

### Dr William Dall (1926-2011)

Dr William Dall's research over the past four decades has led to a distinguished international reputation in marine science. His significant contributions to crustacean physiology include studies of moulting and growth, osmotic and ionic regulation and nutrition. This research has had profound impacts on understanding crustacean biology, ecology, fisheries science and aquaculture. His prolonged interest in the taxonomy of Penaeidae ranges from identification of species to evolution and zoogeography of the entire family. As both an academic supervisor and laboratory director, he has shaped two generations of scientists who will influence Australian marine science for years to come.



*July 1991 John Middleton, AMSA President*

**The above rather succinct statement does not give any insight into the development and progress of Dr Dall's research career - he was asked in October 2006 to write a brief outline of his career for the web site. It follows...**

In 1951 in my final undergraduate B.Sc. year, I was called in to the office of the Professor of Zoology, who said he had been contacted by the Government Ichthyologist asking if he had a student who could study prawns in Moreton Bay and adjacent waters. Open water trawling had just started, but no-one knew what species were being caught, much less details of their biology and was I interested? My immediate reaction was no, I didn't know much about Crustacea and they hadn't interested me as a group, and I wanted to study fish physiology. Finally I got talked into it and enrolled for a part-time M.Sc on taxonomy and biology of penaeid prawns. I soon found that the literature on Australian prawns was very sparse indeed and my first task was to become familiar with the Australian species, ultimately leading to a full-scale revision of the family. The biology part was confined to the easily accessible estuarine species, *Metapenaeus bennettiae*. The long term effect of all this was that I spent the next 50 years researching Crustacea.

At this point I joined the then CSIRO Division of Fisheries at Cronulla, Sydney, to study the distribution and abundance of zooplankton in the Tasman Sea and Bass Strait, develop zooplankton calendars and the relevance of zooplankton in tuna and barracouta biology. Zooplankton research down to species level is slow and after three years I felt my research was unproductive, i.e. I had had enough. So in 1955 I took up a position in the Zoology Department, University of Queensland, enrolling for a part-time Ph.D. entitled "Mineral and carbohydrate metabolism of a penaeid prawn during preparation for moulting".

In 1967 I left the Zoology Department for a position in the Zoology Department, University of Guelph, Canada. It was an exciting time for researchers – grants were plentiful and much money was being poured into universities. Although virtually in the middle of the country, the Zoology Department was building a large artificial sea-water facility and offering new undergraduate courses in marine zoology. This was my role. I travelled several times to the Fisheries Research Board laboratory at St. Andrews, Halifax. There I studied osmoregulation in the American lobster and the role of homarine in Decapod Crustacea.

However, the second winter was too much for me and in early 1969 I returned to Australia, once again in CSIRO, to research the physiology of the Western Rock Lobster at the Marmion

Laboratory in Perth (my second position in a new laboratory). This included osmotic and ionic regulation, developing indices of nutritional state in the field, blood carbohydrates, the role of ninhydrin-positive substances and the physiology of moulting, including hormonal induction of moulting.

Although I enjoyed this research I yearned for my first love – penaeid prawns. In 1973 I submitted a proposal for the establishment of a new comprehensive Tropical Prawn Research Project in Queensland, where field work in the Gulf of Carpentaria had been going on since 1963. This was accepted and included the establishment of a new laboratory. I travelled across northern Australia in search of an appropriate site and concluded that since AIMS had been established in Townsville, the only feasible site for a modern sophisticated laboratory researching tropical prawns was in southeast Queensland. Cleveland seemed a likely spot and in spite of head shaking in some quarters was given the OK, with a field station at Karumba.

So I was in the enviable position of getting a new project, a new laboratory and a new young and enthusiastic research team. In January of 1975 all this came together with the beginning of field studies in the Gulf of Carpentaria and laboratory research at Cleveland.

My research was broadly on the ecological physiology of prawns, oxidative, nitrogen and lipid metabolism, blood volume and extracellular space. Other research at Cleveland was meanwhile progressing well and led to saving the prawn industry in the Gulf of Carpentaria over \$20 million annually and ultimately to the establishment of the best prawn fishery management in the world. Also, the difficult problem of predicting the annual catch of banana prawns had been solved. In 1990 Academic Press published our book "The Biology of the Penaeidae" written by myself and three other senior research staff. Overall it showed clearly how much our knowledge of this family had progressed since my first uncertain steps in 1952.

This takes us up to the date of my Silver Jubilee Award in 1991. I retired in August, 1990, but felt I could not abruptly abandon a life-long interest and continued on a three-year Post Retirement Fellowship, researching carotenoids in penaeids. Such research really demands a full-time involvement, to which I was unwilling to commit after the Fellowship ended (after which I was appointed an Honorary Research Fellow). The obvious direction was to resume my interest in taxonomy of prawns. I had a long-standing promise to Peter Davie, Curator of Crustacea at the Queensland Museum to examine their prawn collection and was appointed an Honorary Research Fellow of the Museum. Then I became interested in the other families in the super-family Penaeoidea. There are four in all besides the Penaeidae, the Aristeidae, Solenoceridae, Benthescymidae, Sicyonidae. The first three of these four families are largely deep-sea species, but have been well researched for much of the Indo-West Pacific, except for the Australian area. Only a few had appeared in the literature, so I obtained loans of specimens from the various museums, or visited them and found a total of 27 species of Solenoceridae from Australian waters. Twelve species of Aristeidae were turned up and 10 species of Benthescymidae. Papers were published on these three groups. That left the little known Sicyonidae, but fortunately a comprehensive French monograph was published, which includes Australia.

In 2003 a joint cruise between Australian, New Zealand and French Laboratories was organised to describe the faunas of sea-mounts and ridges of the Tasman Sea around the Norfolk Ridge and Lord Howe rise. It was called the NORFANZ Cruise. I volunteered to identify and discuss the Penaeoids and a paper has been published.

The research at Cleveland has continued and diversified over the years and is now recognised internationally in its various fields. I regard my establishment of the Cleveland Laboratory and its research programmes on the penaeid prawns as my most significant achievement.