

# Australian Biostratigraphy Pioneer talks to PESA QLD

By Deidre Brooks

On Thursday April 29, 2004, the PESA Queensland Branch monthly luncheon meeting was fortunate to have a speaker who is one of Australia's pioneering biostratigraphers, Dr Mary Dettmann.

Mary Dettmann is currently associated with the Botany Department, University of Queensland, and with the Queensland Museum where she is involved with research on plant fossils. She graduated from the University of Melbourne and obtained an MSc from that university under the supervision of Isabel Cookson, universally recognised as an important pioneer of palynology. Her PhD studies in Cambridge were on Cretaceous palynofloras from southeastern Australian basins.

Since returning to Australia in the early 1960s, she has consulted to exploration companies and government institutions on evaluating palynofloras from sequences in the majority of eastern Australian depositional basins. Her research interests have been focused on southern Gondwanan floras of Mesozoic-Palaeogene age, and on the evolution and history of Australia's present-day vegetation. Mary was involved in developing one of the first detailed Mesozoic to Tertiary biostratigraphic zonation for the eastern Australian basins in the 1960s. This early scheme formed the basis for modern schemes and many parts of this scheme are still in use today.

Palynology in hydrocarbon exploration: biostratigraphy and beyond

## Abstract

Palynology (the study of acid insoluble microfossils, most of which are of plant origin) has made significant contributions to hydrocarbon exploration worldwide for well over half a century. In Australia, initial



*Dr Mary Dettmann.*

palynological studies were concentrated on coal sequences, but since the discovery of oil in northwest Western Australia during the 1950s, palynology increasingly has been recognised as an effective tool for dating and biostratigraphic correlation of marine and non-marine sequences.

The discipline became an integral adjunct to oil exploration during the 1960s - 1980s, and palynostratigraphic zonation were proposed for Palaeozoic-Tertiary sequences represented in the majority of Australia's sedimentary basins. By the late 1980s, a comprehensive zonal scheme comprising concurrent dinocyst and spore-pollen zones was published for the Australian Mesozoic, and the scheme was correlated with previously

proposed palynostratigraphies. Similarly for the Palaeozoic, palynostratigraphic zonation have been compiled. Recent work has been directed at refining zonal schemes in individual basins, with particular emphasis on establishing sequence surfaces which define bioevents reflecting shifts in depositional environments, and modifications to source floras related to changes in base levels and/or climate. Nevertheless, exploration geologists are sometimes confronted by an array of disparate palynological zonation for the same sequence. This may have stemmed from different concepts in palynotaxon differentiation, conceptual differences in what are and what are not stratigraphically and/or temporally significant palynoevents (eg., first/last appearances or total range/relative frequencies of a taxon or group of taxa), different data sets, and variations within those data sets resulting from differences in sampling and/or preparation procedures.

Palynology has been an important tool in hydrocarbon exploration and will continue to offer valuable evidence in resolving stratigraphic and a suite of other problems, not only in hydrocarbon exploration, but also in other fields of earth and biological sciences. Palynology has proven an effective and complementary tool in thermal maturation and source rock studies, and it provides important insights into palaeoenvironments and palaeoclimates. Moreover, it offers indubitable and complementary evidence on the composition of contemporaneous marine and terrestrial floras which provided much of the raw material for hydrocarbons already extracted and being sought for by exploration companies.

The presentation provided an overview, with examples, of what palynology has offered in the past, and focussed on its future potential in resolving problems associated with hydrocarbon exploration. ■