A Brief History of the Department of Mathematics

This article was written by Professor Peng Tsu Ann in November 1989.
Professor Peng was the Head of Department from 1982 to 1996.

The Department of Mathematics was among its first departments when Raffles College was officially opened in 1929. Its first professor and only staff was R. K. Butchart who came from the University of Edinburgh. From 1931 to 1946 the Department had only one professor, A. Oppenheim, and one lecturer, J. C. Cooke. They were assisted for many years by K. M. R. Menon of the Education Department of the Straits Settlements. Menon eventually joined the Department as a lecturer in 1951 and left the University on retirement in 1955.

Oppenheim was a student of G. H. Hardy, the most eminent British pure mathematician of the time, but obtained his Ph.D. from the University of Chicago. He also had an appointment in the University of Edinburgh before joining Raffles College in 1931. He was interned during the Second World War and had near fatal work experience on the Siam Railway.

Mathematics was taught to the Arts as well as the Science students from the very beginning of Raffles College. Until about 1940 the number of Arts and Science students of all years reading mathematics did not exceed 50. There was no honours course in mathematics until after the formation of the University of Malaya in 1949. The honours course began in the 1950-1951 session with four students and year after year thereafter honours graduates were to gain Queen's Scholarships and other similar awards.

In 1951 P. H. Diananda and R. K. Guy joined the Department as lecturers. They were followed in 1952 by E. C. Milner and M. J. Wicks who joined as assistant lecturers. P. Lancaster was appointed an assistant lecturer in 1957. In 1962 Lancaster became the first person since the founding of Raffles College to receive a Ph.D. in mathematics in Singapore. Milner left the Department in 1961 and Guy and Lancaster about a year later. All three of them were later to become Chairman of the Mathematics Department at the University of Calgary in Canada. Wicks remained in Singapore and was for many years the most senior member of the Department until his retirement in 1988.

In 1952 members of the Department, with the help of some school teachers in mathematics founded the Malayan Mathematical Society (now the Singapore Mathematical Society). Its aims were to raise the standard of mathematical education in the schools and to foster relations between those interested in mathematics in Singapore and the then Federation of Malaya. In addition to organising talks and discussions the Society published a bulletin containing mainly articles of general interest to its members. In 1956 the Society organised its first inter-school mathematical competition which attracted a large entry of 345 candidates. R. K.Guy was the examiner for this competition. The competition is still being held every year.

The Department remained small in the 1950's and the 1960's. During these two decades it had about 10 staff members, although the number of students reading mathematics increased rapidly. There were 44 honours students in the 1969-1970 session and this number has not been exceeded since.

By the late 1970's the number of staff members in the Department had increased to about 15. More local staff were recruited, most of whom had graduated from the University of Singapore in the 1960's. Although there were many changes in the University during the late 1960's and early 1970's, the Department was not much affected by those changes.

When the University of Malaya was formed in 1949 A. Oppenheim continued as Professor of Mathematics and Head of Department and a year later J. C. Cooke was appointed Professor of Applied Mathematics. Cooke resigned in 1957 to take up an appointment with the Ministry of Supply at the Royal Aircraft Establishment, Farnborough, England. In January 1957 Oppenheim was appointed Vice-Chancellor of the University of Malaya for two years, after which he was to return to his position as Head of Department. But in January 1959 he was reappointed Vice-Chancellor for a period of five years and he retired from the Chair of Mathematics which he had occupied for 28 years. He was later honoured by the government of Malaya with the award of Tan Sri and and was knighted by the British government.

The Chair of Mathematics was filled in late 1959 by D.Pedoe. When Pedoe left the Department in 1962, P.H. Diananda who was promoted to a readership in 1958 was appointed Professor of Mathematics and Head of Department. Diananda retired in 1979 and K. K. Sen who joined the Department in 1963 and was promoted to a professorship in 1978 took over the Headship. Sen held the Headship for about a year and in 1980 elected to retire early and to return to India.

Teh Hoon Heng who was Professor of Mathematics in Nanyang University for many years was appointed Head of Department when the National University of Singapore was established in 1980. He was succeeded in 1982 by Peng Tsu Ann who graduated from the University of Singapore in 1962 and joined the Department in 1965. Peng has been Head since.

There was little change in the curriculum of the Department from 1949 to 1969 except for the introduction of courses in probability and statistics in the late 1960's. Students who intended to read Honours Mathematics must read Pure Mathematics and Applied Mathematics in each of the three years for a B. Sc. or B.A. pass degree. Those who chose to read only one subject in mathematics must read Pure Mathematics. In Honours Mathematics all students had to read the same subjects in pure and applied mathematics and sit for six papers at the end of the course. There were no options.

It was during the 1960's that graduates of the Department began to go overseas to study for their Ph.D.'s. Also during this period the Department had a number of research students and 12 theses (one M.A., seven M.Sc. and four Ph.D.) were written by them.

The curriculum of the Department went through some changes in the 1970's. For example, courses in numerical analysis and operational research were introduced and these courses were soon to gain more popularity with the students than the traditional courses in applied mathematics which had been taught since the days of Raffles College.

Research in mathematics has been done in the Department almost from its inception. A. Oppenheim and J. C. Cooke were both active in research (in number theory and applied mathematics respectively). In the 1950's and the 1960's research interests in the Department widened and work was done in many fields in pure mathematics, applied mathematics and mathematical physics. Research output from the Department increased markedly in the 1970's. There were now papers in combinatorics, group theory, operational research, probability, statistics, mathematical logic and the history of Chinese mathematics besides those in other fields of pure and applied mathematics. In a compendium of research work done by the staff of the Department from 1949 to 1980, no less than 320

research papers were listed. Of these, 210 were published during the last ten years of this period: 27 in local journals, 9 in regional journals, and 174 in international journals.

In 1980, the Department entered a new era. As a result of the merger of the Depart-ments of Mathematics of the University of Singapore and Nanyang University the Department acquired a staff of about 35. During the last ten years the number of undergraduates reading courses offered by the Department increased very rapidly and now it stands at about 3700. Although the Department has at present a staff of about 75, it is short of manpower in many fields.   A vigorous recruitment drive in the next few years may increase the number of staff to about 100, which will still fall short of the desired 10:1 student/staff ratio.   In recent years the Department has succeeded in attracting some of its best honours graduates to join as senior tutors. Six senior tutors are currently on study leave overseas working for their Ph.D.'s (two in MIT and one each in Oxford, Stanford, Berkeley and Yale).   In addition, some honours graduates and government scholars who are in Ph.D. programmes in these and other universities (e.g. Brown, Cambridge, Chicago, Cornell, Harvard, Michigan)   are expected to join the Department on completion of their studies. But even if all these young people join the Department it will still be short of manpower in the late 1990's because by then many of the present staff will have reached retiring age.

The curriculum of the Department underwent several major revisions in the last ten years. There are now many optional courses.   Also, students may choose to read different subjects depending on their interests and the requirements of their main field of specialisation. The present honours course requires that all students read Analysis and four other subjects chosen from a list of twelve.   In addition each student has to carry out a project under the supervision of a staff member.   The project carries the weight of a written paper in the honours examination.   All this has given the honours graduates as good a training as any honours course overseas.

Since 1980 the Department has organised more than ten conferences and workshops at the research level. The objective is to establish Singapore as a major centre of mathematical activities not only in the region but also in East Asia.   The main funding for these meetings comes from the Department's Lee Kong Chian Centre for Mathematical Research which receives an annual grant from the Lee Foundation. (The Centre was first established in Nanyang University and over the years has had several changes of names and functions.)   The Centre also supports short visits by mathematicians from overseas and the Department has about 40 such visitors each year.   Since each visitor will give at least one talk and many staff members organise specialist seminars among themselves, there is a lively research atmosphere in the Department.

Members of the Department continue to play an active role in the Singapore Mathematical Society. Besides the annual inter-school mathematical competition, the Society has in recent years organised jointly with the Department a number of workshops for mathematics teachers from the junior colleges. Since 1988 the Department and the Society have helped to select and train the Singapore team for the International Mathematical Olympiad. The Singapore team won two silver and two bronze medals in 1988 when it participated for the first time.

The Department has academic links with many major universities overseas. It has an exchange programme with French universities and one with Japanese universities.   Since most staff of the Department did their Ph.D.'s in Australia, Britain, Canada and the United States, many members have good relations with mathematicians in these countries. The Department also keeps in close   touch   with universities in the region   and   their mathematicians are regularly invited to visit the Department and to participate in the many

meetings held in Singapore. Some members have been deeply involved in the activities of the Southeast Asian Mathematical Society since its founding in 1972.

Members of the Department are encouraged to engage actively in research, and performance in this area is an important criterion for advancement and promotion. Some members publish routinely the results of their research in leading international journals and are internationally known experts in their fields of specialisation. Some have been invited to be editors of regional and international journals. Some of the staff in statistics and operational research have from time to time undertaken consulting work. In basic research the Department has reached a stage where the quality of publications is more important than their number.

The Department has plans to expand its postgraduate programme and increase the number of research students. In the near future an M.Sc. programme in statistics by course work will be introduced. Other programmes (e.g. in operational research and numerical analysis) will be introduced when there are sufficient staff for undergraduate and postgraduate teaching in these fields.

The Department has grown in strength over the years and has a good reputation overseas. But it must improve its overall research performance and recruit more talents before it can claim to have joined the ranks of major mathematical departments in the world.