# Tinkering in the Machine Room

In the humming corridors of New Zealand's universities during the 1960s and 70s, computing wasn't just a matter of flipping switches and running code — it was an act of invention, adaptation, and the occasional stretch on a stretcher beside a clattering card reader.

## Card Decks and Night Shifts: Life with the IBM 1620

At the University of Auckland, the IBM 1620 was a coveted resource — the sole computer on campus, rationed via a booking book. Graduate students often claimed the "graveyard shift," sleeping in the Old Chemistry building on stretchers while their programs churned away in binary silence. But silence could be deceptive. What if the computer stopped?

Brian Hicks and Murray Johns, both from Physics, engineered a solution: a "computer watcher." Using photocells taped over the 1620's indicator lights — specifically "Read No Feed" and "Check Stop" — the device would ring a bell to wake the dozing student whenever the machine failed. It was a homegrown guardian angel for batch jobs. Kiwi computing at its finest.

The machine itself was temperamental at times. On one occasion, it began vibrating ominously. Roger Barclay, a young IBM engineer, was called in. His diagnosis: a mouse had crawled into the fan and died, throwing off the balance. The fix? De-mousing the fan.

## The 1130: More Than IBM Bargained For

The arrival of the IBM 1130 introduced a new era of experimentation. Originally a modest system with 8k of storage, the 1130 at Auckland was transformed into a hub of student innovation and technical tinkering.

Brian Hicks added a 1440 chain printer via a Storage Access Channel (SAC), while Peter Fenwick created a custom floating-point arithmetic unit. Unfortunately, the design relied on 8-input OR gates — cheap, but plagued by leakage currents that made results unpredictable. Nevil Brownlee, who became Computer Manager in 1970, eventually retired the unit.

But the real triumph was software: Murray Johns reworked IBM's operating system to provide faster integer-only operations — up to ten times faster than floating-point. This meant users who didn't need decimals could fly through their workloads. Meanwhile, Nevil built a real-time clock for the machine, which later found its way to Massey University.

At Waikato, however, the same model remained pristine. "No tinkerers," Roger Barclay recalled with a smile.

## DataBank and the Mainframe Era

While universities were building and breaking things, IBM was shaping the commercial landscape. In 1966, two System/360 Model 30s were installed for BNZ — one in Wellington, the other in Auckland — to support a new cooperative banking effort: DataBank. These systems were modest by today's standards: 16k ferrite-core memory and five tape drives, one reserved just for the operating system.

The system evolved rapidly. Tape drives gave way to 2311 and 2314 disk drives; 1419 MICR cheque readers sorted 1,600 cheques per minute; and by 1969, DataBank had grown to six centres across the country, running on 360/40s with 128k of memory.

## Burroughs, Bureaucracy, and the B6700

In the early 1970s, the University Grants Committee standardised university computing around the Burroughs B6700. Auckland, Massey, Victoria, Canterbury, and Otago each received one. Waikato, perhaps too new or too small at the time, was given a Remote Job Entry (RJE) station, sending punch card jobs north and printing results locally.

The B6700 became beloved in some circles. When Auckland's was decommissioned, engineers offered to dump it. Staff were invited to scavenge: memory planes became mementos, and disk platters became coffee tables. Canterbury kept the MDF status display showing "The Big B." and wired it into their home-made equipment.

Nevil Brownlee edited the Journal for Users of the B6700 — the "JUB" — a passionate and slightly nerdy digest for aficionados of the machine.

## Before Silicon: SILLIAC and the Stackless Stack

Not all stories began with IBM or Burroughs. Back in 1956, John Butcher — later an Auckland mathematics professor — was the second person ever to run a program on the SILLIAC, an Australian-built version of the ILLIAC. He used it to model cosmic ray showers, and in doing so, independently invented what we'd now recognise as a stack, although he didn't know the term.

His efficient method of managing memory — using energy conservation to reduce space to log2 of the size of a shower — reflects the creativity that was needed when computers had far less memory than today's smart watches.

## A Language of Our Own

And then there was SMALL — the "Small Machine Algol-Like Language." Developed within Auckland's Computer Science department under Nevil Brownlee's leadership, SMALL offered a structured, elegant language suited to teaching compiler construction. It even became part of internal debates over what language to teach to non-specialists. BASIC, proposed by some, was deemed too crude — and reportedly banned in Austria by a professor from the University of Vienna!

## A Culture of Curious Minds

From stretchers in corridors to photocell alarms, from floating-point units held together with logic gates to mouse-based diagnostic adventures, early computing in New Zealand wasn't about blinking lights and dry specifications — it was about people. Curious, restless, deeply practical people, with a streak of Kiwi ingenuity that could make an international machine dance to a local tune.

Today, some machines live mostly in memory, with only a few parts saved as souvenirs — a disk platter repurposed as a coffee table, a status panel turned art piece — but their legacy runs deeper. A lucky few, like Waikato's IBM 1130 and Auckland's IBM 1620, escaped the skip and now reside in the Bob Doran Museum of Computing. The spirit of "tinkering" shaped not only the careers of those involved, but the computing landscape of a nation just beginning to code its future.