

lished many papers on this subject. In 1949 he gave the Cantor Lectures of the Royal Society of Arts. He is well known for the development, with his colleague W. Martin, of the Flour Colour Grader, and the instrumental techniques now used in determining flour quality owe much to him, and his partner's enthusiasm for technological innovations.

Kay-Jay (as he was mainly known) and his wife had no children, but within the family he gave great affection and loyalty; so too did he to his many professional and close friends. He found great joy in the companionship of the Savage Club and after retirement, through being given honorary memberships of the Flour Milling and Baking Industries Research Association, the British Industrial Biological Research Association, the American Association of Cereal Chemists and the Bread Research Institute of Australia, as well as the honorary Fellowship of the Institute of Food Science and Technology.

J. B. M. Coppock

D. M. Dring

DR D. M. DRING, Mycologist, Plant Pathologist and Quarantine Officer at the Royal Botanic Gardens, Kew, died suddenly after a brain haemorrhage on 26 July 1978 at the age of 46.

Born in Peterborough he went to Exeter University and obtained an external London B.Sc. (1953). From 1953 to 1956 he was an Andrew Simons Scholar at the same University where he worked on *Mycosphaerella* disease of cauliflower for which he was awarded a Ph.D. (1958).

This led to a wider interest in plant pathology and from 1956 to 1960 he was plant pathologist to the government of Ghana with an additional duty to act as Director of the Botanic Garden at Aburi. From 1960 to 1961 he was Agricultural Officer to the United Nations Food and Agricultural Organisation in West Africa working on Kaincope disease, spending much time in the Camerouns and Togo. During his travels he became interested in the larger tropical fungi, especially those bizarre and brilliantly coloured Gasteromycetes belonging to the Phallales.

On return to the United Kingdom he was awarded a Senior Research Fellowship to work for three years at the Royal Botanic Gardens, Kew, on the fungi he had collected in West Africa. Later in 1965, he joined the Scientific Civil Service as a Senior Scientific Officer and became a per-

manent member of the staff at Kew, where his unique knowledge of plant pathology combined with an interest in taxonomy of higher fungi were invaluable. Indeed his experience of tropical plant pathology ideally fitted him for the job of Officer-in-Charge of quarantine in a rapidly expanding unit, and in 1973 he was seconded briefly to the Government of Fiji to advise on the setting up of a quarantine station.

Donald Dring will be remembered for his publications on Gasteromycete taxonomy which established him as one of the world authorities on this difficult group of fungi. These contributions included floristic studies of the species occurring in tropical Africa and Israel. He also published, with Dr H. Kreisel, a monograph of the genus *Morganella*. However, his chief interest lay in the elucidation of the complex structure, inter-relationships and taxonomy of the phalloids, especially of the family Clathraceae. His magnum opus *Towards a natural re-arrangement of the family Clathraceae* was in an advanced stage of preparation at the time of his death and it is hoped to publish this in due course.

Another of his many scientific activities involved giving a stimulating annual course of lectures on mycology to the student gardeners at Kew. He also took a keen interest in the affairs of the British Mycological Society and served as a co-editor of their Transactions from 1978-1971, and for part of that time as senior editor. His editorial expertise also led to his serving on the editorial board of the *Kew Bulletin*. He also served on the Council of the Systematics Association.

Donald Dring was a congenial colleague who was always happy to take part in and contribute to social occasions. He had a great interest in antiques and enjoyed restoration of period furniture. He leaves a widow, Vivienne, and two daughters.

Derek A. Reid

A. S. Jack

ANTHONY JACK, member of staff of the MRC Laboratory of Molecular Biology, Cambridge, died of a heart attack on 14 July 1978 at the age of 30.

Born in Newcastle, he was educated at Leeds Grammar School and at Peterhouse, Cambridge, which he entered as an Exhibitioner in 1966. After getting a First in Part II of the Natural Sciences Tripos (Crystallography), he went on to the MRC Laboratory of Molecular Biology to work for a PhD which he received in 1972. He spent two years on a Jane Coffin Childs Re-

search Fellowship at the Gibbs Laboratory, Harvard University, and returned to the MRC Laboratory in 1974 as a junior member of staff.

Tony Jack's research work centred on the structures of large biological molecules and methods of solving them by X-ray analysis. Although a skilful experimenter when the occasion demanded, he was, by temperament and aptitude, more of the analytical type of macromolecular crystallographer, more intrigued by the way to the solution than by the results of the solution itself. Thus it was no coincidence that he was attracted to problems which were non-orthodox at the time. His PhD thesis, following work initiated by Blow, Rossmann and Crowther, deals with the problem of how to use for phase determination the redundant information present in the X-ray intensities of structures made up of many subunits. He solved a practical problem, namely a two-dimensional projection of the structure of the protein disk of tobacco mosaic virus, thereby pointing the way to the full solution of three-dimensional virus structures.

In the laboratory of S. C. Harrison at Harvard, he played a key role in the earlier stages of the X-ray work on tomato bushy stunt virus, among other things, using the low resolution structure reconstructed from electron micrographs to locate the heavy atoms used in the isomorphous replacement analysis.

On his return to Cambridge, Jack turned to the problem of refining the structure of the monoclinic form of tRNA, solved there earlier. This analysis, as well as settling the details of the tertiary interactions, led to the discovery of certain new correlations in nucleotide conformation and showed up the magnesium and spermine binding positions in the molecule. In an extension of this work on tRNA, Jack, together with M. Levitt, developed a particularly rapid and powerful method of refinement, which combines X-ray results and energy analysis. The method has been applied successfully to a number of proteins as well, and bids to become widely accepted.

Almost none of his friends or colleagues knew of Tony Jack's heart condition. Though quiet by nature, he was ever energetic and worked with astonishing rapidity. He was a man of varied interests. As an undergraduate he played in the 'Pineapple Truck' pop group, having built his own bass guitar. He was widely read in 18th century English literature, he collected its authors and was a stout Johnsonian. He is survived by his wife, Sharon Bellard, a chemical crystallographer, whom he met at Harvard. *A. Klug*