OTHER BRANCHES OF ACOUSTICS

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Australian researchers and practitioners have contributed significantly to most branches of acoustics over the past decades. This final note gives references to articles in which much of the history of other branches of acoustics is related.

It has proved impossible, within the compass of a single issue of this journal, to relate the history of all fields of acoustics in Australia. An omission does not imply a judgment on the importance of any field, but rather a recognition that some have been the subject of recent review articles in this journal or, in some cases, the simple unavailability of an appropriately knowledgable author within the timescale of preparation of this special issue. This final note, therefore, gives references to previous articles and other resources from which much of the history can be gleaned. A brief survey article on acoustical research in Australia [1] was published in this journal in 1997 and provides a more extensive, though brief, account.

THE NATIONAL ACOUSTIC LABORATORIES

Human hearing is of prime importance to all of us, and it is a sad fact that many children are born with hearing defects, many people suffer noise injuries to their hearing, and most of us suffer a decline in hearing abilities as we age. The charter of the National Acoustic Laboratories is to help prevent noise injuries and to assist those whose hearing has been damaged through the development and provision of appropriate hearing aids. Some of this history has been related in connection with the CALAID, as described in this issue. An outline of the history of the Laboratories is also provided in a recent brief "time-line" article [2], while a survey of current research is given in the Special Topic of *Acoustics Australia* for 1993 [3].

COCHLEAR IMPLANTS

The multi-channel cochlear implant known as the Bionic Ear was developed by Professor Graeme Clark and his collaborators over the past thirty years, and now gives hearing to thousands of people, particularly children, who without it would be profoundly deaf. The Australian company Cochlear manufactures these instruments and distributes them throughout the world through its subsidiaries, and indeed dominates the world market with something like 75% or all implants used.

The personal story of this remarkable achievement has been told by Professor Clark in his recent book *Sounds From Silence* [4]. Earlier and more formal publications include the edited book *Cochlear Implantation for Infants and Children* [5] and an article in the special "Hearing" issue of *Acoustics Australia* in 1993 [6].

THE NATIONAL MEASUREMENT LABORATORY

Another major Australian involvement in acoustical research is through the various divisions of the CSIRO. The Division of Building, Construction and Engineering is concerned mainly with architectural and industrial acoustics, as its name suggests, while the national Measurement Laboratory, now a part of the Division of Telecommunications and Industrial Physics, maintains Australia's national measurement standards in acoustics and investigates the applications of acoustics in a variety of industrial fields.

The calibration and standardisation activities of the Laboratory were surveyed in a special issue of *Acoustics Australia* in 1989 [7]. Since that time the activities of the Laboratory have turned increasingly towards industrial applications of acoustics, with major projects in ultrasonics and in non-destructive testing of composite panels for aircraft.

ULTRASONICS

A major and very different field of acoustics is that of ultrasonics. Ultrasonic techniques are applicable to the non-destructive testing of structures, to medical imaging, and to condensed-matter physics. A history of the use of medical diagnostic ultrasound is given in this issue, many of the techniques having been devised at the Ultrasonics Institute while this was associated with the National Acoustics Laboratories and before its transfer to CSIRO. A more wide-ranging discussion was given in the Ultrasonics Special Issue of this journal in 1991 [8] and again in 1999 [9].

SIGNAL PROCESSING AND ANALYSIS

Other important practical applications of acoustic techniques are in the fields of signal processing, active noise control, and machine condition monitoring. There are active groups in machine condition monitoting at Monash and the University of New South Wales, and Australian research in this area was reviewed in a Special Topic issue in 1994 [10]. The related topic of active noise control, in which the group at Adelaide University has been particularly productive, was reviewed in an article in 1992 [11]. Acoustic signal processing is, of course, of general importance, but particular mention should be made of the "surround sound" and other techniques developed commercially by Lake DSP in Sydney.

UNDERWATER ACOUSTICS

The use of acoustics techniques to explore the ocean bottom is of increasing importance, particularly in Australia with our long and largely unexplored coastline. A survey of work in

this field was presented in a Special Topic issue in 1992 [12] and more recent issues have contined papers on particular subjects in the field.

CONCLUSION

This brief addendum fills out, to a limited extent, a catalogue of the range of activities in acoustics that are being pursued in Australia. A detailed account of their history over even the last few decades would fill many issues of this journal. Perhaps, however, this brief account will incite those who know more of the detailed history to write such an account for us.

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