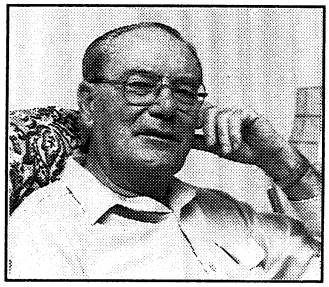

When I Think Back...

by Neville Williams

Murray Stevenson - 2: A self-educated student who became a leading electronics engineer

Entering the industry at a time when there were few if any academic training courses in basic 'wireless', Murray Stevenson went on to become President and a 'Fellow' of the Institution of Radio Engineers and Honorary Editor of their professional *Proceedings*. He was also a respected member of the American IRE and a Fellow of the SMPTE (Society of Motion Picture and Television Engineers).

Having become aware of the Stevenson clan in the early 1930's, per medium of 'Radio House', I was again confronted with their activities some years later when I joined the staff of this magazine.

In 1934, in the absence of a direct radio link, 2UE had set up — in competition with the ABC — to simulate live test cricket broadcasts from England. This was in co-operation with Associated Newspapers Ltd, with whom they had developed close business ties.

For the purpose, Murray Stevenson installed and equipped a small studio on the thirteenth floor of the then imposing *Sun* building, near the corner of Elizabeth St and Martin Place. Built from caneite over a timber frame, the studio was furnished with comfortably padded chairs around a large wooden table, plus a couple of transverse current mics, two low voltage DC-powered 78rpm turntables with slipping clutch drives and two Marconiphone studio type phono pickups. On match days, overseas despatches describing the progress of play were received in rapid succession through the newspaper's cable facilities and delivered directly to the studio by a team of copy boys.

In the studio, a couple of sports announcers, one of whom Murray remembers only as 'Captain', translated this basic information into an impromptu running commentary, interspersed with relevant small talk. As they did so, a pencil tapped on the table doubled for the sound of ball on bat, while turntable operators maintained a suitably atmospheric background of recorded crowd noise.

Looking back, I can vaguely remember listening to these 'phantom' broadcasts but while we knew they were contrived, they still provided compulsive listening — hours ahead of the daily papers.

When I joined the magazine in December 1941, I found myself working in the same building one floor below the old studio — now unused and deserted — but with the turntables, pickups and one microphone still in place. It fell to my lot to dismantle them, some years later, when the studio was re-fitted to serve as the nerve centre of the *Sun*'s mobile radio news-gathering venture.

I stored them at home until they posed a space problem, at which point they were passed over to the Sound & Film Archive in Canberra, where they presumably still are.

Incidentally, I was reminded by the *B&T* magazine liftout mentioned last month, that 2UE did another widely publicised phantom broadcast in 1946 — the Vic Patrick/Tommy Burns welterweight championship fight in the old Sydney Stadium.

A rigger's rigours

In the late 1930's, with radio stations competing vigorously for audience share, 2UE management decided that the station needed a more powerful signal. However attractive Lilli Pilli might once have been for a small family station, the terrain was unsuitable and, being on the south-eastern fringe of the city, a large sector of the coverage was being wasted anyway, on adjacent bushland and the rolling blue Pacific.

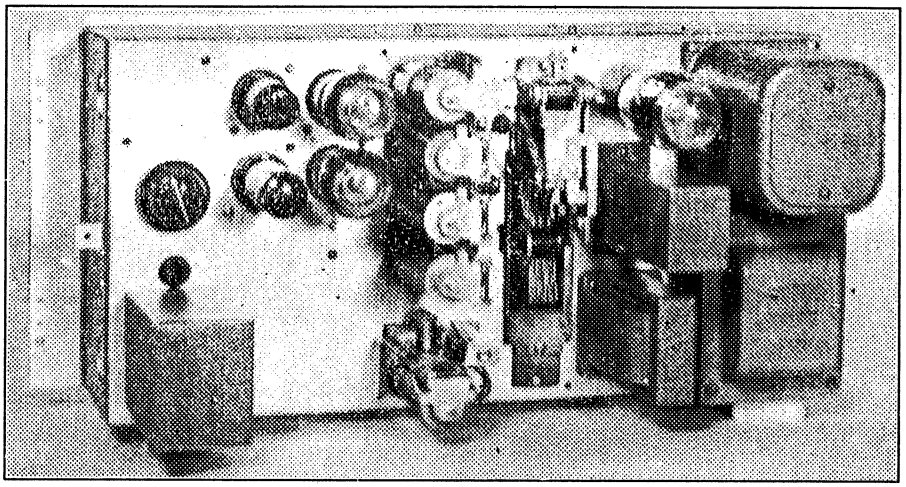

Fig.1: The automatic monitor for standard time signals installed in the late 1930's by 2UE technical staff under the supervision of Murray Stevenson.

The logical course was to invest in a new transmitter and set it up with a vertical 'quarter-wave' mast, on the moist river flats near Concord — then roughly the geographical centre of the Sydney area. Vertical masts were reputed to concentrate more of the radiation field in a 360° ground wave, thereby improving regional coverage.

With the mast resting on insulators, the signal could logically be 'series fed' between the bottom of the antenna and ground. From overseas literature, however, Murray had reason to believe that that 'shunt feed' was quite practicable, with the signal drive tapped part way up a mast that was earthed at the bottom. It sounded like a better idea, if only as a protective measure in the event of a lightning strike.

Playing it safe, Murray said that he specified a slender, self- supported tapered tower, something over 200ft tall, with four legs forming a 10ft (3m) square, each resting on a large insulator. By bridging each one with an earth strap, he could have a fully earthed, shunt-fed tower. If it didn't come up to expectations, he could simply remove the straps and revert to conventional series feed!

As he said: "To short out four insulators would be easy. To install insulators after the tower had been erected would have been a very different matter"!

In July 1939, Murray and his technical off-siders had to set up and adjust the transmitter/tower feed — a job which could only be done late at night after the existing 2UE transmitter had been turned off, thereby clearing the channel.

So it was that, on a bitterly cold winter's evening, they assembled the appropriate lights, tools and instruments at the foot of the new mast, plus a fire in a 40-gallon drum with enough wood and coke to provide at least an illusion of warmth.

Around midnight, when 2UE closed down, someone had to climb the ladder to select the cable feedpoint for an optimum impedance match, while the others tended the instruments.

In the absence of volunteers, Murray had to climb the ladder himself, only to realise that a South Australian station was still on air and pumping enough energy into the new mast to upset the instrument readings. "So", said Murray, "The Chief Engineer had to fiddle and freeze 80ft (25m) above the ground, while the other so-and-sos crouched around the fire!"

The new mast worked fine, he said. But a few weeks later, army sappers appeared on the site with instructions to attach explosive charges to the legs of the mast. If Australia was invaded, they certainly didn't want the enemy to be provided with viable broadcasting stations.

"Fortunately, the military didn't need to press the button and the mast remained intact until it was subsequently replaced by a much taller one of uniform cross-section, on a site large enough to permit the use of guy wires."

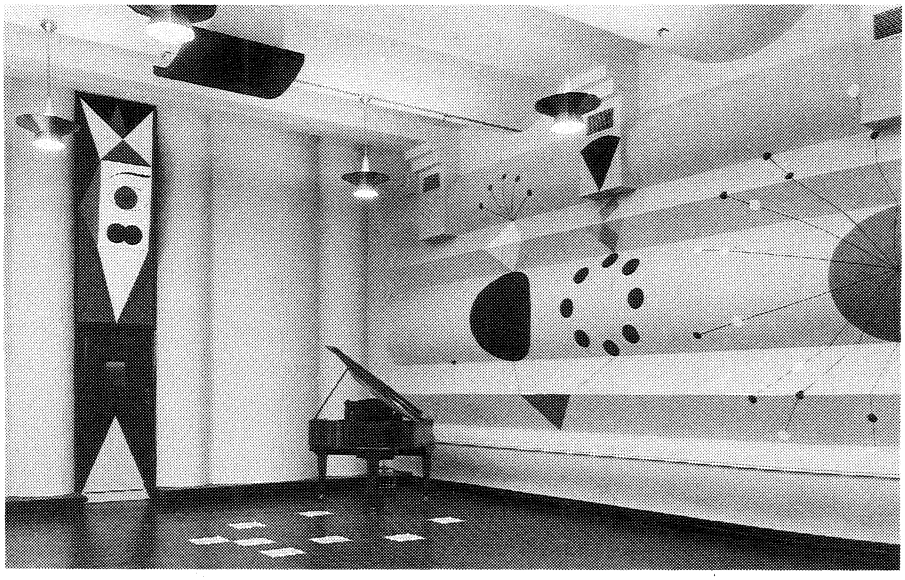

Fig.2: An original photo of 2UE's acoustically 'live' studio, designed by Murray Stevenson. Hard, non-plane, non-parallel surfaces reflected sound without setting up sustained spatial oscillation modes.

Having a good time

As radio stations grew larger, busier and more involved in programme production and distribution, accurate time — and timing — became progressively more critical.

In the era before 'quartz' technology took over, 2UE relied on mains-synchronised clocks, checked each hour on the hour against standard format time signals available on-line from the Sydney Observatory.

In 1937, with the consent of the Observatory, 2UE decided to broadcast the time signals, foreshortened — for convenience — to warning pulses at 30, 20 and 10 seconds to each hour. At five seconds to, a sequence of six brief pulses one second apart registered 5, 4, 3, 2, 1 and 0 — the last indicating the exact 'o'clock'.

An article in the October 1939 issue of this magazine (then *Radio & Hobbies*) told how Murray and his off-siders had devised an automatic monitor that would sense all pulses on the Observatory line — spurious or otherwise — but respond only to one that was followed by two other pulses at 10-second intervals.

Thus activated and anticipating a succession of six timing pulses, the monitor would automatically superimpose equivalent tone 'pips' from an in-built audio oscillator directly on the signal line to the transmitter, thereby giving station personnel and listeners alike hourly access to standard time signals.

Supplementary circuitry would also flash indicator lights to warn announcers and panel operators that a time signal was coming up, as well as displaying a fault signal for the duty technician if it sensed an apparent malfunction.

In modern technology such a device would probably involve a few transistors and/or ICs on a printed circuit board. In 1939 it called for something equivalent in size and weight to an old-time hifi amplifier, but styled to mount in a 19-inch (480mm) equipment rack. As pictured in Fig.1, space on the chassis was taken up by valves, transformers, filter components, PMG relays and a stepping switch! What follows is a precis of the original explanatory text:

Two of the relays are associated with time delay circuits using gas discharge tubes to provide delays of nine and 11 seconds respectively.

The first pulse, 30 seconds before the hour, operates the line switch which steps from position 1 to position 3, activating a power supply and setting in operation the nine and 11-second time delay circuits. Since the next pulse comes 10 seconds later, i.e. 20 seconds to the hour, it is obvious that it will fall between the operation of the two time-delayed relays.

The circuit is so arranged that, unless the succeeding pulses occur within the limits set by these relays, no further rotation of the line switch will take place.

If a second pulse arrives at the right time, however, it will restart the time delay circuits from zero, preparing for the next pulse at 10 seconds to the hour.

This, too, will operate the line switch, causing another relay to be brought into circuit which responds directly to the Observatory pulses, thereby applying the six resulting pips to the studio equipment as a time signal.

After the last pulse, the 11 second relay is allowed to function, resetting the rotary switch to standby and interrupting the power supply.

Though bulky and clumsy by modern standards, according to Murray, the system worked fine until wartime overload of the power stations made it impossible for the supply authorities to avoid frequency and voltage variations.

As a result, synchronous clocks often slowed during the day and picked up again at night, being out of step with the time signals for much of the time.

2UE got around the resulting confusion only when Murray discovered that AWA could supply a low power crystal-locked AC power supply, sufficient to run the station's synchronous clocks. It, too, was large and expensive but it did the job.

A rival Sydney station sought to get out of the same kind of trouble by relying on master/slave clocks and using them to trigger their own simulated time signal. The authorities were not impressed, however, pointing out that standard time signals provided a reference for navigation purposes and the broadcasting of makeshift signals could lead to confusion and hazardous errors.

Murray the hifi buff

If the foregoing seems to imply that Murray Stevenson was concerned purely with medium-wave, medium-fi broadcasting, such was certainly not the case.

Throughout the 1930's, a bevy of mainly British audio buffs had been 'stirring the hifi pot' with sometimes controversial articles, brochures, books and products. One of their number, Gilbert Briggs of Wharfedale, listed more than 60 of them in his book *Audio Biographies* (1961) including W.A. Chislett, N.H. Crowhurst, 'Free Grid', A.C. Haddy, S. Kelly, P.W. Klipsch, G.W. Tillett, P.J. Walker and P. Wilson.

If one may mix a couple of metaphors, their assorted creeds spread like a scrubfire to the Australian scene, such that audio topics featured large in the technical press and dominated much of the everyday conversation between local hifi aficionados.

Murray Stevenson was very much a part of this scene, except that he was more conscious than most that the considerations in broadcast and recording studios differed greatly from those in private lounge rooms.

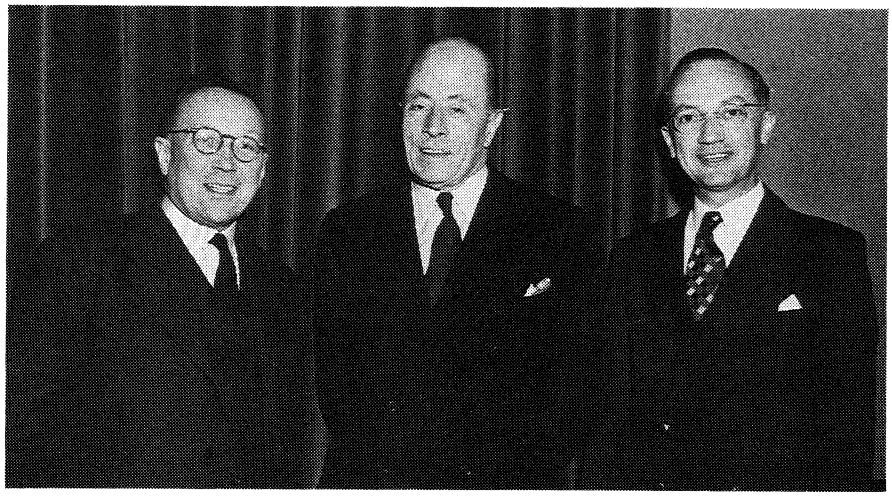

Fig.3: At the IRE (USA) Engineering Convention, New York 1951. Left to right are Sir Robert Watson Watt (UK), Sir Ernest Fisk (Aust) and Murray Stevenson, Past President of the IRE (Aust).

Far from being accepted, many of the ideas, techniques and products being passionately debated by hifi 'cultists' were, in fact, seriously questioned by many audio/studio professionals.

In practical terms, working under pressure, announcers and panel operators could simply not be expected to fuss around with gimmicky gadgets or frail super-dooper phono decks. While conceding the importance of sound quality, everyday reliability was considered more important than the obscure, ultra-subtle 'musicalities' often targetted by the 'golden-ear' brigade.

Over the years, 2UE had itself installed most impressive recording facilities for in-house and network production, including both top quality tape machines and microgroove disc mastering using thennew heated styli. Over and above this direct involvement with 2UE, Murray was also a consultant to the Australian Record Company, from 1936 to 1944 and a director from 1940 to 1944.

Radically new studio

Perhaps Murray Stevenson's most notable personal contribution to this general field was a sound studio designed and installed by 2UE in 1952.

To that point in time, most studios had been routinely lined with celotex, caneite, heavy drapes and thick carpet — all intended to prevent the original sound from being obscured by studio echoes.

Tests and observations, however, indicated that the absorption of such damping materials was selective, increasing with rising frequency. As a result, musical performances lost much of their top-end 'sparkle' — an effect that became ever more frustrating with pro- gressive improvements in sound reproducing systems.

In a complete break from tradition, Murray came up with a studio which was largely devoid of absorbent surfaces (Fig.2). Instead, the walls and ceiling were of firmly braced masonite broken up by triangular and partially spherical ridges. As well, the studio was of non- rectangular shape and of deliberately diverse dimensions.

The idea was that sound would be reflected rather than absorbed, but so dispersed by the irregular surfaces, that it would not set up sustained spatial oscillation modes. High frequency 'sparkle' would thereby be preserved and low frequency energy modes dissipated, more effectively than by practical absorbent treatment.

Murray says that his expectations were justified by observations and tests, with sound balance markedly more natural. In fact, some years later, when installing a large video recording studio for Sydney's TV Channel 7, exactly the same principles were applied to good effect.

Sound film technology

As it happened, Murray was also well informed on the subject of sound

picture technology — perhaps by good fortune.

The early link between 2UE and Associated Newspapers Ltd brought him into contact with the managerial Denison family, and an entrepreneur by the name of Fred Daniels.

They, in turn, had been toying with the idea of producing Australian feature films, taking advantage of the old Pagewood film studios.

There would be no problem in obtaining the necessary sound cameras and other associated equipment, but they were unsure about obscure production techniques which might conceivably spell the difference between success and failure.

The answer? Send Chief Engineer Murray Stevenson to America to see how it was done, and take note of 'tricks of the trade' that might otherwise have had to be discovered the hard way. So it was that, during 1938, Murray found himself to-and-froing across the Pacific in the *Mariposa* and the *Monterey* at Company expense, with his mind focussed on sound motion pictures.

In the process, he did the rounds of the Hollywood studios and was invited to 'sit in' on the production of a typical film, where he was able to monitor the whole procedure.

From there, he visited Chicago, Western Electric, RCA and the SMPTE (Society of Motion Picture & Television Engineers). The SMPTE made him especially welcome and arranged membership on the spot.

Nothing came of the Pagewood proposition, but Murray maintained his connection with the SMPTE and regularly digested the contents of their journal. In due course, he was made a Fellow of the Society and was a founding member of their Australian branch.

Looking back on those days, I well remember that, if anyone needed to clear up a point about film technology, one obvious recourse was to "give Murray a ring"!

IRE/IREE association

For me, contact with Murray Stevenson was most frequently through the IRE (Aust) — later the IREE (Aust) — where he built up an outstanding record of voluntary service.

As Chief Engineer of 2UE, he became a corporate member of the IRE in May 1934, at a time when the IRE itself was very young.

In 1940 he was elected to the (national) Council, the IRE's governing body, and remained a councillor for the next 34 years, by election or ex-officio. For extra measure, he served as Chairman and Honorary Secretary of the Sydney Division for terms during the 1940s.

Murray became Vice President of the IRE (Aust) during 1946/47, Senior Vice-President 1947/48 and President 1948/49. He also served on a number of IRE/IREE (Aust) committees and boards until 1981, notably: Publications Board 1948-78; Qualifications Board and Education Board 1936-49; Education 1961- 70.

It was on the Publications Board that I got to know Murray best, at a time when he was also acting as Hon. Editor of the IRE (Aust) *Proceedings*.

To be sure, papers submitted for publication were scrutinised by independent referees for both expert and broad content and appeal, but it often fell to Murray as Editor sort out differences in perception between authors and reviewers, finalise the contents of each issue and check the layout and presentation of each article.

In a recent conversation, Murray told me how, during one of his visits to the USA, he had a session with Dr Alfred N. Goldsmith of the American Institute. When he confided to Dr Goldsmith that he found the role of Honorary Editor something of a burden, on top of his other duties, Dr Goldsmith indicated that, as Editor of the American *Proceedings*, he understood the problem only too well.

He went on to offer publication rights to all original papers in the American journal to its Australian counterpart, requiring only that the source and authors be formally acknowledged.

He further suggested that the IRE (Aust) respond by granting the IRE (USA) reciprocal access to Australian papers. Murray was only too happy to agree.

Looking back to my own experience on the Publications Board, I can recall many occasions when hassles over a local paper created a 'hole' in an up-coming issue, which we were only too glad to fill with an American paper that someone had found interesting and appropriate for local consumption...

During one American visit, Murray was requested by the IRE (Aust) President and Council to represent the Institution at the IRE (USA) Radio Engineering Convention, New York, during February/March 1951. Sir Ernest Fisk would also be present (Fig.3).

Said Murray: "What I saw when I walked into the Convention, and what I still vividly recall forty years later, was the Australian flag at the very top of the IRE motif, sharing pride of place with the Stars and Stripes!"

And there we must leave Murray for the present. Next month, we tell how he had to enlarge his technical horizons to embrace the establishment of a major television station and film/video production centre.

(To be continued) ❖

Fig.4: Raymond F. Guy, President of the IRE (USA) welcomes delegates to the 1951 New York Convention, framed by a huge replica of the Institute's motif. Sharing pride of place at the very top with the Stars and Stripes was the Australian flag.