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The Department of Civil Engineering, UWI St. Augustine: A Historical Note of 1972-2001

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Abstract: *This paper is a continuation of a history of the Department of Civil Engineering at The University of the West Indies (UWI) at St. Augustine. It thus extends an account of its formative decade 1961-1971 previously published (in 2013) in The West Indian Journal of Engineering. The three subsequent decades covered herein encompass milestones, and transformations: (a) beginning of graduate level research, (b) commencement of an MSc programme in Construction Engineering and Management, (c) change of name from Civil to 'Civil and Environmental' for embracing the heightened awareness of environmental concerns, (d) relocation into a purpose-built building with a floor space of approximately 5,000 m^2, (e) construction of new environmental engineering, engineering geology, highway engineering, soil mechanics and structural engineering laboratories, (f) expansion and modernisation of the fluid mechanics laboratory, and (g) introduction of the semester system with its credit-based curriculum and assessment. Besides, there was a fivefold increase in student enrolment, followed by a sharp decline, and an increase in academic staff strength from six to twenty. This period also witnessed a gradual loss of regional diversity of its undergraduate students from a high of approximately 50 % in 1972 to less than 10% in 2001. On the other hand, there was a notable, and opposite, change in gender (female/male) ratio among the students – from less than 10%/90% in 1972 to approximately 50%/50% in 2001. Finally, the accreditation of the department's degree programmes by the Engineering Council in the United Kingdom (UK), as well as the triennial visit of overseas external examiners, inherited from its inception, were maintained.*

Keywords: *Civil Engineering; Coastal Engineering; Environmental Engineering; Education; History; University; West Indies*

1. Introduction

In October 1973, a distant world event became the catalyst for change for the Department of Civil Engineering, hereafter referred to as the department, and equally for the Faculty of Engineering at The University of the West Indies (UWI) at St. Augustine, and Trinidad and Tobago (T&T). Specifically, it was the Arab Israeli war which greatly increased the price of petroleum. The ensuing windfall provided an opportunity, inter alia, to build/ expand/modernise the country's infrastructure – airports, hospitals, industrial estates, ports, public buildings, roads, and water supply. Some of the prominent public buildings thus built in Trinidad are the Hall of Justice, the Central Bank Towers and the Mount Hope Medical Complex. Moreover, the Priority Bus Route, the Uriah Butler Highway, the Point Lisas Industrial Estate, and the O'Meara Industrial Estate in Trinidad, and the Claude Noel Highway in Tobago were built from the increased petroleum wealth. Further, the newfound wealth gave an impetus to build the Arena and the Lower Navet dams, previously envisaged for increasing the capacity of public water supply in Trinidad. Therefore, there was an urgent need to train more civil engineers, both at the undergraduate and postgraduate levels. The objective of this paper is to chronicle how a hitherto small department, then only a decade old (Ellis and Shrivastava, 2013), addressed this need.

Photograph 1. I D C Imbert Building (*Completed 1986*)
Photo Credit: Author
Civil and Environmental Engineering, UWI St. Augustine

2. Heads of Department

During the three decades spanning this paper, there were six heads of departments. Information about the first, Professor Ponnambalam Selvanayagam, who served for six years 1968-1974 is sparse. An earlier publication (Ellis and Shrivastava, 2013) essentially provides all that is known about his links with the department. Further, out of

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the remaining five (see Photograph 2), comprehensive profiles, as Caribbean icons, are provided for the three (Harry Orville Phelps, Myron Wing-Sang Chin and I D C Imbert) by the National Institute of Higher Education Research Science and Technology of Trinidad and Tobago (https://icons.niherst.gov.tt/profiles/). Besides, there are memorial articles (Bretton, 2012; Shrivastava, 2017; Shrivastava and Imbert, 2018) for Professor Ignatius Desmond C. Imbert, Mr. Raymond Charles and Professor Harry Phelps, respectively. Accordingly, this paper provides only those aspects of the five heads of department which specifically relate to the periods of their respective headships.

Harry Orville Phelps 1974-1986 | Anil Kumar Sharma 1986-89; 1995-98 | Myron Chin 1989-1992

I D C Imbert 1992-95 | Raymond Charles 1998-2001

Photograph 2: Five Heads of Department (1974 – 2001)
Photo Credits: Department of Civil & Environmental Engineering

The Late Professor Harry Phelps (1926-2018) established the ethos of the department. Among these was an insistence that academic staff should normally be present in their office during working hours for students' consultation. He also ensured strict adherence to examination protocols – preparation of error free and lucid examination question papers within the stipulated deadlines, and rigorous and timely marking of examination scripts.

Professor Anil Sharma focused on academic staff recruitment. Professor C. Venkobachar and Dr. K. Venkatraman were recruited from India for filling vacancies in Environmental and Geotechnical Engineering respectively; Mr. Keith Sirju and Dr. Richard Clarke were recruited locally for filling vacancies in structural engineering. Notably, Professor Sharma served as the editor of the West Indian Journal of Engineering.

Dr. Myron Chin connected the department to the society through mounting continuing education courses for engineers, and for the National Emergency Management Agency (NEMA). Among his contributions the following two are prominent: (a) seismic risk evaluation of critical infrastructure in Trinidad, and recommendations for retrofitting the same; (b) development of a Caribbean Uniform Building Code (CUBiC).

The Late Professor Desmond Imbert (1931-2010) was passionate about keeping the curriculum linked to the foundational aspects of the subjects taught. Hence, he advised that the syllabi be as brief as possible to avoid distortion with time. He concurrently led the MSc programme in Construction Engineering and Management. He preferred to meet staff in the openness of corridors and walkways, and always reminded academic staff to publish only in high quality scholarly journals and not to become a pamphleteer.

The Late Mr. Raymond Charles (1951-2017) pioneered regional Coastal Engineering Training Courses in different Caribbean Islands and was instrumental in starting an MSc in Coastal Engineering. His initiative for the department to take the lead in Coastal Engineering was rooted in his observation that major roads in the Commonwealth Caribbean islands, owning to their generally mountainous landscapes, were built along the coastline. These are vulnerable to coastal erosion, especially during the passage of hurricanes.

3. Expansion, Rebranding, and Restructuring

With an increase in student numbers (see Figure 1), two needs emerged: (i) additional floor space, and (ii) additional teaching and support staff. In response to the first need, temporary wooden buildings were constructed in 1976 – with classrooms, offices, and a large drawing room. Alongside, the budgeted academic staff strength was increased from six to twenty (see Table 1). In 1986, the temporary wooden buildings were replaced with a purpose-built building (see Photograph 1), later renamed after the late Professor I D C Imbert. While the student numbers varied in response to the fluctuations in T&T's petroleum-based economy, the academic staff strength remained constant. This motivated an increase in research activities in mounting continuing education courses and for developing the previously mentioned postgraduate course in Coastal Engineering in 2001.

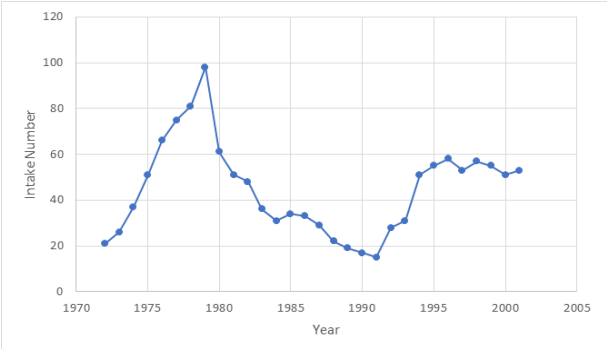

Figure 1. Student Intake Numbers 1972-2001
BSc Civil Engineering and Civil with Environmental Engineering
Source: Department's Submission Document for UK Engineering Council Accreditation 2001

Table 1. Academic Staff (Nationality other than T&T)

1972	**2001**	*Remarks*
P. Selvanayagam (Sri Lanka) Compton Deane Ignatius Desmond Imbert Harry Orville Phelps Leon Taylor (Grenada) Gerald Webb	Raymond Charles Myron Chin Vincent Cooper Derek Gay Madaniyo Mutabazi (Tanzania) Ian Khan-Kernahan Richard Clarke Abraham Mwasha (Tanzania) Robin Osborne (Dominica) Everson Peters (Grenada) Timothy Michael Lewis (UK) Kangala Ramamurthy (India) Cassandra Rogers Anil Kumar Sharma (India) Gyan Shrivastava (India) Keith Sirju Winston Suite K. Venkataramana (India) Chintanapalli Venkobachar (India) Rupert Williams	The following were members of academic staff in the intervening period: Gregory Andrews David Gunaratnam (Sri Lanka) Colm Imbert William Milne-Home Emru Millette Samuel Naranjit Joseph Srilal Perera (Sri Lanka) Winston Rajpaulsingh Kandula Sarma (India) David Smith (Jamaica) Percival Thomas (Sri Lanka) Ronald Williams

The four floors of the I D C Imbert building provided approximately 5,000 m^2 floor space for staff offices, new laboratories for Structural Engineering, Highway Engineering, Geotechnical Engineering and Engineering Geology. Additionally, three design studios, four lecture rooms, and two tutorial/seminar rooms were created. On the other hand, an architectural design flaw in the new building created frequent, and often prolonged, inconvenience to its occupants. Put another way, extensive use of glass in staff offices created a greenhouse effect during the breakdown of its water chilled central air-conditioning system. In hindsight, its architectural design should have provided pathways for the north-east trade winds, for alleviation of heat during breakdowns of its air-conditioning system.

The old structural engineering laboratory, located diagonally opposite to the Faculty of Engineering workshop, was converted into a new Environmental Engineering Laboratory in 1985. At the same time, the Fluid Mechanics Laboratory was expanded and renovated. It was then equipped with a number of new apparatuses: a hydraulic bench with pumps in series and parallel, dynamics of vortices apparatus, pipe friction apparatus, pressure transient apparatus, a sediment transport flume, a Hele Shaw apparatus and a subsonic wind tunnel for Wind Engineering (see Photograph 3).

The 1990s brought an awakening: it became obvious that though civil engineers have a leading role in the matters relating to the environment, as builders of infrastructure, they risked being marginalized by other disciplines in an era of growing public interest in sustainability and environmental preservation. No doubt, civil engineering departments elsewhere had foreseen such a trend and had changed their names from civil to civil and environmental, for example – Imperial College, Massachusetts Institute of Technology and Stanford University, to name a few. In 2000, after a considerable debate the department changed its name from Civil Engineering to 'Civil and Environmental Engineering'. Consequently, two undergraduate degree programmes were simultaneously offered: civil engineering, and civil with environmental engineering.

Photograph 3. Sub-sonic Wind Tunnel, Fluid Mechanics Laboratory (May 1996)
[L to R – Anil Sharma (Head of Department), Guru Kochhar (Dean, Faculty of Engineering), Samuel Hinds (Prime Minister, Cooperative Republic of Guyana), and the author)]
(Photo Credit: C. Kanhai))

A milestone, starting in 1990, was the switch from its UK based academic year comprising three terms to a two-semester system. Such a move was a UWI-wide decision which the department was obliged to follow. The stated objectives were said to extend the teaching period and conformity with universities globally, particularly in

North America. Nonetheless, it required a restructuring of the overall curriculum and individual courses, and timetables for lectures, tutorials, and laboratory and field sessions. Additionally, a system of course credits and grade points were brought into the teaching and examination rubrics. This transition took five years (1990-1994), during which two parallel systems of course delivery and examinations were implemented.

4. Introducing MSc Construction Engineering and Management

An MSc programme in Construction Engineering and Management (CE&M) commenced in 1978 for meeting the gathering pace of construction in the wake of the petroleum windfall previously mentioned. Its objective was to train civil engineers for managing large construction projects and equip them with skills in areas of optimal sequencing of myriad activities at construction sites, risk management, cost control and human resource management.

This programme was designed and delivered under the leadership of the late Professor I D C Imbert. For this purpose, three academic staff – Mr. T. M. Lewis, Mr. R. Osborne, and Mr. S. Perera - were initially recruited. Four years later, Dr. K.N. Ramamurthy and Dr. W. H. E. Suite joined the CE&M teaching staff. Upon the retirement of Professor I.D.C. Imbert in 1996, Professor Winston Suite took over the leadership of this programme. Since its inception, approximately two hundred students completed this MSc programme. Its part-time mode was favoured by those in full-time employment, and consequently many completed the programme in two or three years. Often, completion of MSc project reports was the main delaying factor. Nonetheless, with its mix of engineering and management, this programme was well received by the construction industry.

5. Research Activities in the Department

The Department, to its credit, created a strong tradition of research in its formative years (Ellis and Shrivastava, 2013). Thereafter, the early seventies saw the culmination of a regional research project on coastal erosion in the Eastern Caribbean (Deane et al., 1973), and the beginning of experimental research in hydraulic engineering (Phelps et al., 2021A and 2021B). To these, twelve PhDs (see Table 2) added to the body of the department's research. Additionally, eight published works give a flavour of research activities in the department. These are:

1) Resource Sharing in Linear Construction (Perera, 1983),
2) UWI Experimental Catchment Research Project, 1986 (see *Annex A*),
3) Hurricane Resistant Housing Design (Osborne et al., 1992),
4) Soil Mechanics of Trinidad's Expansive Clays (Ramana and Phelps, 1993),
5) Properties of Bitumen from Lake Asphalt (Charles and Grimaldi, 1996),
6) Torsion of thick-walled open concrete sections (Khan-Kernahan, 1997),
7) Impact of Sea Level Rise on Coastal Aquifers (Shrivastava, 1998), and
8) Aerodynamics of a Cricket Ball (DaSilva and Shrivastava, 2001).

6. Impact of Computers, Declining Regional Diversity and Changing Gender Ratio

The use of desktop computers first commenced in the mid-1980s, followed by laptops in the mid-1990s. The exponential increase in the use of computers by staff and students alike has had positive as well as negative impacts in teaching and learning. The positive impacts were self-evident, but the negative impacts were generally overlooked.

Table 2. PhDs Awarded (Nationality other than T&T)

Name	Title (Supervisor)	Year
Gyan Shrivastava (India)	The optimisation of pumping operations in the El Socorro aquifer (Harry Phelps)	1978 (May)
Winston Suite	A study of Melajo and Gunapo aggregates and the properties and behaviour in the fresh and hardened states of concrete made with these aggregates (I D C Imbert)	1978 (July)
Carson Charles	Linear systems approach to transportation modelling in Northern Trinidad (John Underwood)	1981
Joseph Perera (Sri Lanka)	Linear programming models in construction planning and control (I D C Imbert)	1983
Anthony Joseph	Structural utilisation of local timbers (A K Sharma)	1984
Timothy Lewis (UK)	An investigation into technology and technological change and their special relationships with engineering and development (I D C Imbert)	1989
Robin Osborne (Dominica)	Factors affecting selected methods of testing concrete for compressive strength (I D C Imbert)	1990
Firdaus Kamalodeen	Strength and behaviour of fibre reinforced concrete beams under combined bending, shear, and torsion (Anil Sharma)	1993
Ian Khan-Kernahan	Structural behaviour of bridge decks (Anil Sharma)	1994
Reynold Stone	Microcomputer-based model for surface runoff prediction from small agricultural watersheds in Trinidad (Harry Phelps)	1995
Richard Clarke	The hysteretic behaviour of ferrocement-retrofitted clay block masonry walls under in-plane reversed cyclic lateral loads (Anil Sharma)	1997

Source: The Alma Jordan Library, UWI St. Augustine

Among the negative impacts were a lessened ability to solve a problem from first principles and prepare sketches by hand. Further, it made plagiarism in coursework more difficult to detect, due to the use of identical software. In later years, the Internet has exacerbated this aspect in all study fields including engineering (Park, 2003). Furthermore, computers and slide projectors gradually replaced the blackboard/whiteboard in the classrooms. This reduced beneficial human interactions because a chalkboard/whiteboard is natural to the teaching of science and engineering – where intricate diagrams and equations need to be drawn and derived. Moreover, it is simple, reliable, spontaneous, and due to its slower pace permits the students to take notes. In sum, eyes, ears, and hands operate at the same time, and this improves concentration and learning. Its virtual disappearance is a loss in a high-tech world (Ressler, 2004).

The three decades covering this paper also saw a gradual decrease in regional diversity amongst its undergraduate students. In the author's observation, the number of students coming from outside Trinidad and Tobago decreased from approximately 50 % in 1972 to less than 10% in 2001. Recent statistical reports continue to show this trend (UWI, 2019a, 2019b). It approximated 9 % during the academic years 2013-2019. This loss of diversity diminished the richness of student and staff experience, since diversity enhances thought processes, communication skills and better prepares graduates for work in pluralistic work environments (Gurin et al., 2002). However, to the best of the author's knowledge its underlying causes have not yet been investigated. Although there seems to be a combination of factors ranging from a change in UWI's governance structure in the mid-1980s (Sherlock and Nettleford, 1998), the emergence of the University of Technology, Jamaica, and a greater appeal of universities in North America are most likely contributing factors.

In parallel with the above-mentioned decrease in regional diversity, there was an increase in the number of female undergraduate students in the department. In the author's observation, it increased from less than 10% in 1972 to approximately 50 % in 2001. Such an increase is now the norm: e.g., during the academic years 2013-2019 females constituted approximately 67% across the St. Augustine campus, and 30 % in its faculty of engineering (UWI, 2019a, 2019b). From a gender equality point of view this was/is a positive development and augurs well for female empowerment in a modern society.

In the author's recollection, and from a qualitative perspective, the before-mentioned increase in the ratio of female undergraduate students brought to the fore greater diligence and superior academic performance of female students, in general. Such a difference in the academic performance between male and female university students has also been observed elsewhere, for example in Turkey (Dayıoğlu and Türüt-Aşık, 2004,) and in the Netherlands (Verbree et al., 2022). Indeed, a study of university students in the Netherlands posits greater female conscientiousness as a predictor of the gender gap in academic achievement.

7. Teaching and Learning: Quality Assurance

An enduring aspiration of the department, since its inception in 1961, has been its pursuit of excellence in teaching and learning. Against this and considering the geographic isolation of The UWI (from the north Atlantic academic stream, and within the Caribbean region due to language barriers - Dutch, French, and Spanish), triennial visits of external examiners from the United Kingdom (UK) and elsewhere were instituted in its formative years. Subsequently, a number of professors – J.R.D Francis and Peter Wolfe from Imperial College, Duncan Mara from the University of Liverpool, Paul Johnstone from the University of Dublin, D.M. McDowell from the University of Manchester, Kuldeep Virdi from the City University in London, and Johann Atrops from the University of Cologne in Germany – visited the department. They interacted with staff and students, examined coursework, and took part in oral examinations. In addition, draft examination question papers and a sample of marked scripts were sent to the aforementioned external examiners for their review. In the mid-1980s Professor Atrops recommended a system of peer review in the department as a tool for continuous improvement. This was done in the subsequent years with its attendant benefits. Other external examiners stressed the link between teaching and research and spoke of the need for a greater research output in the department. These external interactions provided beneficial checks and balances.

The department also strived for a hallmark of international recognition of its degree programme. For this purpose, in 1972, the department had its first accreditation visit by the Council of Engineering Institutions (CEI) in the UK. The CEI gradually transformed into the Engineering Council in 1981 (Chapman and Levy, 2004), and the subsequent accreditations in 1983, and 1988 took place under its auspices; and in 1993, 1997 and 2001 through its Joint Board of Moderators (https://jbm.org.uk).

A recommendation of the 1988 accreditation visit was for design to be a continuous learning thread in the curriculum. This was done and the subsequent accreditation visits consistently singled out its capstone design project for its excellence (Shrivastava, 2013). Needless to say, preparation for accreditation visits – documentation, planning and curriculum restructuring through the changing paradigms of 'Standards and Routes to Registration' (SARTOR) and the UK Standard for Professional Engineering Competence (UK-SPEC) – were one of the onerous duties of its head of department.

Perhaps, the best indicator of the quality of teaching and learning imparted at an educational institution is informal feedback from its alumni. During the past four decades, it has been the author's privilege to meet several past students informally during his travels, and in

seminars and conferences. It was uplifting to see former students running successful engineering consultancy firms, managing large construction projects, rising to senior positions in the public sector, and progressing in academia.

Four examples convey the essence of the feedback:

1) 'Coming to The UWI St. Augustine from Dominica was an exhilarating experience. Amongst the students from different islands, I understood what it means to be a West Indian, and Compton Deane taught me the value of working from first principles' (Jerry Medford, Class of 1976, Personal Communication, 2019);
2) 'Professor Phelps apart from teaching Environmental Engineering, took time to correct my grammar and instilled in me a lifelong aspiration to write clearly, concisely, and correctly. It has done me good' (Fazir Khan, Class of 1984, Personal Communication 2022);
3) 'My final year design project on a Pelton Turbine for a hydro-electric plant in Tobago remains an important formative influence' (David Prevatt, Class of 1985, Personal Communication 2022); and
4) 'When I went to the University of Birmingham in the UK to do my Master's, I had apprehensions. Would I be able to cope? I need not have worried. UWI had prepared me well' (Adesh Surujnath, Class of 1995, Personal Communication 2022).

8. Administrative and Technical Staff

Last but not least, the invaluable contribution of administrative and support staff is acknowledged. In this context, Angela Crichlow (Departmental Secretary, 1971-2008) is foremost, followed by Rohana Rafeek (Secretary of CE&M MSc Programme, 1982-2018). Similarly, the following technicians are acknowledged: Computers (Ronald Singh), Environmental (Althea Richardson), Fluid Mechanics (Sherry Ann Dumas-Harewood; Kurt Fereirra) Geotechnical/Highways (Samuel Ames, Carlyle Christian), Geology (Chatergoon Kanhai), and Structures (Darnley De Four, Martin Moore; Austin Rodriguez).

9. Revisiting the First Decade (1961-1971)

Ten years have elapsed since an account of the department's formative decade was published (Ellis and Shrivastava, 2013), and this paper provides an opportunity to include some observations which were inadvertently overlooked. The observations of Tony Gibbs (personal communication 2014 and 2022) are invaluable (*Annex B*). He is an outstanding civil engineer and a Caribbean icon (https://icons.niherst.gov.tt/icon/tony-gibbs-ci2/).

Besides, Eng Gibbs' links to the department literally go back to its roots: he was the Assistant Site Engineer with Norman and Dawbarn (Architects and Engineers) during the construction of the Faculty of Engineering buildings at St. Augustine in 1961. Specifically, his observations enhance the value of the said publication by presenting opposing views for a balanced perspective.

10. Conclusion

During the three decades, 1972-2001, the department underwent considerable expansion, physical relocation, renovation, rebranding, restructuring and an increase in the percentage of female students. Added to these were a decline in regional diversity of its students, which reduced the richness of academic experience for students and staff alike, and emergence of computers with their own positive and negative impact on teaching and learning. That the department met these challenges with resilience is a tribute to its good leadership and dedication of its staff.

The department emerged stronger to face the challenges of the new millennium, such as the need to provide a 'Matching Section' by either adding a year to its three-year BSc programmes leading to a MEng or providing an accredited MSc programme for meeting the evolving accreditation requirements of the UK Engineering Council. Chronicling how this was achieved and other subsequent changes is, in the author's view, best left for others who came to the department after him.

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Declarations:

Some documents, particularly for the years 1970-1990, could not be found. This historical note is considerably based on the recollections of the author who spent thirty-six years in the department: 1972-1975 as a graduate assistant, and 1982-2015 as a member of its teaching staff.

***Annex A*:** UWI Experimental Catchment Research Project

It became evident in the early 1980s that the volume of rainfall runoff on the St. Augustine Campus was increasing rapidly, judging from the observations of flow entering and exiting the pond between the blocks 1 (now the K. S. Julien Building) and Block 2 (now, the I. D. C. Imbert Building). It was believed an increase in impervious area on campus due to the conversion of hitherto green spaces by new buildings (such as, the International Relations Building, expansion of the Frank Stockdale Building, Management Studies Building and expansion of the car park at the main administration building as well of the tennis courts were contributing factors).

In 1984, the late Professor Harry Phelps asked the author to carry out a drainage study of the St. Augustine Main Campus (Approximately 20 Hectares) which drained into the Engineering Pond. Its objective was to initiate measures to reconfigure the drainage network, lest flooding occurs in the Faculty of Engineering located at the downstream end of the said campus. Accordingly, a Parshall Flume was constructed and equipped with a streamflow recorder (see Figure A1). Simultaneously, a recording rain-gauge was installed nearby for rainfall/runoff correlation.

In 1990, a report was prepared and submitted to Campus Research Grants Committee which had funded the project. Unfortunately, this report was not published, and neither can now be located. Nevertheless, the following summary of the author's recollection may be pertinent now.

Figure A1. Parshall Flume and Streamflow Recorder on a drain between the Principal's Office and the Swimming Pool (Photo Credit: the author – shown in the picture with his daughter, 1986)

After analysing five years of concurrent rainfall and streamflow measurements it became obvious that a runoff from the campus had fundamentally altered. That is to say, runoff from areas outside the campus (i.e., north, and east of the campus) was entering, as observed during storms. Moreover, anecdotal evidence of flow through the Engineering Pond indicated that the campus internal drainage network was self-contained until the end of the 1970s. Subsequent flooding of the International Relations Building, of some of the Faculty of Engineering Laboratories and other areas on the campus reflects a new reality. It also tells us that any solution to the flooding problems on the St. Augustine Campus should consider the growing urbanisation of external areas as well.

***Annex B*:** Observations of Eng. Tony Gibbs, Fellow, Royal Academy of Engineering

• "Although the building and design of bridges and the design and maintenance of waterworks are indispensable parts of modern life, the role of a Civil Engineer remains somewhat obscure to many people. If this is so today, it was even more so in the 1950s and 1960s, when the Civil Engineer was even more an enigmatic character on the West Indian landscape." – When I embarked on my engineering studies in 1957 and when I worked in Trinidad in 1961-1962, I was not conscious that engineering was an obscure profession nor was I conscious that I was perceived as an enigmatic character.

• "In fact, as many engineers who began their studies or careers in the 1960s would explain, to the average West Indian, the engineer was simply "an Englishman," "a white man", and as

such, his mystique, in the social milieu of the last days of colonialism, was heightened (Phelps, 2007; Julien, 2008; Suite, 2007)." – The engineers I recall from my 1961-1962 stint in Trinidad included Harry Phelps, Curtis Knight, Ron Bates, Roderick Douglas and David Key. Of those, only Key was a white Englishman. Curtis Knight, a Grenadian, was regarded as arguably the top civil engineer in Trinidad at that time. And it was he who initiated the formation of APETT. Roderick Douglas. too, was a Grenadian. It may be that Grenadians had a different perspective on the profession. When I was President of the Barbados APE in 1973-1974, my First Vice President was Grenadian Ambrose Johnson, and my Second Vice President was Grenadian Bert Mahy.

• "… United Nations Educational, Scientific and Cultural Organisation (UNESCO) put it, "that too few returned to their homes to practice what they had learned" (UNESCO, 1969, p. 10)." – I am surprised at that. I can think of only one Caribbean engineering student that I knew during my 4-year undergraduate period in the UK who did not return to work in the Caribbean.

• "The Faculty was funded by the Ford Foundation (Buildings)…" – I do not think this is correct for the first engineering buildings at St Augustine. The Ford Foundation buildings came much later. Also, while I was working at St Augustine in 1961-1962 my firm (Norman and Dawbarn) were busy designing Canada Hall. I doubt very much that Ford Foundation funded that project.

• "A strong example of this is the Jentech Consultants Limited engineering company of Jamaica. This company was founded in 1972 by five (5) men who were cohorts and friends at the Faculty of Engineering." – My recollection is that Dr. Radcliff Frederick, a Trinidadian who was not a graduate of The UWI, was one of the founding partners of Jentech. Radcliff was a top-class geotechnical engineer. I was quite friendly with him during my working period in Jamaica in 1965. You may wish to check this with Wayne Reid.

• "UNDP analysts feared that this compromised the prime objective of the Department: to create well-trained and qualified regional engineers." – Surely not – surely the prime objective of the Department is to create well-educated graduates who are subsequently trained to become professionally-qualified engineers equipped for work anywhere in the world.

• "Dr. Selvanayagam's area of specialisation was structural engineering. He had obtained his PhD at Imperial College in London in 1950, where he had worked on analytical and experimental investigation of the distribution of stress in shell structures." – It is a pity he did not work much more in that field while at UWI. Shell structures have an important utilitarian role in the construction of a wide variety of buildings – warehouses, factories, schools, housing, stadiums, and auditoriums. In the Commonwealth Caribbean, probably the majority of shell (and folded-plate) concrete structures were designed by Wilson Chung and Fred Benghiat (in Jamaica); David Key, Anthony Farrell and Tony Gibbs (in Trinidad); Tony Gibbs (in Barbados); Anthony Farrell, Tony Gibbs and Wilston Etienne (in Dominica). Of those engineers, only Anthony Farrell graduated from UWI, and he did not learn about shell structures there. Shells and folded plates are favourable for earthquakes, hurricanes and climate change mitigation and adaptation. And they are economical.

• "Late Emeritus Professor I.D.C. Imbert (1931-2009)" – I believe that Desmond Imbert's funeral was on 26 May 2010. I recall asking a gathering of 100 engineers, scientists, architects and insurance personnel attending a seismic hazard meeting at the Normandie Hotel to stand for one minute's silence in honour of Desmond on that day.

• "In this regard, the 1970s represented a boom for the Department of Civil Engineering. The main reason for this boom was the success of Trinidad's oil industry, as well as Jamaica's bauxite and tourism industries. …. Jamaica, one of the countries providing subventions to the University was developing profitable bauxite and tourism industries. … the number of projects requiring the services of a civil engineer in Jamaica and Trinidad and Tobago was increasing at a rapid pace." – The 1970s saw the collapse of the very strong engineering profession in Jamaica. At the start of the 1970's Jamaica boasted a construction industry – engineers, architects, and builders – unmatched in the rest of the Caribbean. By the end of the 1970's the construction industry had been decimated. In fact, it still has not recovered its former glory.

Author's Biographical Notes:

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