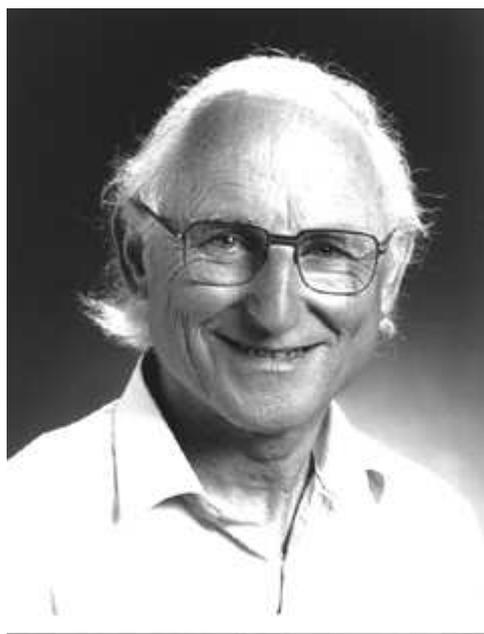


*NZMS Newsletter #64****CENTREFOLD******JOHN CHRISTOPHER TURNER***

John Turner's professional life shows the same variety as the man himself. Fortunately for me, he wrote some notes on distant places and times now passed. I can hardly improve on them, but the quotation marks do not quite mean what they say, for I had to select passages, and sometimes, shorten them.

A Yorkshire lad from Leeds, he grew up during the war, served in the RASC[1] (1946-1949), and was demobilised just after the Berlin airlift began. He spent two years as a student engineer with Brush Electrical in Loughborough, and ended up as the top student of his year with a Higher National Diploma in Mechanical Engineering.

On the strength of that, he received

a Technical State Scholarship, which enabled him to enter Leeds University and specialise in mathematics.

"At that point, I suppose, I began to understand what it was `to be a mathematician' (I remember devouring E T Bell's `Men of Mathematics' in my first year; that had an inspirational impact on me, which has lasted to the present. We studied for a three-year honours degree, called a BSc (Special Honours Mathematics). In the first year, I took papers in engineering too (one had to take some kind of science as leavening) but thereafter, it was all mathematics. In the final year, we had to `choose' a special topic, Foundations of Mathematics, Applied Mathematics or Statistics. As they were usually allocated in that order, by brightness of the student, I `chose' Statistics!"

On graduating with second-class Honours, "I was immediately offered a post as Statistician, with the rank of Scientific Officer, in the Mathematics Division of the Armaments Research and Development Establishment at Fort Halstead in Kent. On that campus, the first Atomic Energy Division was set up, within a ring of high green barbed wire fencing. A year after I started there, I was permitted to pass through the fencing (armed with an entry pass) to learn to write computer programs for their wonderful FERRARI computing machine[2]. As I recall, it took me several days to learn how to compute values of exponential functions from series expansions - and then it needed three or four engineers to present the programs to the computer and interpret the flashing dots on the screens at the console!"

"My boss, a Principal Scientific Officer, set me to prepare programs to simulate tank battles over a variety of terrains ... in those days, words such as `simulate' and `stochastic process' were not in common use, and

very little literature was around. In that year (1955), I invented my first mathematical concepts: I defined 'reliability' and 'operability' as probabilities of certain kinds of event, and put them in a short paper 'Reliability and Operability of Components in Series and in Parallel'. This work resulted from a request from the War Office for knowledge of the likely 'trigger time' of an atom bomb released from an aircraft and set to explode later (they were testing explosions at various heights above sea-level)".<sup>[3]</sup>

"In 1956, a strong desire for travel led me to take a post as Tutor in Mathematics at the Mombasa Institute of Muslim Education, a residential College in Kenya. I taught mathematics and physics for would-be engineers aged 14 to 22, who aimed at the British City and Guilds Examinations. The best students went on to take Ordinary National Certificates, but all students got good practical training in subjects ranging from seamanship to radio engineering, from motor mechanics to advanced electrical trade practice. For three years, I was House Master of Batani House - in fact, all the Houses (Batani, Yunus, Haytham and Jabir) were named after famous Muslim scientists of the past - but to my shame, I did not try to find out what they contributed to our subject.<sup>[4]</sup> When I left in 1960, I looked back with pride on their success in the sports and athletic activities that we ran: my House had taken all the silver cups and trophies to be won."

"In Mombasa, I lived amongst the diverse cultures of Africans, Indians and Arabs for four years, perhaps the most enjoyable period of my life: I loved my teaching job; I learned Kiswahili, and how to live in a vastly different culture (as a Colonial 'Bwana mkubwa'); I traveled far and wide, in battered old cars on unmade roads through the African bush, to Lake Victoria and Uganda, to the White Highlands around Nairobi, to the game parks of Serengeti; and with a party of friends (well aided by a dozen or so bearers), I climbed to the very top of Mount Kilimanjaro, clambering along its snowy peaks at over 25 000 feet, with views of all Africa (so it seemed to us) laid out below in the morning sunlight."

"In Mombasa too, I acquired my wife Barbara and two stepsons, and my first daughter was born there. From a window in the beautiful hospital, we watched the Arab dhows plying their trade, moving under brown sails in and out of port."

Perhaps lacking mathematical stimulus, they decided to return to Britain, and in 1960, John joined Nottingham Technical College as a Lecturer, where he taught Statistics and Pure Mathematics at all levels up to BSc Hons, mainly to engineers. "I spent an exciting and challenging two years there. My toughest course was Solid Geometry: two evenings a week, I lectured for three hours on end, following the London University syllabus, and each weekend, I had to prepare myself and the lectures, find suitable exercises and obtain the answers ... I had 8 students in the class, all doing the degree part-time like this."

"After a couple of bleak English winters, my wife and I heard the call of Africa again." As all three of his applications succeeded, they had a choice - and chose Fourah Bay College, in Sierra Leone. So in August 1962, they set off in a P & O boat through the storms of the Bay of Biscay to the steamy port of Freetown, 'the Athens of Africa'. "A taxi brought us up the steep hill from the coast, in the most torrential rain we had ever encountered, to the lovely campus perched on three levels of the hillside. We were allocated to an old colonial-style bungalow, with spacious high-ceilinged rooms and a balcony that ran right across the rear of the house. The view from the balcony was fabulous - worth a millionaire's ransom. For three years, it was the repository for our children's toys; our daughters learnt to tricycle on it, and raced up and down like charioteers, side by side."

There at Fourah Bay College, "I first came to think of myself, with immense pride, as being a 'University Lecturer' ... with the duty not only to teach courses but also to produce research, and that was a worry, since I had only my experience as a Scientific Officer behind me. There were about eight on the staff, but no other statisticians or probabilists to help me. I was actually hired as Lecturer in Applied Mathematics, which meant I had to prepare and present courses on any topic in Statistics or Mathematical Physics, towards the Honours Degree (all carefully monitored to high standards by Durham University). I must be a rare bird in University circles this century, having taught in all branches of mathematics up to Honours, and beyond."

"There too, I first came under the sharp eye, logical mind and kindly Headship of Professor Teddy Zulauf (I called him `Sir' in those days). One of his institutions, the weekly seminar, was of immense value to me: he called on each of us to talk. and all staff had to attend, regardless of the topic. I learned the great lesson of listening carefully, however strange the symbols or opaque the material, trying to pick the bones of it, trying to gather some idea that I might apply to my current work. My first seminar was on Markov Chains, two expository talks. I was terrified. However, as I had mugged up enough theory in Nottingham to give a short evening course, I got through the sessions without wishing the ground would swallow me up."

John then found he could use his knowledge of Markov Chains to extend his paper on the Reliability Theory of Networks; by 1966, three years later, this became his research thesis for an extra-mural MSc from Leeds University. "We spent a happy three years in Sierra Leone, but in the end, we began to tire of the climate ... the rainy seasons, the electrical storms ... I applied for a Senior Lectureship at Huddersfield College of Technology[5] and obtained it on the strength of letters of reference alone."

"Thus we returned to my home county of Yorkshire; it was grand for me to hear the broad Huddersfield accents again, though my family had to get used to them. We bought a very old house on a hill overlooking a panorama of smoke-blackened roofs[6] and industrial buildings down in the valley where Huddersfield lay; its solid stone walls, two feet thick, made living very comfortable in both summer and winter."

"In my two years at Huddersfield, I completed my MSc from Leeds, and began my activity as author. I proposed a book `Modern Applied Mathematics', a mix of discrete maths, statistics and operational research for the new courses and first-year curricula under development then, and to my surprise, English Universities Press offered me a contract on the spot. I worked on it for two or three years (mainly in evenings and holidays, because we lectured 21 hours a week in technical colleges), typing its 500 pages (and carbon copies, of course) on a battered old portable. It finally appeared in print in 1970, it remained in print for 20 years (its Spanish translation is still on sale, I believe), and the British Council selected it for a special issue to third-world countries."

"In 1966, the British Government began to convert about 30 Technical Colleges into Polytechnics (to develop degree courses and research in new areas of technology). Huddersfield got the thumbs down, but a College in Leeds, 25 miles away, advertised for a Principal Lecturer with responsibilities in Statistics and Operational Research, a post which seemed tailor-made for me. I decided to have a go: I was only 39, the corridors of power were beckoning (and on joining the `boss class', my lecture load would fall to 15 hours a week). So in 1967, we moved into a three up and down terrace house in Mapperley, an old-established suburb of Leeds."

"In my three years at the new Leeds Polytechnic, I learnt a great deal about politics, among Departments and among Polytechnics too, for we competed with one another to get our courses and degrees approved by the CNAA (the Council for National Academic Awards), a spider-like organisation in London with supreme authority over the plans of us hicks in provincial Polys. After two years planning, report-writing and committee work, I succeeded in establishing a four-year Honours Degree, the BSc in Operational Research with Computing, a strange title that emerged like a camel from a CNAA committee[7]. Burdened by this work, by other projects, by research and by the heavy teaching load, I began to feel `something had to give!'"

"Early in 1970, out of the blue, I received a letter from Professor Zulauf. He told me he had left Africa three years earlier to join Waikato University, then hardly two years old, as Reader in Pure Mathematics, vowing he had his fill of being Head of Department and `running things' - but when his Head, Professor Sawyer, resigned in 1970, the Vice-Chancellor had prevailed on him to take the Chair. He had agreed to do so only if he could appoint two senior people, and with their help, develop a full Mathematics Department, offering courses in Pure Mathematics, Mathematical Physics and Statistics. Would I like to apply for the post in Statistics, at the level of Professor or Reader? Barbara and I read the letter twice, thought it over for half an hour, and said `We would!' Having missed the deadline, I fired off an aerogramme in return, and scribbled a CV on the back - I never did follow it up with a proper CV!

Without a Doctorate, I dared not apply for a Professorship, but the Readership entailed a drop in salary, a point that seemed worth making. In the end, the Registrar offered me the post, and that August, we packed up all our possessions, including a piano, and boarded the glorious ocean liner, the MV Oriana."

"She set sail from Southampton on a bright sunny day, bunting flying and horns sounding, but we didn't get past the Isle of Wight! An engine room caught fire, and the Captain had us all up on deck in our orange life-jackets ... Apparently it was touch and go; we made the national papers and the TV screens, with helicopters buzzing overhead. The ship was towed back to Southampton, and the company looked after us, entertaining us on board for two weeks while repairs were made. Even so, fire broke out again in mid-Atlantic, but the crew finally fixed the gremlins, and we sailed through the Panama Canal to Vancouver and then to Auckland, a very pleasant five-week voyage. However, overeating and inactivity combined with a game of deck quoits on the last day to give me an extremely painful slipped disc. Thus began my career at the University of Waikato - and as they say, the rest is history."

As these notes attest, John led a varied and even adventurous life before we knew him, in situations that usually demanded the flair and perseverance of the true pioneer. Now let me remind you of some of his works since arrival in New Zealand.

(A) For three years, 1970-3, he served as Director of Computer Services, overseeing the expansion from an IBM 1132 (quite a big machine then, though its 8K memory sounds tiny now) to the network of large BURROUGHS machines that bedeviled all NZ Universities for several years. (Later, he urged the early UDI which led to our family of VAXen.)

(B) His experience with computers and with large courses on introductory statistics convinced him of the urgent need for a simple reliable statistics package. In 1972, he designed and, with Bill Rogers' help, implemented the language STATUS. It enabled the student hordes to gain realistic statistical and computing experience, using marked-sense cards; it also did general statistical work very well, because of its simplicity, generality and linked modes of operation. It remained in use until 1985. (Its main competitor, MINITAB, also emerged in the early 70s, but STATUS had several advantages - except market success.)

(C) In 1976, he, Don Joyce and Roger Hosking wrote their 'First Steps in Numerical Analysis'. It appeared in Braille too, and more recently, in a Bahasa translation for Malaysia.

(D) In the 80s, he designed a large system of computer-aided learning for basic mathematics and statistics courses, and also for revision and remedial work. With its help, most of our students became familiar with the use of computer terminals. (Now that our labs have MACs and PCs instead of terminals, we have no comparable support material to put in place!)

(E) With Kevin Broughan, he undertook the academic planning and political struggles that established a new four-year degree pattern [another one - see Leeds Polytechnic too] for Mathematics and Computer Science within a new School, against the often negative prognostications and activities of many in other subjects (and some in our own). He consolidated this work with a four-year stint<sup>[8]</sup> as Foundation Dean of the School.

(F) By 1980 too, John's interest in graphs and network processes led him to forsake research in statistics, and in 1984, he completed his Doctorate with 'A Study of Knot-Graphs'. This led him to a long and productive collaboration with George Schaake on braids. Their theory provides the first coherent system for describing and classifying braids; it also embodies explicit algorithms for constructing braids of any chosen design. These methods have now been adopted by expert craftsmen throughout the world.

Since 1984, he developed theories of number sequences and number trees (often jointly, with overseas collaborators). One discovery, which attracted international interest, was a method of solving quadratic Diophantine equations (and Pythagoras' equation, in particular), based on analysis of the rational number tree. This work gained him international note: John had several invitations to speak ... at Special Sessions of the AMS on Number Theory in Maine (1991) and Vancouver (1993), and at a Conference on

Combinatorics and Lattice Theory in Delhi (1994).

(G) Perhaps because of Pythagoras and Diophantus, John became interested in the history of mathematics - and through his efforts, we offered a course on the subject for several years.

(H) John retired from Waikato University early in 1994, an event marked by a 'Retirement Symposium' with speakers and visitors from Auckland, Massey and Vic. He did NOT retire from mathematics, or from conferences - he has just returned from one in Italy (or was that the previous one)?

We miss his enthusiastic contribution to our teaching and research, we miss his flow of thought, talk and comment at meetings and the round the coffee table. I must pass over John's family life (that is a story for him to tell, not me), but beyond it, the more public side of his personal life has just as much variety as his career. Since his arrival in NZ, he retained his interest in sport and after recovering from his back injury, he played tennis regularly, with the same eagerness that he devoted to all his activities. Thanks to his interest in almost everything, he became

Vice-President and then President of the NZ Mathematical Association,

Foundation Chairman of the Waikato and Bay of Plenty Computer Society, for three years,

Council Member of the NZ Computer Society, for three years,

Chairman of the Hamilton Classical Guitar Society, for 10 years,

Foundation President of the NZ Federation of Classical Guitar Societies, for three years,

Foundation Chairman of the Waikato and Bay of Plenty Hang-Gliding Society, for three years, and the instigator and Foundation Chairman of the Waikato Art Group (with two colleagues, we enjoyed visiting exhibitions and galleries, and we made regular contributions to buy 'objet d'art' - many of which still decorate walls and offices in the University).

I hope you permit me to draw a moral from his career. I think it took John a long time to realise that he really could 'join the club of true mathematicians': because of his start in life, working in institutions without a practice or tradition of research, he felt he did not 'belong' in a university. However, he DID prove himself, in several areas, to his immense pride and satisfaction. Nowadays though, nobody 'starting on the wrong side of the tracks' like him has any hope at all of gaining a job in a university - a real loss to the university system, I feel.

Kevin Broughan

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