

Clocks at Ardingly College

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On 26 November 2012, the Dingwall Beloe lecture was given as usual at the British Museum, and in the convivial post-lecture atmosphere, created in part through Bonhams' generous sponsorship of the refreshment, attendees swapped anecdotes and stories. One remarkable coincidence emerged, in that Peter Waller and I discovered we had something in common. We had both been custodians of our school's clock system, at Ardingly College, in West Sussex, though our terms in charge were some twenty years apart. In March 2020, I led a party from the Electrical Horology Group on a visit to the school (reported in AH June 2020) and revisited familiar haunts from some forty-five years earlier. In the aftermath of the visit, while convalescing from Covid-19, I started to research the history of the clock system, and this short article is the result.

Ardingly College

The main buildings of Ardingly College took a long time to reach their final form. Started in 1864, many of the main elements of its distinctive H-shape were complete by the 1890s, though one whole wing (New Wing) was not constructed until 1926–7 (Fig. 1). The



Fig. 1. Ardingly College, aerial view (1959–60). The completed form of the main building group, in a distinctive 'H'-shape. Image author's collection.

Chapel and the dining-room with assembly hall above (charmingly known as the 'Under') form the crossbar of the H-shape, but until 1938 the two elements did not actually meet, and a large gap (known as 'the Gap'!) lay between (Fig. 2). This gap was filled in 1938 by the structure that forms the very distinctive



Fig. 2. Ardingly College, c. 1910. The 'New Wing' is yet to be built, and the 'Gap' between the Chapel and the Dining Hall and 'Under' is obvious. Image author's collection.

archway between the north and south quads of the main buildings. The architects took the opportunity to add clock dials above the north and south openings of the archway, one facing into each quad (Fig. 3).

Above the archway there was a single room, reached by a cast-iron spiral stairway. Over time the room has had many functions, but started as a 'Sixth Form Room'—by the 1950s it was described by Peter Waller as a 'prefect's common room'. In the 1970s it was known as the 'History Room', and perhaps this was in part because Patrick Molony taught history there, at least some of the time. During school productions, given its position immediately behind the main stage area of the theatre, it served as a 'green room'. More recently it has

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Fig. 3. The 'Gap' has been closed, and the archway formed, with the south dial for the clock sited above the Green Room. Photo Sue Hines.

lost any other functions, and simply is the Green Room, doubling up as a store for theatre equipment.

The Gents system

The dials above the archway, introduced with the linking of the two buildings, formed part of a timekeeping system installed by Gent of Leicester. In a cupboard in the north-west corner of what is now the Green Room, Gent installed a C7 impulse transmitter clock, No. 4955, which left the factory on 29 August 1938. The cupboard remains to this day, as does the C7, which is one of the best-known and most dependable of English electro-mechanically reset, gravity escapement, impulse transmitter clocks (Figs 4 and 5). Alongside the C7, there was a C69 program unit. This resembled later twentieth-century timeswitches, in that it comprised a large program wheel in which holes around the perimeter marked five-minute intervals. A pin in a given time slot on the wheel would cause a bell to be rung at the designated time. In the absence of any further device, the bell would ring for a full thirty seconds—too long to signal the start and end of lessons. Another device—a C60 duration controller—added to the C69, allowed for the length of the signal to be controlled, and this was typically set to a length of three seconds at Ardingly.

1. 'Headmaster's Notes', *Ardingly Annals*, 1944.



Fig. 4. Gent C7 impulse transmitter, No. 4955 (29 August 1938), now a rather forlorn relic in a cupboard in the corner of the Green Room. Photo Sue Hines.

The two dials facing into the quads were very probably originally laid out in a typical mid-twentieth century design by Gent. However, in 1944, changes were made:

The clock now has conventional Gothic figures in gilt on a dark blue background, and there seems general agreement that the new dials suit the appearance of the buildings admirably. The work was carried out under the supervision of Mr Joseph Cribb, of Ditchling.¹

These dials are on the outside walls of a tall loftspace above the Green Room. Gents installed one of its well-known 'waiting-train' movements on a wooden horse in the centre of the loft room and this drove two long leading-off rods that linked with the dial either side, driving the hands forward (Fig. 6). Each rod was supported half-way along its length by



Fig. 5. Movement of No. 4955, which the author recalls servicing c.1976. Photo Chris Andrews.

a column, bearing a pair of support rollers on which the rods rested, to prevent any bending along what were relatively long runs.

Thwaites flatbed

There is another clock in the loftspace, a three-train flatbed turret clock by Thwaites & Reed, made in 1911. The date appears on the setting dial (Fig. 7), which interestingly bears the name David Glasgow, the distinguished Vice-President of the BHI, and author of *Watch and Clock Making* (London: Cassell, 1885). Above the loftspace, on the highest point of the west wall of the Chapel, just below the apex of the roof, there is a nest of hemispherical bells, on which the quarters are struck (top of Fig. 3). This installation post-dates the Gent system by some time, and has an interesting back story.

Arthur Rodgers (1862–1910) and his wife Emily lived at Great Walstead, near Lindfield,

West Sussex. Arthur was associated with the well-known cutlery firm Joseph Rodgers of Birmingham and he was wealthy, leaving an estate of £132,261.² The big house was advertised by Knight Frank as early as spring 1909 as being up for auction in June 1910. Arthur died a few months later in September.

With Great Walstead sold, Emily moved to Walstead House, very close by. Here, in honour of her late husband, she arranged for the installation of a new chiming clock in 1911, the Thwaites flatbed introduced above. It is very likely that a plaque which has survived at Ardingly, and which commemorates the installation, was originally erected at Walstead House (Fig. 8). Of the chimes, it was very much later reported that, 'they almost immediately fell into disuse, since they disturbed the inmates of the house, but many people who heard them have reported favourably on their tones.'³

2. Probate records, and also *Illustrated London News* (7 January 1911), p. 37.

3. *Ardingly Annals* (January 1950).



Fig. 6. The sad remains of the Gent 'waiting train' movement. The Meccano 'windmill' arrangement (see text) was fixed to a further wheel in the nest of bevels. Each quarter an arm closed a micro-switch in front of the main drive coil armature, releasing the chiming train of the flatbed. Photo Robert Wren.

In a history of the school, Nigel Argent recalled,

Snow [headmaster] had engaged a Pole, Victor Nossoff, to give a piano recital in December 1948 and it appeared that a lady who was sponsoring this young man might be willing to persuade the owner of some chimes to give them to us. Nossoff got his recital and Mrs Rodgers gave Ardingly the chimes.⁴

A further and later stone plaque in the archway at Ardingly confirms 'The Chimes' from Walstead House were donated to the College in 1950, where they were reconditioned and erected by the gift of JRW Alexander, OA (Old Ardinian) and Governor of the School, during the time that George Snow (1903–1977) was headmaster (Fig. 9).

Waller memories

Peter Waller (OA 1947–52) recalls working on the clock and chimes, presumably not long

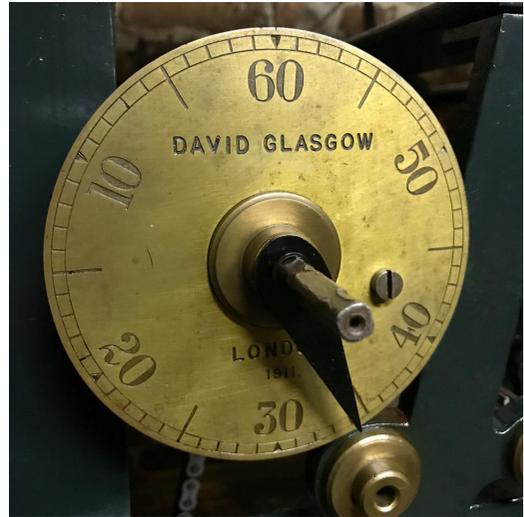


Fig. 7. Setting dial of the Thwaites flatbed, signed for David Glasgow and dated 1911. Photo James Harris.

after their arrival. The Thwaites clock was delivered complete to the school, and was installed on a horse next to the flank wall of the chapel, where it remains (Fig. 10), below the bells. Peter remembers:

Somehow, I found myself avoiding ball games by being put in charge of the school swimming pool filtration system and the head man commissioned me to wind the college clock, which had a nice three-train flat bed. I knew nothing about clocks at the time, so when he asked me whether I could mechanise the winding I said yes! With the help of my father, a clever automobile engineer, who had worked in Rolls Royce's experimental department on aero engines, I devised an endless wire cable (Huygens style) with three turns around the clock drum, and three turns around a drum on the end of a gearbox on an electric motor. There was a tensioning weight between the two drums. I quickly learned what $e^{\mu\theta}$ is all about, and how to do long splices!⁵

This all worked fine, with limit switches on the wall to control motor stop/start (including an extra safety switch in case of

4. Nossoff, born 1907, was very probably Russian by birth. Nigel Argent, *Ardingly College 1939–1990*, p. 100.

5. $e^{\mu\theta}$ is the Euler-Eytelwein equation, which relates the hold-force to the load-force if a flexible line is wound around a cylinder.

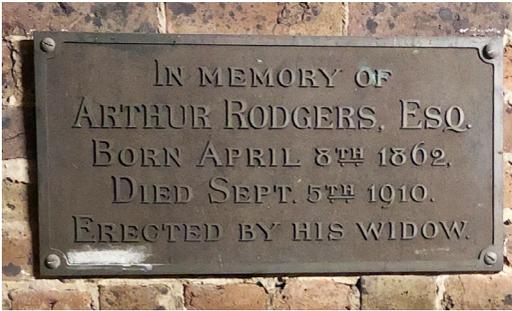


Fig. 8. Plaque commemorating Arthur Rodgers in whose honour the clock was originally installed at Walstead House, now next to the Thwaites flatbed. Photo James Nye.

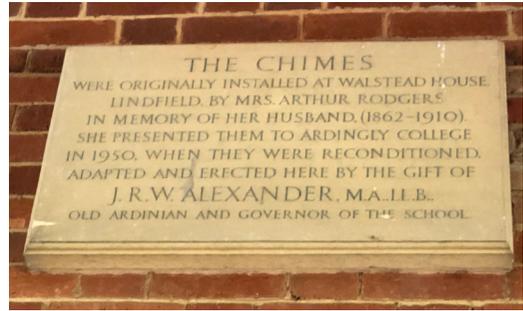


Fig. 9. Plaque in the Archway that commemorates the re-installation of the clock and chimes at Ardingly. Photo James Nye.

over runs), with a motor for each train. The motors had integral gearboxes and were screwed to the joists through the floorboards as I did not want the weights to pull them up to the top! I also put a loose pile of timber below each weight so that if there were a catastrophe the falling weight would not go through the floor.

The bit I didn't like was the scrubbing of the wire cable over the brass drum, as it promoted drum wear. I had attached an iron bar to the bed by each drum, to push the cable away from the cheek. I expect the holes are still in the bed. I was going to put a nest of pulleys under each drum to feed the cable without side slippage, but I don't think I ever got round to that.⁶

The clock was now auto-wound, but its timekeeping could still depart from the timekeeping of the Gent system. The headmaster tasked the young Peter Waller with the job of synchronising the two. Peter recalls:

I decided to stop the going train and fit a large solenoid to the bed, made from a government surplus relay (there was a lot of that sort of stuff around at that time), to catch the setting off lever that ran from the going train to the striking train. When the solenoid was impulsed, the arm dropped and set off the quarter striking sequence. At the end of the sequence the arm was raised and pushed the armature out of the

way, and then descended to sit on the armature ready for the next cycle. The problem was how to generate an impulse for the solenoid. I did this by fitting four Meccano standard strip arms to the Gent hand drive unit and a microswitch. The arms were adjusted so the microswitch clicked exactly on the quarter. Power to the switch was taken from the Gent system and a large capacitor was connected so that most of the time it was connected to the 24V rail and being charged. When the microswitch contacted, the capacitor was discharged through the solenoid and there was sufficient energy to allow it to pull in and start the cycle. Dwell time was around half a second, which was plenty to allow the solenoid to relax before the letting-off lever descended.

John Lawrence memories

Peter's successor, John Lawrence (OA 1950–57) devised a night-silencing system which utilised the program wheel of the C69 device in the room below. This once again used a microswitch. John arranged for a wire (perhaps 3mm thick) to run around the external rim of the program wheel, from just after 2100 to just after 0900. The microswitch was activated by a sprung arm with a roller at one end, riding on the outside of the wheel, and therefore activated by the presence (or not) of the additional wire in its path. Peter's circuit between the waiting-train and the flatbed was interrupted for 12 hours as a result, and the chimes would cease at 2100

6. Peter Waller to James Nye (14 March 2020).



Fig. 10. The Thwaites & Reed flatbed, signed David Glasgow. Photo Robert Wren.

each evening, and commence with the first quarter after 0900 the next day.⁷

James Nye memories

I was at Ardingly from 1970 to 1979, and looked after the clock system in the mid-1970s. This was a time when inexpensive quartz watches became available, and I could monitor the short-term performance of the C7 more closely. I would watch the seconds tick down at the end of each teaching period, expecting the bell to ring to within a second of the right time. If it had not rung within a few seconds, I would race across the school to activate the bell manually. It happened a few times over my term in charge. In general, things were uneventful. Distant impulse dials would lose time, probably owing to the quality of wiring, and a lack of servicing. One summer I dismantled and fully serviced the C7 and the waiting train. On arrival in charge of the clocks, the Thwaites flat-bed had no escape wheel, and no pendulum. A lot of searching around eventually brought these to light, the pendulum being found in the Technology Centre, in the Farm complex. I was very pleased to unite them with the clock. By this time, there was no trace of Peter's winding

system, and I wound the weights entirely manually, each week. But the wooden blocks on the floor, below the pathway of both weights, remained.

Coming up to date

The waiting-train was made redundant in 1996 with the installation of synchronous motors to drive the Archway dials. A new electronic controlling clock, with radio-control, replaced the C7, presumably controlling signals for the start and cease of lessons, but in recent years the school has foregone any sounding system. In 2004, Thwaites and Reed were engaged to reinstate the flatbed movement, in order to bring the chime and strike back into action. They fitted autowind, night-silencing, and the provision for remote control to allow for silencing of the chimes during examinations. In March 2020, the visit with the Electrical Horology Group involved a substantial trip down memory lane for me, with only a few parts of the system I remembered still in place. The program unit and duration controller had gone. Peter Waller's additions to the waiting-train had been stripped off, but the main mechanism remained in place, the leading-off rods now discarded in the corners of the loft room. The flatbed is now encased inside a large purpose-built cage, which keeps it safe from prying fingers and inquisitive visitors. With luck, this account of the history might encourage the school to consider the value of moving the C7 impulse transmitter to a site where it could be run and used as a teaching tool in due course.

Acknowledgements

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7. John died in 2011. He set out his memories of the clock system in a note he wrote to the school in 2004, kindly supplied by Neville Barker, Estates Bursar.