GREAT Australian IDEAS

By PETER ROBERTS

IT was exactly 10 years ago this month that Brian Davis and Ray Gordon filed into the Melbourne Room of the Victorian Premier's Department.

The State Governor, Sir Henry Winneke, was presenting Australia's first industrial design awards to eight manufacturers, including Davis's Decor Corporation Pty Ltd.

Industrial design was not given high priority in boardrooms back then and it was even less often associated with products made in Decor's favoured material, plastic.

Melbourne designer Moira Wallace won one of those first awards for a simple bag, made of waterproofed hessian and stamped with the letters "BYO". It beat a brown paper bag for taking white wine to those BYO restaurants which were springing up in Melbourne.

When Davis and Gordon saw the hessian bag, they turned to each other and raised their eyebrows. "We were surprised. Was this the best that could be done?" recalls Gordon, Decor's managing director.

Then began an intense process of conceptualising, designing and making what is still today one of the most elegant objects ever made from plastic — the Decor wine cooler.

A decade later, it remains a classic, purchased in thousands in Australia and overseas, the winner of numerous Australian design awards and the only Australian product on permanent display at the Museum of Modern Art in New York.

Precious few Australian products can truly be called great. There are several reasons for this: our history of "she'll be right", "make do" thinking, our small insular market and passive management which has been able to get away with buying design from overseas.

But we do have world-class products and we're coming up with more and more every year. When we do things properly, we can beat the world. The problem is that far too few Australian businesses are even making the attempt.

My subjective choice of best contemporary products and processes, including the Decor cooler, comprises:

- The work of IVF Australia, the company formed to market the in vitro fertilisation techniques pioneered in Melbourne.
- The bionic ear developed by Professor Graeme Clark and the Nucleus Group.
- The Journeyman car assembly robot produced by Mr Len Wheelan's company, Machine Dynamics.
- Pacific Dunlop's radical Pulsar batteries.

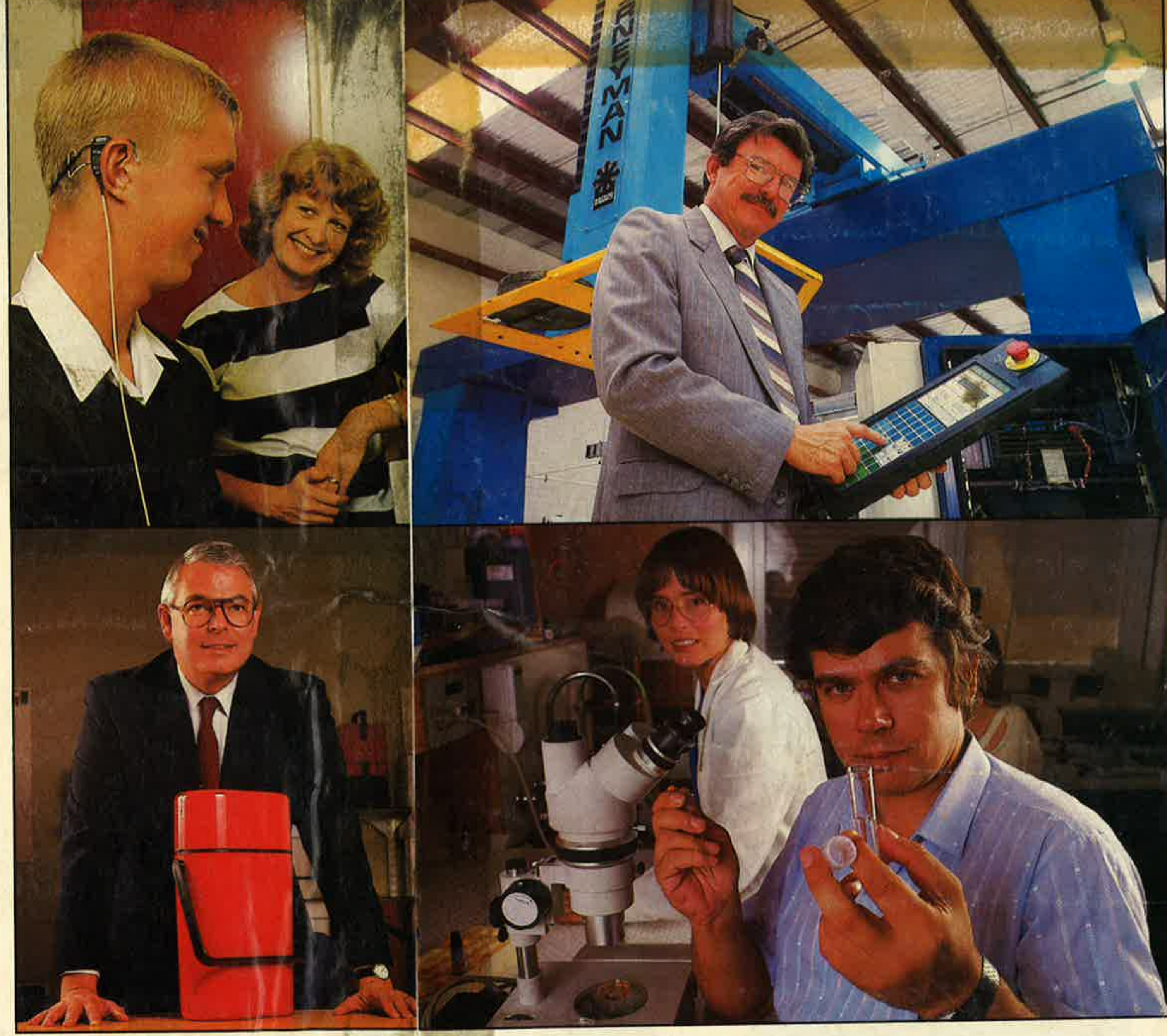
Good design does not necessarily require genius. At Decor in Melbourne, there has always been simply a commitment to creating a quality product. "We don't take the easiest way, we take the best way," says Ray Gordon.

The Decor cooler's rounded shape stemmed from the desire to make a product that would not knock knees and legs. The cooler won't leak and can be laid on its side in the back of a car or stood on its lid under a restaurant table.

Five types of plastic were used to give the glossy, deeply coloured exterior, the shock-absorbent interior, the freezer-proof ice bottle and the tough handle and locks.

Attention to detail means that you are unlikely to see on a Decor product the tiny bumps and blisters where plastic was squirted into the mould or the tell-tale ridge where two moulds join.

Decor, not a company to rest on its laurels, is working on as many as 50 new products at a time. It now sells the wine cooler alongside a second generation range of four cooler products using better plastics, more modern lines and foam sandwich insulation.



From top left clockwise; David Suutari with bionic ear: Len Wheelan and Journeyman robot: Dr Alan Trouson of IVF Australia Ray Gordon with Decor wine cooler:

Medical technology is one area where Australia is at the forefront — in vitro fertilisation and the bionic ear being two fine examples.

Hundreds of women at Melbourne's Epworth Hospital have now had the minor operation required for IVF to make their hopes of motherhood come true.

As many as 15 per cent of Australian couples are infertile because of some problem with one partner.

In the past 17 years, Professors Carl Wood and John Leeton, and Dr Alan Trounson of Monash University have built on techniques already proved in animals, giving previously infertile couples a better than 50 per cent chance of having a child.

The operation is a simple one. A small incision is made in the abdomen to allow the insertion of a laparoscope (a combination microscope and torch) and a suction tube to reach into the ovaries and harvest their tiny mushroom-like eggs.

Sperm and a complex blend of nutrients are then added in the laboratory. The scientists and technicians watch as the eggs are fertilised and divide, and the four or five embryos are either implanted in a simple procedure or frozen for use should the first batch fail.

The conversion of this unique technology into a great Australian product was the idea of Vicki Baldwin, a senior consultant from McKinsey and Co in the US who has had two children through the program.

She was pregnant with her first test-tube baby in Melbourne when she agreed to help raise funds to support the IVF research.

"She was asked to sell raffle tickets and lamingtons," says Dr Trounson. "We all sold lamingtons in those days to help buy microscopes and so on. Money has always been a problem for the program — $2,000-$3,000 was a lot of money to us then."

Ms Baldwin, now a director of IVF Australia, did not actually sell a lamington, but assessed Monash University's IVF technology and the US market where there is demand for IVF services but few clinics.

There is little patentable in biology, and in any case the Melbourne scientists were opposed to restricting publication of their findings.

Vicki Baldwin suggested that the IVF team was good at helping others set up IVF clinics — a steady stream of scientists had already visited Melbourne to look at their methods.

In return for training and technology for the fledgling company, IVF Australia has paid Monash University $300,000 to equip a laboratory at the new Queen Victoria Medical Centre in suburban Melbourne, and more royalties will follow to fund research.

Two IVF centres have already been set up at Port Chester, New York, and Birmingham, Alabama. About 10 centres should be established in the US within two to three years.

Dr David Beames, IVF's vice-president in charge of new program implementation, says: "We are fairly choosy about where we will establish a centre. Our object is to become the number one standard for the provision of IVF services in the United States and that means not only providing the best technology but the best patient care, the best environment and so on."

The centres, established and operated by IVF Australia personnel, cost a major hospital about $US500,000 to set up.

At the two US centres already in operation, the pregnancy rate is about 30 per cent per embryo transfer, and more than 50 per cent for patients who persevere with the program. The cost is $5,000, although medical insurance reduces this to about $1,000.

Dr Beames says: "Australia seems to be held in high regard in medical circles. That gives us a very strong marketing tool."

The bionic ear was the inspiration of Professor Graeme Clark, professor of otolaryngology at Melbourne University, who was one of the first to recognise the potential of modern electronics for helping the disabled.

The deaf can literally hear using the bionic ear implant developed by Professor Clark and the Nucleus group in Sydney — a totally new idea, beautifully executed.

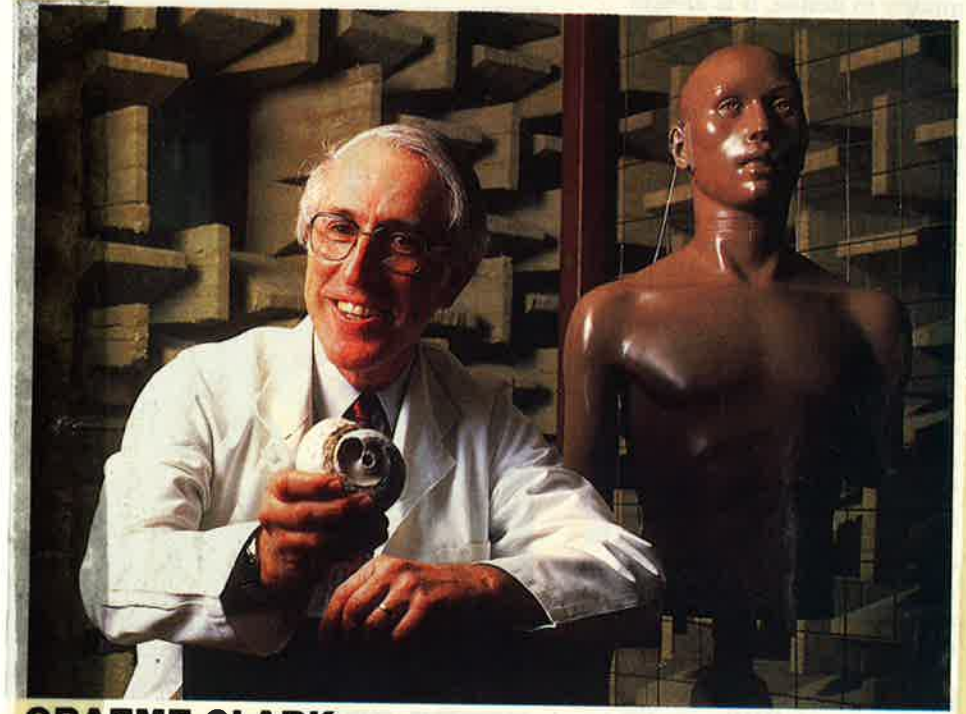
It is 20 years since Professor Clark determined to try to produce a bionic ear. He left his ear, nose and throat practice in Collins Street in 1967 to do a PhD in brain physiology to learn what he could about how the brain interprets sound.

"It was a crazy idea at the time," says Professor Clark. "Well, perhaps not crazy. But many physiologists said the brain was so sophisticated and complicated that to develop a neurological model of how it processes speech information was impossible."

He says the research and product engineering which translated the idea into reality turned out better than he ever could have imagined 20 years ago. The result is as sleek in appearance as its electronic innards are functional.

Speech is detected by a microphone mounted in a cigarette-sized processor worn in a shirt pocket. An in-built computer analyses the incoming sound and breaks it down to the key elements of human speech, known as formants.

SCIENCE AND TECHNOLOGY



GRAEME CLARK

Professor Clark, winner of BHP's 1984 award in science and technology, is the Melbourne surgeon who developed the bionic ear that has already broken a lifetime of silence for hundreds of profoundly deaf people around the world. Grown men have wept to discover they can hear again; others have described Professor Clark and his research team at the Royal Victorian Eye and Ear Hospital as "miracle workers".

Graeme Clark, a gentle be-spectacled man with a boyish grin, is in his middle 50s, and is unaffected by the resounding success the bionic ear has had in 130 medical centres world-wide, including technologically advanced countries like Japan and West Germany. He is more concerned with helping the million Australians who have significant hearing loss, and looks forward to the day when medical advances will help all deaf people.

The BHP Award gave Professor Clark and his team much needed public recognition of their work on the bionic ear, and was a great morale booster. More importantly, the $40,000 cash prize helped purchase an advanced computer to develop a new generation of bionic ears that were smaller and more refined. The bionic ear, suitable only for the profoundly deaf, is a miniature silicon chip embedded beneath skin in the mastoid bone.

Professor Clark, who holds the Chair of Otolaryngology at the University of Melbourne, and his research team took 15 years to develop the bionic ear. Through the development stages there was constant concern about funding the research.

Graeme Clark's interest in the deaf grew from childhood when he saw the difficulties faced by his own father who was severely deaf. While other boys talked of being train drivers, he resolved to become an ear, nose and throat surgeon . . .

'I can hear'

Susan Walters, age 24.
Diagnosis: total deafness following meningitis.
Prognosis three years ago: lifelong total deafness.
Outlook now: she can hear and understand normal conversation.

THREE years ago Susan became ill with meningitis which left her in a world of silence. At first she believed her loss of hearing was temporary, but gradually she became aware she could be totally deaf for life.

Susan, struggling with a paralysed eye and finding it hard to keep her balance, was devastated by this blow. For four months she struggled to come to terms with her disability before learning of a revolutionary new operation to restore hearing — the cochlear implant.

Professor Bill Gibson, professor of ear nose and throat surgery at Sydney University and Royal Prince Alfred Hospital, who performed the operation, explained. In many totally deaf people the hearing nerve which leads from the ear to the brain, where sounds are registered, is intact. But the nerve endings (fine hair cells) within the inner ear have been destroyed.

In a cochlear implant operation an electrode is inserted inside the inner ear and this gives off an electrical charge which stimulates the hearing nerve directly. It bypasses the faulty endings.

Originally the cochlear implants were one channel, which meant that patients heard only a limited range of the sounds a normal ear picks up.

Susan's operation involved a multi-channel cochlear implant containing 22 electrodes. This improved model, developed by Professor Graeme Clark of Melbourne University, means she can now pick up a wider range of sounds than she would have through a single channel.

A tiny control unit, placed in the mastoid bone under the skin behind the ear, receives signals from an external microphone and speech processor and passes them along to the implanted electrodes. These then stimulate the nerve fibres to send messages to the brain, which results in hearing.

Although her hearing is not completely normal and she uses lip reading as an extra help, it is good enough to allow her to resume her studies at technical college. She has enrolled in the final year of a fashion-technology course.

Susan now goes to pubs, discos and parties, but her proudest achievement is being able to have a telephone conversation — the thing she missed most when deaf.

She also helps other deaf people. As a member of CICADA (Cochlear Implant Club and Advisory Association), she has designed a special members' badge and counsels and reassures people facing a cochlear implant (CICADA's contact number is (02) 516 3322).

Please turn the page ►

MEDICAL MIRACLES

Australian 16.12.'87

Govt rapped over bionic ear funding

Proud to pose with the bionic ear (foreground) are, from left, Dr Judith Brimacombe from Colorado; Professor Graeme Clark who invented the device; and Dr Michael Hirshorn from London

INTERNATIONAL scientists have criticised the Federal Government for not fully supporting pioneering technology which produced the bionic ear.

Unless there was increased funding for pure medical research at the tertiary level, Australia's place as the leader in bionic ear research would be threatened, the scientists said.

The overseas success of Australia's bionic ear drew leading European and American ear, nose and throat surgeons, audiologists and engineers to a meeting last week at Melbourne's Royal Eye and Ear Hospital.

The focus was on international research to extend the benefits of the bionic ear to a wider range of people throughout the world.

Dr Michael Hirshorn, based in London, said the Australian Government must provide more funding for pure research to enable a flow-on effect to industry.

"If they stop, we stop," Dr Hirshorn said.

The Government should fund more pure research at the university level so that its results could be drawn upon by industry.

Professor Graeme Clark, who invented the bionic ear and set up the Bionic Ear Institute in Melbourne, has long been an advocate of more government funding but this is the first time international specialists have been so outspoken.

"Here's something where Australia's undoubtedly the world's leader, where there's a high-technology export that is the best in world," Dr Hirshorn said.

"We're being shot at and competed with by companies from all over the world . . . we're ahead and we've got to stay ahead.

"This is just the beginning so we've got to have the support in Australia to take this further.

"It has the dual benefit of helping deaf people hear and then there's exports and international recognition."

The Australian bionic ear is now used in 15 European countries.

The conference also concluded:

THAT the full potential of the ear had not been explored; and

POSSIBLE improvements could be made with further research on adults and children.

Scott's tuned in to sound

Ten-year-old Melbourne boy Scott Smith is the first child in the world with a bionic ear.

The chirpy youngster has switched into the world of sound after seven years of profound deafness. It's a miracle for Scott and a coup for the Melbourne University research team which leads the world in hearing technology.

Now he's learning to speak.

"Once he was tuned in, it was like being in a room where everyone spoke a foreign language," Scott's mum Betty explains.

"He's had to connect what he hears with what he sees — it's a long process of learning."

Scott is still a boy of few words and when asked how it feels to be able to hear, he states simply: "Good.".

Says Betty: "What he hears are sounds like Donald Duck talking.

"He has taken it all for granted. His speech has improved and the more he can make himself understood, the more confident he becomes."

Not that Scott had a problem with confidence. He's in year five at school — which is where he should be at his age — and doing well. He captains a football team for West Footscray, and plays cricket.

His bionic ear was implanted during a three-hour operation. A couple of weeks later it was switched on, giving Scott a blast of what he'd missed since meningitis caused his deafness.

The multi-channel hearing device, developed by Sydney company Cochlear, has been implanted in adults before. This is the first time a half-sized model has been fitted to a child.

Professor Graeme Clark (pictured with Scott) heads the team which developed the bionic ear and he's delighted with Scott's results.

Betty says: "When Scott returned to school after his operation, the other kids applauded. He heard that and was delighted.

"The other day he came home in a taxi and later told me about the driver. Someone with the patience gave him a go and he was out there having a conversation."

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healthy sons, Lee, 10, and Luke, 5, and were caught off guard when Dean, now 18 months, was born with a cleft palate, small jaw, narrow head and without ears.

The Aldridges, from Wagga Wagga in NSW, say there was no indication before Dean's birth that anything was amiss.

Dean spent some time in a humidicrib, but his problems were not over when he went home. The cleft palate made it almost impossible for him to take in any form of sustenance.

Kay says: "After a while he taught himself a technique of swallowing and then I started to love him. I felt it was safe and he was going to live."

Dean has had two operations to correct his palate, but medical procedure is not far enough advanced to correct his hearing problems. He wears a headband to hold in place the hearing aid enabling him to pick up about 70 per cent of normal sound.

Kay and Michael decided not to do anything cosmetically about Dean's ears.

"We're going to leave it up to Dean," she says. "But really, he's very lucky, he's perfect from the neck down."

The cause of treachers collins syndrome is not yet known, although Kay and Michael have been told Dean's afflictions were caused by a spontaneous genetic mutation.

Kay says: "We've never wondered why it happened to us. We were so fortunate because we have a good relationship, and there were lots of family members to help us."

Michael and Kay wanted to make Dean's problem known in the hope that they can help other affected children. "We're through the worst now and feel we must pass on our knowledge," Kay says.

Aug 24th, 1987 The Mirror

THE WORLD OF SOUND OPENING UP

● NEW ring of confidence . . . Wendy loves answering the phone

Hello, Wendy's got a new bionic ear

By SUE GREENWOOD.

JUST the ring of the telephone brings a smile to Wendy McLean's face.

It's just one of a whole host of sounds she is getting to know.

For the past 12 years, 17-year-old Wendy has been totally deaf. But in January this year she was given a cochlear implant, tagged a bionic ear.

The device wasn't switched on until February and that was when Wendy began exploring the world of sound.

She had limited hearing until she was five. Then she went totally deaf.

She remembers when the implant was turned on for the first time – she jumped at the sound of her voice.

Wendy has limited speech but is learning to make new words with the help of her teacher Dr Gaye Musgrave.

She also attends secretarial classes and says her ideal career would be computer work.

The most difficult aspect of the implant, according to Wendy and Dr Musgrave, is having to learn to "map new signals" onto people's speech.

Wendy doesn't hear as we do. Instead she picks up electronic signals through the implant's receiver, which you can feel beneath her scalp just above her ear.

Wendy copes quite nicely by combining her excellent lip reading skills with the electronic sound supplied through her implant.

Wendy's greatest achievement since getting the implant is being able to talk on the phone to her mum with the help of a special microphone which plugs in to the implant transmitter.

Wendy is one of only four teenagers in Australia with a cochlear implant.

MIRACLE FOR THE DEAF

World of sound opens up for David

As a child he lost his hearing and quit talking. Now he's leading a normal life

. . . David is thrilled by the sounds we take very much for granted.

SIXTEEN-year-old David Suutari has just entered the world of sound, thanks to a miracle operation called a multi-channel cochlear implant. David is the second teenager in Australia to receive this device, which provides totally deaf people with auditory (hearing) sensations through direct electrical stimulation of the auditory nerve. Up until now, David, with the help of a hearing-aid, has perceived sound as a vibration rather than as a hearing sensation.

Three other Australian children so far have received the multi-channel implant. They were operated on in Melbourne by Professor Graeme Clark, of Melbourne University, who developed the nucleus multi-channel cochlear implant. Although David could hear until he was two-and-a-half years old, when meningitis destroyed his hearing he stopped talking. He is believed to have no memory of sound. "Sound is a new awakening — like being able to see when you have been blind," Dr Gaye Musgrave, David's teacher, said.

Gaye is a research officer with Professor Bill Gibson, of Sydney University, who performed the operation on David. They are working on an ongoing rehabilitation project with children who have received the implant. David is her first student.

"It is a new step in clinical research into the amount of help that an implant can give a child to learn to process language through hearing rather than sight (as with lip reading and cued speech)," she said.

"Cued speech is a system which combines hand cues and lip reading synchronised with speech.

"Some adults are disappointed with the operation because the sounds they can hear afterwards are more artificial than those of a normal hearing person. But David's first reaction of delight at hearing has continued."

Mrs Suutari spoke of her heartbreak when meningitis robbed her toddler of his hearing. "I cried for years but I never thought of David as handicapped. He had been a normal little boy for over two years and I continued to treat him that way.

"From the age of three he had to put up with children saying 'You are deaf and dumb' constantly. When it stopped in sixth class, David told me, 'It's nice no one says it any more'.

"At nine, his friends, who had played happily with him, seemed to notice his deafness. During the school holidays he was left out of things for a short period. It was the one time I heard him rebel: 'I don't want to be deaf, I don't like it'. But soon after he was included in everything again."

David's new happiness is apparent, his mother said. "He just beams. Everything is a thrill."

The first electrodes were hooked up in July. "At first he was very sensitive to sound and kept asking to have the device turned down, but within days he had become used to it and wanted the volume turned up."

David does not see himself as handicapped, his mother said. "He is a boy who thrives on making things [illegible]. It is a pleasure to help him because he responds so well."

I met David, a pleasant, intelligent teenager, at St Gabriel's School for Hearing-Impaired Children. His speech is still very staccato and can be difficult at times to understand but Gaye smoothed communication.

What had the operation meant to him? "I wanted to hear because I want to learn more things," he said. "I can hear the school bell for the first time. I can tell when people come into a room and when they are talking.

"If I had to do it again, I wouldn't be nervous because I know there's nothing to be afraid of. I'd like to tell others that it's worthwhile — everything will be all right."

The first sounds David heard were "people talking in the audiologist's office at Royal Prince Alfred Hospital when the implant was first turned on. "I was so excited because I like loud sounds."

There are 22 electrodes in the device, which can enable a person to hear the full range of speech from low to high sounds. Each electrode has to be set separately, starting at the point where the patient first hears, then adjusting the sound to a comfortable level.

"Previously, David could detect sounds with a hearing aid but could not tell them apart," Gaye explained. "It all sounded much the same and he missed a lot — getting only intermittent signals. That's why his speech sounds that way.

But the wonders of sound are opening up new vistas. David intends becoming a draftsman after leaving school. But in the meantime he will attend Killarney Heights High School, full-time instead of part-time next year.

David is looking forward with enormous pleasure to other experiences we take for granted. WD

Story: **JOAN MOONEY**

DAVID'S DIARY

I had my operation on June 11, 1986.

Friday, July 4: I had my switch-on and had only 10 electrodes turned on. I was excited and happy to hear the sounds. Before my mum and I went home from the eye-and-ear unit we stopped at a restaurant. There was a piano behind me and a lady came to play it . . . I thought the noise was from people who were talking near us and my mum said that the noise came from behind my back, so I turned round and found out that it was the piano . . . I also heard the noise from the TV, and my parents that evening. I love to hear the things that I haven't heard.

Saturday, July 5: Some time during the afternoon my mum took me outside and asked me to listen. I heard chattering noises. My mum said there were many birds in a large tree . . . I thought the toilet made a very loud noise when it was flushed.

Sunday, July 6: I heard a bang. It was from the front door of our house and I knew that my mum and sister were home from church.

Monday, July 7: When I got to Killarney Heights High School it was nearly lunchtime. I heard a noise and thought that it was the school bell. I was right because I saw the students coming out of their classrooms for lunch. I was so happy because I have heard the school bell for the first time.

Thursday July 10: I had 10 more electrodes turned on and my first 10 turned up to a higher volume. I could hear better than a few days ago. That evening my mum dropped a plate by accident and it made a very loud noise when it hit the floor. I went into the kitchen and saw what happened.

Monday, July 14: I was doing some listening and my teacher, Gaye, was saying some vowels. I was about 40 metres away from Gaye and I could hear most of the vowels. I heard Gaye calling my name.

Thursday, July 17: Steve Otto came to have my electrodes turned up to a higher volume. It was the first time I heard the sound "S". I had thought that this sound was a sharp sound.

Sunday, July 20: My family went to Lane Cove Park for a picnic with other people who have the cochlear implant. I talked to some of them and asked them questions. There were a lot of noises at the picnic. I could hear people talking, cars going by, and I think I heard birds making noises.

Tuesday, July 22: I was having some speech-and-listening lessons. My teacher was saying high-pitched sounds and low-pitched sounds. I had to listen to which of the pitched sounds my teacher said. I was 100 per cent right.

Thursday, July 24: I was doing some listening . . . to the difference between "cause" and "because". I had to listen to which of these words my teacher said. I did well and I also did some other pairs of words. I also did speech.

Saturday, July 26: I was watching TV and I could hear the door banging when someone in my family came into the room where I was.

Wednesday, July 30: I was ready to go to school and I was waiting for my taxi to come to my house. My taxi came and I heard the horn from the car for the first time. I was so pleased.

Tuesday, August 5: I did some tests for lip reading by itself, lip reading and listening, and listening by itself. I did very well and my teacher, Gaye, was so pleased. I was happy because I am improving all the time.

Sunday, August 10: I heard a noise and I asked my mum what it was. My mum said that the noise was from a dog barking two houses away from my house. I was trying to follow the rhythm of the dog's barks and I was able to do it. I was so surprised.

The operation

What is a multi-channel Cochlear Implant? The device consists of a tiny strip of 22 electrodes inserted into the inner ear (cochlea) and a speech-processing unit which is worn externally. It makes use of sophisticated electronic technology such as silicon chips.

The device brings deaf people in touch with sound again — environmental sounds as well as their own and other's speech — but the sounds are different from those heard by people with normal hearing.

Who can it help?

- People who lack useful hearing in both ears and cannot be helped by hearing aids.
- Those who have other serious medical conditions.
- People who desire to be a part of the general hearing community.

Patient benefits include:

- A better understanding of speech combined with lip reading.
- Improvement in detecting normal environmental sounds.

The multi-channel cochlear implant consists of:

- A speech processor (compact and worn on a belt, shoulder pouch, or in a pocket) which selects and codes features of the speech signal that are most useful for understanding speech.
- A directional microphone/transmitter (worn as a headset). The microphone picks up sounds; the transmitter relays coded signals to the receiver.
- A receiver-stimulator (implanted in the bone behind the ear through an operation) decodes and sends electrical signals to the electrodes.
- A 22-channel electrode array (surgically inserted into the inner ear), a special set of 22 electrical contacts which carry signals to remaining nerve fibres.

What is involved?

Preliminary tests must be done to determine to what degree a person's hearing could be restored by the implant. About three weeks after surgery the patient is given a training program to get the most benefit from the device. The sounds heard will not be the same as those by people with normal hearing.

The limits?

Results vary with individuals. It may be difficult to hear in crowds or with a great deal of competing sound such as music. The microphone is not suitable for hearing at a great distance.

Possible potential side-effects? The normal risks of surgery and general anaesthesia.

Over the past five years 300 adults worldwide have received a cochlear implant.

SMH July 9th. '87

Holly's world full of sound again

Picture by ANTON CERMAK

olly McDonnell yesterday, with Susan Walters, the first person in Sydney to have a cochlear implant.

Bionic ear implant lets ive-year-old girl hear

By JOHN O'NEILL, Medical Reporter

A five-year-old girl who became af after contracting meningitis s become the youngest child in stralia to hear through a ionic" ear.

During a 3½-hour operation ee weeks ago, doctors at Royal ince Alfred Children's Hospital erted a receiver into the girl's er ear.

Yesterday, a Walkman-sized nputer attached to Holly Donnell's belt was translating man voices into electronic pulses and broadcasting them to t tiny receiver. In turn, it was nulating 22 nerve ends, sending ssages which her brain interted as sound.

"We are certain that she can ar," said Dr Barrie Scrivener, e of Holly's surgeons.

Dr Scrivener said the $7,000 eiver, developed by a former yal Prince Alfred doctor, Prosor Grahame Clarke, was arguy the best in the world.

Unlike earlier patients, Holly has a multi-channel receiver which stimulates more than one nerve end, providing a range of tones.

A shy Holly sat through yesterday's press conference without talking. But Susan Walters, 25, who in 1984 was the first person in Sydney to have an implant, said it was like listening to people from the other end of a tunnel.

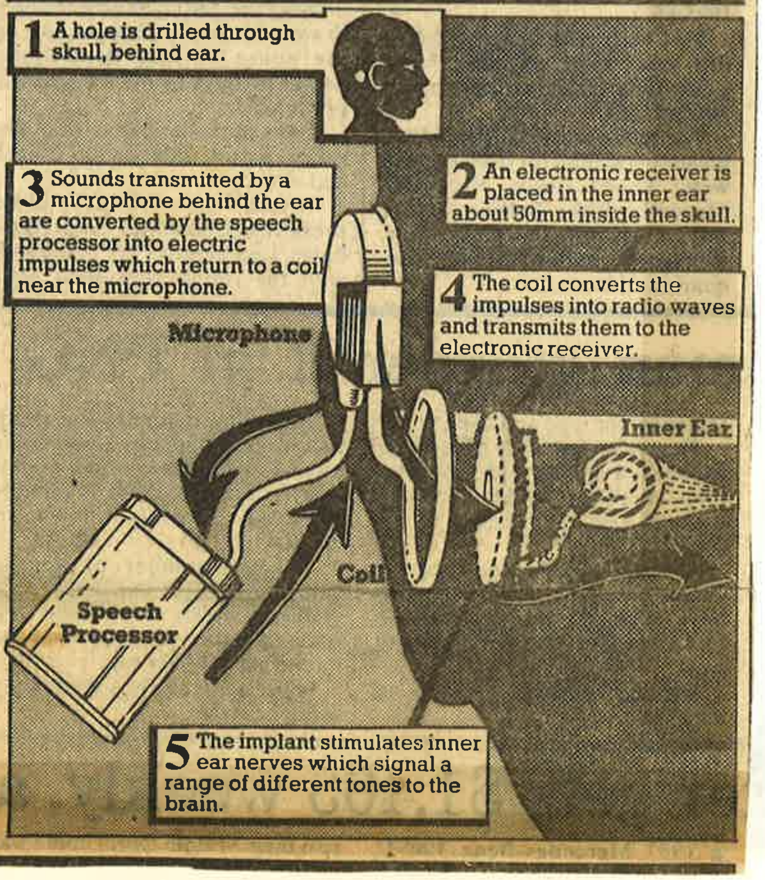
"It's been great," she said. "I'm in my final year of a fashion course at tech and I hardly ever had trouble hearing in lectures."

Professor Bill Gibson, head of the team of surgeons which operated on Holly, said: "At first she will recognise her own footsteps, the rain and so on. It will be a few more weeks before she recognises words."

Twenty-six people have received the implants in Sydney and 12 more are awaiting the operation.

The surgeons do not charge for the operation. Mr Larry Adler and his company FAI Insurance paid for Holly's equipment, costing almost $13,000. Dr Gibson said his team was looking for the public to donate further funds.

HOW THE DEAF ARE ABLE TO HEAR



Holly hears again with bionic ear

Awake to the world of sound after eight months of silence, five-year-old Holly McDonald, the youngest patient ever to receive a bionic ear implant, with her relieved mum. PHOTOS: Ros Cannon.

Holly with the electronic speech processor strapped to her waist.

For five-year-old Holly McDonald, of Towlers Bay, the world became a very sad and silent place when she contracted meningitis last October, a disease which left her completely deaf.

But three weeks ago all that changed when Holly became the youngest patient ever to receive a multi-channel bionic ear implant.

Now, thanks to a dedicated team of surgeons at the Childrens Hospital Camperdown and doctors at Prince Alfred Hospital, Holly is well on her way to becoming a part of the hearing world again.

"There's still a long way to go, but it's a great relief," said Holly's mother, Victoria.

"The day she was switched on her whole face was so engrossed with the sound."

In an operation that lasted three hours the team of Professor William Gibson, of Sydney University, and Dr Barry Scrivener implanted the sophisticated device inside Holly's left ear. This will give her hearing capacity similar to that of a partially deaf child using a hearing aid.

The $12 000 device is connected to a speech processor strapped to the waist like a Sony Walkman. This box, which according to Professor Gibson is as sophisticated as an Apple computer, extracts the most relevant sound information and broadcasts it via an external transmitter to the inner ear.

Dr Scrivener, who described the operation as a landmark in the field of deaf education, said the implant would give Holly a distorted sound, a "mixture of space invaders and Donald Duck".

Mrs McDonald said Holly understands she will not hear in the same way she used to but they are both prepared to work hard at developing her hearing and speech.

Mrs McDonald said Holly is happily wearing the new device.

According to Professor Gibson, who is thrilled at the success of the program, there are already another 10-12 hopefuls on the waiting list for "bionic ears". Since 1984, 26 patients have had them implanted.

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Bionic girl Holly can hear once again

By CHRISTINE SPITERI

AUSTRALIA has a subculture of bionic people and the latest addition to the group is just four years old.

Tiny Holly McDonnell made medical history last week as the youngest person in Australia to receive a cochlear implant, commonly known as the bionic ear.

She underwent surgery in early June but the hearing device was switched on only last week.

Although the procedure is complete, Holly will undergo an intensive education program to enable her to decipher sound.

Donald Duck

She is beginning to detect simple noises like footsteps and voices.

But because the bionic ear synthesizes sound, everything she hears will be distorted and voices will resemble that of Donald Duck.

Holly went deaf after a bout of meningitis.

But despite being unable to hear she kept up her speech.

The implant works better for people who have lost their hearing and so have a prior knowledge of sound and speech, rather than those born deaf.

Holly has been wired for sound for only a week but already her mother Victoria has noted an improvement.

Mrs McDonnell admits she was unsure at first whether to allow her tiny daughter to undergo surgery for the implant.

"It took quite a while to reach a decision — it was such a big operation for such a little girl and there was almost no information on the proceedure," she said.

Mrs McDonnell's final decision came after a 20-minute telephone conversation with Susan Walters.

Susan, 20, is profoundly deaf.

But since a cochlear implantation two years ago her level of hearing is almost 100 per cent and she can use the phone with ease.

She lives on her own and studies fashion technology at Gymea Technical College.

"The fact that we could carry on a normal phone conversation for half an hour was the best proof the bionic ear worked," Susan said yesterday.

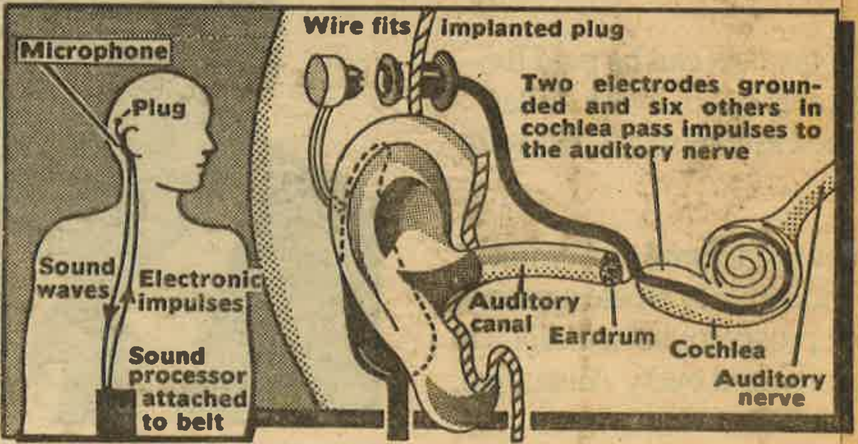
Like Holly, Susan became deaf after suffering meningitis.

She was without sound for four months and became the first person in NSW to receive a bionic ear implantation.

The cochlear implant is the most sophisticated in the world and costs $13,000.

The Children's Hospital, Camperdown, is raising money to fund research into further development of the bionic ear.

Tickets to a benefit concert, starring Don Lane, Jono and Dano and the Rancan sisters, are available from the hospital.



The intricate mechanics of implanting the bionic ear — and how it works

A revolutionary device, developed by Australian medical experts, has brought back sound to a number of deaf Australians.

By Liz Deegan

Bionic ear breaks the silence

BREAKING THE 'silent bubble' which traps hundreds of thousands of deaf Australians has been a long struggle for our medical experts.

Earlier this year a major breakthrough in returning the deaf to the world of sound was achieved with the acclaimed success of the Melbourne-based 'bionic ear' program.

The result of 20 years research and dedication by a team of specialists at the University of Melbourne, the bionic ear, or cochlear implant, enables people to understand speech after years of silence, and for some, to hear for the first time. It is suitable for those people who are not benefitted by hearing aids.

Developed by Professor Graeme Clark, head of the Australian Bionic Ear Institute, the bionic ear program is regarded as an Australian landmark, offering arguably the most advanced technology in the world.

Five hundred and fifty patients around the world have so far received the cochlear implant, while in Australia there are an estimated 100 recipients. Of these, 65 patients are in Melbourne, about 30 in Sydney and one or two in Brisbane and Adelaide.

Surgeons estimate that over 90 per cent of these patients experience significant hearing improvement, and one in three is now able to conduct a telephone conversation. These results stretch far beyond original expectations.

With the help of her mother, Victoria, and Dr Gaye Musgrave, Holly McDonell is moving back into a world of sound.

'Revolutionary' device

The bionic device, hailed as revolutionary, is implanted during a delicate four-hour operation. The device consists of an internal electronic receiver, a microphone, an external transmitter and a speech processor. Cost of the equipment is about $13,000 per individual.

Sounds are detected by the microphone, attached behind the ear, and then transmitted to the sound-box, or mini-computer which is strapped to the patient's waist. This recodes jumbled sounds into coherent electronic stimulations which are in turn received by the brain as automated speech.

Hearing, though not clear, involves a distorted sound pattern, similar to that of Donald Duck or a Space Invaders machine, which allows the patient to comprehend the sounds vital to daily life.

The significance of the bionic ear program was brought to public attention in June this year when five-year-old Holly McDonell became the youngest child to ever receive the cochlear implant. It was highlighted again in August when the team achieved a world

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Holly one of ‘lucky ones’

Five-year-old Holly McDonnell, of Towlers Bay, was one of the lucky ones in July: she became the youngest child in Australia to hear through a $12 000 “bionic ear”.

t that time available to patients with private funds or private health insurance, the operation reopened the world of sound for the little girl who became completely deaf after contracting meningitis last year.

Today, thanks to the generosity of Larry Adler and his company FAI Insurance who paid for Holly’s multi-channel cochlea implant, Holly is a happier girl no longer trapped in her “silent bubble”.

With a Walkman’s-size transmitter strapped to her belt, translating human voices into electronic “beeps”, Holly can now enjoy the sound of television voices and join in childhood games, aware of what is happening.

Good news for those awaiting the operation came last week with the State Government announcement of $150 000 funding for the program to be spent on providing “bionic ears” to 10 totally deaf public hospital patients per year.

Previously, the deaf unable to raise the high cost of the implant were barred from entering the program.

This government funding breakthrough now means the vitally important work of the Royal Prince Alfred Cochlear Implant team will be equally available to all who are deprived of sound and entitled to this new technology.

Holly McDonnell — no longer trapped in a silent bubble thanks to a “bionic ear” she received in June this year.

Deaf Oscar star to visit Sydney

Children of a Lesser God star Marlee Matlin will visit Australia during Deafness Awareness Week, from August 16 to 22, as a guest of the Australian Caption Centre.

The centre provides supertext subtitles on television programs for the deaf.

Marlee Matlin, who has suffered from severe hearing loss since she was an infant, has learned to communicate through sign language.

The manly Daily. 12/8/87.

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For the Melbourne team, and in particular Professor Clark, the path to such medical triumphs has been long and drawn out, but eventually rewarding.

Professor Clark began his research 20 years ago with an ambition to understand and cure deafness. As the first professor of Otolaryngology (Ear, Nose and Throat), at Melbourne University, Professor Clark began his pioneering with a team of three specialists. This team has now grown to about 50.

Initial work concentrated on the biological feasibility of a cochlear implant to determine if the device could be used safely on humans. This proved successful and was followed in the mid-seventies with the development of the actual technology by a group of specialist engineers.

In 1978 the prototype of the implant was developed by the Melbourne team, and tested successfully on three voluntary patients within a laboratory environment.

Each patient attended a clinic twice weekly where they were connected to a computer which transmitted sound patterns. Though the three adults did not get the opportunity to hear outside the lab, this was a crucial step in the development of the technology and paved the way for the introduction of an external speech processor worn by the patient.

In 1981, commercial production of the device was taken over by Cochlear Pty Ltd, in close alliance with the Melbourne University team, and with the help of funding from the Australian federal government.

The first implant was ready by 1982 and tested with eight patients. The results indicated a range of performances and were far better than doctors expected. The device was approved by the United States government as a suitable surgical device for marketing and today, Australia has captured 75 per cent of the worldwide market for the sale of cochlear implants.

Holly McDonell hears again

Five-year-old Holly McDonell, from Pittwater in Sydney's north, is one of the lucky ones.

Last December her world became a sad and silent one when she contracted meningitis, a disease which left her completely deaf.

In July this year all that changed when she became the youngest child in Australia to receive a bionic ear during a three-and-a-half hour operation at the Children's Hospital, Camperdown.

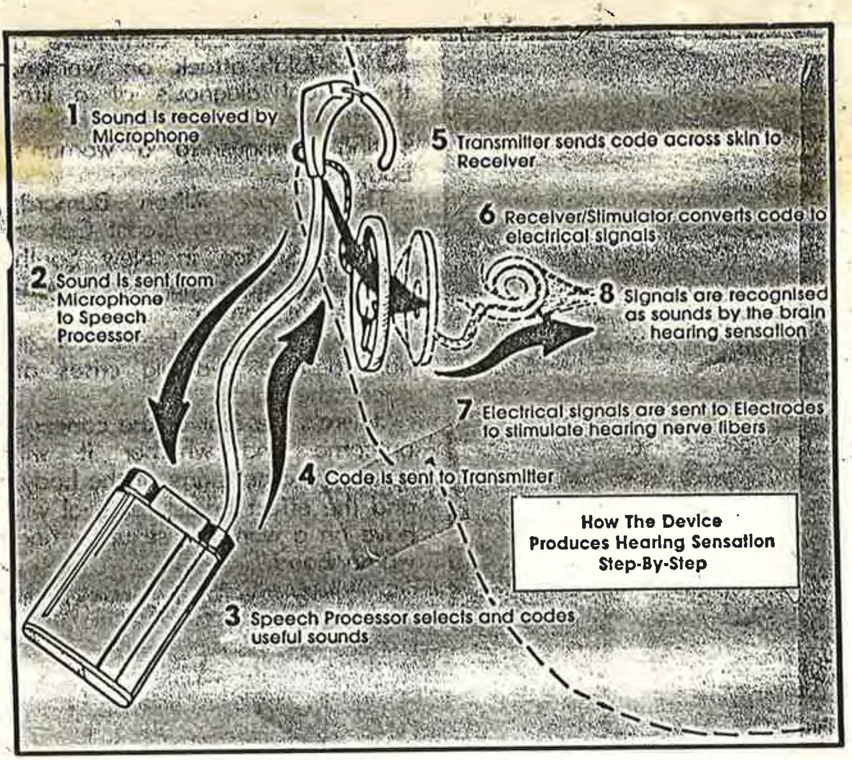
Now with the help of Doctor Gaye Musgrave, a research officer with the Royal NSW Institute for Deaf and Blind Children, and the patience of her mum, Victoria McDonell, Holly is slowly moving back into the world of sound.

Since she was 'switched on' in July, Holly has made incredible progress and according to her mum, who spends at least four hours a day working with Holly on listening and speaking exercises, she is a much happier and more confident little girl.

'Already she can discriminate between nursery rhymes through hearing alone which is wonderful,' says her mother.

'More importantly she is much easier to converse with, you no longer have to be concerned she is getting the right message.'

For Holly this step was vital and has seen her on the way to renewing childhood friendships which have waned since she became deaf, because she could not understand her playmates.



How The Device Produces Hearing Sensation Step-By-Step

Sounds instead of silence

by SUE HICKS

JOSEPH lost his hearing when he was four but now, thanks to a bionic ear transplant and speech and listening training from Dr Gaye Musgrave, the nine-year-old can interpret noise.

He is just one of five youngsters in the Sydney area who have had the operation and are learning to live with the "robot-like" noise the ear provides.

A teenager who Dr Musgrave is helping has been deaf since birth, another from two-years-old. They had no memory of sound at all.

She is the key to their understanding and her work has been sponsored by The Royal NSW Institute for Deaf and Blind Children at North Rocks.

Now more of the operations which give hope for totally and near-totally deaf youngsters are planned, thanks to a $150,000 NSW Government scheme to provide implants for 10 public hospital patients a year.

In 1985 Dr Musgrave worked in Melbourne where the first child in the world to have the Bionic Ear was trained as Australia led the world in this transplant field.

Dr Musgrave, who has lectured widely in the States, Canada and Australia, recently joined the Institute and does research at Sydney University.

"Rehabilitation is a very lengthy process," she said. "The children have to interpret the new signal and some have no memory of sound at all."

Dr Musgrave said the best way to describe the sound they hear after the cochlear transplant was "robotic".

One little girl now looks at the television and says: "Mummy they're talking funny".

Dr Musgrave stressed the bionic ear – which is surgically implanted into the skull in an operation which could take up to four hours – does not restore hearing.

"It provides a hearing sensation, a very different sound than the children would have heard before," she said.

"They really need good follow-up to use it and get maximum possible rehabilitation which takes years."

So few children have had the cochlear transplant that experts do not really know what to expect.

Adults who lose hearing in later life at least have memory of language, speech and listening.

"Every child is different," Dr Musgrave said. "They either use lip-reading plus the sound to understand what people are saying or they use the listening by itself.

"We are aiming for them to understand ongoing conversational speech."

She stresses that the operation is only appropriate for children who can't get any benefit from hearing aids.

"Its success has provided so much for each family involved," Dr Musgrave said.

"Again, each child has been different. A couple have been so surprised when they heard noise and overwhelmed by the situation.

"Hearing sound after six years of total deafness is very exciting – sometimes they just cry.

"One little girl just started talking.

"We said 'hello, hello' and she said 'hello, hello' and then experimented with sounds like 'mmmm' and 'umm' and she could hear herself making noise.

● Deafness Awareness Week runs from August 16 to 24. The Adult Education Centre for Deaf and Hearing Impaired Persons is running workshops in Strathfield.

They include Working with an Interpreter, Deaf Language and Culture and Hearing Loss in the Workplace: Changing Attitudes. For details phone 764 4635 or 764 4972.

Sept 2nd 87 Norther District Times

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Sydney Morning Herald

1 Telephone: Editorial 282 2822; General 282 2833; Classifieds 282 1122 45 cents* 64 pages **Wednesday, August 26, 1**

Sound of laughter . . . now they can hear it

Picture by RICK STEVENS

Dr Gaye Musgrave, left, with bionic ears recipients David Suutari, Pia Jeffrey, Holly McDonell, Wendy McLean and Joseph Silipo.

By DEBORAH CAMERON

Three have forgotten what it's like to listen; two never could. Fifteen electrodes and lessons in listening in a cramped office above a school canteen will make them remember.

It is the sort of medical wonder that still brings tears to the eyes of Dr Gaye Musgrave.

Dr Musgrave is research officer with a project jointly run by the [redacted] NSW Institute for the Deaf and Blind and Sydney University.

Children on the program receive cochlear implants — commonly known as bionic ears. The project has restored the hearing of four Sydney children who either became deaf in early childhood or were born profoundly deaf. A fifth child is now waiting to be "switched on".

Pia Jeffrey, who is not yet six, will be "switched on" in about four weeks. It will happen in a small room above the Chatswood Infants' School canteen.

Her parents will be there when Dr Musgrave starts tuning electrodes implanted in Pia's ear to restore her hearing. And if the operation to correct her congenital deafness has been a success, she will be able to hear after the 15th electrode is tuned.

The first sound she will hear is already decided: "My voice," her mother, Mrs Prue Jeffrey, said yesterday.

The remaining seven electrodes which complete the bionic keyboard will be switched on later. The biggest test of the project's success is the 20th electrode, which detects "s" and "sh" sounds in speech.

"It is the highest frequency sound and the most difficult to hear," Dr Musgrave said. "If they can hear 's' then it is really excellent."

David Suutari, 17, who became deaf with meningitis at the age of two, received the first of the implants by the Sydney team about a year ago. Dr Musgrave introduced him to his first sound — the voices of his mother and father. It wasn't until months later that he first heard a dog bark.

Wendy McLean, 17, got her bionic ear last year. She was born hearing-impaired and became completely deaf in early childhood. When her high-technology ear was switched on, there was so much noise from her eager family that she had to tell them to keep quiet so she could hear her own voice.

"I told everybody to be quiet because it was a real surprise to hear my own voice. I hadn't heard it for such a long time. I got such a surprise that all I could say was oh!"

Joseph Silipo is nine and had his meningitis-related deafness reversed a month ago. He is still experimenting with sound and says that his favourite noises are the sound of tearing paper and his mother calling him.

The only child who so far remembers sounds from early childhood is Holly McDonell, five, who received her new ear earlier this year after eight months of deafness.

Dr Musgrave describes what the children hear as "like a robot's voice" — a metallic monotone. But she is confident that advances in bionic ear technology will continue to improve sound quality.

Tears as Pia hears her first voice

Prue Jeffrey hugs Pia's sister, Kitty, 9, as the electrodes in Pia's cochlear implant begin to work, and stimulate nerve fibres to transmit sound signals.

By DEBORAH CAMERON
and YVETTE STEINHAUER

Pia Jeffrey can hear for the first time – and it's written all over her face. Now she knows the voices of her mother, father and sister.

"Pia, Pia, I love you," her mother said.

Prue Jeffrey of Artarmon wanted those to be the first words that Pia heard. So did her father, John, and nine-year-old sister Kitty.

Pia is six and was born deaf. Her "bionic ear" cochlear implant was switched on this Wednesday, after being installed about six weeks ago.

"Hello, hello, hello," Dr Gay Musgrave said as she tuned a small speech processor.

Pia's face suddenly changed. Hearing her first voice was as startling as seeing colour for the first time, as vivid as a shower of sparks.

"Hello," she said back to Dr Musgrave. And then she stopped and listened to her own voice: "Hello."

"Can she hear?" her mother asked.

Dr Musgrave had tears in her eyes as she answered yes.

It was the end of a tense two months for the Jeffrey family, waiting and hoping for the success of the bionic ear.

"I didn't think I'd be able to stop myself from crying," Pia's mother said.

The head of the cochlear implant team, Professor William Gibson of the University of Sydney, said the system used 22 electrodes placed in the inner ear, which stimulated nerve fibres to transmit signals.

"A microphone picks up sounds within the main speech range and relays them to the electrodes through a processor resembling a small Walkman worn by the recipient," he said.

"It's not the sort of sound that you and I might hear – speech would sound like Donald Duck talking under water – but the recipients can interpret and respond to the signals."

The bionic ear costs $13,000, not including surgery and rehabilitation. The implant program is still at an experimental stage.

Now Pia can hear, the small task set by a poster on the wall near Dr Musgrave's office is no longer impossible.

It says: "Close your eyes and sit and listen. Draw what you can hear. There are loud noises and quiet noises."

Yesterday, two days after her implant was switched on, Pia was still running around banging her toys on the ground and ripping up paper, Professor Gibson said.

"There are certain sounds that obviously intrigue her," he said. "One is the sound of flushing water, so she's been milking the toilet dry."

The sound of birds, of a plane flying overhead, of a ball bouncing have become sources of wonder in Pia's new world.

Professor Gibson said she had adapted surprisingly quickly – much faster than adults with a bionic ear implant.

As well as listening, Pia is busy making sounds. She can say simple things such as "Mummy car", "Daddy home", "Where's Baby?".

Her speech level is still about that of a two-year-old. Professor Gibson said he hopes that one day she will master the use of language.

But she has already heard the most important words. "Pia, I love you."

The Daily Telegraph

Phone 288 3000 SYDNEY, MONDAY, AUGUST 24, 1987 40c*

Exclusive: Bionic breakthrough

SOUND OF HOPE IN PIA'S SILENT WORLD

Story and picture — PAGE 3

The Daily Telegraph (Sydney) - Monday, August 24, 1987.

Corks popping sounds like the best birthday gift for plucky Pia

Pia with her mother Pru . . . . they hope to be able to talk soon. Picture: GARY GRAHAM

Girl awaits bionic ear switch-on

PRETTY Pia Jeffrey will celebrate her sixth birthday next w — and her parents are praying she will hear champagne c popping for the first time.

Pia was born deaf but has been given a chance to hear after a world bionic ear implant operation in Sydney last Wednesday.

Her bionic ear will be switched on next week in what will be a test case fo technology and — more importantly — for her little brother Alex.

Exclusive by Medical Reporter STEPHEN ROM

Alex, 2, was also born deaf and parents John and Pru Jeffrey realise his future hinges on the success or failure of Pia's implant.

"We are hoping Pia receives the best birthday present in the world — her hearing," Mrs Jeffrey said.

"Certainly we would be keen for Alex to have the implant in the future but naturally it is conditional on Pia's development."

Pia became the first congentially deaf child to have a multi-channel cochlear implant in a five-hour operation at Camperdown Children's Hospital.

Breakthrough

Cochlear implant team head William Gibson said the operation went smoothly but he had no idea if the implant would be a success.

Professor Gisbon said 22 electrodes implanted in Pia's ear would be individually switched on over a six-week period.

Each electrode will be gradually adjusted to a frequency which Pia is comfortable with.

If Pia can hear it will be a medical breakthrough as previous child bionic ear recipients had all lost their hearing through accident or illness.

It will also be the culmination of 20 years work by Professor Graeme Clark of Melbourne University, who started research into the bionic ear in Australia with the aim of giving hearing to people born deaf.

Mrs Jeffrey said Pia's attitude throughout had been an inspiration to the rest of the family.

"When we showed her a film of Professor Gibson doing the operation on another child we thought it would turn her off, but she just sat there and pointed to herself," she said.

"She was pretty sick for the first two days after the operation but she quickly bounced back to normal.

"She understands exactly what is going on and is terribly excited and pleased with herself."

The bionic ear is implanted behind the ear and connected to a microphone which picks up voice signals and relays them to a computer worn on the waist.

The computer converts the signals into speech patterns and sends them through a set of electrodes to nerve endings deep within the ear.

Receiving a bionic ear was the first step for Pia, who has joined a rehabilitation program run by the

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For the Jeffreys the operation ended years of waiting.

They first approached Professor Gibson when Pia was two but were told an implant was impossible.

But the Jeffreys did not give up. They met Dr Gaye Musgrave, a teacher of the deaf who persuaded Professor Gibson to consider an implant.

Beacuse Pia was born deaf, permission had to be gained from both Professor Clark and the Food and Drug Administration.

"Pia was getting to the age where she would have to learn to sign (language) and there are people who think that is the right thing to do," he said.

"But we wanted her to have a chance to speak and of course it is our decision in the end."

Editorial — P10

The Daily Telegraph

SYDNEY, MONDAY, AUGUST 24, 1987

Professor and Pia — working for a dream

AUSTRALIA has a proud record in pioneering technology but it will possibly record its proudest moment next week when little Pia Jeffrey's bionic ear is switched on.

This is modern electronics at its most human level. It could open up a whole new world of sound for a child whose six years of life have been silent.

Pia was born deaf and last week's cochlear implant operation at Camperdown Children's Hospital was a world first.

While it is a wonderful achievement for Australian scientists, its promise extends far beyond the sterile world of scientific laboratories. It offers enormous hope for others with Pia's affliction.

Those in our society who look to overseas innovators for scientific and medical breakthroughs should offer praise and encouragement to those dedicated Australians who toil tirelessly and unselfishly in the "backrooms" of local institutions.

These brilliant humanitarians deserve the respect we so willingly bestow on foreign scientists but often deny our own successes.

Pia's cochlear implant was the culmination of 20 years' work by Professor Graeme Clark of Melbourne University.

He said from the beginning that his work was aimed at giving hearing to people born deaf.

Next week will be a testing time for both Professor Clark and Pia Jeffrey.

If the bionic ear is a success, it will be a life's dream come true for Professor Clark.

For Pia it will be the beginning of a whole new life, full of the glorious sounds of living.

Telegraph Aug 20 '87

Deaf toddler gets bionic ear in world-first implant

By Medical Reporter
STEPHEN ROMEI

A LITTLE girl who was born deaf has been given a chance to hear after receiving a bionic ear in a pioneering operation in Sydney yesterday.

The 5-year-old became the first deaf-from-birth child to have the delicate cochlear implant operation.

Doctors are hoping for a medical breakthrough — previous child bionic ear recipients had all lost their hearing through accident or illness.

Head of the cochlear implant team, Professor William Gibson, said the operation at Royal Prince Alfred Hospital was a success.

"We are very pleased. Everything went very smoothly," he said.

"The electrodes all went inside her ear and that is what they are supposed to do."

But Professor Gibson said it would be six weeks before he knew if the child would be able to hear.

"We are on tenterhooks until then," he said.

"We have no idea if it is going to work or not.

"In about four weeks we will start to switch it on but it will be a gradual process involving intense rehabilitation for the child.

"If it works the child will hear a horrible cacophony in her head.

"All the noises will be too loud. The sound of a running tap would upset her.

"We will have to go very slowly and gradually switch up the volume over a period of weeks."

Transmitter

Professor Gibson said the child's parents were relieved but still anxious and had asked not to be named.

The operation took place in the middle of Deafness Awareness Week and on Friday the bionic ear team is holding an open day at Royal Prince Alfred Hospital.

The bionic ear is implanted behind the ear and connected to a transmitter which picks up voice signals and relays them to a computer worn around the waist.

The computer converts the signals into speech patterns and transmits them through a set of electrodes to nerve endings deep within the ear.

If the implant is a success it will be hailed as a medical miracle, but for the child it will only be the beginning.

The operation is intricate but relatively simple and takes about four hours. However, training the recipient takes at least five years.

The little girl will join a training program run by the Royal NSW Institute for Deaf and Blind Children.

Head teacher, Dr Gaye Musgrave, said rehabilitation presented a considerable challenge.

"This is a person who has never learnt to listen, who has no auditory memory," she said.

"We will have to go to the beginning of language development, listening development and speech development.

"She will have to develop language the same way a baby does but at a much later stage than normal."

The Mirror Sept 15th '87

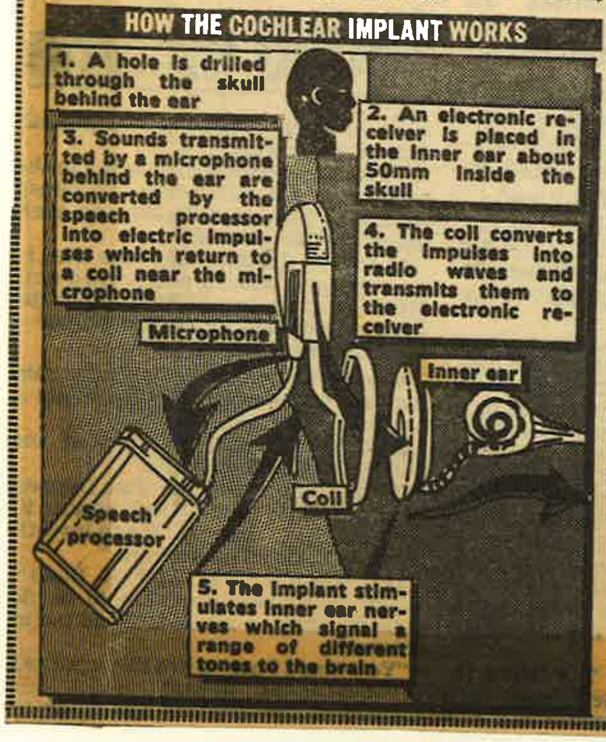
BIONIC PIA'S MAGICAL GIFT

By LISA OFFORD
and CHRIS BLACKBURN

BIONIC ear girl Pia Jeffrey heard her parents say "I love you" on her birthday today — the first words the six-year-old has heard in her life.

The miracle of sound came when doctors switched on her cochlear implant today after it was embedded deep behind her ear in an operation at Camperdown Children's Hospital a month ago.

HOW THE COCHLEAR IMPLANT WORKS



The success of the operation is a breakthrough for the pioneering technology, but for Pia it is a magical present for her sixth birthday.

"It really is the most beautiful thing to witness — it was like she had been born again," said Pia's mother Pru.

"We told her we loved her and for the first time she replied she loved us too," father John added.

"It was her sixth birthday and she heard the words 'happy birthday' for the first time."

Pia, from Artarmon, is the world's first congenitally deaf child to get the multi-channel implant — previous child recipients had all lost their hearing through accident or illness.

Electrodes

In the weeks since the delicate operation, specialists activated 22 super-sensitive electrodes embedded in her inner ear.

CUDDLE: Pia Jeffrey and mother Pru

Birthday girl hears 'I love you' for the very first time

The electrodes will be adjusted gradually to a frequency which is comfortable for Pia.

She will now have to perfect her new hearing skills and learn to identify thousands of new sounds.

Today's "switch-on" was completed by Doctor Gaye Musgrave, teacher of the deaf at the Royal NSW Institute for Deaf and Blind Children, who will teach Pia how to develop her hearing and auditory memory.

Because Pia never learned to hear or talk she will have to develop her hearing and speech the same way a baby does, and will have intensive therapy at the institute for at least the next five years.

The bionic ear is implanted behind the ear and connected to a transmitter which picks up voice signals and relays them to a computer which is worn around the waist.

The computer converts the signals into speech patterns and transmits them through a set of electrodes to nerve endings deep within the ear.

The Jeffreys are hoping that Pia's two-year-old brother Alex, also totally deaf, will also be able to have an implant.

● What the Mirror says, page 8

The Mirror Sept 18th 87

BIONIC WORDS OF LOVE

Birthday girl Pia hears for the first time

By LISA OFFORD and CHRIS BLACKBURN

BIONIC ear girl Pia Jeffrey heard her parents say "I love you" on her birthday today — the first words the six-year-old has heard in her life.

The miracle of sound came when doctors switched on her cochlear implant today after it was embedded deep behind her ear in an operation at the Camperdown Children's Hospital a month ago.

The success of the operation is a major breakthrough for the pioneering technology, but for little Pia it is a magical present for her sixth birthday.

"It really is the most beautiful thing to witness — it was like she had been born again," Pia's mother Pru said.

"We told her we loved her and for the first time she replied she loved us too," father John added.

"It was her sixth birthday and she heard the words 'happy birthday' for the first time."

Delicate

Pia, from Artarmon, is the world's first congenitally deaf child to receive the multi-channel implant — previous child bionic ear recipients had all lost their hearing through accident or illness.

In the weeks since the delicate operation, specialists activated 22 super-sensitive electrodes embedded in her inner ear.

The electrodes will be adjusted gradually to a frequency which is comfortable for Pia.

She will now have to perfect her new hearing skills.

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● What the Mirror says — page 8

CUDDLE: Bionic ear girl Pia Jeffrey and mother Pru

HOW THE COCHLEAR IMPLANT WORKS

1. A hole is drilled through the skull behind the ear

2. An electronic receiver is placed in the inner ear about 50mm inside the skull

3. Sounds transmitted by a microphone behind the ear are converted by the speech processor into electric impulses which return to a coil near the microphone

4. The coil converts the impulses into radio waves and transmits them to the electronic receiver

5. The implant stimulates inner ear nerves which signal a range of different tones to the brain

‘I love you’ — the first words plucky Pia heard

The Daily Telegraph (Sydney) - Saturday September 19, 1987.

Bionic ear opens a new world of sound

By Medical Reporter
STEPHEN ROMEI

Bionic ear recipient Pia Jeffrey hugs her brother Alex, 2, who was also born deaf — Picture: GARY GRAHAM

PLUCKY Pia Jeffrey has discovered a whole new world of sound — and her little brother Alex is set to join her in it.

Pia, 6, was the first child born deaf to receive a bionic ear and its successful switch-on this week was a medical breakthrough.

The multi-channel implant was activated on Wednesday and the first words Pia heard were “I love you” from her mother.

Now her parents John and Pru, from Artarmon, are hoping two-year-old Alex, who was also born deaf, can have the operation.

“If Pia’s works then Alex will get one,” Mr Jeffrey said.

“We have been enormously encouraged by the success of the switch-on and the outstanding progress of the other bionic-ear children.

“We have two deaf children who have to compete in the hearing world and until the bionic ear they did not have a hope.”

Electrodes

Pia was expected to cry when the device was switched on. This has been the case with other children who are frightened by the sudden noise.

And for a moment her eyes welled with tears of bewilderment but then she surprised everyone with a big smile.

“We were all quite overwhelmed,” Mr Jeffrey said.

Mrs Jeffrey said Pia had already shown outstanding progress. Seventeen of the 22 electrodes have been switched on and each is working.

“At first she was a bit shy because she was overwhelmed by so many noises,” Mrs Jeffrey said. “I don't think she knew the world had so many sounds.

“But now she runs around the house listening to the toilet flush and people having a shower.”

“We gave her some birthday presents this week and she spent hours tearing up the paper — she seems to love the sound.

“The change in her in just two days has been remarkable.”

Pia had the world-first operation at the Camperdown Children's Hospital in August and its success has exciting implications for deaf children.

Head of the bionic ear team Professor William Gibson said he hoped the device would be available to all totally deaf children.

The bionic ear is implanted behind the ear and connected to a microphone which picks up voice signals and relays them to a computer worn on the waist.

The computer converts the signals into speech patterns and sends them through a set of electrodes to nerve endings deep within the ear.

Pia will now begin an intensive rehabilitation program at the Royal NSW Institute for Deaf and Blind Children.

In sickness and in health

YEAR IN REVIEW

MEDICINE with STEPHEN ROMEI

A YEAR of achievement in medicine ended on a high note with Sydney surgeons performing the 100th heart transplant operation in Australia yesterday.

Melbourne man Kurt Schutze is recovering in St Vincent's Hospital after the life-saving operation. The surgical team, led by Dr Victor Chang, had performed the 99th heart transplant on an unnamed Sydney man 12 hours earlier.

The same afternoon, John Robilliard, 46, who had a heart-lung transplant in June, held his first press conference.

It was indicative of a year when Australian doctors and scientists notched-up several firsts. In August, six-year-old Pia Jeffrey made medical history when her bionic ear was successfully switched-on.

Pia, of Artarmon, was the first child born deaf to receive the multi-channel cochlear implant.

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Wollongong teenager Amanda Plant handled a press conference with new-found confidence after her severely curved spine was corrected in a pioneering operation at the Prince of Wales Children's Hospital.

But Sydney's Siamese twins, Peter and Brendan Uren, were not so lucky. They died at home on August 12, eleven weeks after their birth at Camperdown Children's Hospital.

Their mother Karen, 20, revealed she and husband Brett were expecting another child. Pediatric surgeon Hugh Martin said her chances of having siamese twins again were no higher than the first time (about 250,000 to 1).

A year of industrial turmoil ended with doctors sounding a warning that the worst is still to come.

The Australian Medical Association has called for a government inquiry into the public health system. Warwick Stening, president of the NSW branch, put it bluntly when he said patients were dying who should have lived.

Health Minister Peter Anderson, who denied the existence of waiting lists in public hospitals, later admitted he was wrong.

Unprecedented industrial action by rural doctors has also left a big question mark over the future of medical services in country areas.

The Rural Doctors Association claims 321 of NSW's 568 small-town general practicioners have resigned from public hospitals.

The walkouts began on November 10 and the doctors, who want financial parity with their city colleagues, have threatened to quit rural medicine altogether.

In November, angry resident medical officers took to the streets in an escalation of their dispute with the Government over accident insurance.

With public health in crisis, Dr Stening warned the Government that the AMA not tolerate "doctor bashing".

The Government's plan to deinstitutionalise mental health care, in line with the recommendations of the 1983 Richmond report, also drew a lot of flack.

The controversial move, being watched with interest by other States, has been criticised by psychiatrists and others who work with mental patients.

Good news story: Pia Jeffrey received a bionic ear

In August, former rebel surgeon Bruce Shepherd launched a stinging attack on the standard of nursing education in NSW.

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Dr Shepherd, president-elect of the NSW branch of the AMA, said the switch from hospital-based to college-based training had been a disaster.

In an interview with *The Daily Telegraph*, Dr Shepherd broadened his attack, branding the Government's favorable health statistics as rubbish.

His comments raised the hackles of nurses and Mr Anderson, who angrily defended the public hospital system.

It was the year AIDS turned five in Australia. At the end of November, 622 Australians had contracted the disease.

It has been estimated that, in the absence of a cure, that number will reach 100,000 by 1997.

Melbourne biochemical firm Rancoo Ltd generated much excitement — and more than doubled the price of its shares — in October when it announced the development of an anti-AIDS vaccine.

The vaccine, now being tested on animals, was developed by researchers at the Australian National University in Canberra.

The anti-viral drug AZT remains the best chance people with AIDS have. It has been proven to both prolong and improve the quality of their lives.

But the cost of AZT — $10,000 a patient a year — led the State Government to restrict treatment to 20 new patients a month.

This resulted in a protest outside Parliament House in November and Mr Anderson scrapped the quota program.

The National Advisory Committee on AIDS stepped up its public education campaign after the success of the controversial Grim Reaper television commercial in April.

The troubled year also had its lighter side. A report on the health of NSW parliamentarians and senior public servants found most were overweight.

The media dragged out the "roly-pollies" and "fat cats" jokes and our chubby Health Minister admitted he was not employed to be a role model.

Australian medical researchers announced the world's first set of guidelines on gene therapy set at the 104th session of the National Health and Medical Research Council in Canberra in November.

The Medical Ethics Committee banned genetic manipulation of reproductive cells which, if feasible, might be used to create a gentically perfect "super-race".

But it endorsed, under strict conditions, research into the genetic manipulation of non-reproductive cells.

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The council also ended a 20-year debate when it endorsed the addition of thiamine (vitamin B1) to beer and cask and flagon wines. The move aims to prevent the onset of Wernicke encephalopathy, a disorder common in alcholics.

In December, allegations of scientific fraud were levelled at eminent Australian scientist William McBride, who pioneered research that linked thalidomide to birth defects. Dr McBride has denied the allegations.

Triumph, turmoil as 1987 ends

For Pia's birthday, a medical miracle

In a historic operation a small deaf girl received a bionic ear implant and heard, for the very first time in her life, her mother say "Pia, I love you"

Pia's big day. Some final adjustments to the implant . . . anticipation turns to joy as Pia discovers the world of sound.

PIA JEFFREY looked up from the flashing lights of the computer board. Her tiny hands clenched and unclenched as she looked expectantly at her parents, Prue and John Jeffrey.

"Pia, Pia, I love you," Prue said, anxiously waiting for a response.

"Yes, Pia, we love you," John said, clasping Pia's hand.

A tear ran down Pia's cheek as she listened, for the first time, to the sound of her mother and father speaking.

"Can you hear anything?" Prue asked. "Can you hear something inside your head?"

Pia nodded, overwhelmed by the soft flood of sound. She raised her hands in astonishment, gesturing first to the computer and its operator, Dr Gaye Musgrave, then to the microphone behind her ear which duplicates the role her own body cannot fulfil.

Kitty, Pia's nine-year-old sister, leaned close from across the table and said gently: "Pia, I want you to know that all my Christmas pudding wishes have come at once."

Pia's wishes have come true, too. Until now she has communicated with her family only through lip-reading, but when she heard her mother say "I love you" for the first time, a door opened on a new world — a world filled with sound and wonder.

Six-year-old Pia was born deaf. She is the world's first congenitally deaf child to receive a bionic ear implant, and can hear most of the sounds until now denied her.

Pia's 22-channel implant was activated in Sydney by Dr Musgrave on September 16, a few days before Pia's sixth birthday. The gift of hearing was the best present she could hope for.

Although the implant program is still in its experimental stages, success with Pia could lead the way for thousands of deaf people throughout the world, providing them with a means of hearing.

But perhaps the most immediate and moving result of the switch-on is the joy it has given to Pia and her family. Her parents, Prue and John, of Artarmon, a northern Sydney suburb, waited four years in the hope their daughter might one day hear through such an implant.

When that day came, it produced a wave of emotion they still find hard to express. "Words cannot do justice to how we felt when we knew Pia could hear us," Prue said. "In a way it was like giving birth all over again. One of our most treasured memories will be the look of wonder on Pia's face — that is something that will stay with us for the rest of our lives."

Pia's implant was embedded deep behind the ear, about 5cm inside the skull, in a delicate operation at Sydney's Camperdown Children's Hospital nearly two months ago. The surgical team, headed by Professor William Gibson of Sydney University, placed a tiny electronic receiver in the inner ear which stimulates nerve endings that send messages to the brain.

Sounds are collected by a microphone placed behind Pia's outer ear,

Pia with Prue, brother Alex and John.

For Pia, every sound — from dogs barking to traffic — is a new experience.

converted to electric impulses by a speech processor worn around her waist and then sent via a magnetic coil to the inner-ear receiver.

Prue and John first heard about the implant program when Pia was two. They were told that because Pia was born deaf, she was not suitable for an implant.

"Until then, no-one had considered using the implant on a congenitally deaf child," John said. "Every other child who has received an implant has lost their hearing either through illness or accident.

"It wasn't until December last year that an implant really became a possibility for Pia."

Dr Musgrave, who performed Pia's switch-on, introduced Pia to a select group of young people who had either received the implant or were soon to receive it. Pia met and worked with two children — Holly McDonell, 5, and Joseph Silipo, 9, who underwent the implant surgery shortly before her own operation.

The operation, though delicate, was a complete success. Pia was released from hospital within a few days, ready to start the fine tuning the implant requires before it is activated.

"I don't think I have ever been as nervous as the day of Pia's switch-on," Prue said. "It was the day that we had all hoped for. All we could do was wait and hope that it worked successfully.

"John, I and Pia's older sister Kitty sat beside Dr Musgrave as she prepared the computer. When it came and I knew she could hear us saying, 'We love you', it was all I could do to keep from crying."

Pia's initial reaction was one of shock, but her expression quickly changed to one of joy. She was able to respond to her family's voices for the first time. And as soon as the switch-on was complete, Pia and Kitty set out on a tour of discovery, listening to as many new sounds as possible. Running water, dogs barking, nearby traffic — each held a new and distinctive sound.

"As soon as Pia wakes in the morning, she puts on her speech processor and sits in bed listening to the sound of her own voice," Prue said. "Every day she comes across a sound that she hasn't heard, and learns what makes the sound. Her reactions are still full of the same wonder she had in the computer room.

"Listening to the toilet flush has become quite an experience for her, and the first time she heard the shower running she just lit up. I think the most satisfying thing is that we can see her making the connections between sounds and objects."

The sounds Pia hears through her implant are not the same as those captured by a normal ear. According to Dr Musgrave, the sounds are "robotic". Or, as another child put it, like "listening to Donald Duck underwater".

Dr Musgrave will continue to work with Pia, developing her speech and language skills. "Pia's brain has to develop the function of remembering sounds and language," she said.

Pia's development during the next few years will determine whether the implant has been a complete success. If so, it will offer even more hope to the Jeffrey family. Their youngest child, Alex, 2, was also born deaf and if Pia's progress is a success, Prue and John will consider asking for another implant, which costs $13,000 without the cost of surgery or rehabilitation.

"We have never lost sight of the fact that the implant is not a cure for deafness," John said. "It is an invaluable aid for those who might not otherwise have the chance to communicate.

"Before we made the decision about Pia, we considered it very carefully. She had to undergo many tests to make sure she was suitable for the implant. If the time comes when we think Alex might benefit from an implant, then we will have to consider that situation just as carefully."

Pia has heard her mother and father say, "I love you". Perhaps Alex will one day hear the same words. WD

Story: Michael Sheather
Pictures: Tony Gunn

THE CHILDREN'S MULTICHANNEL

Cochlear Implant Programme in N.S.W.

Several totally deaf children in N.S.W. have this year received multichannel cochlear implants in a new programme sponsored by Sydney University and supported by The Royal New South Wales Institute for Deaf and Blind Children. This programme has created a great deal of interest as it is an important development in the field of aural rehabilitation.

What is a Cochlear Implant?

A cochlear implant is a device that stimulates the nerve endings in the inner ear to create hearing sensations. Although the sounds are not like normal hearing, they provide implantees with a great deal of help for understanding speech. The device is implanted inside the cochlear in a delicate operation that takes approximately 4 hours. Professor William Gibson heads the surgical team that performs this operation. Sounds are collected by a microphone that looks like a conventional hearing aid worn behind the ear. The sounds are converted to electrical impulses by a speech processor worn around the waist and then sent via a magnetic coil to the inner ear receiver. Multiple channel implants have only recently become available for children with the production of a miniaturised implant device.

Who can benefit?

Cochlear implants are suitable for children who receive NO benefit from the most powerful hearing aids. Implant candidates, therefore, are either totally or near totally deaf.

Holly McDonnell was the first child in N.S.W. who received an implant. She was 4 years old when she became totally deaf from mengingitis in October, 1986. Eight months later she underwent the implant operation at The Children's Hospital, Camperdown. Holly has been using the implant for 3 months at this stage, and she has made remarkable progress in that time. She is now able to understand speech entirely through hearing, and does not need to depend on lipreading. Next year, she will be a pupil at Mona Vale Infants School where she will be fully integrated into a Kindergarten Class.

This is also the case with the second child who received an implant. Joseph Silipo became totally deaf at 3 years 9 months of age from meningitis. He was almost 10 when he received the implant, and therefore was totally deaf for a much longer period than Holly. However, Joseph also understands speech entirely through hearing and has completely intelligible speech. He will be fully integrated into a 5th grade class at Chatswood Primary School next year.

A third postlingually deaf child, Alison Vary, has recently been implanted and the 'switch on' only just completed. She lost her hearing 10 months ago from meningitis when she was 4 years of age. It is too early to discuss her progress, though she is certainly beginning to respond well to the new sound sensations.

Pia Jeffrey was the first congenitally deaf child in the world to receive a multichannel implant. Her case created enormous interest as it was the culmination of the work that was begun by Professor Graeme Clark at Melbourne University 20 years ago. Professor Clark, who is the inventor of the Nucleus implant, developed the device with the intention of helping congenitally deaf children. Pia will now learn to listen, to talk and to communicate with the aid of the implant, and her progress will be closely monitored. Dr. Gaye Nicholls Musgrave, who is employed by The Royal New South Wales Institute for Deaf and Blind Children, will be carrying out this work. Though Pia's verbal skills are quite delayed at this point, she has the next 6 years in which her brain has plasticity to adapt to the new stimulus of sound.

At present, mainly children who have become totally deaf after they had acquired some language are being considered for a cochlear implant. Pia is the one exception. These children will be studied intensively to discover what they obtain from the implant. They will be given intensive therapy by Dr. Nicholls Musgrave to ensure that they gain maximum possible benefit from the device.

Australia is at the forefront in this area of medical research and the Sydney University implant team is providing leadership in the important area of rehabilitation. The role of the Institute is therefore crucial to the success of the programme.

▲ Recipients of the Cochlear Implant. From left to right. Pia Jeffery, David Suttari, Joseph Silipo, Holly McDonell and Wendy McLean. Courtesy John Fairfax & Sons Ltd.