matics and she was the main author of the new Romanian soil classification system.

Her work had a continental as well as a national significance and her death leaves the European community of soil scientists and loess investigators perceptibly impoverished.

I. J. Smalley

Arthur Erdélyi

ARTHUR ERDÉLYI, FRS, Professor of Mathematics in the University of Edinburgh, died suddenly at his home on 12 December 1977 at the age of 69.

Professor Erdélyi was a mathematician of immense talent and earned an international reputation for his research in many aspects of mathematical analysis.

He had, by any standards, a remarkable life. He lived in Eastern Europe until his early thirties when he was forced as a Jew to leave, in mortal danger, and seek refuge in Britain in 1939. Due largely to the good offices of the late Sir Edmund Whittaker, he was able to settle in Edinburgh and work in the university there. In the late 1940s he was attracted to California but fifteen years later he returned to the University of Edinburgh as Professor of Mathematics, a position he filled with great distinction until his death.

The fifteen years he spent at the California Institute of Technology constituted the period at which his mathematical talents were at their height. He had gone originally to examine the research notes of the late Professor Harry Bateman on Special Functions and subsequently led a team of analysts to produce an integrated record based on his work. The resulting five volumes of the "Bateman Project", three on the properties of Special Functions and two devoted to tables of Integral Transforms, will almost certainly be regarded as the final definitive treatment of this topic.

It is not, however, for this that Arthur Erdélyi would like to be mainly remembered. Important as the applications of Special Functions were and are, there was a danger of the subject degenerating into sterile manipulations. In addition, the advance of computer technology had made less important the detailed properties of the functions themselves. It was therefore appropriate that, having produced the complete survey of the subject, Arthur Erdélyi should turn his powerful analytical mind to other fields.

There were two topics in particular in which important developments occurred in the early 1950s and with which Erdélyi became deeply involved,

then and subsequently. The first was a systematic and rigorous approach to generalised functions, a topic envisaged by the pragmatic approaches of Heaviside and Dirac, and first given a proper framework by Schwartz. The second was the modern theory of singular perturbations, strained coordinates and matched asymptotic expansions in which mathematicians at the California Institute of Technology were particularly active. Erdélyi became known internationally as an expert in these fields although there were many other areas in which he worked actively and effectively.

From 1964 until his death, he was Professor of Mathematics at Edinburgh University. He returned to a department which had been dominated for over 50 years by the great names of Whittaker and Aitken and was to prove a worthy successor. The department flourished under his leadership, helped, as he was the first to acknowledge, by the cooperation of old and new colleagues alike.

Perhaps the most abiding memory of him which his mathematical colleagues will cherish was the remarkable breadth of his knowledge. He was able to talk with authority on almost any topic in mathematics and his commentaries were often laced with anecdotes and personal recollections and always given in impeccable English.

Outside his mathematics, he had a great love of music and of all things artistic. He was a man of ready wit and great personal charm. His many friends all over the world feel a sense of deep loss at his death but will ever recall with pleasure the privilege of having known him.

A. G. Mackie

Christopher Goetze

CHRISTOPHER GOETZE, Associate Professor of Geology at M.I.T., died on 21 November, 1977 at the age of 38. He received his training at Harvard, obtaining the AB in Physics in 1961 and PhD in Geophysics in 1969. His doctoral studies were carried out with Francis Birch on attenuation in salt mixtures.

During his eight years at M.I.T., Goetze and his associates became one of the world's leading groups in the study of the rheology of rocks. They extended the creep measurements of olivine to temperatures as high as 1700 °C and to stresses as low as 50 bars. These were very important developments, for it enabled the flow law of olivine—the most important constituent in the upper mantle—to be determined rather accurately for the first time at upper mantle conditions.

The mechanism of plastic flow of rocks at high temperature involves dislocation motion. Goetze and his associates pioneered techniques of dislocation identification. For example, they so improved the resolution using the transmission electron microscope that lattice planes in olivine or pyroxene could be directly imaged for the first time. They discovered that collapse of dislocation loops provided a measure of diffusion in olivine. They also discovered a simple way of decorating dislocations in olivine to make them visible optically. They showed for the first time a clear distinction between creep associated with dislocations and that associated with stress corrosion.

Goetze showed how dislocation theory combined with laboratory calibration experiments could be used to measure paleostresses in ancient deformed rocks. His establishment of a paleostress scale for quartz, olivine, and calcite gave structural geologists for the first time a measure of the stress active during the geological deformation of these minerals.

In 1971 Goetze suggested the use of ion thinning to expose microcracks in rocks for direct examination. This opened up a whole new field. Several groups now map cracks, using this technique, with such diverse applications as geothermal energy extraction, and earthquake prediction.

Goetze was a brilliant experimentalist with a keen understanding of the physics of deformation. His laboratory became recognised worldwide. A number of foreign scientists were attracted here for sabbatical visits. He was an invited lecturer at the Royal Society in London in 1977 and at the NATO Advanced Institute Summer School in Geophysics at Cargèse, Corsica, in the summer of 1976. He was also invited lecturer at a number of Penrose and Chapman conferences and was to have lectured at a conference on the physics of magmatic processes at Princeton in November 1977. During the last couple of years he had been able to extend the laboratory results to a number of major geophysical problems such as the stress near plate boundaries, the role of shear heating in the upper mantle, the role of volatiles and melt in upper mantle flow, and the mechanical history of certain meteorites.

A noted mountain climber, Goetze established new routes on Mount McKinley and in the Hayes range in Alaska, the Wind River Range in Wyoming, in British Columbia, and in Labrador. He cruised the waters of Newfoundland and Northern Labrador in a small sailboat and in a kayak for many years on vacations with his family.

W. F. Brace