, the Trinidad & Tobago Bureau of Standards, the Ministry of Health, the Forensic Science Centre, the Environmental Management Authority and the Pan American Health Organization. He currently holds memberships in the American Chemical Society and the Association of Official Analytical Chemists and is the Trinidad and Tobago representative to the International Union of Pure and Applied Chemistry.

As a scientist, he constantly thinks of improving efficiency and quality, but relaxes by cooking, making local wines, growing orchids and practising black and white and colour photography.

He advises children to: "Dream and plan things you would like to do and not what somebody else wants you to do; become people of tomorrow rather than people who just follow others of today".



Francis Cope

(1913-2004)

COCOA BREEDER

Dr. Francis Cope contributed to the development of cocoa breeding programmes and the training of plant breeders. In the 1950s his work on the compatibility/incompatibility system in *Theobroma cacao* (cocoa) was the basis for all further work on cocoa breeding.

Francis William Cope was born on August 15th 1913 in Portsmouth, England. He attended the Municipal College in Portsmouth and graduated with a Bachelor of Science (General) with honours in botany, chemistry and mathematics in 1934. He was awarded a Royal Scholarship to study botany and geology at the Royal College of Science and Technology, University of London. He graduated with a Bachelor of Science (Special) with First Class Honours in 1936.

From 1937 to 1940, he served as junior botanist for cocoa research at the Imperial College of Tropical Agriculture (ICTA) in Trinidad, where his principal interest was in incompatibility studies. Cope noted some factors that controlled the yield of young cocoa, such as the self-compatible trees being superior in yield of harvested pods to the self-incompatible tree. In addition to conducting research, he taught plant physiology at ICTA.

Top to Bottom:
1) *Theobroma cacao* (cocoa) pods
2) UWI Administration building (former ICTA building)
3) Cocoa beans
4) Amazon Rain Forest

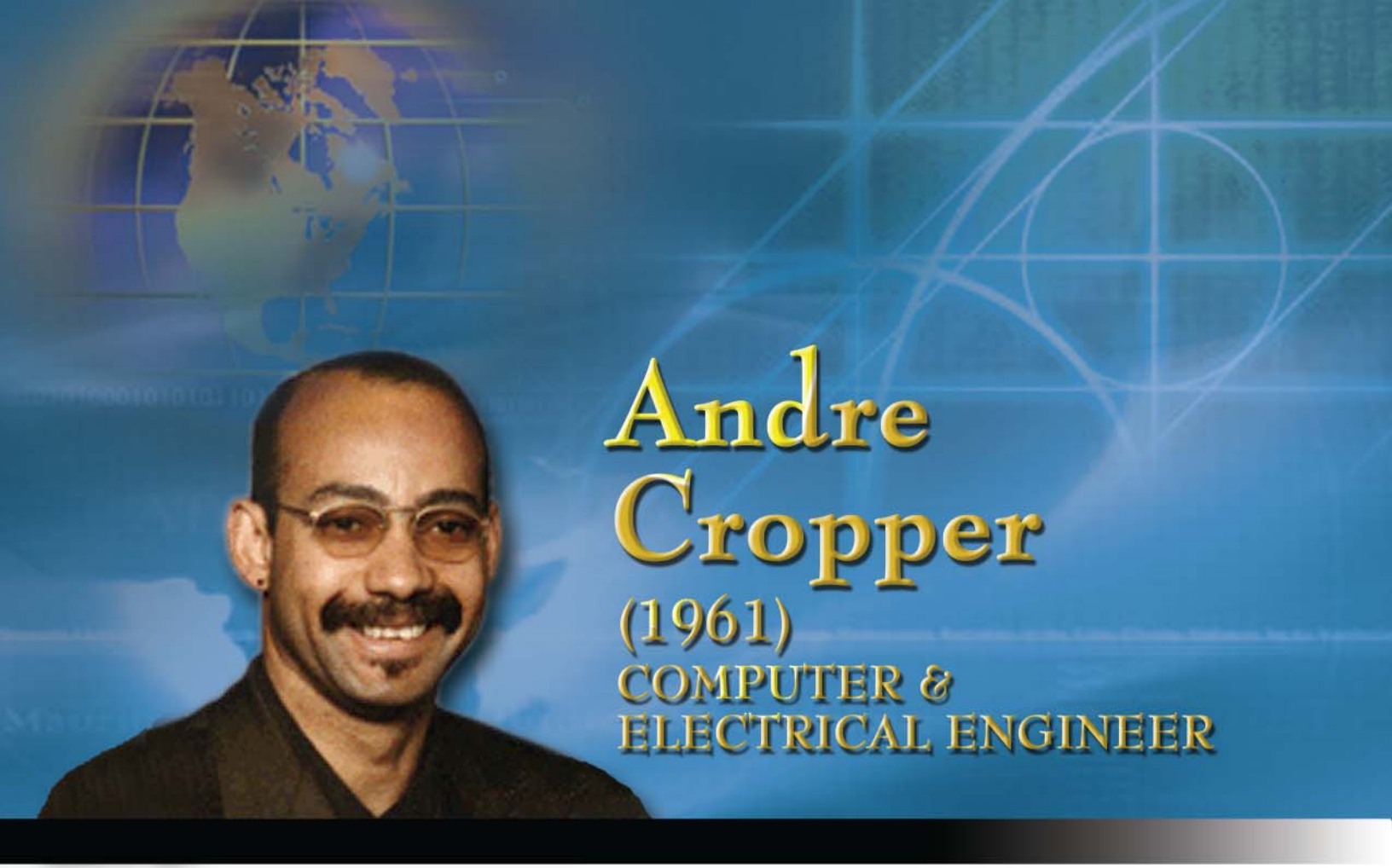
In 1940, he left for Grenada to operate the Cocoa Industry Improvement Scheme. Later he represented the Caribbean at the very first Cocoa Conference, which was held in London in 1945. That same year, he obtained his M.Sc. from the University of London. He was appointed Cocoa Agronomist to the Windward Islands in 1946 and was responsible for researching cocoa breeding and training cocoa plant breeders in the region.

Returning to work at ICTA from 1948-1962, he undertook a two-year expedition to the Amazon forests in Colombia to collect cocoa and its germplasm. In 1959 he worked out the compatibility/incompatibility system in *Theobroma cacao* and for his seminal work, he was awarded the Ph.D. from the University of London.

In 1962, Dr. Cope began teaching plant breeding and the botany of tropical crops at the Faculty of Agriculture, UWI. Generations of plant breeders were introduced to the subject and trained by him. He was an editor of the journal of the Faculty, 'Tropical Agriculture', and became Editor-in-Chief.

He was the first Head of the Department of Biological Sciences (a union of the former departments of botany and plant pathology, zoology and entomology). In 1967, he was appointed Professor of Botany and after his retirement in 1973, he received the title Professor Emeritus.

Professor Cope relocated to the United Kingdom in 1984, where he died on February 23rd 2004.



Andre Cropper

(1961)

COMPUTER & ELECTRICAL ENGINEER

Dr. Andre Cropper is a foreign-based electrical engineer who has developed a new semi-conductor from thin layers of laboratory produced diamond. This outstanding innovator holds patents for the inexpensive manufacture of Organic Light Emitting Diodes (OLEDs) and stands poised to revolutionise the electronics market with his new innovations.

Andre Dominic Anthony Peter Cropper was born on August 4th 1961 and grew up in St James, Trinidad. He attended Newtown Boys R.C. Primary School and Fatima College. He was fascinated by Mathematics and Physics and often tinkered with electronic devices as a youngster. He knew he wanted to be an electrical engineer. An avid swimmer, he represented Trinidad and Tobago in Caribbean and international games during the 1970s.

He received a Bachelor of Science in Electrical Engineering from Howard University, Washington D.C. in 1984 and a Master of Science in 1987 and taught at Norfolk State University, in Norfolk, Virginia. In his spare time, he began research on diamond technologies and their applications to semi-conductor technologies.

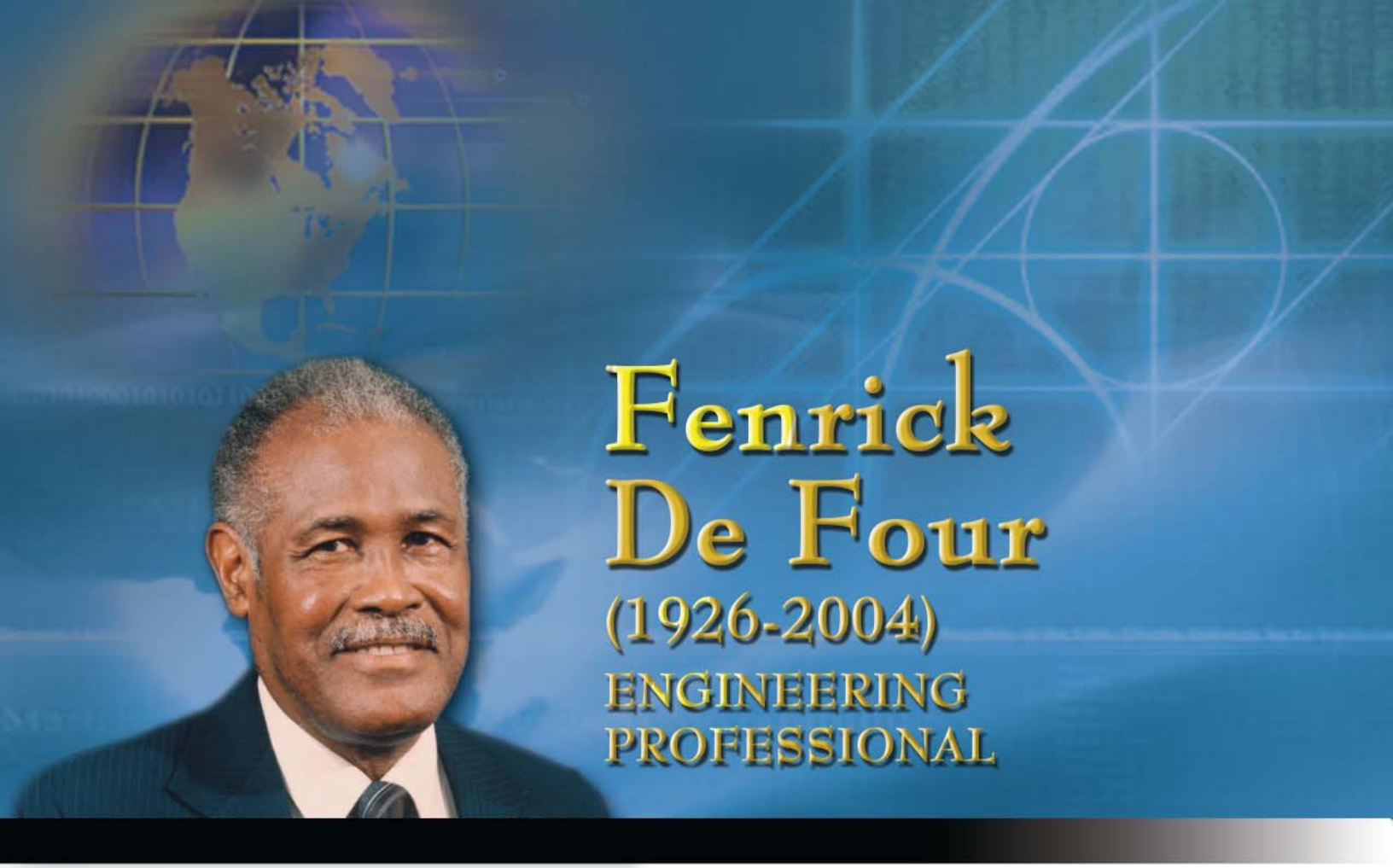
Top to Bottom:
1) Young Cropper with parents
2) Cropper with his wagon
3) Flat panel TV with image of Cropper at swim meet
4) Cropper in Japan in 1999

Cropper sent a proposal to NASA and impressed the agency with the idea, but was informed that "a qualified researcher" would take charge of the work and he would work under that person as he did not have his doctorate. He refused the offer, and in 1995 gained his Ph.D in Electrical/Materials Engineering from Virginia Polytechnic Institute and State University in Blacksburg, Virginia where he developed his idea. He returned to Trinidad and lectured at the Department of Electrical Engineering, the University of the West Indies.

In 1999 he joined Eastman Kodak Company in Rochester, New York as a Research Associate and Project Manager of OLED applications. Presently, he is the Technology Development Manager for New Business within the U.S Department of Defense and other National Laboratories within ITT Industries Space Systems Division. He determines discriminating image science, electronic and sensor product technologies needed to support innovation, prepares technology roadmaps and initiates and pursues funding for research and development projects.

In his free time he is involved in the promotion of science awareness to educate and inspire young scientists. He contributes to academic institutions conducting workshops and guest lectures at university campuses, professional organizations and science fairs. He is a role model and liaison with schools from kindergarten to secondary level.

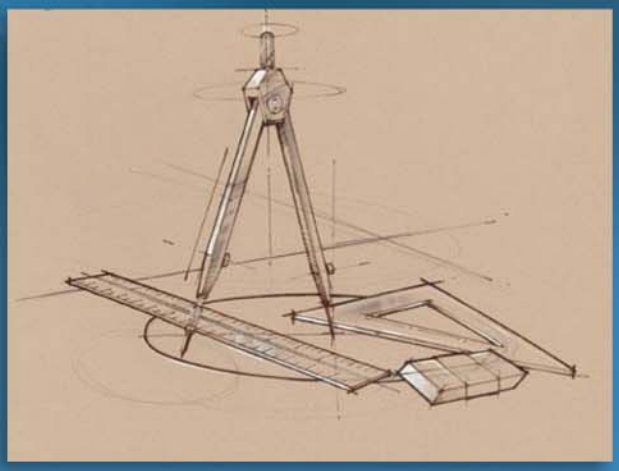
Cropper regularly gives back to the youths of his homeland and has delivered seminars at Fatima College, St. Anthony's College, Republic Bank Youth Link and The University of the West Indies. His vision is to promote science and engineering awareness in our society and to encourage young innovative minds to develop and attain their true potential.



Fenrick De Four (1926-2004) ENGINEERING PROFESSIONAL

Mr. Fenrick De Four was an extraordinary man committed to the service of his country and profession. His unassuming nature belied his many contributions to the Caribbean, in particular Trinidad and Tobago. An engineer by profession, he was the lead author of almost every national engineering code and standard. He was also responsible for the harmonisation of registration laws for engineers in the Caricom region to facilitate the free movement of professionals. His work directly impacted on the profession of engineering in the Caribbean and it improved the lives of countless people.

Born on April 15th 1926, Fenrick De Four was a former student of St. Mary's College. In 1950 he obtained a Bachelor of Science in Electrical Engineering from Howard University, Washington DC. He received his Master of Science in Civil Engineering (1954) from the Polytechnic Institute of Brooklyn, New York and a Master of Science in Engineering Mechanics (1956) from New York University, New York. He also pursued numerous short courses including Executive Management Studies (1965) at the University of the West Indies and the Owner/President Management Program (1980) at Harvard University, USA.

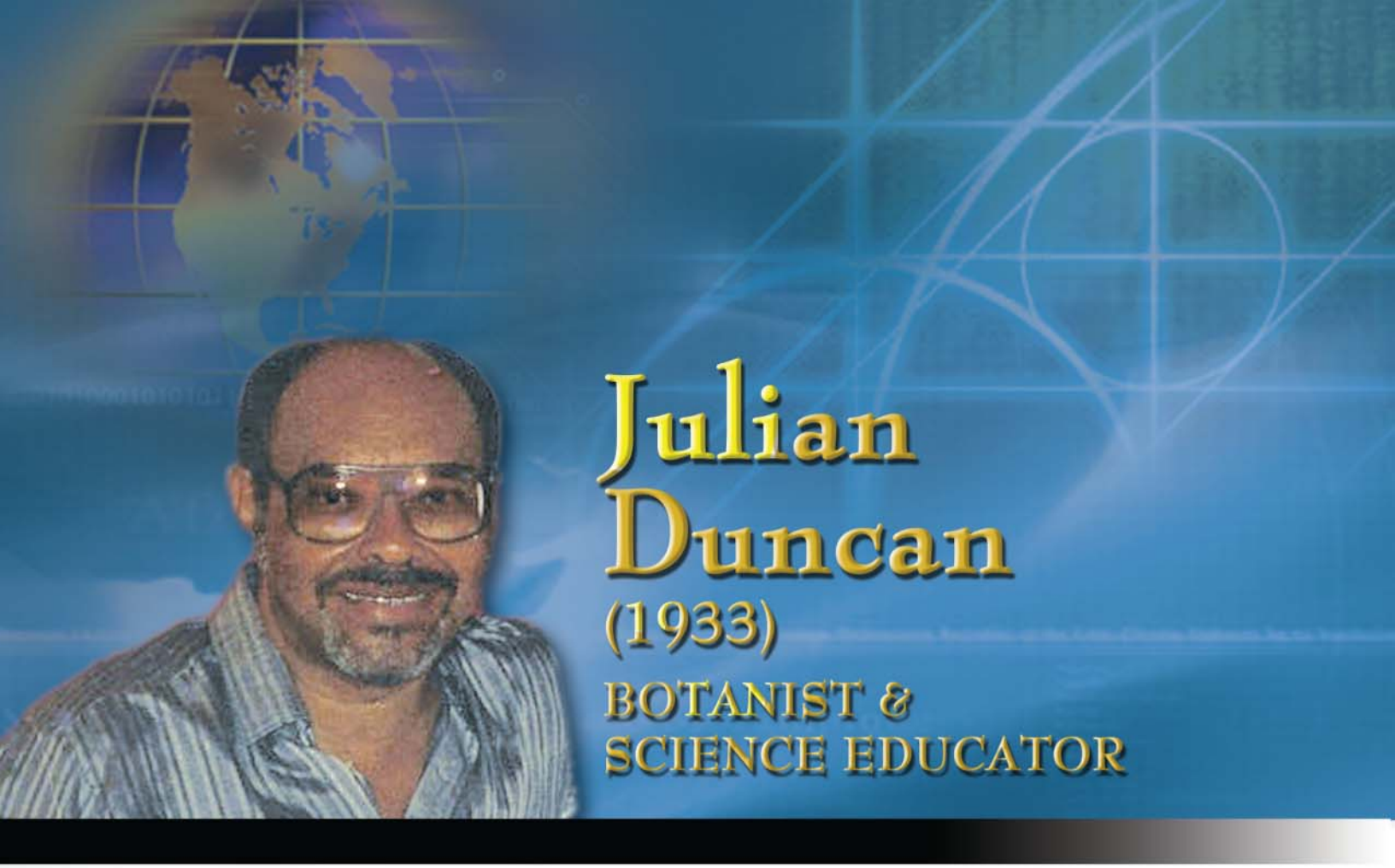


Top to Bottom:
1) De Four in his graduation robes
2) Engineering tools
3) Engineer at work

Always at the forefront during his career, Mr. De Four was a founding member, President and Fellow of the Association of Professional Engineers of Trinidad and Tobago (APETT) and the first Secretary-General of the Council of Caribbean Engineering Organisations (1966 – 1973). He served as the first Chairman of the Board of Engineers of Trinidad and Tobago for twelve years from 1986. He was also President of the Association of Consulting Engineers of Trinidad and Tobago (1991). In 1972 he founded A De B Consultants Limited, Port of Spain and served as its Chairman and Managing Director. He was also the Director of A De B practices in Jamaica, Barbados, St Lucia, St. Kitts and London.

Throughout his career, Mr. De Four served on many national commissions as well as committees to review or establish engineering codes and standards. He was also an expert adviser to the NIHERST Committee on the Recognition of Degrees (CORD) for several years. For his outstanding contributions, he was honoured with APETT's "Career in Excellence" Award, as well as the Chaconia Medal (Silver) posthumously in 2004.

Despite his decorated career, Mr. De Four was a humble, kind and generous man who was active in the St. Vincent De Paul Society and Opus Dei. This exemplary engineer, devoted husband and father of four passed away on April 3rd 2004.



Julian Duncan (1933)

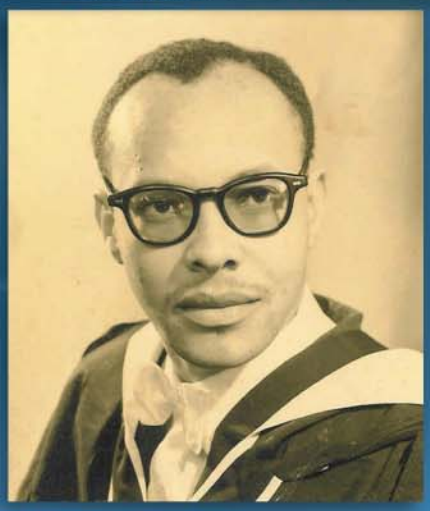
BOTANIST & SCIENCE EDUCATOR

Julian Duncan, Emeritus Professor at the University of the West Indies (UWI), St. Augustine, has lectured in the field of Botany for over 35 years. He has contributed to the training of hundreds of young scientists through his teaching and research. He is also well-known for pioneering plant tissue culture techniques and in developing Trinidad and Tobago's capability in plant biotechnology.

Julian Duncan was born in St. Vincent on December 9th 1933. He attended St. Vincent Boys' Grammar School. After completing school, he taught geography at secondary school. He entered the University College of the West Indies (UCWI), Jamaica in 1957 and graduated with a Bachelor of Science in Botany and Zoology in 1960.

The first recipient of the Sir James Irvine Memorial Scholarship, he obtained a doctorate in Fungal Genetics and Cytology at St Andrews University, Scotland in 1963. His Ph.D. thesis researched nuclear division in fungi for which no precise theory yet existed and he published a new hypothesis.

Duncan returned to the Caribbean in 1963 and began lecturing at the UWI, St. Augustine. In 1975 he underwent training in the practices of plant tissue



Top to Bottom:
1) Duncan and his family
2) A graduation portrait
3) Plants in nursery
4) Professor Duncan receiving the Vice-Chancellor's Award for Excellence in Teaching and Administration

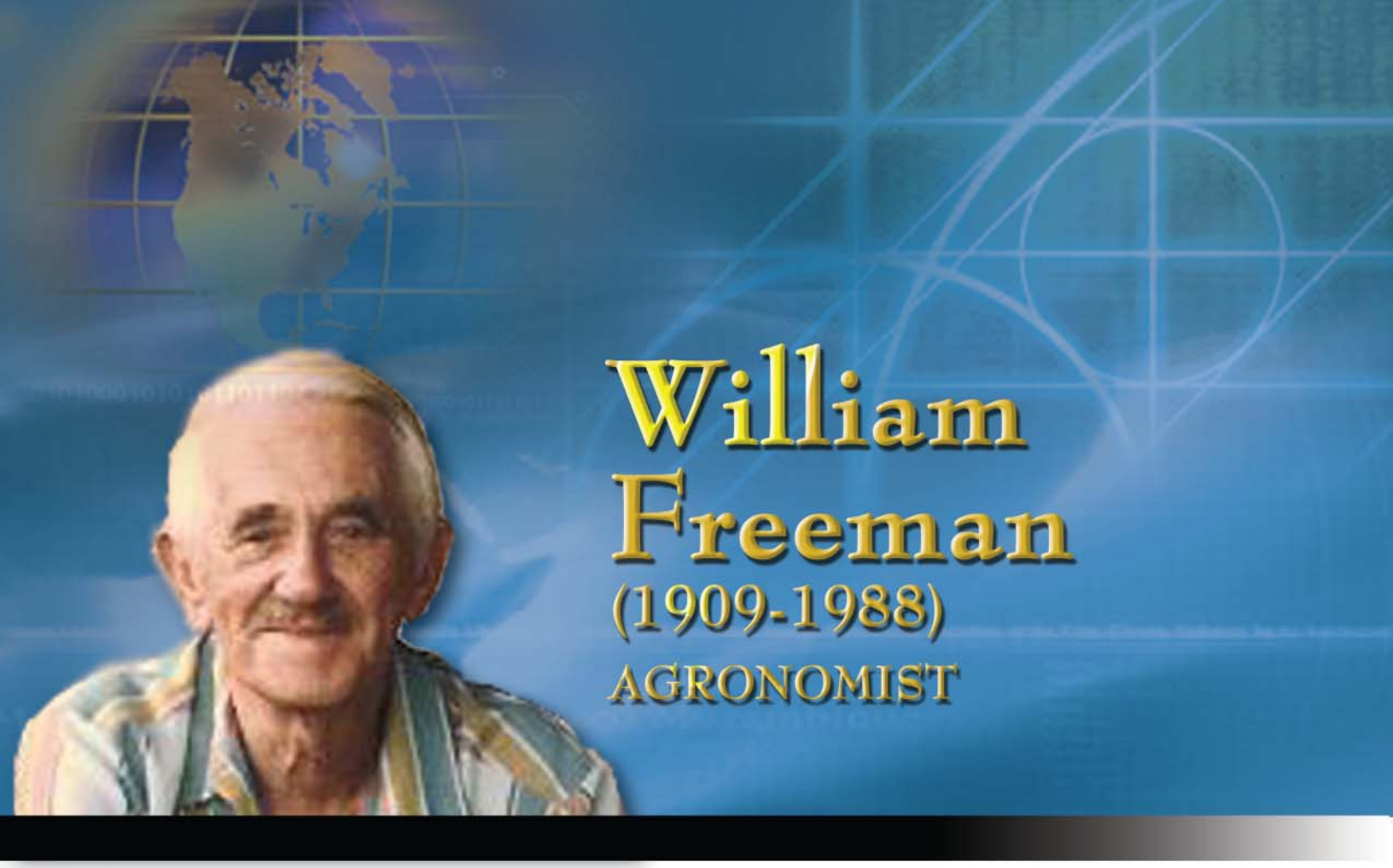
culture at Freie Universitat in Berlin, Germany. He lectured briefly at the University of Reading, Britain and returned to Trinidad in 1976 to introduce a new undergraduate course in plant propagation.

He set up a small laboratory for tissue culture applications and updated his training in Piracicaba, Brazil in 1980. With the support of state and international agencies, he later established the UWI Biotechnology Research Programme and built a larger, modern facility to develop local capability. He also helped establish in 1990 the first semi-commercial plant biotechnology facility in CARICOM.

Apart from introducing new courses in botany, supervising postgraduate students and holding senior administrative positions, Duncan founded the UWI Biological Society. He also served on the boards of the Caribbean Industrial Research Institute, Institute of Marine Affairs and Asa Wright Nature Centre. He was the National Co-ordinator of the OAS Multinational Project in Biotechnology and Food (1990-1996).

In 1994 he received the inaugural UWI Vice Chancellor's Award for Excellence in Teaching and Administration. In 2000, he received a NIHERST Lifetime Achievement Award for lifelong commitment to plant biotechnology.

Duncan authored a book on local flowers and published several articles in recognised scientific journals. Retired since 1999, he remains active in teaching and research, and represents Trinidad and Tobago on the Board of Governors of the International Centre for Genetic Engineering and Biotechnology (ICGEB).



William Freeman
(1909-1988)
AGRONOMIST

Edwin Freeman's dedication to research led to significant advances in cocoa breeding during the period 1960–1984. He developed one of the world's most successful varieties of cocoa, the Trinidad Select Hybrid (TSH).

William Edwin Freeman was born on May 4th 1909 in Kent, England. His father was a former Director of Agriculture in Trinidad and Tobago so he briefly attended a primary school based at Queen's Royal College. He continued his schooling in England.

He studied at the University of London and at Cambridge University and gained a bachelor's degree with first class honours in botany. At Cambridge, he captained the rugby team and excelled on the sculling team. He undertook postgraduate training at Cambridge and at the Imperial College of Tropical Agriculture, where he completed a thesis on cocoa.

From 1931 as a plant-breeding probationer, Freeman conducted research throughout Africa. He did experimental work on groundnuts, tobacco, sorghum and cotton in Northern Nigeria; supervised banana, oil palm, rubber and cocoa plantations in British Cameroon; conducted fertiliser trials in

Top to Bottom:
1) The cocoa plant
2) William Freeman enjoying a quiet moment
3) Freeman and colleagues in Nigeria
4) Freeman in his trademark field gear

Mauritius; and established quinine plantations in Southern Nigeria and Cameroon. He retired as Senior Botanist in 1953.

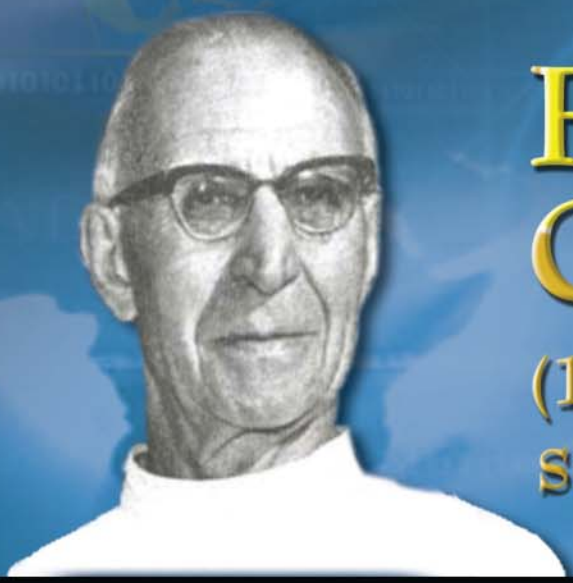
He returned to Trinidad in 1954 and became a tutor in crop husbandry at the Eastern Caribbean Farm Institute (now Eastern Caribbean Institute of Agriculture and Forestry) in Centeno. In 1956 he joined the Cocoa Board as a research officer and engaged in the breeding of improved cocoa clones and hybrid seedlings.

When the Board ceased operations in 1968, Freeman continued his work at the Ministry of Agriculture until retirement in 1978. After years of experimentation he developed the prized Trinidad Select Hybrid (TSH). According to the Ministry, eight commercialised TSH varieties have high yield, excellent flavour and resistance to Ceratocystis wilt and Witches' Broom diseases.

He also pioneered the introduction of high density planting systems for cocoa. This work was of significance to all cocoa growing nations, but mostly to Trinidad, which boasts of producing the finest quality cocoa in the world.

Freeman derived great satisfaction from his work and research. He emphasised simplicity and his advice was, "If there are two words with the same meaning, always use the smaller one." He was an active member of the Horticultural Society of Trinidad and Tobago. He was honoured by the Agricultural Society of Trinidad and Tobago and also by the University of the West Indies, which named a street after him.

He passed away in 1988 and was bestowed the Chaconia Medal (Gold) in 1991 for his contribution to agriculture.



Fr. Leonard Graf

(1883-1970)

SCIENCE EDUCATOR

Father Leonard Graf built and sustained the reputation of St. Mary's College for excellence in science teaching for several decades. A former Classics teacher, he immersed himself in self-studies and gained qualifications in Zoology and Botany in order to introduce these subjects at the college. During his 42 years of science teaching, St. Mary's students won the science scholarship 31 times.

Leonard Joseph Graf was born on February 10th 1883 in Aachen, Germany. From an early age he desired to become a priest, but the Iron Duke, Otto von Bismark, had closed all the Roman Catholic seminaries. He began studies for the priesthood at Rockwell College's Junior Seminary in Tipperary, Ireland at age ten.

He learnt to speak English and placed first in Ireland's School Leaving Certificate Examinations. Afterwards, he taught at Rockwell and attained an external bachelor of arts degree from the Royal University of Ireland in 1903.

In 1906 he joined the staff of St. Mary's College and was ordained a priest four years later. Fr. Graf taught Latin, Greek and Ancient History, but

Top to Bottom:
1) Fr. Graf Wing at St. Mary's College
2) El Tucuche in the morning mist
3) Trinidad and Tobago Field Naturalists' Club logo
4) Part of campus at Rockwell College, Ireland

switched to Zoology and Botany after qualifying in these subjects. He made these subjects come alive by taking his students on field trips to El Tucuche, the Aripo Savannas and Monos Island where he taught them about different environments. Non-science students were welcomed on these trips and they too benefited from his vast knowledge.

A patient and generous man, he often loaned students books from his personal library to provide additional study references. Former students recall the tremendous influence of "The Lion" in shaping their lives, by giving counsel on career choices and maintaining contact throughout their adulthood.

Fr. Graf was "the pillar of St. Mary's". He liaised with Government on staffing and educational matters and was Dean of Studies (1920-1957). He spearheaded many extra-curricular activities including the choir, orchestra and annual plays. He also edited the College's 50th and 100th anniversary annals. He retired from active teaching in 1966 having missed only 2 days of school in 60 years.

Outside of teaching, he was an active member and President of the Trinidad and Tobago Field Naturalists' Club and was elected an honorary member in 1955. An amateur photographer, he took photos and made short movies of the group's botanical excursions.

In 1969, he received one of the inaugural national awards from the Trinidad and Tobago Government, the Chaconia Medal (Gold) for "Long and Meritorious Service to Trinidad and Tobago in the Sphere of Education".

He passed away in 1970.

Barbara Hull

(1939)

VIROLOGIST

Dr. Barbara Hull contributed to the development of diagnostic laboratories for the promotion of public health and disease eradication for 27 years. In Trinidad and Tobago she helped set up monitoring systems for disease patterns in preparation for outbreaks. As the World Health Organization (WHO) Global Lab Network Co-ordinator, she led the Global Polio Eradication Programme.

Barbara Phyllis Naomi Hull was born in Belmont, Trinidad on May 23rd 1939. She attended Providence Intermediate School and Bishop Anstey High School. During one of her school vacations, she worked in a medical laboratory and became fascinated with lab work from that first experience.

She worked at the Imperial College of Tropical Agriculture (ICTA) as a laboratory assistant and studied Zoology at Polytechnic Institute. After three years at ICTA, she left for Canada to pursue university studies. She graduated from McGill University in 1966 with honours in bacteriology and immunology.

At the Trinidad Regional Virus Laboratory, she gained interest in virology and researched the Trinidad Cocal virus for her master's degree from McGill

Top to Bottom:
1) World Health Organization logo
2) Hull in her teenaged years
3) Hull and some WHO staff members
4) Aedes Aegypti mosquito

University (1969). She later worked at the Diagnostic Laboratory, Port of Spain. She focussed on public health issues for disease mitigation rather than mere diagnosis and set up monitoring systems with the Trinidad Public Health Laboratory using health centres and hospitals.

In the 1970s, she achieved effective immunisation programmes for the 1972 polio outbreak and discovered two new strains of the Yellow Fever virus. At the Caribbean Epidemiology Centre, she co-ordinated Caribbean-wide surveys on the status of polio and was later involved in the Pan American Health Organization's regional eradication programme. She was able to show for the first time that a rotavirus with seasonal incidence caused gastrointestinal disease in children during research for her doctoral studies at the University of the West Indies (1983).

Dr. Hull undertook work on HTLV-1 and HIV transmission and led efforts to standardise testing in the Caribbean. At the WHO she achieved global proficiency testing of all Polio Network Laboratories and contributed to the development of standardised methods and manuals. She also conceptualised similar 'master plans' for yellow fever and measles control. In 1986 she received the Public Service Medal of Merit from the Trinidad and Tobago Government.

To youngsters interested in pursuing careers in science, Dr. Hull advises, "All scientific findings, if well used, can benefit mankind. There is no better way to spend your life than in the pursuit of science – with a conscience."

Maura Imbert

(1929)

BIOCHEMIST & ASTRONOMER

Dr. Maura Imbert worked in many Caribbean islands including Antigua, Barbados and Trinidad. Her work at Caribbean Industrial Research Institute (CARIRI) from which she retired as Principal Researcher (1978 – 1994) resulted in several patents and successful commercial products. Although most of her career has been in the field of chemistry her passion has always been astronomy from since her childhood. Today her major public recognition has been in the development of astronomy in Trinidad and Tobago.

Maura Imbert nee Cooke was born on January 14th 1929 in Dublin, Ireland. She attended St. Louis Convent for both primary and secondary schooling. She attained her Bachelor of Science in Chemistry from the University College Dublin (1953); Master of Science in Chemistry was concluded at Trinity College, Dublin University (1968) and a doctorate in biochemistry (1973). She also completed a Master of Science degree in astronomy online from James Cook University, Australia (2005) and holds a diploma in bacteriology.

At CARIRI, Dr. Imbert pioneered research on essential oils such as thyme oil used in cosmetics. She led a project in the full utilisation of mangoes which culminated in an international conference in 1994. She researched medicinal plants and successfully test marketed a health drink based on cold-stabilised

Top to Bottom:

1) Dr. Imbert recording a solar eclipse in 1998
2) Opening of the Imbert-Barrow Observatory in 2003
3) CARIRI's retirement function for Dr. Imbert
4) Deep galaxies

Aloe Vera gel. She developed and patented a food preservative based on spices that could be used as a substitute for chemical preservatives in some beverages. This has been successfully incorporated into the local soft drink industry. She introduced the idea of Microbial Enhanced Oil Recovery to TRINTOC (now Petrotrin), a process that is successfully carried out today.

Dr. Imbert popularised the field of Astronomy for several years through her weekly newspaper column. She also authored the book "Caribbean Skies" in 1998 and edited "Tropical Skies" and "Trinidadian Skies" in 1990 and 1987 respectively. A founding member of the Trinidad and Tobago Astronomical Society, Dr. Imbert has served as its President since 1972. She was involved in the precise videotaping of the occultation of a star by Titania, one of the moons of the planet Uranus. This occultation was investigated by astronomers world-wide and as a result, this once-in-a-lifetime event can now be viewed by many international astronomical societies and on several websites.

Dr. Imbert currently teaches at UWI and she is also an industrial consultant. She is researching the Archaeoastronomy of the Arawaks and Caribs and the possibility that a "Tropical Stonehenge" exists in Antigua. A firm believer in hard work, she advises that, "one should never stop learning." Her philosophy for life is that, "with God's help all things are possible." With her positive outlook on life, the stars are truly her limit.

Kenneth Julien (1932)

ELECTRICAL ENGINEER & EDUCATOR

Kenneth Julien, Professor Emeritus of Energy Systems, University of the West Indies (UWI) holds an outstanding 35-year record as an academic and has been the driving force in the development of the national energy sector. He was the first West Indian Dean of the Faculty of Engineering, UWI St. Augustine and the first Caribbean national to attain the rank of Fellow of the Institute of Electrical and Electronics Engineers, USA. He holds patents for electrical systems and has published extensively in his field. He has taught and mentored numerous engineers, many of whom now hold key positions in the energy sector.

Kenneth Stephen Julien was born on September 2nd 1932 in Arouca, Trinidad. He attended St. Mary's College then worked as an apprentice at United British Oilfields of Trinidad (UBOT). He studied at the University of Nottingham, England on an UBOT scholarship and gained a Bachelor of Science in Electrical Engineering with first class honours in 1957. He was the first Ph.D. graduate in electrical energy systems from the University of British Columbia in Vancouver, Canada in 1962.

He joined the staff of the newly established Faculty of Engineering, UWI St. Augustine and was the first local engineering lecturer with a Ph.D. He later

Top to Bottom:
1) Julien delivering speech at a conference
2) Electrical system
3) Point Lisas Industrial Estate
4) Julien with his wife, Patricia

became one of the youngest Deans in the Commonwealth and was appointed Professor and Head of the Department of Electrical Engineering in 1970, posts he held until retirement in 1996. He was named Professor Emeritus in 1997.

In 1974, Professor Julien chaired the Energy Co-ordinating Task Force which examined the potential use of natural gas. This group managed the country's thrust into the global gas market and the diverse new industries of methanol, ammonia and power generation. Professor Julien also steered post-independence industrial development through his directorship of the National Energy Corporation, the Industrial Development Corporation of Trinidad and Tobago, and the Trinidad and Tobago Electricity Commission, among other state companies.

He guides Trinidad and Tobago's present industrial thrust based on local energy, technological innovation and human capital. He achieves this in part through his chairmanship of Evolving TecKnologies and Enterprise Development Limited, the developer of the Wallerfield science and technology park; his presidency of the University of Trinidad and Tobago (UTT) and his leadership of Kenesjay Systems Limited, a consulting company specializing in energy.

For his outstanding service to Trinidad and Tobago, Professor Julien was awarded his homeland's highest honour, the Trinity Cross, in 2003.

Allastair Karmody

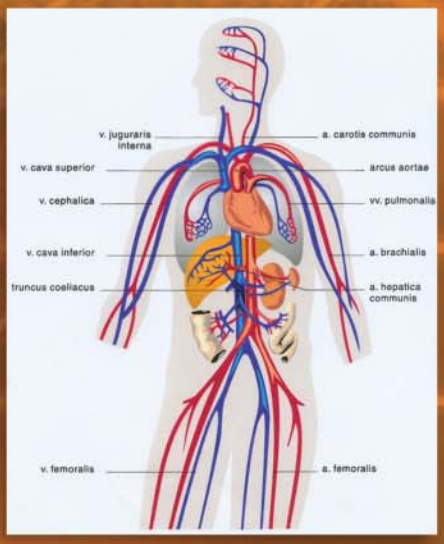
(1937-1986)

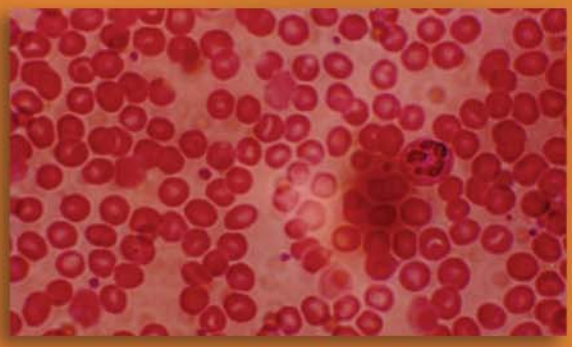
VASCULAR SURGEON

Dr. Allastair Karmody is internationally recognised for his techniques in vascular surgery. Among these is the "Albany operation" for treating blocked arteries in the lower limbs. He also pioneered limb re-attachment surgery and kidney transplants at Albany Medical Institute for Vascular Health and Disease. Some of the procedures in vascular surgery now used internationally as standard, are the results of innovations of his surgical team at Albany.

Allastair Michael Karmody was born in Trinidad on March 29th 1937. He attended Coffee Street E.C. Primary School and St. Mary's College. At St. Mary's he participated in extra-curricular activities and played cricket. He was an avid reader and he also maintained an interest in architecture. He won the Jerningham Gold Medal and the Science Island Scholarship in 1955. He studied medicine at the University of Aberdeen, Scotland and Oxford University, England. His master's degree in surgery researched the blood clotting mechanism.

Karmody held Fellowships of the Royal College of Surgeons in England and Scotland. In 1970 he joined the staff of Albany Veterans Administration





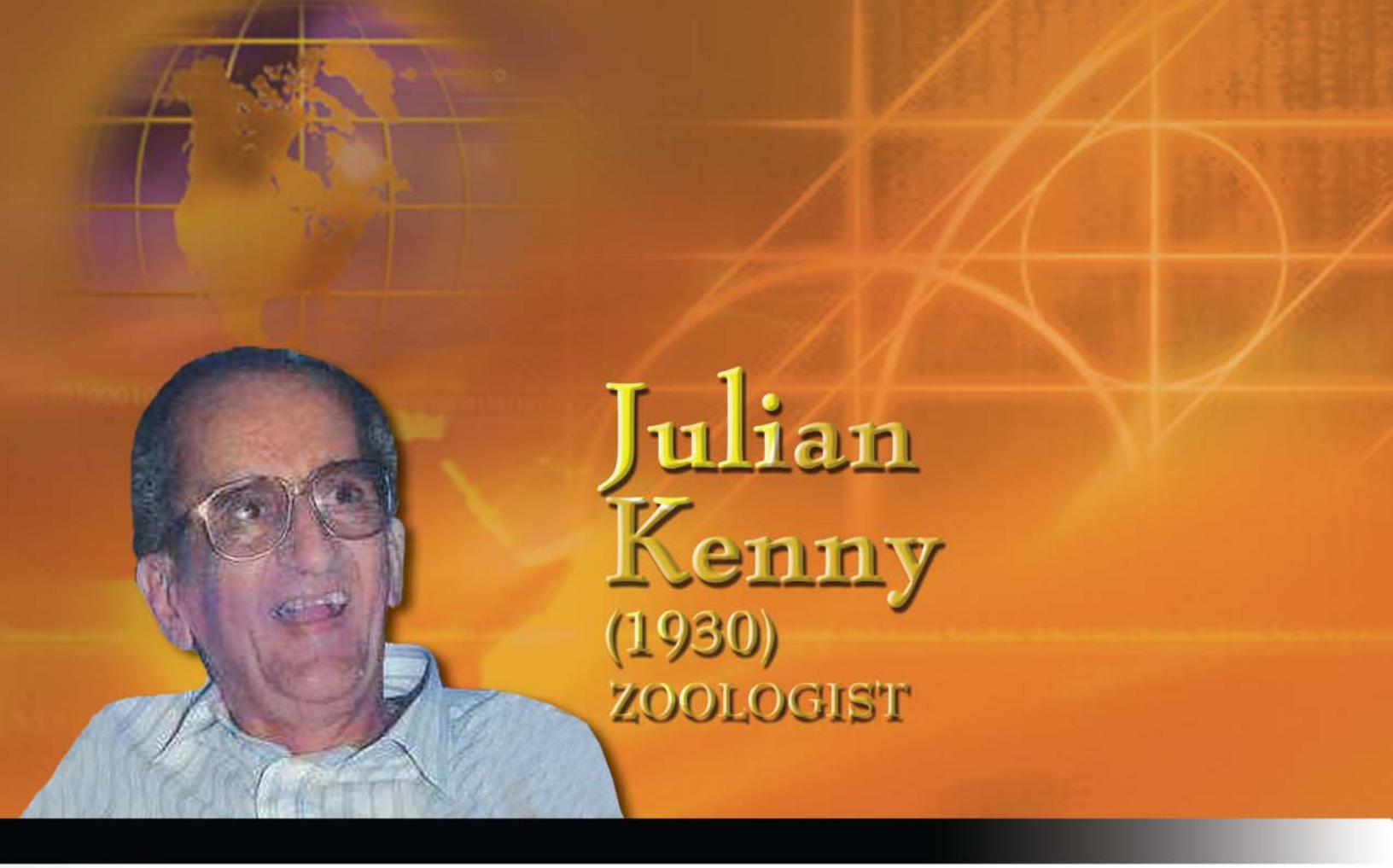
Top to Bottom:
1) The circulatory system
2) An operating theatre
3) Red blood cells
4) Albany Medical College

Hospital, New York and later the faculty of Albany Medical College where he and his surgical team developed a reputation for excellence in vascular surgery.

Karmody and Dr. Robert Leather refined the "in-situ saphenous vein bypass." First attempted in Norway for the treatment of blocked arteries in the lower limbs, the procedure bypassed the flow of blood into the vein thereby eliminating the need for artificial grafts. The improved procedure was given the name the "Albany operation" and is now the standard technique. At Albany, Dr. Karmody was also a key figure in pioneering limb re-attachment surgery and the institution's kidney transplant programme for which he became internationally recognised.

He was elected Professor of Surgery in 1980 and mentored surgeons from the United Kingdom, the Caribbean and other countries. He authored over 150 publications and held memberships in professional bodies including the American Surgical Association, the Society of Vascular Surgery, the International Cardiovascular Society, and the New York Academy of Science.

Karmody died at the relatively young age of 49 in 1986. The Society for Clinical Vascular Surgery administers the "Allastair Karmody Essay" award for medical students and the Karmody Vascular Laboratory, Albany is named in his honour. He will long be remembered as a bright shining light in the annals of vascular surgery.

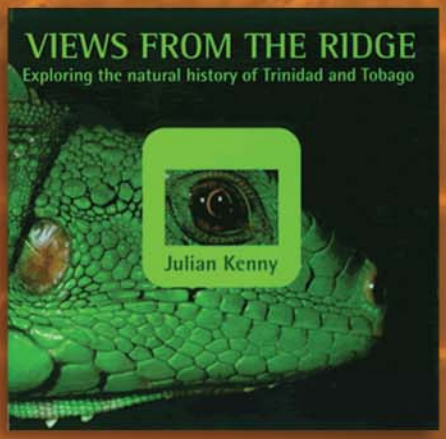


Julian Kenny (1930) ZOOLOGIST

Professor Julian Kenny is a zoologist who is considered an authority on the natural history of the Caribbean. He worked at the University of the West Indies (UWI), St. Augustine for 29 years as a Lecturer, Senior Lecturer and later Professor of Zoology. He led research on the ecology of savannas, wetlands, cave systems, marine systems and coral reefs of Trinidad and Tobago. His work contributed to the protection and management of sensitive ecosystems and the development of a National Trust.

Julian Stanley Kenny was born on January 27th 1930 in Woodbrook, Trinidad. He attended Belmont Intermediate School and St. Mary's College. He completed Grade 13 in Canada and graduated with a Bachelor of Science degree from the University of Toronto in 1951.

He developed an interest in fisheries research during his postgraduate years in Toronto. He returned to Trinidad to work as a Scientific Officer at the forerunner of the local Fisheries Division. He introduced new systems and protocols in fisheries management including a statistics system to evaluate the types of fish caught by age, and the marking of boats with special codes for identification of authorised fishing vessels. He also helped to establish the flying fish industry in Tobago.



Top to Bottom:
1) One of Kenny's publications
2) Kenny speaking at IMA symposium
3) The Bush Bush Wildlife Sanctuary
4) The Golden Tree frog

In 1963 he gained his doctorate from Birkbeck College, University of London and joined the Department of Biological Sciences at UWI. His research students advanced knowledge of the Tamana Cave ecosystem, the Caroni Swamp and the Aripo Savannas. His own research documented the distribution of freshwater fish species in Trinidad and Tobago.

On account of his reputation as an erudite scientist and outspoken naturalist, Professor Kenny was called to serve on many national bodies and committees. He was an Advisor to the Inter-ministerial Committee on the Law of the Sea Convention, Chairman of the Board of the Institute of Marine Affairs, and Member of the Cabinet-appointed Committee that drafted the National Parks legislation, among other things. He also served a five-year term as an Independent Senator in the Senate of Trinidad and Tobago. He serves as the current Chairman, Board of Trustees of the Guardian Life Wildlife Trust, which supports environmental education and protection.

An avid underwater diver and nature photographer, Professor Kenny developed a prolific photographic collection of wildlife, including native orchids and landscapes, and has written several books featuring his photographic works. They include "A View from the Ridge – Exploring the natural history of Trinidad and Tobago" and "The Native Orchids of the Eastern Caribbean". He recently donated his vast collection of works to the National Library and Information System Authority (NALIS).

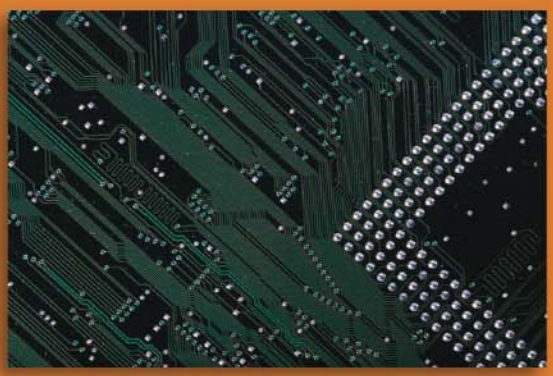
St. Clair King (1938)

COMPUTER & ELECTRICAL ENGINEER

Professor St. Clair King is an ingenious individual with several copyrights for software applications. His inventive mind and his pioneering spirit set him apart from many others in his field. A man of vision, he is known for his passion and dedication to promoting local innovation and to developing local capability in computer and electrical engineering. One of his greatest accomplishments is the formation of Ixanos Limited; a company developed to build innovative products for the energy and telecommunication sectors using local skills.

St. Clair King was born in 1938 in Port of Spain. He attended Mucurapo Boys' and Richmond Street Boys' EC Schools. At the age of ten, he won a scholarship to Queen's Royal College. In 1958 he won an additional island scholarship to study electrical engineering. He obtained his Bachelor of Science in Electrical Engineering from the University of Glasgow (1962) followed by a Master of Science degree from Massachusetts Institute of Technology (1963) and a doctorate from Glasgow University (1967) in control systems.

Always a high achiever, King remembers feeling immense pressure to perform. However, he used this as fuel to excel, and developed a greater love for what he was doing. Throughout his professional career, he did everything



Top to Bottom:
1) King in his graduation robes
2) Satellite dish
3) St. Clair King
4) Circuit board

with great fervour. His career began as a project engineer at the Ministry of Works (1963). He also served as Acting Head at the John S Donaldson Technical Institute (1964).

It was at The University of the West Indies, however, that he made his greatest contribution. He served from 1966-1999 as Lecturer, Senior Lecturer and later Professor. He introduced several innovative programmes including Control Systems as a core programme in the Department of Electrical and Computer Engineering and the Master's in Electronics and Instrumentation. An outstanding educator, he is noted for developing many local professionals in the field.

With the assistance of NIHERST, Textel and the OAS, Professor King started the Microprocessor Development Project (1989). Its aim was to develop a laboratory and local expertise in technological innovation to meet industry needs and to seed innovative start-up companies. The Real Time Systems Group at UWI was created and it developed many successful solutions for local industries.

The Group later blossomed into Ixanos Ltd. King resigned from UWI to guide Ixanos through its infant stages. Ixanos is UWI's first "high-tech start-up company", an accomplishment that few other universities in developing countries have attained. He currently serves as Ixanos' Chairman and is on the Board of the Telecommunications Authority of Trinidad and Tobago.

Ranjit Kumar

(1912-1982)

CIVIL ENGINEER

Ranjit Kumar left an indelible mark on the development of civil engineering in Trinidad and Tobago. He constructed the first dual carriageway at Wrightson Road, Port of Spain on reclaimed land. In the 1940s this project was deemed impossible but now, more than 60 years later, commuters are still benefiting from his achievement.

Ranjit Kumar was born on August 6th 1912 in Rawalpindi, India. At age eight he migrated to England where he attended Holborn Grammar School. His excellent school grades allowed him a rapid progression through the school system. At age 15 he passed the London Matriculation and the Higher School Certificate examinations. He gained his Bachelor of Science in Civil Engineering from London University's Imperial College of Science at age 18.

Unable to find employment because of colour prejudice, Kumar returned to India. He wrote the Indian Imperial Police Entrance Examination and placed at the top of the list. In 1931 he joined the service and was soon promoted to the rank of Assistant Superintendent of Police and received training in law. By his early twenties, he was in charge of security in the Punjab Legislative Council.

Top to Bottom:
1) Wrightson Road, Port-of-Spain
2) A young Ranjit Kumar
3) Tools of his engineering trade

In 1935, Kumar ventured to Trinidad as the distributor of the first Indian film to be shown locally. Two years later he was employed as Assistant Engineer with the Works Department. Among his first responsibilities was the Wrightson Road Project. Though the prospect of building a road under swampy conditions was considered to be impossible, he planned, designed and constructed the dual carriageway in 1940.

He also designed irrigation and drainage systems for flood-prone Port of Spain, Laventille and El Socorro. He worked on the Morvant Housing Project, widened the Eastern Main Road and constructed footpaths. Other notable projects included the site works for Federation Chemicals Limited and the Hilton Hotel.

Through the Challenger newspaper, he popularised engineering and educated the public on irrigation, flooding and technologies to alleviate physical and environmental problems. He served as an elected Alderman in the Port of Spain City Council and is remembered for his habit of riding a white horse to meet with the people.

Kumar was dedicated to his family and had a great love for mathematics. He also had a keen interest in astronomy and history. An avid reader, he encouraged everyone around him to follow world developments and to think globally.

In 1950, Ranjit Kumar Street in St. James was named in his honour. He died at age 70 on September 1st 1982.

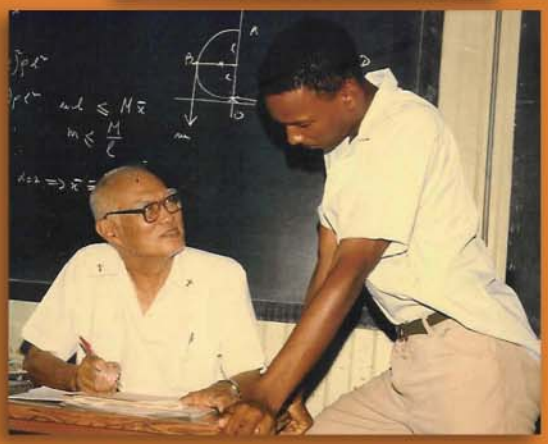
Fr. Arthur Lai Fook (1919)

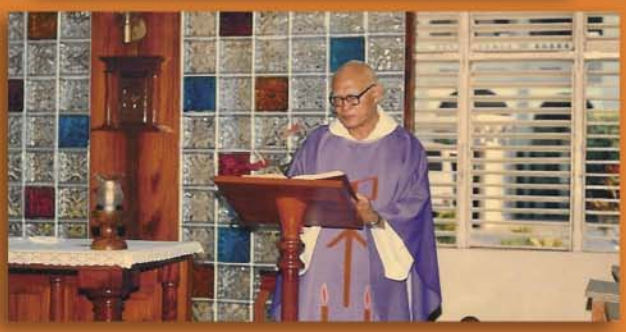
MATHEMATICS EDUCATOR

Fr. Arthur Lai Fook is a former mathematics teacher at St. Mary's College, Trinidad. In his initial 26 years of teaching mathematics at the school, St. Mary's gained no less than 11 Open and 8 Additional Mathematics Scholarships based on performance in the Higher School Certificate and A'Level Cambridge Examinations. He continued to teach beyond that period well into the 1980s and 1990s and is still a voluntary member of staff at the college today.

Arthur Eugene Anthony Lai Fook was born on July 5th 1919. He grew up in Port of Spain and attended Nelson Street Boys' R.C. School (Columbus School), Tranquillity Intermediate School and Iere Central High School. He entered St. Mary's College in 1930 to pursue his secondary education. He won the Jerningham Gold Medal and an Open Scholarship in 1937.

He taught at his alma mater for one year and then left for France to spend a year in spiritual retreat, testing his calling to the priesthood. In 1939, he enrolled in the University College, Dublin (National University of Ireland) where he attained a Bachelor of Science in Mathematics and Mathematical Physics (1942) and a Master of Science in Mathematics (1943), both with First





Top to Bottom:
1) The Lai Fook family
2) Lai Fook in his younger days
3) Shaka Hislop in his teenaged days, with Fr. Lai Fook
4) Fr. Lai Fook at the pulpit

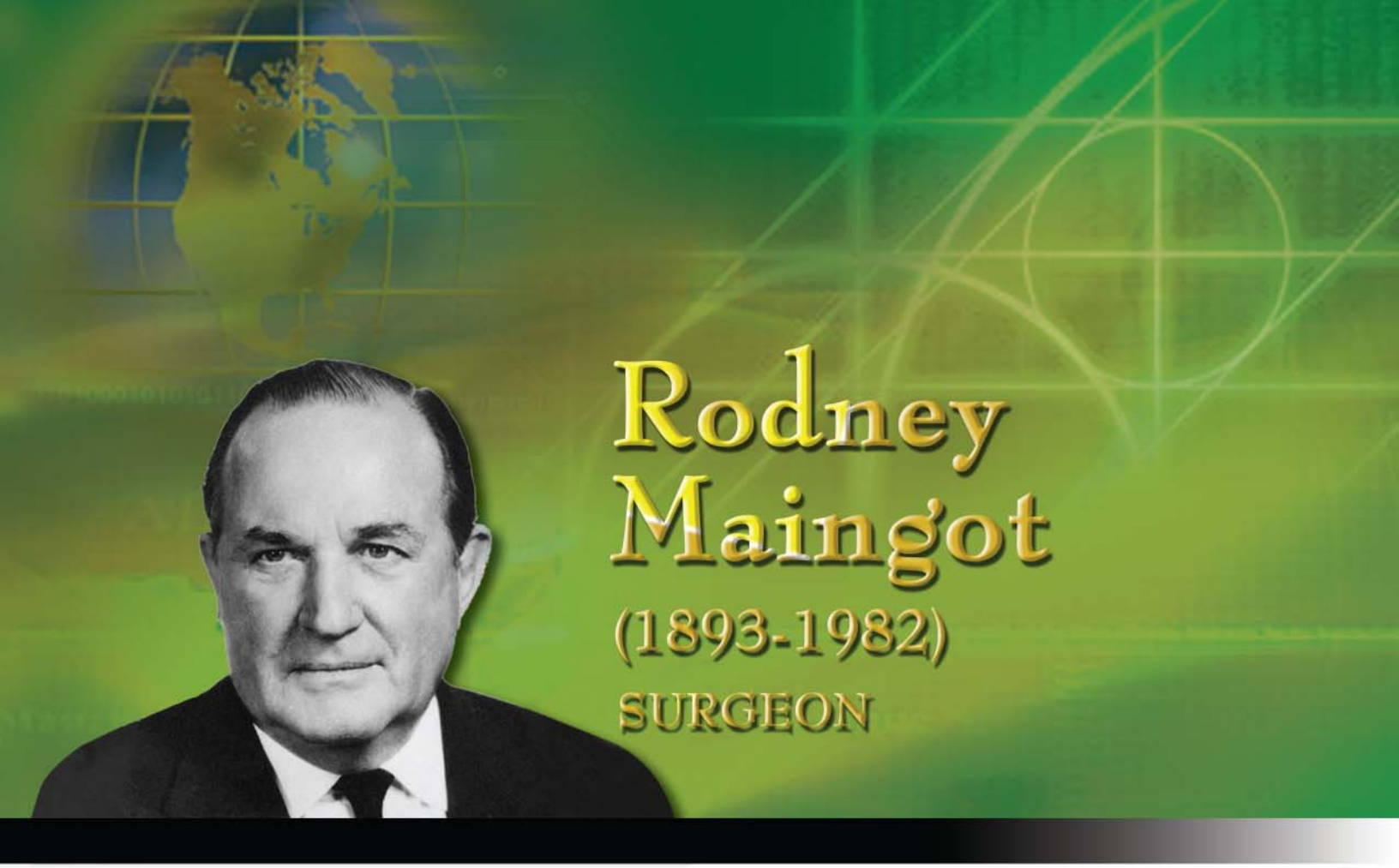
Class Honours. He also obtained a Bachelor of Arts in Mental and Moral Philosophy and a Higher Diploma in Education (1944).

He began studies in Theology in 1945 at the Holy Ghost Seminary, Dublin and continued at the Cantorial University of Fribourg, Switzerland for the Baccalaureate in Theology. He was ordained a priest and became a Member of the Congregation of the Holy Ghost in 1947.

Upon his return to Trinidad in 1948, Fr. Lai Fook taught at St. Mary's College and was Junior Dean of Studies (1948-1958). He remained there as senior mathematics teacher until 1962, then lectured in mathematics at the University of Nigeria (1962-1964) and at the University of the West Indies, St. Augustine campus (1964-1966) before returning to St. Mary's College.

He became the college's principal in 1971 and retired in this position seven years later. However, he continued teaching mathematics first on a contract basis then voluntarily in order to lead students to continued successes in their examinations. In 1990, the Government of Trinidad and Tobago awarded him the Chaconia Medal (Gold) for his contribution to education.

Fr. Lai Fook notes that the pre-conceived idea that, 'mathematics is difficult', is a mind block to students who make no effort to apply themselves. His advice to youngsters is, "there is no substitute for hard work."



Rodney Maingot

(1893-1982)

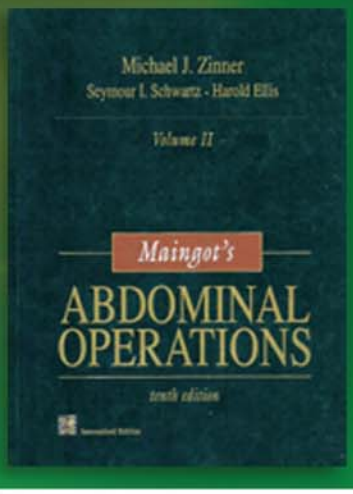
SURGEON

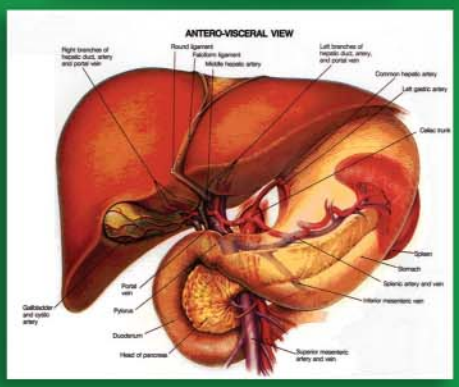
Mr. Rodney Maingot was a world-renowned surgeon, prolific writer on surgery and teacher of postgraduate surgeons. His best-known publication "Abdominal Operations" in 1940 has since seen 10 editions. This book is still considered to be a key text for aspiring surgeons in Great Britain.

Rodney Maingot was born on February 27th 1893 in Cascade, Trinidad. At the age of 8 he migrated to England, where he obtained all his academic training. He studied at Upshaw College, Durham and at St. Bartholomew's Hospital in London.

He qualified as a doctor in 1916 with the Membership of the Royal College of Surgeons, England (MRCS) and the Licentiate of the Royal College of Physicians (LRCP). At St. Bartholomew's he worked as a house surgeon and surgical registrar and obtained the Fellowship of the Royal College of Surgeons, England (FRCS) in 1920. In the midst of attaining these qualifications, Dr. Maingot also served in the First World War, 1914–1918.

He was a regional consultant in the Emergency Medical Service during World War II and fellow of the surgical section of the Royal Society of Medicine.





Top to Bottom:
1) Maingot with his puppy
2) Abdominal Operations-a publication by Maingot
3) Diagram of the stomach
4) Maingot at the beach with a friend

He served as the Editor-in-Chief of the British Journal of Clinical Practice and apart from his best-known publication, Maingot also contributed to a two-volume surgical reference "Postgraduate Surgery".

Maingot was elected the Chief Surgeon at the Royal Free Hospital and was considered an expert in surgery of the gall bladder. His popularity as a skilled surgeon was witnessed through the number of young surgeons that came to see him operate at the Royal Waterloo and Southend Hospitals in London where he served as a consulting surgeon. As a result, these hospitals became key centres for postgraduate instruction in surgery and his reputation as a surgeon grew outside of London.

During his career, he was also a visiting specialist and professor at institutions outside of the UK. They included Ohio State Medical School, Mount Sinai Hospital in Miami and Maadi Hospital in Cairo. In 1976, Dr. Maingot was awarded his homeland's highest honour, the Trinity Cross.

After his death in England on January 3rd 1982, his family established the Maingot Charitable Trust in his honour. The Trust assists young doctors from Trinidad and Tobago to qualify for the FRCS by providing a scholarship grant. The Trust has to date assisted some 22 scholars over the past 21 years since its inception.

Elliot Mannette

(1927)

STEELPAN INNOVATOR

Elliot Mannette (popularly called Ellie) holds the distinction of being the living individual immediately associated with the early development of the steelpan and its emergence as a legitimate musical instrument and art form. Nearly 70 years after he became involved in the steelpan's early development, he continues his unparalleled odyssey as the premier master craftsman of the steel ensemble's instrumental components.

Ellie Mannette was born in Sans Souci in 1927 and grew up in Woodbrook, Trinidad. Beating on "anything he could lay his hands on", his lifelong journey with the steelpan began at the tender age of 11, when he became involved in the rudimentary beginnings of the use of pans to create music.

As early as 1940 he helped organize a group called the Oval Boys, which later evolved into the Invaders Steel Orchestra, a group that he led for almost three decades. He built the first musical instrument from a 55 gallon steel drum (the same size of drum that is used today) in 1946 and he continued to tune pans for several bands and assisted their development in the early 1950s.

His scientific approach to instrument making refined the hit-or-miss tinkering, which initially was the common approach, into an orderly process

Top to Bottom:
1) Mannette at work tuning a steelpan
2) Mannette displaying a prestigious award
3) Elliot Mannette receiving an award from Pan Trinbago
4) Elliot Mannette with Hilary Clinton

that became the accepted standard. He was the first to use a concave surface of the oil drum for making the notes on the pan.

In 1950, Mannette was offered a scholarship to study music at the Birmingham School of Music. He turned it down to stay in Trinidad and continue his experimentation with pan. In 1951 he was the main builder and tuner for the historic tour of Britain and parts of Europe by the Trinidad All Steel Percussion Orchestra, which introduced orchestrated steelband music to the world.

He was invited to the USA in 1963 to build instruments and train players to develop the US Navy Steelband. Mannette relocated there in 1967 and began making a major contribution to broadening the vista of pan music. He has since introduced steelband music to scores of schools, colleges and community programmes throughout the USA.

Mannette was presented with the prestigious National Endowment for the Arts 1999 National Heritage Fellowship Award by US President Bill Clinton. In 2000, he was awarded an Honorary Doctorate by The University of the West Indies, St. Augustine, Trinidad.

Mannette is currently Artist-in-Residence at West Virginia University, where he is also CEO of Mannette Steel Drums and where he launched the Mannette Foundation. He continues to work with leading acoustics physicists and metallurgists on the science of the steelpan.

Bertie Marshall

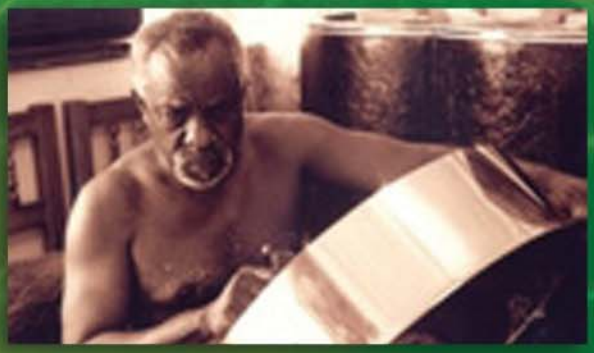
(1936)

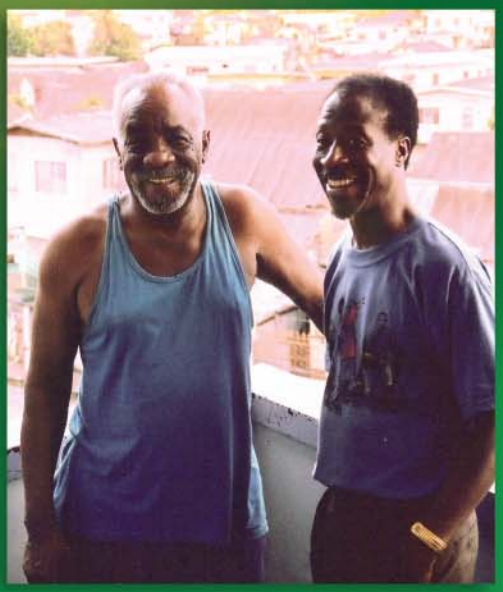
STEELPAN INNOVATOR

Bertram Marshall (popularily called Bertie) invented the technique of harmonic tuning that completely revolutionized the instrument known as the steelpan, resulting in its rich, clear sound. It became the standard for tuning which is unique to the pan. He created the popular double tenor and was the first to amplify pans on the road for Carnival. He also excelled as a bandleader, player and arranger. His band, the Hylanders Steel Orchestra, made history partnering with Fr. John Sewell of the Holy Trinity Cathedral to accompany the church choir and to play classics and carols.

Bertram Marshall was born in February 1936 and grew up in Laventille, Trinidad. As a boy, he watched pioneering tuners at work and came into contact with Winston "Spree" Simon who created the multiple notes on the convex metal containers used for making pans. These encounters sparked his interest in the steelpan and began his secret association with pan and panmen. He began playing openly only when his mother died in 1954, but had tuned his first pan long before.

Marshall quickly rose to the pinnacle of the art form and excelled in all its areas. He was the main tuner for the celebrated Desperadoes Steel Orchestra.





Top to Bottom:
1) Marshall at work tuning a steelpan
2) Marshall relaxing at his home with a friend
3) Bertie Marshall giving advice to a panman

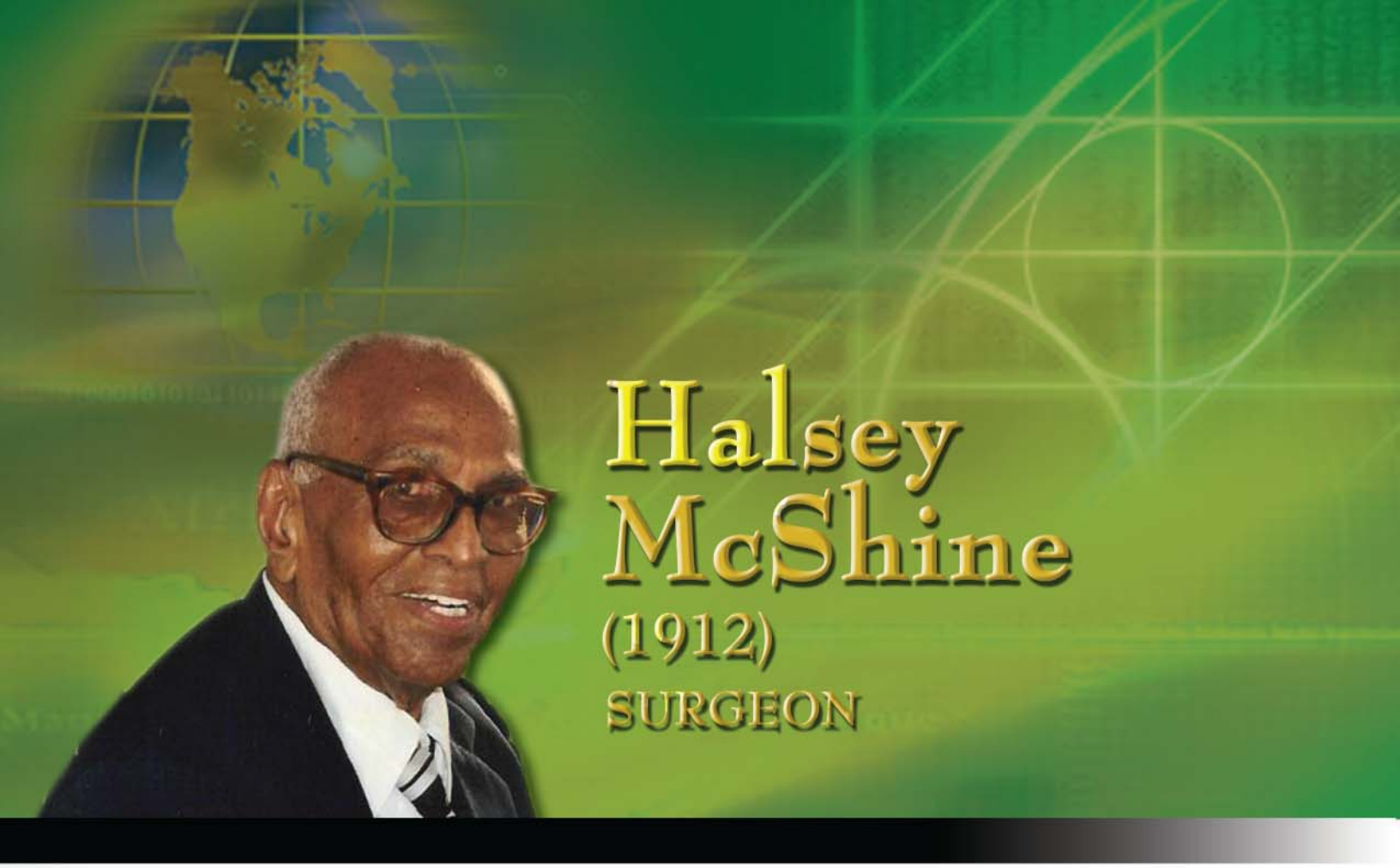
He played in several bands in the mid-1950s then formed his own band. Dissatisfied with the range of lead (tenor) pans, he began experimentation to get the best sound from the instruments as components of a steelband.

In order to get high notes that were missing, he created the high tenor and then the double-tenor to accommodate lower notes. The most popular instrument in the steelband ensemble, the double tenor has a mellower sound and a musical range that makes it ideal for solo artistes. He also experimented with low pitch pans that made the difference in the total pan sonority.

Marshall introduced the first amplified pans on the road for Carnival in the mid-1960s. It was such a difficult feat that no other band has tried it since. His attempts at improving the technique led to the invention of the "Bertphone" in 1971, which combined tonal control and amplification using mixers and equalizers. Unfortunately it was lost in a fire at his home in 1980.

He contributed to the first scientific study of the steelpan at the Caribbean Industrial Research Institute in the mid-1970s. Unfortunately, the project was terminated before many of his ideas and innovations could materialize.

Bertie Marshall is considered a rare genius because of his inventions and a master tuner of high quality instruments.



Halsey McShine (1912)

SURGEON

Dr. Halsey McShine spent his entire medical career in the public health system. As a specialist surgeon at the Port of Spain General Hospital (POSGH), he pioneered numerous medical procedures including cardiac surgery in the West Indies. He performed the first successful mitral valvotomy in the region in 1956 and the first repair of ductus arteriosus in Trinidad in 1959. He was noted for his dexterity as a surgeon and for performing challenging timely interventions that saved lives.

Louis Anselm Halsey McShine was born on August 24th 1912 in Port of Spain. He attended Tranquillity Boys' Primary School and secured first place in the 1924 Government Exhibition Examination to gain entrance to Queen's Royal College. He obtained the Jerningham Gold Medal and an Island Scholarship in 1932.

He studied medicine at St. Bartholomew's Hospital, London and graduated with the Bachelor of Medicine and Bachelor of Surgery and Membership of the Royal College of Surgeons in 1939. He interned in England and Wales and obtained the Licentiate of the Royal College of Physicians in 1940.

Top to Bottom:
1) The McShine family portrait
2) Open heart surgery
3) The modern Trinidad and Tobago Medical Association
4) McShine back in 1998

In 1947, he gained the Fellowship of the Royal College of Surgeons from Edinburgh University, Scotland and was awarded the Fellowship of the American College of Surgeons in 1963.

McShine's most celebrated accomplishment was the West Indies' first open-heart operation using hypothermia on May 22nd 1968 at the San Fernando General Hospital. His patient was a six-year-old boy with a defective heart valve. Open-heart surgery was at that time, a relatively new procedure even to the developed world. It became a more regular surgical procedure locally with the use of the heart and lung machine and modern equipment some 25 years later.

He was the personal physician of his former classmate and friend, the Hon. Dr. Eric Williams, the first Prime Minister of Trinidad and Tobago. He also was an adviser to the national Olympic team in 1968 and 1972. Additionally, he served on the Task Force that developed the Mount Hope Medical Sciences Complex and was past President of the Trinidad Medical Association and the Chest and Heart Association of Trinidad and Tobago. After a long and illustrious career spanning some 50 years, Dr. McShine retired in 1992.

For his outstanding contribution in the field of medicine, he was made a Commander of the British Empire by Queen Elizabeth (1962) and was awarded the Chaconia Medal (Gold) by the Government of Trinidad and Tobago (1969).

George Moon Sammy

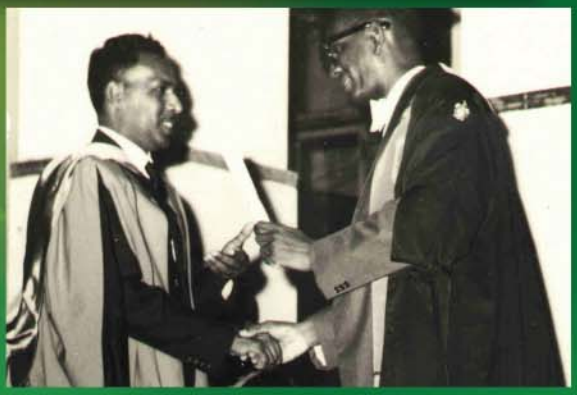
(1922-1988)

FOOD SCIENTIST

Professor George Moon Sammy was highly respected in the Caribbean for his teaching and research in food technology and the promotion of local agriculture. With no more than formal primary schooling, he uplifted himself and became the first Ph.D. graduate of the University of the West Indies (UWI), St. Augustine and its first Professor in Food Technology.

George Moon Sammy was born on November 17th 1922 in Duncan Village, Trinidad. He came from a poor family and as a youngster, worked in a sugar-cane estate and sold produce on the streets. He attended Canaan Canadian Mission School but left at age 13 to work full-time. At home he studied French, Chemistry and Mathematics.

He worked as an apprentice tailor and took typing, shorthand and book-keeping courses. Afterwards, he worked at Texaco Oil Company as an office boy, then a lab hand. There he developed a desire to pursue a career in chemistry. In 1953, he passed the matriculation examination and was accepted by Sir John Cass College, University of London.



Top to Bottom:

1) George Moon Sammy at World Scout Headquarters
2) Professor Sammy at his graduation
3) Local preserves
4) Dried plantain chips snacks

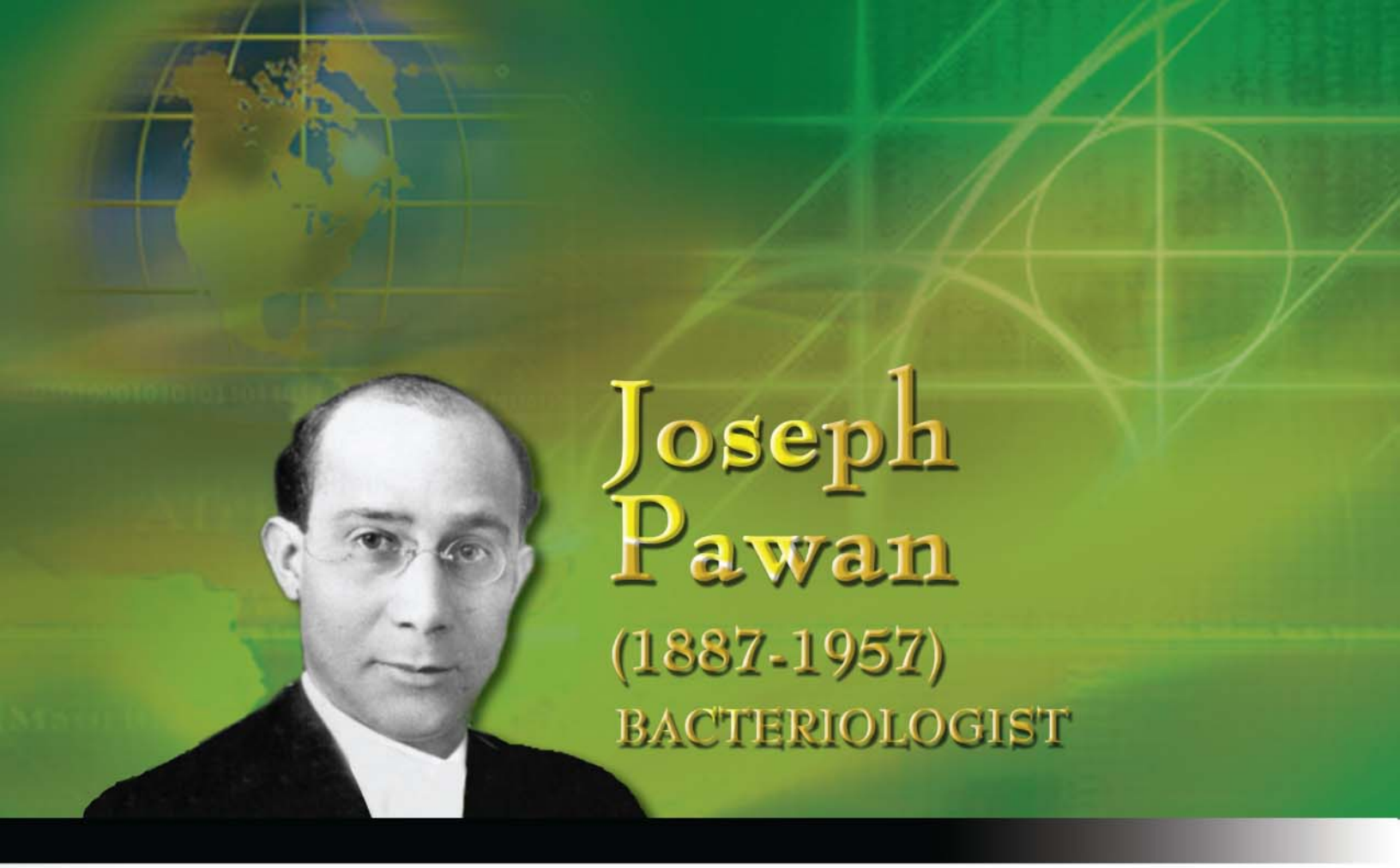
In England he worked during vacations to earn his tuition fees and became an active member of the World Scout Association. In 1957, he earned a Special Honours Degree in Chemistry.

He was employed by the Texaco Refinery Laboratory as a Chemist then as a Research Chemist. In 1964, while a postgraduate student at UWI, he was offered the position of Lecturer. He earned a doctorate in Physical Organic Chemistry (1966) and completed a Master of Science in Food Science and Technology at the University of Massachusetts, USA (1967).

Sammy returned to UWI and introduced courses in food technology. He established the Food Technology Unit and first Food Technology Laboratory in Trinidad and Tobago. He led research to develop new local food products and pioneered work on the preservation of local produce. He created a composite flour made from sweet potato and wheat, a sorrel drink, a canned fruit cocktail and "instant (dehydrated) yam" used in Barbados. In 1977, he was elevated to the rank of Professor in Food Technology.

Sammy was instrumental in establishing the Caribbean Institute of Food Science and Technology and assisted tremendously the National Foodcrop Farmers Association in educating farmers on preservation techniques to start small businesses. A nature lover, he founded the Trinidad and Tobago Tropical Fish Association and was an active member of the Orchid Society. He registered three new hybrids.

Professor Sammy received two national awards, the Hummingbird Medal (Gold) in 1974 and the Chaconia Medal (Gold) posthumously in 1988. He died on 11th July, 1988.



Joseph Pawan

(1887-1957)

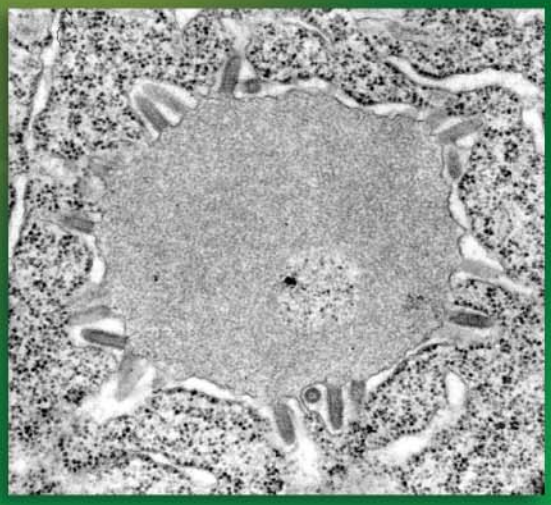
BACTERIOLOGIST

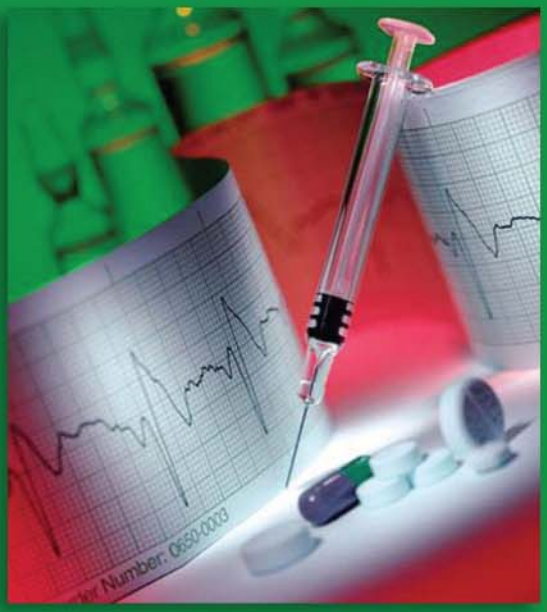
Dr. Joseph Lennox Pawan achieved international acclaim for the discovery of the transmission of the rabies virus by vampire bats. This led to the development of a vaccine for the virus. He also researched many other tropical diseases in the 1940s.

Pawan was born in Trinidad on September 6th 1887. He attended St. Mary's College and won an Island Scholarship in 1907. He attained the Bachelor of Medicine and Surgery degrees from Edinburgh University, Scotland in 1912 and studied at the Pasteur Institute in France.

In 1915 he started his career at the Colonial Hospital, Port of Spain as a District Medical Officer and was later appointed Bacteriologist. As the country's only bacteriologist and pathologist, he provided services for the entire territory in hospital and public health work, as well as bacterial work at the Caribbean Medical Centre.

In 1925, many cattle on the island became ill and died suddenly. The same disease killed 13 people in 1929 and others died in ensuing years. The disease, later identified as rabies, was known to be spread by dogs.





Top to Bottom:

1) *Desmodus rotundus* (vampire bat) in flight
2) The Rabies virus
3) Vaccination needle with pills

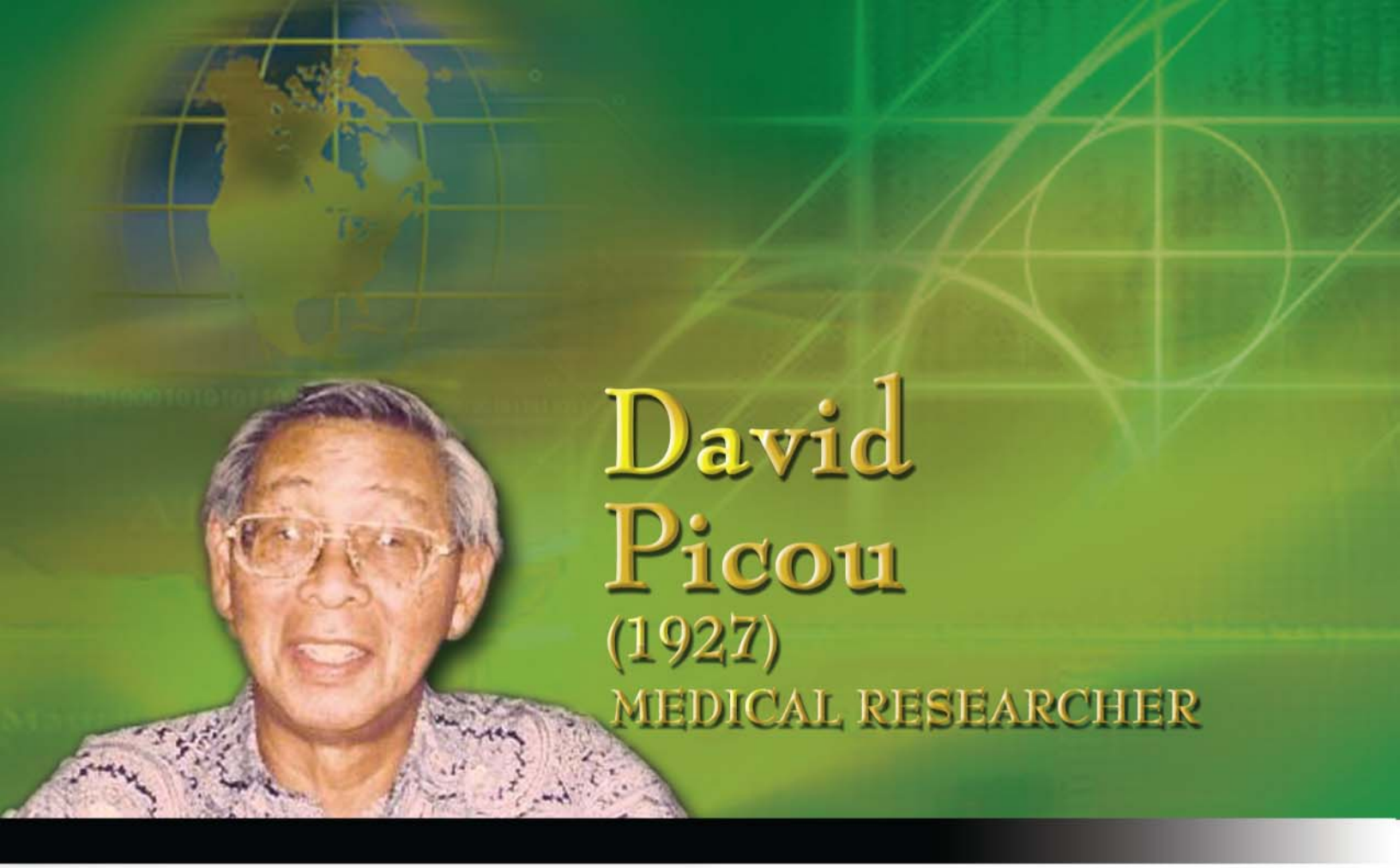
However, victims were not bitten by dogs and rabies had not been identified in Trinidad since 1914.

Pawan and his colleagues J.A. Waterman and H.M.V. Metivier were convinced of a link between the cattle outbreaks and human cases and worked in a simply equipped laboratory to isolate the disease. During research, a woman mentioned being bitten by a bat a month before becoming ill. A. Carini had established in 1913 that vampire bats carried the disease. Pawan knew that bat bites were common in rural districts and completed the puzzle, linking the bat and the bite.

In 1932 he and his team isolated the rabies virus from different species of bats including *Desmodus rotundus* (vampire bat). A vaccine was developed and for his hallmark discovery Pawan was honoured as a Member of the British Empire (MBE) in 1934. He also discovered that sleeping sickness in livestock was due to disease-bearing insects from the South American mainland.

He retired in 1947 but continued to work part-time at the Colonial Hospital. In 1954 he became a consultant on rabies to the US Government. He was invited to work for the World Health Organization but declined due to poor health.

Hospitalized for the last three years of his life, Pawan passed away on November 3rd 1957. The Pan American Health Organization named him a "Hero in Health" in 2000 for his contribution to public health.



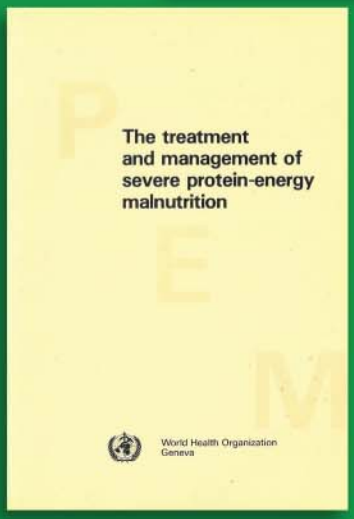
David Picou (1927)

MEDICAL RESEARCHER

Dr. David Picou made an outstanding contribution to medical research on the causes of childhood malnutrition. His expertise was sought after by the Pan American Health Organization/World Health Organization (PAHO/WHO) on malnutrition and gastro-enteritis and the Food and Agriculture Organization (FAO) on standards for nutritional requirements.

David Picou was born on March 23rd 1927 in Port of Spain, Trinidad. He attended Tranquillity Boys' Intermediate School and Queen's Royal College. On completing his studies, he taught science for one year at his alma mater. He attended Long Island University in Brooklyn, New York and graduated with a Bachelor of Science degree.

Though keen on becoming an architect, he honoured his parents' wishes and pursued medicine at the University College of the West Indies in Mona, Jamaica. He graduated with the Bachelor of Medicine and Bachelor of Surgery degree (1955) and began an internship in paediatrics. He did his residency at the Children's Hospital of Philadelphia (1957) and was appointed a research fellow in clinical nutrition (1956). He was also an instructor in paediatrics at University of Pennsylvania, Philadelphia.



Top to Bottom:
1) Young David Picou
2) Dr. Picou attending a conference
3) Receiving an award
4) WHO manual on treatment of malnutrition

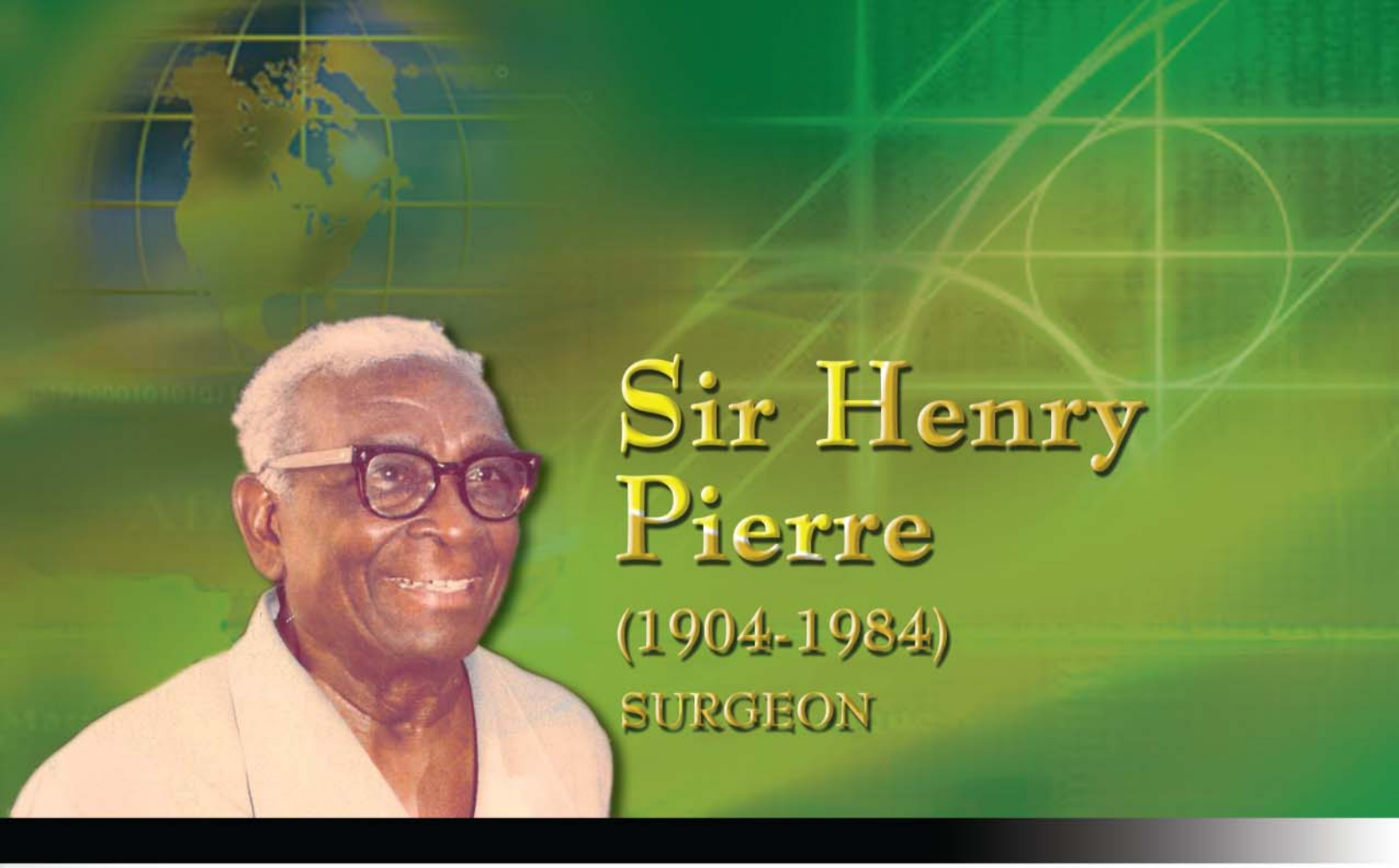
In 1959, Picou was recruited by the Tropical Metabolism Research Unit (TMRU), which was set up and funded by the Medical Research Council in England. Here, he made significant contributions to address the problem of child malnutrition. One was the production of a booklet, adopted for use by the WHO and entitled "The treatment and management of severe protein-energy malnutrition".

He obtained his doctorate in medicine from the University of London (1963) and when the UWI, Mona acquired the TMRU in 1970, he was appointed its Head. In 1973, he was appointed Professor of Experimental Medicine and TMRU's Director, a post he held for seven years.

Dr. Picou was a member of the Advisory Committee of the World Hunger Programme of the United Nations University, the UNAIDS Ethics Committee in Geneva, and the editorial board of the West Indian Medical Journal. He was the scientific secretary for the Caribbean Health Research Council and its first Director of Research.

He headed the Task Force that developed the Mount Hope Medical Sciences Complex in Trinidad during the period 1978-1987. He is associated with the Caribbean Epidemiology Centre, where he is the current Chairman of the Research Ethics Committee.

For his outstanding contribution to medical sciences in the Caribbean, he has received several awards, including the PAHO/WHO Medal (1986), the Commonwealth Caribbean Medical Research Council Award (1995), and the Sir Philip Sherlock Distinguished Award (2001).



Sir Henry Pierre

(1904-1984)

SURGEON

Sir Henry Pierre was an outstanding general surgeon. He pioneered lung surgery in Trinidad and was a master of surgical techniques. He was knighted by Her Majesty the Queen in 1957 and became the only national to receive the United States Meritorious Naval Citation for his service to the U.S. military.

Joseph Henry Pierre was born on October 28th 1904. He attended Queen's Royal College and then entered St. Bartholomew's Hospital, London to study medicine in 1925. He qualified in 1932 and was a junior medical officer at the hospital for one year before returning to Trinidad.

He served in a variety of posts in the medical service of Trinidad and returned to the UK on study leave in 1938. He became the second Trinidadian to obtain the Fellowship of the Royal College of Surgeons of Edinburgh in 1939.

On his return he worked at San Fernando General Hospital. There was no specialist surgeon on staff, so he performed many types of surgery including of the abdomen, breast and thyroid. In his career he also performed surgery of the brain, eye and ear-nose-and-throat. His surgical techniques were legendary: his incisions were delicate and accurate; difficult operations were

Top to Bottom:
1) Sir Henry (third from left) with colleagues
2) Sir Henry with his wife and grandson
3) Surgical instruments
4) An operating theatre

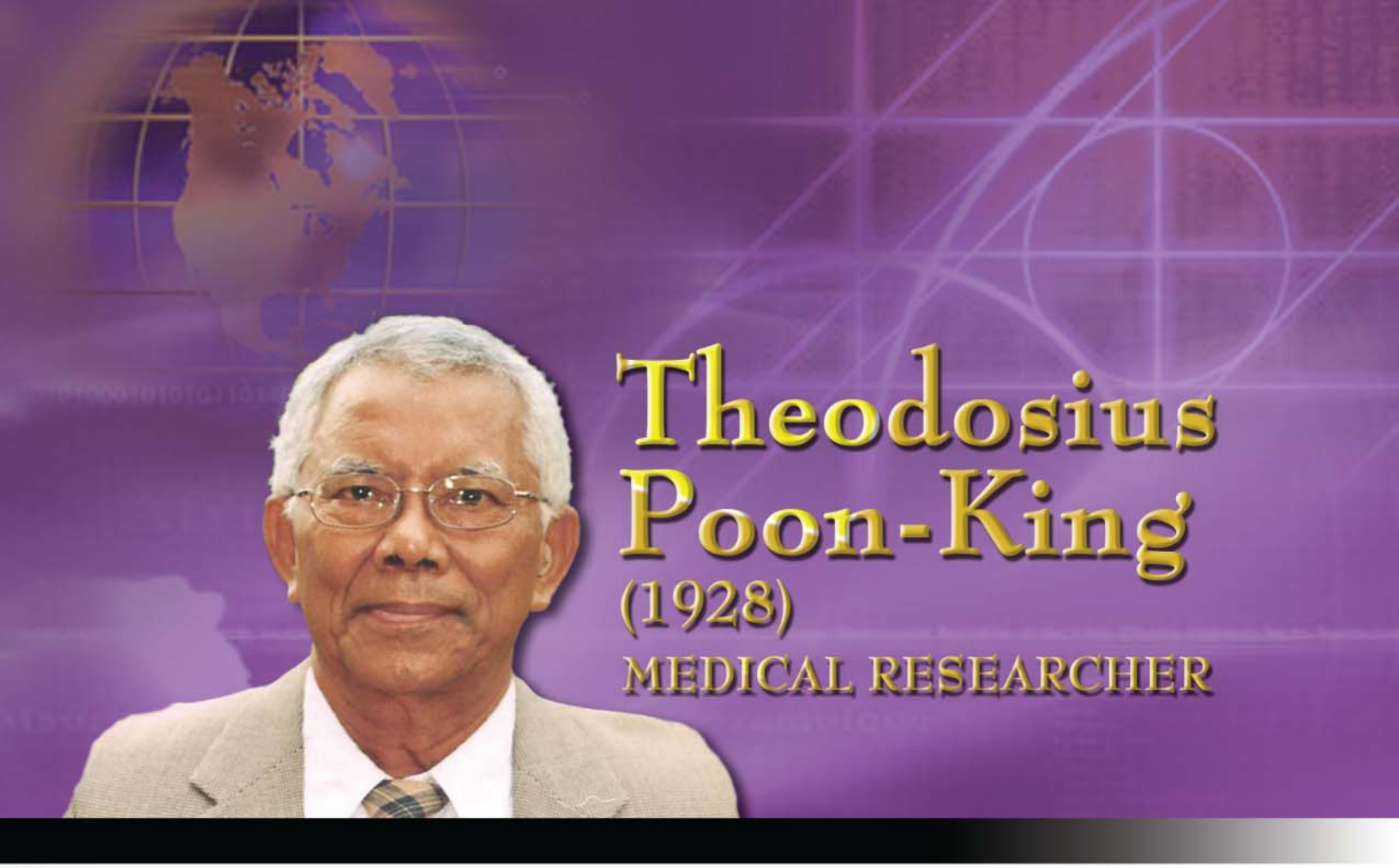
made simple; and his techniques were considered the best teaching methods for his surgical assistants.

After his transfer to Port of Spain General Hospital, patients in San Fernando journeyed northward to be attended to by "Dr. Pierre", for such was his reputation. For many years, he was the only surgeon operating on tuberculosis patients and he was credited for initiating lung surgery at Caura Chest Hospital, where he was appointed thoracic surgeon. He was also the surgeon of choice for operating on American servicemen at the Chaguaramas naval base, where he volunteered his services.

Sir Henry was a gentleman par excellence. He broke many social barriers on the American bases and in the oilfields, sugar estates and social clubs by his charisma and genuine nature. He was also active in the Trinidad Medical Society and the Red Cross Society, which he served as President. With his wife, he participated in the Horticultural Society's flower shows and won several prizes. He also enjoyed photography, tennis, golf and yachting.

After retiring from the Colonial Service in 1958, he continued an active private practice. In 1972, he eventually settled into retirement in England. In 1974, he was bestowed the Chaconia Medal (Gold) for his outstanding contribution to his homeland.

Sir Henry passed away in 1984.



Theodosius Poon-King (1928)

MEDICAL RESEARCHER

Dr. Theodosius Poon King was lauded by the Caribbean Health Research Council as the "Medical Researcher of the Century". From nephritis to coronary heart disease to paraquat poisoning, he contributed tremendously to medical research in the region for several decades.

Theodosius Poon King was born in Biche, Trinidad on January 4th 1928. He attended Arouca Boys R.C. School and St. Mary's College. In 1946, he won the Classics Open Scholarship. He studied medicine at the University College Dublin (National University of Ireland) and graduated with the Bachelor of Medicine and Surgery in 1953.

He interned at St. Vincent's Hospital, Dublin and obtained his Bachelor of Science in Pathology and Physiology from the National University of Ireland (1955). He was a house physician at the Royal Postgraduate Medical School, London (1955–1956) and Medical Registrar at the University College Hospital, Jamaica (1957–1958).

His studies in endocrinology under Professor O'Donovan in Ireland and Professor Fraser in London inspired his passion for research. Appointed to San Fernando General Hospital in 1958, he researched and published the first

Top to Bottom:
1) The human heart
2) Medical testing
3) Lab research
4) Streptococci virus

report on scorpion stings and myocarditis (inflammation of the heart muscle). He spearheaded research on the "Prevalence and natural history of diabetes in Trinidad" in a nation-wide survey (1960-1961).

As a graduate student in cardiology at Harvard Medical School, Boston (1962-1963) he worked on a team which reported new risk factors for coronary heart disease including low HDL cholesterol and abnormal fat tolerance. He returned to work in internal medicine and cardiology at San Fernando (1961 – 1988).

In 1965, his research on an acute nephritis epidemic in South Trinidad identified a new streptococcus, M type 55 as the cause. The M type 49 and three other new streptococci were also discovered in this study. The Streptococcal Disease Unit, which he headed from 1966 to 1988, continued surveillance, treatment and control measures leading to the virtual disappearance of the disease.

In 1974, he pioneered research on paraquat poisoning with Dr. Rasheed Rahaman and designed a special treatment protocol which he later modified in collaboration with Dr. Edward Adoo. He diagnosed the first patient in a 1977 yellow fever outbreak and enabled demonstration of the live virus in the liver for the first time.

Dr. Poon King received many honours, including the Chaconia Medal (Gold) from the Government of Trinidad and Tobago (1975) and a doctorate in medicine from the National University of Ireland for published research (1972).

To young persons, he offers four watchwords: self-discipline, enthusiasm, will power and hard work, noting that one should always develop a passion to work and to excel.

Elizabeth Quamina
(1929-1997)
PUBLIC HEALTH SPECIALIST

Dr. Elizabeth Quamina was the first female and the longest serving Chief Medical Officer (CMO) of Trinidad and Tobago. In an illustrious career spanning 33 years, Dr. Quamina made a major contribution to the health care service in her adopted homeland.

Elizabeth Quamina nee Smith was born in England in 1929. She married Dr. David Quamina in 1955 and they migrated to Trinidad. She attended Trinity College (1954) and the University of London (1960) where she qualified in Medicine and Public Administration. She studied and practised in an era when medicine was a male-dominated profession. She faced and overcame many challenges thus earning the respect of her colleagues and those around her.

Dr. Quamina served in the public health system where she held several senior positions including Medical Officer (1955), County Medical Officer of Health (1965), Principal Medical Officer (1969) and CMO (1979). She was instrumental in organising the early immunisation programme against poliomyelitis and the national Breast Feeding Programme. She undertook and wrote an assessment of the status of the health sector. She formalised the infrastructure for primary health care and integrated the vertical programmes

Top to Bottom:
1) Graduation in Dublin, accompanied by her husband, Dr. David Quamina
2) Dr. Quamina at WHO committee meeting in Geneva (1983)
3) Dr. Quamina with former Ministers of Health.

within the public health care system. Her characteristic pleasant but authoritative manner ensured that the system functioned well.

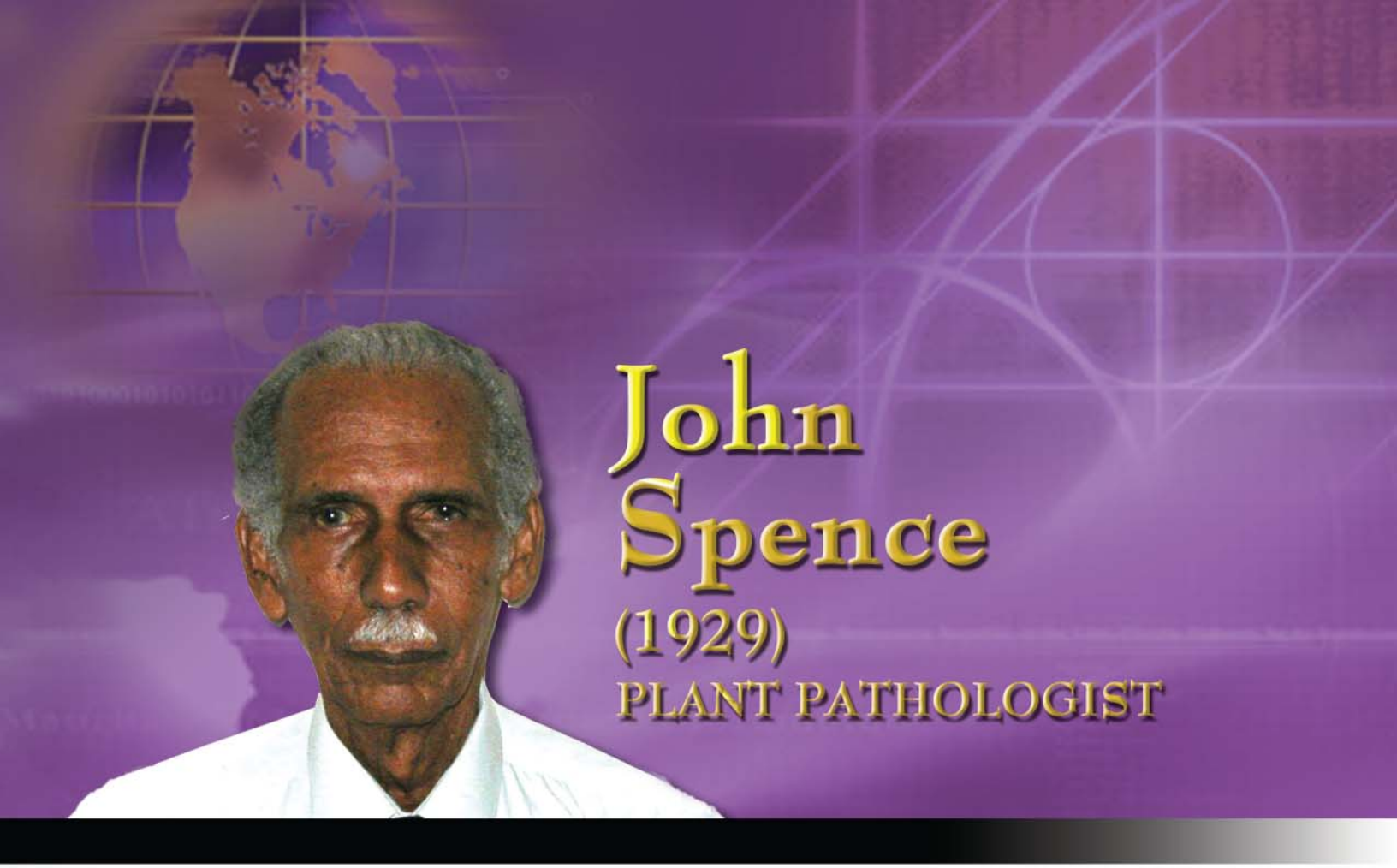
She was at the forefront of health legislation reform and pioneered efforts to formulate the first National Health Plan of Trinidad and Tobago. She initiated the National AIDS Programme and chaired the National AIDS Committee. She served on many other Cabinet-appointed committees including the Task Force that developed the Eric Williams Medical Sciences Complex (1981 – 1987).

She was an active member of the Cancer Society and toiled to establish the National Cancer Registry in 1994. The registry is today known as the Dr. Elizabeth Quamina Cancer Registry – The National Cancer Registry of Trinidad and Tobago.

Dr. Quamina received many awards for her achievements. They included the Chaconia Medal (Gold) for service in medicine (1980), the PAHO Award for Administration (1985), the Medal of the Medical Society of the WHO (1985), the Scroll of Honour from the Trinidad and Tobago Medical Association (1986), and the PAHO / WHO Gold Medal for Health for All (1988).

Dr. Quamina's lifelong dream was to help people. This she fulfilled as indeed countless persons benefited from her dedication and hard work. A

A rare and precious gift to humanity, she passed away in 1997. Her life serves as an inspiration for us all.



John Spence (1929)

PLANT PATHOLOGIST

Professor John Spence has made a multi-faceted contribution as a spokesperson for agriculture in the Senate of Trinidad and Tobago; a university lecturer, researcher and administrator; and a producer of citrus, anthuriums and dwarf pommecythere.

John Arnott Spence was born in St. Vincent on 15th July 1929 and migrated to Trinidad at age 11. He attended Queen's Royal College and later the University of Bristol, where he obtained a Bachelor of Science in Botany (1951). He attained postgraduate diplomas in Agricultural Science (1952) and Tropical Agriculture (1953) from the University of Cambridge and the Imperial College of Tropical Agriculture, respectively, and a doctorate from the University of Bristol (1961).

His research showed the role of the polyphenol oxidase enzyme in the resistance of cocoa pods to invasion by *Phytophthora palmivora* (black pod disease). This demonstrated a resistance mechanism in fruits to fungal attack.

Spence contributed to the development of dwarf pigeon pea varieties that could be harvested mechanically. He showed that rooted sweet potato leaves could produce tubers and received a Guggenheim Fellowship to pursue

Top to Bottom:
1) The Spence family
2) Spence in London
3) John Spence receiving the Chaconia Gold Medal from Sir Ellis Clarke
4) Cocoa beans

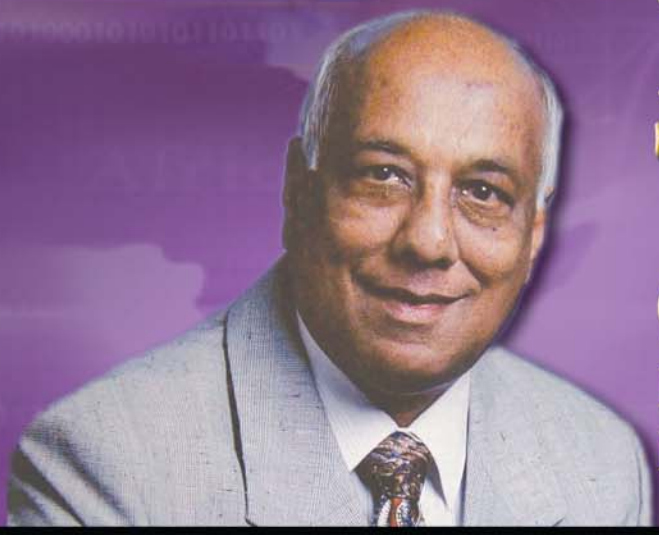
physiological studies on rooted leaves. His research work is recorded in over 50 scientific publications.

His career spans 44 years of dedicated service to agricultural and scientific bodies. He worked as a Plant Pathologist in the Ministry of Agriculture, Lecturer, Professor of Botany and Dean of the Faculty of Agriculture, the University of the West Indies (UWI), St. Augustine. He headed the Cocoa Research Unit (CRU) after retirement from UWI in 1989. He is credited with restoring the CRU into an internationally recognized centre of excellence, holding the largest collection of cocoa varieties and making important contributions to the world cocoa industry.

As an Independent Senator (1986 – 2000), he lobbied government to address the decline of the agricultural sector and promoted national food security. He advocated increasing capital, knowledge-intensive production systems to develop international competitiveness and new market opportunities. His efforts continue in a weekly column in the local press.

Professor Spence supported the development of the country's capability in biotechnology, by helping to direct NIHERST-funded research at UWI in plant tissue culture. He served on many bodies including the Caribbean Industrial Research Institute, the Association of Professional Agricultural Scientists of Trinidad and Tobago, the International Board for Plant Genetic Resources (Rome) and the International Centre for Tropical Agriculture (Colombia). He sat on advisory committees to the Inter-American Institute for Cooperation on Agriculture and the Commonwealth Science Council.

Spence received the Chaconia Medal (Gold) in 1980, was elected Fellow of the Caribbean Academy of Science (1990) and received a NIHERST Lifetime Achievement Award (2000) for his contribution to agriculture.



Elisha Tikasingh

(1927)

PARASITOLOGIST & ENTOMOLOGIST

Dr. Elisha Tikasingh made significant contributions to scientific research through his work in entomology, parasitology and virology. He described the 'Nariva Virus' and assisted in the description of the 'Restan Virus', both new to science at that time. However his greatest achievement was the development of a technique for the production of large amounts of fluids with antibodies in mice used to identify arboviruses (arthropod-borne viruses). This procedure was at one time a standard technique in arbovirology around the world.

Born on 1st December, 1927, Dr. Tikasingh is a former student of Naparima College, San Fernando. From an early age he had a passion for biology. He obtained a Bachelor of Science in Biology from Eastern Nazarene College, Massachusetts (1953). Later, he pursued his M.A in Biology at Boston University (1955) and his doctorate in zoology and parasitology at Oregon State University (1960).

Dr. Tikasingh worked at both the Trinidad Regional Virus Laboratory (TRVL) and the Caribbean Epidemiology Centre (CAREC). He served as a Senior Lecturer at TRVL when it came under the management of the University of the West Indies.

Top to Bottom:
1) Tikasingh's scouting days
2) Graduation in 1960
3) Dr. Tikasingh checking mosquito cages
4) Field research at Nariva Forest

When CAREC was founded in 1975, he became a PAHO scientist. He established the Centre's Parasitology / Entomology Unit and served as its head. His research included the investigations of outbreaks of malaria and eastern equine encephalitis in the Caribbean and of yellow fever in Trinidad. During his career, he wrote numerous articles and published the book "The Hunt for Caribbean Viruses: A History of the Trinidad Regional Virus Laboratory". He also edited a book on "The Natural History of Yellow Fever in Trinidad."

Dr. Tikasingh received many awards for his work including the Distinguished Service Award in Recognition of Outstanding Contributions to Public Health from the Caribbean Public Health Association (1994), the Award for Outstanding Service to Medical Technology from the Caribbean Association of Medical Technologists (1995) and the Award for Excellence for Outstanding Scientific Achievements in Entomology, Parasitology and Virology from the Caribbean Health Research Council (2001). The main lecture theatre at CAREC is designated the "Dr. Elisha Tikasingh Lecture Theatre" in his honour.

Dr. Tikasingh enjoyed photography and was an ardent bird watcher. He is a member of the Trinidad and Tobago Field Naturalists' Club and currently functions as the editor of the Club's 'Living World' journal. He never allowed his humble beginnings to hinder him but worked hard to achieve his goals. However, he admits that he could not have done it alone.

Anthony Williams (1931)

STEELPAN INNOVATOR

Anthony Williams is one of the early major innovators of the steelpan. He created the layout of the notes known as the cycle of fourths and fifths. A genius in tuning, he also excelled as a bandleader, arranger, player and musical pioneer.

Anthony Williams was born in 1931 in Port of Spain and grew up at Nepal Street, St. James, where he still resides. In the early 1940s, he began a lifelong involvement with the steelband movement. He played with Harlem Nightingale Steelband at age 12 for the first street Carnival after World War II and subsequently co-founded several bands including North Stars, the most successful band of its era.

In 1951 he participated in the Trinidad All Steel Percussion Orchestra's historic tour to Britain and parts of Europe. His genius as a tuner was recognised when he tuned a tenor bass using three standard oil drums. He created this new instrument to replace the "tune boom" which was made from two smaller biscuit drums of inferior quality metal. At this time he also made an epic discovery and identified the octave within the note itself.

Top to Bottom:
1) The steelpan
2) Creating the steelpan
3) Wind instrument with musical score
4) Conductor's hands at work.

Williams captained North Stars from the early 1950s on overseas tours and to winner's row at many local competitions, including the first Steelband Panorama Competition in 1963. He created complex introductions to calypsoes utilising key modulations and experimenting with arpeggios. He was the first tuner to compose complete tunes especially for the steelband and recorded the album "Ivory and Steel" with celebrated pianist Winifred Atwell, a pioneer quality recording of the steelband playing the classics.

Williams was the first to put pans on wheels allowing for mobile road bands in which pan men could play several pans at the same time. He was also the first to make a pan from flat sheet metal as opposed to a drum and the first to make an "oversized pan".

He tested many of his ideas at the Caribbean Industrial Research Institute in the first scientific study of the instrument in the mid-1970s. Following years of study, calculations and experimentation, he designed the layout of the notes, arranged in circular chromatic scales such that each note is a fourth from its neighbour in a clockwise direction (a fifth from its neighbour anti-clockwise), and an octave away from the nearest note in the radial direction. The arrangement, which allows for greater ease of tuning, musical interpretation and harmony, was a revolutionary innovation and is virtually the standard format today.

Ronald Williams

(1929)

ENVIRONMENTAL ENGINEER

Mr. Ronald Williams has contributed over forty years of service to the field of Environmental Engineering. He is credited with founding the Caribbean Water and Wastewater Association (CWWA) and was an architect of the Caribbean Environmental Health Institute (CEHI). He worked with the World Health Organization (WHO) in Africa and the Caribbean and Latin American region and has extended his scope to advisor in the field of sustainable development.

Ronald André Williams was born on July 15th 1929 in Port of Spain. He attended Rosary Boys R.C. School and St. Mary's College where he was vice-captain of the football and cricket teams. In 1946, he joined the Colonial Service and left seven years later for St. Michael's College, Canada. He obtained both his Bachelor of Science (1958) and Master of Science degrees (1959) in Environmental Engineering from the University of Toronto. While there, he kept active in sports and captained the university's football team.

In 1959 Williams took up the post of sanitation engineer in Trinidad. He contributed to supervision of several sanitation schemes and sat on the Water & Sewerage Authority (WASA) establishment team. He joined the WHO in

Top to Bottom:

1) Williams as captain of his University's football team
2) Graduation from University of Toronto
3) Williams among past presidents of CWWA

1963 as an environmental health engineer. He worked in Iraq, Egypt and Ethiopia over a seven-year period as an advisor and lectured at the college and university level.

Returning to Trinidad in 1970, Williams made several national contributions. He was the project manager for consultants on the Caroni-Arena water supply and the Navet pumped storage projects. He chaired the Pollution Control Council and was a member of the National Conservation Council.

In 1978 he prepared the paper "Preliminary Proposals for a Caribbean Centre for Environmental Health" on behalf of PAHO/WHO. He assisted in the early development of this body, the Caribbean Environmental Health Institute (CEHI), when he returned to WHO in 1979 for a ten-year period of service.

During this period, he was instrumental in founding the Caribbean Waste Water Association (CWWA). Together with the President of the Inter-American Association of Sanitary and Environmental Engineers and PAHO, Williams, as CWWA president, initiated the celebration of Inter-American Water Day in 1992. This has now developed into Inter-American Water Week and Month in several countries. He later expanded the CWWA's scope to include solid waste management issues.

Retired since 1989, Williams is a Fellow of the Chartered Institution of Water and Environmental Management, U.K. and a member of the Association of Professional Engineers of Trinidad and Tobago (APETT). He is a joint founder of ReCaribe, Wider Caribbean Solid Waste and Recycling Alliance, founder and first President of the Society for the Conservation, Appreciation and Promotion of the Environment and former Executive Director of the Caribbean Forest Conservation Association.

Lawrence Wilson

(1934)

PLANT PHYSIOLOGIST

Professor Emeritus Lawrence Wilson is internationally recognised for advancing knowledge of the physiology, agronomy and post-harvest biology of tropical root crops. He introduced many new teaching and research programmes that led to the recognition of the University of the West Indies (UWI), St. Augustine as a centre of excellence in agriculture.

Lawrence Aldridge Wilson was born on November 14th 1934 in Barataria. He attended San Juan Government and Nelson Street Boys' R.C. Primary Schools and St. Mary's College. He graduated with a B.Sc. degree (1957) and M.Sc. degree in Botany (1960) from the University College of the West Indies (UCWI). In 1964, he obtained a Ph.D. in Plant Physiology from the University of Bristol.

He joined the Ministry of Agriculture in 1964 and conducted research on mineral nutrition of vegetable and tree crops. He devised a fertiliser management system for farmers and a hydroponic system using coconut fibred "dust" and slow release fertilisers, which gave very high yields of tuber crops and vegetables.

Top to Bottom:
1) Wilson with UWI staff
2) Wilson in Philippines
3) At Caroni conference in 2000
4) Researching Banana Mineral Nutrition

In 1967, he began lecturing in plant physiology/biochemistry at the Faculty of Agriculture, UWI. He led the Root Crop Programme that conducted critical research on tuberous crop biology including early growth and tuberisation, methods for selecting elite cultivars of yams and sweet potato, and methods for extending dormancy in yams for up to 9 months. Some 70 joint publications were produced as a result.

He was appointed Professor of Crop Science (1975) and served as faculty dean from 1981-1984 and 1988-1994. Under his stewardship as dean, he established postgraduate training programmes in food and nutrition and the Distance Education Teaching Programme in Agriculture and Rural Development. He introduced the Caribbean Agricultural Extension Programme, the Continuing Education Programme in Agricultural Technology and the Certificate Programme in Agriculture.

He was the first Sub-Regional Representative of the Food and Agriculture Organization (FAO) of Latin America and the Caribbean (1965-1966) and served on the board of the International Institute of Tropical Agriculture. He is Editor-in-Chief of the journal 'Tropical Agriculture' and serves on the International Editorial Board of the journal 'Tropical Science'.

Professor Wilson has given over 20 years service to various national and regional bodies including the Caribbean Agricultural Research and Development Institute (CARDI). He is a Fellow of the Third World Academy of Science, Honorary Life Member of the International Society for Tropical Root Crops, and Honorary Life Member and current President of the Association of Professional Agricultural Scientists of Trinidad and Tobago.

TRINIDAD & TOBAGO

ST

ICONS
SCIENCE & TECHNOLOGY

NIHERST
NATIONAL INSTITUTE
OF HIGHER EDUCATION
RESEARCH, SCIENCE AND TECHNOLOGY
INCORPORATED BY ACT OF PARLIAMENT ACT NO 20 OF 1984

Supported by:
The Ministry of Science,
Technology
& Tertiary Education

ISBN# 978-976-95095-4-X