

The Compton Electrone

By John Harvey

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John Compton was born in Leicestershire in 1865. He worked for Brindley and Foster before setting up on his own in 1902. He moved to Chiswick in 1902 and eventually built his own factory in Willesden in 1930. Initially building traditional pipe organs, he subsequently installed hundreds of cinema organs in the UK, of which the most notable is the large five manual example still in use at the Odeon Cinema, Leicester Square, as well as many fine church and concert organs.

In 1938 he launched the Compton Electrone, an electronic organ based on the pioneering electrostatic tonewheel technology developed by Leslie Bourn in the 1920s and already used in his Melotone unit (a synthetic solo voice added to theatre pipe organs).

Interestingly he was arrested on the island of Capri in June 1940, where he had been, perhaps unwisely at that time, on holiday (Italy entered the war on 10 June). He was interned as an enemy alien but apparently spent much of his time restoring pipe organs despite being in his seventies.

After the war Compton produced the Electrone, a two-manual church specification with twelve electrostatic disks, one for each semitone of the chromatic scale, housed in the console. This was further developed throughout the 1950s, with later models featuring pistons and couplers. Custom three manual versions were occasionally built, for example the Royal Festival Hall and the BBC Maida Vale Studios.

Compton died in 1957 and the business was wound up around 1965. The pipe organ department was sold to Rushworth and Dreaper, while the electronic department became Makin Organs.

While Compton built some impressive horseshoe consoles for the larger instruments, the standard postwar Electrone featured a relatively compact rolltop console design with genuine ivory keys that remained unchanged throughout its life and was still being used in the 1980s by Makins (by then with digital electronics). Indeed the well-made consoles were sought after for many years as the basis of a more modern electronic organ, replacing the original electronics with analogue or digital solid state tone generators.



The tone wheel technology

Synthesising audio tones in the 1930s was no easy task. While it could theoretically have been possible to do the job with valve oscillators, as Walt Disney did in *Fantasia*, the number required for an organ (approaching one hundred), space, heat generation, unreliability and cost would have been quite prohibitive.

However, hitting on the core characteristic of a capacitor, that at constant charge the voltage across its plates is inversely proportional to the plate area, it was both practicable and economic to construct tone generators based on this principle.

The sound was produced by the rotation of a disk with a number of etched waveforms in close proximity to a stationary plate; the variation of capacitance as the disk rotates generating the wave which is fed into an amplifier. When a key was depressed DC voltage was applied to one or more of these plates, and a note was produced that was proportional to the voltage applied.

Starting with a 400 volt DC supply, each stop contained eight harmonics, and voicing was achieved by a Heath Robinson arrangement of resistors with their leads bent into hooks, attached by springs to harmonic busbars, the choice of resistances determining the harmonic makeup of that stop. The swell pedals (there were always two, for swell and great/pedal) controlled the volume by varying the initial 400V, and an echo effect was easily achieved by controlling the decay of the voltages sent to the generators with capacitors.

The tone switching had all the complexity of a small crossbar telephone exchange, however the use of silver-plated busbars and switch contacts together with the very high voltage used avoided the common problem at the time of contact corrosion leading to missing notes or harmonics.



Physically the twelve tone generators were arranged in a row, one for each semitone, and spun with a motor, the pitch for each semitone being determined by the diameter of the pulley wheel. The overall pitch of the organ could be adjusted if required by varying the speed of the motor. The drive belt was rumoured to have been sourced from a cigarette rolling machine manufacturer, and vibrato was achieved by wobbling the belt with a further small motor driving an eccentric pulley. The whole thing was

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fairly noisy, and Compton went to considerable efforts to deaden the noise with sound absorbing material.



Since each generator produced only seven waveforms, the entire organ with its impressive array of stops boiled down to just 84 tones, and this greatly limited the Electrone as a musical instrument, at least by modern standards. Flue stops that required few harmonics sounded good by themselves, though lacking the chuff (attack) and decay of good modern electronic organs. Reed stops were unconvincing and raucous due to the limited harmonic content, and swamped the flues. There was a good deal of breaking back too in the higher octaves as the organ simply ran out of upper harmonics to draw from. A 2' stop broke back in the top two octaves, and in fact the top three C keys all sounded the same note.

The output of the generators was fed directly to separate treble and bass amplifiers and loudspeakers, with the split at middle C.

My first encounter

I was packed off to Prep school in 1959 aged seven, the school being housed in an Edwardian Arts and Crafts country house in rural Surrey. The mansion had been built with a large ballroom that was easily converted into the chapel, and the minstrels' gallery became the choir loft. A Compton had been squeezed into the narrow gallery and did sterling service during the four years I was there and for many years after. However, once in, it was quite immovable, which presented a problem since Comptons required the regular attention of a service technician to oil the generator bearings and replace the amplifier valves and the occasional snapped drive belt. The good priests solved this difficulty by discarding the console's rear cover and knocking a large rectangular hole in the wall behind the console, allowing access via a removable panel from the corridor outside. As well as the daily hymn-bashing by the community our lay music master, Harry Taylor, was a dab hand on the ivories, and germinated my interest in organs and organ music as he knocked out assorted toccatas and toccatinas from Bach to Yon on high days and holidays.

Then came the Melotone

Twenty years later I joined the DDOCA after moving to the north-east, and signed up for monthly lessons with Keith Crosby at South Church, Bishop Auckland, which has a fine 3-manual Conacher organ. Through the association I met Leo Franey, who had just acquired a Hammond and gave me his Compton Melotone, which was based on the church Electrone but painted in cream with black edging and voiced as a cinema organ with tibias and baryphones. It was elderly and fairly knocked about, having started life in a skating rink in the mid

fifties, but provided a useful home practice instrument after some minor repairs. By the time we moved to Cambridge several years later it had become almost unplayable, and I gave the useful bits – keyboards, pedalboard and a solid hardwood bench – to Hector Parr who recently told me he had incorporated them in an organ he had built for a church in Muker, Swaledale. Over a hundredweight (I weighed it) of electromechanical components went to the corporation tip.

Finally the 357

Another fifteen years found us in Weybridge. I had made an idle enquiry about a Compton being advertised somewhere up north in the Organists' magazine and thought no more of it. Then late one Saturday afternoon there came a knock at the door and a chap asked me if I was still interested in his organ. It turned out he had sold it unseen to someone in Devon, then drove it all the way down there only to find it would not go through the front door. Rather than waste the long journey he decided to drop by on the off chance. Thus we acquired a Compton model 357CP, with handsome mahogany console, full set of couplers and adjustable pistons and a 32' pedal bourdon. Still the same annoying breakbacks and noisy tone generators, but a useful practice instrument nonetheless, which we kept until we moved back to Darlington, selling it to the firm in Essex who used to advertise reconditioned Comptons in the Organists' magazine for many years.

There are not many Comptons still in regular use – time and wear have taken their toll on the primitive electromechanical system. However one still in use at Pelsall Methodist Church near Walsall, Staffs., and you can hear it in action on Youtube (www.youtube.com/watch?v=DgCzK7DD_Ok) along with many other Comptons, both pipe and electronic.