Devon Association of Ringers

Founded 1925

President - Keith Bavin

www.devonbells.co.uk

Devon Calls

LATE 2022

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Inside This Issue

Westminster Abbey, photo:Abubakr Saeed

The State Funeral of Her Majesty The Queen took place at Westminster Abbey on Monday 19th September 2022 at 11.00a.m. Nine of the ten Abbey bells were rung fully muffled, i.e. with muffles applied to both sides of the clappers, but with the tenor remaining 'open' (not muffled). Bells are traditionally rung in this way for the funeral of a monarch.

The Abbey's ten bells were all cast by the Whitechapel Foundry in 1970/71. The tenor bell weighs just over 30cwt (1,530 kg) and is in the note of D.

It was at Westminster Abbey that the Coronation of Elizabeth II took place on Tuesday 2nd June 1953. She was then just twenty five years old. On Thursday 2nd June 2022 the Queen and the nation celebrated her Platinum Jubilee.

Colin Adams

COPY for "Devon Calls" is always welcome and we rely on you to submit articles

It is helpful if articles are submitted in MS Word

Deadline for next edition - 15th January 2023

We would be very interested in including "Letters to the Editor"

Articles and letters should be sent to the Editor - Colin Adams - devoncalls@devonbells.co.uk

Novice visitor to Egg Buckland circa 1962

Colin,
After reading your article in Devon Calls recently I resolved to share this story with you…
During the pandemic I decided to write up some family histories which my late mother had begun researching many years previously. This involved much rummaging in the attic and photo album perusing - brilliant for keeping busy during the lockdown time. Of course it led off to other diversions too.

Among the rediscoveries was a file in which I had listed all the towers I had rung at as a new ringer. This leads me to think that I must have learned to ring at the turn of the 60s, 1959 or 1960. I would have been 15 or 16? I learned when I was at school and the first dated visit was with a School Guild trip, end of term July 1960 (Corston, Priston, Twerton, Marksbury, all in Somerset and Bitton, South Gloucestershire).

On 9th August 1961 I recorded that I rang at Egg Buckland, St Edwards. This was the 32nd tower I had rung at - so clearly a seasoned ringer then!! That date fits because my grandparents were still living in Plymouth at that time, though we were now living in Bristol, and I sometimes spent part of my school holidays with them.

Eggbuckland
Photo: Chris Downer

My paternal grandparents had lived in Egg Buckland and both are buried in the churchyard there. So that would explain my reason for going there. They had the house built called 'Linketty' off Linketty Lane on land given to them by granddad Barnes, my great grandfather who was a local farmer I was told.

Anyway, back to the story. The ringers were intending to practice for an upcoming competition (sound familiar?) but were short on numbers so I was given some time and invited to stand in. I knew nothing of competitions and such like but realised that I had to turn in my best efforts.

The bells were already up I think because I chiefly remember the Rounds. They were very good, but I noticed they left no gap at the handstroke lead as I had been taught in the Method ringing style. Very strange I thought, for a band that intended to compete. It was only a matter of time before I came to lead and put in my immaculate open handstroke leads, only to be dismayed when I was shouted at to "close up the lead". Naturally I obliged immediately but remained puzzled by this lack of finesse. What strange folk these ringers were! Could they have not been taught properly? This was my first contact with Devon Call Change ringing.

Afterwards little was said about it beyond knowing nods and the odd remark about a young lad from up the line. An additional embarrassment was that the Mothers Union were doing something to raise funds that involved signing a tablecloth, later to be embroidered, for a donation of one shilling. I had no change. It is possible I had no money at all at that moment - bus fare possibly - I can't now remember how I got there. Suffice to say I owe the Egg Buckland Mothers' Union. If ever I'm allowed back, I shall make good on that.

Roger Algate

I invited Roger to provide an account of his ringing career. I thought it would make interesting reading given that he learnt to ring in Bristol when he was a teenager. In his reply he modestly said "I am somewhat diffident having achieved no particular eminence which might invite interest." He did though provide this brief account on the origin of Bristol Cathedral's bells and how he was introduced to bellringing.

"The circumstances by which the bells came to be where they were when I was taught might be more interesting. As you travel around pursuing the hobby you may have come across the derelict church with the leaning tower in Bristol's Baldwin Street. It was bombed during WW2, lost its roof, was extensively damaged and subsequently deconsecrated.

The tower held eight bells and the Dean, Reverend Douglas Harrison, sought to relocate them within the city. Nobody wanted them, so he had them installed in the Cathedral, it having but four medieval bells.

That raised the need for ringers. His solution was to recruit boys from the adjacent Cathedral School supported by ringers from other city towers, the University and inner suburbs. Sixth-formers were taught by two masters, both mathematicians as it happened, Patrick Bird and Peter Parry. I was among the second cohort as the first began leaving for University. By then a school guild of ringers had been formed to exist alongside the other, more routine school activities and sports teams. Ultimately I became its Secretary (minor activities had Secretaries, major ones had Captains). There must have been eight or ten of us under tuition at that time and over the years it grew to about twenty or so, the sixth-formers teaching the novices alongside the masters. 'Tied' practices were held after school twice a week and 'open' on Saturday mornings. Those who had towers near their homes would ring there on Sundays, otherwise we rang at the Cathedral and I remember being mentored there particularly by John Hunt. Others were Don Exell and his wife, Peter Bridle, Cecil Mogford, Albert Tyler and many more whose names I never knew.

After leaving school I continued ringing at Durham, Cramlington (Northumberland) and Alveston (S.Gloucestershire) until 1978 when we moved to Europe to work and not therefore within reach of bells. Returning to Devon in 1983 I did not take up ringing much until coming to Whimple in 2005 when Janthia and I became immersed in Devon Call Changes. Janthia also learnt to ring in Bristol when she was a Girl Guide working for her Ringers Badge. Eventually I resolved to pick up method ringing where I left off on leaving school. That is still work in progress, very slowly.

This is hardly exciting or praiseworthy stuff and potentially boring. It must be similar to so many ringers who had time away for work and family before returning to ringing."

Thank you Roger for taking the trouble to submit such an interesting article. It is certainly not boring as it provides valuable insight into the origin of Bristol Cathedral's bells; anyone who has rung there knows what a superb peal they are, and we learn how you were introduced to bellringing.

How times have changed since the 1960s. Just think how rewarding it would be to have a group of young students show up on a practice night accompanied by their teachers and to discover that the teachers are themselves ringers. Let's hope your brief account will be widely read and lead to an increase in the number of young people wanting to ring and then go on to discover the wonderful peals of bells which Devon has.

Colin Adams

Editorial

Having rung to celebrate the Platinum Jubilee of Queen Elizabeth II in early June this year, ringers across the nation hastily had to muffle their bells to ring for her funeral on Monday 19th September. Just over a week before, on Sunday 11th September, 'open' peals were rung celebrating the proclamation of the new monarch King Charles III. All-in-all it was a busy time for ringers.

Are there any ringers still around who rung for the Coronation of Elizabeth II on Tuesday 2nd June 1953? If there are it would be good to hear from you. I know of one who did. This was the late Horace Clements of Stoke Gabriel. If there are others, I think their names should be recorded by the Devon Association and even read out when the Centenary of the Association is celebrated in three years' time. A list of those towers that rang for the Coronation, the Silver Jubilee and the Platinum Jubilee could also be compiled. After all, the late Queen was our longest serving monarch.

Did you watch, as I did, the State Funeral on television? I thought the coverage by the BBC was excellent except for one thing. My criticism has nothing to do with the camera angles or the quality of the sound, or the commentaries, although some commentators seemed to draw things out a bit. No, I want to know why we were denied the opportunity of being able to hear the Abbey's bells, even if only for a minute or so. I could faintly hear them at one stage in the background, but the distinctive sound of these beautiful bells was drowned out by a studio interview with two people, both responding to a succession of questions. Just think, one or two ringers will have made the effort to double muffle (quite a task in itself) nine of the Abbey's ten bells leaving the tenor open; something which is only done for the funeral of a monarch. This unique sound on such an equally unique occasion was completely lost on the people at the BBC. The organisation knows nothing about bellringing and doesn't seem to care. Yet what are we so often told by the corporation, "This is your BBC." Really! - I'm not convinced.

Have you ever thought about the composition of bell metal and the stresses and strains imposed on the moving parts whenever a bell is rung? Well here is an opportunity to find out. As you will see, this edition contains an article by Rodney Battey in which he explains exactly what enables a bell to produce its distinctive sound. I have known Rodney, who is not a ringer but a regular member of the congregation at Exminster church and he recently produced a booklet on "The Tower, Clock and Bells" at St. Martin's.

We welcome Mr. Peter Buckland to our proofreading team. Peter and, his wife, Jewel are both ringers at Exminster. Sadly, the Early Edition next spring will be the final one for James, our Technical Editor. James has given ample warning of his intentions to stand down so that we can search for a replacement. Over the past five years he has worked consistently hard setting out the pages to produce a magazine which distinctly represents The Devon Association of Ringers. Finding someone to replace James will no doubt be a challenge.

My grateful thanks to all those who have taken the trouble to submit articles for this edition. Thanks also to Elinor and Colin, our two meticulous proofreaders, for their valuable time spent on scrutinising copy, as well as to James our Technical Editor for carefully setting out the content.

Colin Adams

Affiliation Fee Reminder

The £15 affiliation fee for 2022 -2023 is due to be paid no later than the AGM on 12th November 2022. I would prefer before the day of meeting as it makes life easier for all concerned.

Please post your fee to me, cheques should be payable to DEVON ASSOCIATION OF RINGERS. Please also confirm your name, address and tower name, so that I can ensure I have the correct details for Devon Calls distribution.

Your cheque and details should be sent to;
Mrs C Ley, Fort House, Alexandra Road, Barnstaple, DEVON, EX32 8FD.
You can also pay by BACS at NatWest;
Name: Devon Association of Ringers
Sort Code: 53-50-28
Account Number: 09202153
If you use "BACS", please put tower name on the payment sent, so I will know which tower has been affiliated when I receive the monthly bank statement. Please also send me an email at hontreasurer@devonbells.co.uk saying when you paid and to confirm your address to which Devon Calls will be sent.

If you wish to receive your own personal copy of Devon Calls please send a cheque for £10 with your details to me at the above address.

Please also, to conform to the DAR Rules and Constitution, include a list of your tower ringers with your affiliation fee, as is required in Rule 2.1 of the Rules. The Committee realises and accepts that many ringers ring in more than one tower. Do please however, list all who are ringers in your tower. It would also be useful to know the number of learners you have, but please do not identify them by name. This would help to indicate future trends for ringing throughout Devon.

Best wishes, Chris Ley, Treasurer and Past President.

Here comes the ring again

THE cheery tintinnabulation of church bells has been absent from St Mary's in Denbury for more than two years but this is all set to change as a refurbishment project to the tune of £120,000 is nearing completion.

Photo - Ethan Hepple

'Twas in 1906 when the bells of St Mary's were last given an overhaul and it's safe to say they were in dire need of another.

More than seven years ago residents of the village, as well as other concerned persons, started a project to refurbish the bells, the oldest of which is dated 1631.

The project quickly gained traction and those involved worked tirelessly to secure grants, liaise with architects, planners and historical societies of various persuasions and organise fundraising.
Progress ground to a halt due to the pandemic such that it is only now the project is entering its final stages.

The bells of St Mary's have been retuned and repaired where necessary, with two of the existing bells set to be replaced and a sixth bell added to the peal of five.

Photo - Irene Davey

Forgoing the archaic method of retuning a bell, which involves gouging out chips from the edge of the bell mouth, the bells at St Mary's underwent laser treatment to see them sing properly.

A substantial amount of the final £120,000 price tag of the project, which will also see the ringing room moved to the first floor, was raised by the village community itself.

Churchwardens Steve Bassett, Tessa Amies and Mike Bray have been overseeing the installation; a team of volunteers, under the watchful eye of Ian Hasan from Nicholson Engineering, have been working day and night to see the project through.

It is hoped the bells will be back in place within the next couple of weeks. [*The bells are now back - ed*]

Steve, who is also Bell Captain, said: 'It is fantastic, absolutely brilliant to have these new bells.'

Rachel Belringer, who sits on the Parochial Church Council, said: 'It has been seven and a half years since we launched the idea, held up by the pandemic quite considerably and there is an awful lot of hoop jumping you have to do before you can even start.

'After a very long time we have had the bells retuned, we have replaced a couple which were beyond recovery.

'It is a real joy to hear the sound of the bells again.'

Ethan Heppell, Mid-Devon Advertiser

Chardstock Bellringers Remember Her Majesty Queen Elizabeth II

Rear L-R:- Lucy Herrod, Rikki Johnston, Jason Hill
Front L-R:- Stephen, Derrick Goff (C),Susan Bray, Kevin Newbery

On Thursday 8th September 2022 we were all saddened to hear the news that Her Majesty Queen Elizabeth II had passed away. On that evening Tower Captain Derrick Goff tolled the Bourdon Bell ninety-six times in recognition and appreciation of a lifetime dedicated to public service. The Bourdon Bell is situated above the main ring of six bells. [*The 21cwt bourdon bell is listed in Dove's guide as a clock bell, it is a Bilbie bell from 1766 - ed*]

The six bells were fully muffled prior to The Memorial Service held on the morning of Sunday 11th at St Andrew.

Call changes were rung, that included call changes of Queens.

We are fortunate to have two sets of muffles, both sets were donated to the tower, with one set being donated as recently as three weeks before the departure of our Queen.

Susan Bray

The Rededication of Milton Abbot Church Bells
Perseverence Rewarded!

During the weekend of the 4th June 2022 to mark The Platinum Jubilee of Her Majesty the Queen, a very joyful service was held for the Re-dedication and Blessing of the bells at Milton Abbot.

The service was conducted by the Rev'd Andy Atkins and the Rt. Rev'd Mark Rylands to a packed church where the singing was quite overwhelming. The highlight had to be the singing of the well-known Ringer's Hymn - 'Ring out ye Bells Below" - music composed by the late George Campbell-Grills of Tavistock. The music for the singing of this hymn was played by The Lamerton Handbell Ringers.

During the service Rev'd Andy Atkins thanked everyone for the enormous effort that had gone into the Fundraising. He had also done a huge amount himself and I was pleased to propose a vote of thanks to him!!!! Something that he had not expected, but wholly deserved. After the service, ringing continued now on a much easier ring of bells. The event ended with a free bun feast served by the congregation at Milton Abbot.

The bells are now available to visiting teams. Our thanks go out to everyone who has subscribed to the tower funds and please accept our heartfelt thanks to you all.

Geoff Hill

Visitors at High Bray

We may have stopped the Jackdaws getting into the bell tower at High Bray, but they love it so much they have created an extension on the outside - incredible engineering!!!!!!

Russell Bray

Sound Advice
Spotted by Dave Trout

New Proof Reader

Peter Buckland will be joining our proofreading team from the next publication. Peter survived several years as an English teacher in Zimbabwe and as a university lecturer and public servant in South Africa, followed by a decade or so as an education specialist in the UN. He is now happily retired and has been an enthusiastic (if rather modestly talented) bellringer in the Exminster and Kenton towers for almost eight years. He enjoys reading and is derided by his family for organising his sock drawer by colour and size. This suggests he is something of a stickler for detail.

We welcome Peter to the team.

An Introduction to Metallurgy for Campanologists

Rodney Battey BA(Natural Sciences 1963)

Introduction

Many a pot-shaped metallic container will emit a ringing sound when struck with a hammer, or even with your knuckle. This sonority is a characteristic property of a class of materials called metals, as is the shiny lustre of clean metal, high thermal (and electrical) conductivity, useful strength and ductility (the ability to be shaped by mechanical deformation without breaking). It is these properties that enable us to distinguish a metal from timbers, polymers, ceramics and stones although it is perfectly true that a given metal will not display all these properties to the same useful extent. Pure copper and aluminium possess such high electrical conductivity that they are used almost exclusively for electrical wiring, but the addition of other chemical elements either as impurities or as alloying elements spoil this useful characteristic; the lustre and resistance to corrosion of polished gold has ensured its attraction as a jewelry material for millennia, while the high strength of steel (iron with a trace of carbon) provides us with a vital structural material. Silver is an excellent conductor of electricity, but is sufficiently expensive to restrict its use for electrical purposes to quite esoteric applications. No one thinks of casting a bell out of lead; the pure metal emits no more than a dull thud when struck, and the metal is so soft that it would bend every time it was struck! Rather, an alloy (mixture) of copper with up to 22% tin is chosen; this is a bronze that is remarkable for its sonority, acceptable strength and hardness, and its straight-forward castability.

Structure of Metals

The characteristic properties of metals that enable us to distinguish them from other materials are the result of a particular atomic structure. The atoms of a metal nestle closely together and can have as many as 12 neighbours touching a single atom: in doing so, the atom's outer electrons (for metallic elements 1, 2 or 3) leave the immediate neighbourhood of 'their own' atom and form a cloud that moves freely and randomly through the body of the metal. Under the influence of any potential difference these free electrons will move in a more consistent manner, and this movement of electrons constitutes an electric current; [the greater the potential difference across a piece of metal the greater the current flow – hence Ohm's Law] The tight packing of the atoms also helps to explain the relatively high density of metals as compared with molecular plastics and the compounds forming ceramics, while the electron cloud is very effective at absorbing any incident light energy [making metals opaque] but then quickly re-emitting most of that energy as a reflected ray. The yellow colour of gold and the reddish colour of copper are explained by a selective absorption of the complementary wave lengths that make up white light.

The tight packing of a metal's atoms also allows for a long-range regularity in their arrangement as a molten metal solidifies, so that at the microscopic level a crystalline (or grain) structure can be observed. A metal surface can be prepared and polished to a mirror-like reflectivity, and then etched with a chemical that selectively marks the grain boundaries. The size and shape of the grains revealed in this way, at between 40x and 2,000x magnification, tells us a lot about how the metal was cast, shaped or deformed, and in some alloys two or more different materials can be discerned; again, the distribution that is revealed is useful information.

So, what is Metallurgy?

Bells as manufactured artefacts have a history rooted in the Bronze Age and it is not possible to identify the first bell founder. However, metallurgy (the stress is on the 'a') has developed as a science which is dependent on the ability to correlate the surface structure, revealed by microscopic examination of sections cut from an artefact, with an accurate chemical analysis of the metal, and the particular properties of the alloy in question. Thus, as copper is alloyed with increasing quantities of tin, both the hardness and the sonority of the alloy increase, providing the perfect bell-metal, until further additions introduce an unhelpful brittleness to the alloy.

Casting as an early method of manufacture.

Apart from chance finds of native copper and gold which could be shaped by hammering (forging), the early workers in metals could use only casting – that is, pouring the molten metal into a suitable mould. When a molten alloy begins to solidify the composition of the solid differs from that of the remaining liquid; in its turn the liquid must cool down further to deposit further solid metal. The metallurgy of the casting process is potentially complicated even though the process of solidification sounds simple; gases that have dissolved in the liquid metal are rejected during solidification, and the blow holes formed may not float to the surface but form an internal defect in the casting. At the time that early bells were being cast it was largely impossible to prevent the molten metal reacting with the oxygen in the atmosphere to form oxides of the more reactive metal. These oxides are usually formed as solids and might be entrained in the molten metal, fail to float to the surface and be trapped in the solidifying metal as an inclusion that could affect the strength of the casting. In the case of a high tin bronze, precautions had to be taken to prevent the formation of any tin oxide as this has a density very close to that of the molten metal in which it is then trapped as it solidifies.

A further problem is caused by the volume contraction of the solidifying metal – in this case solved by the provision of an insulated 'hot top' that maintains a body of molten metal above the mould which can flow downwards to compensate for any shrinkage. Finally, the strength of the mould must be carefully controlled: as the solid casting cools down to ambient temperature it will contract, and when casting the characteristic shape of a bell, the shell and rim will also contract. Ideally the contraction forces will be sufficient to crumble the core once it has done its work of creating a hollow casting, rather than having an over-strong core that causes these contraction forces to tear the rim of the cooling bell, leading to a crack.

Once the bell has been cast successfully and tuned, it must be suspended in such a way that it can be swung so that its clapper hits it convincingly, and its full sonority is realized. The bell must be attached to its head-stock and wheel, and then supported by a

framework within which the bell can be freely swung.

Strength and rigidity; why they are important.

The sheer weight of a bell requires the specification of strong and resilient structural materials for the frames, with the added requirement that the frame's design is not only strong but rigid as well. These two concepts are different; they can apply both to the measured mechanical properties of the metal or alloy, and to a structure made from the materials. Strength is the more readily understood, and is simply the alloy or structure's ability to resist the application of a load without permanent deformation or fracture, measured as the maximum force recorded before failure. The load in a practical situation may be tensile (pulling), compressive (pushing), torsional (twisting about a line- axis) or shear (the forces act in opposite directions either side of a plane through the alloy or structure): think in terms of scissors cutting paper, or shears cutting through the stems of a hedging plant.

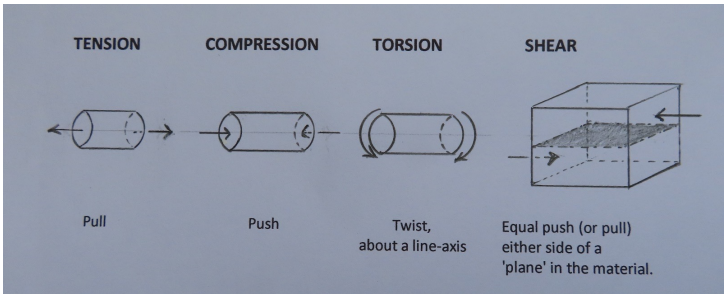
Rigidity is a measure of the size of the elastic deflection produced by a force, related to the test specimen's dimensions. It is an inherent characteristic of a given metal (steel is more rigid than aluminium) whereas a structure can be made more or less rigid by design such as cross-bracing. A structure depending on triangles is more rigid than one built up of squares: in simple terms, a triangle that is made up of three rods is geometrically fixed, whereas a square made of four rods can be pulled into the shape of a rhombus, unless a fifth rod is introduced as a diagonal, making two triangles.

The range of metals and alloys in a bell tower

Early bells were cast with an integral means of securing them to a headstock - bell-canons, but in 'materials' terms this only kicked a fixing problem down the road because the materials available to make a strong and rigid fixing between the bell-canons and the wooden headstock were limited to rope, leather or wrought iron, any of which had to be pulled very tight to make the fixing rigid, and which were then subject to atmospheric or biotic (squirrel, mice and mould) damage. An increased regard for safety led to the removal of a bell's canons and allowed the bell to be attached directly to the headstock with steel bolts, but this was only practicable once reliable tensile steels (about 0.4% carbon) had been developed. This development was mirrored by a change of specification for the material for headstocks, from wood to cast iron or fabricated mild steel plate with an elm wood pad sandwiched between the headstock and the crown of the bell. In this case timber is the antithesis of bronze in having no sonority, and thus has the ability to damp the transmission of the bell's vibrations to the iron structure of the frame: undue transmission would detract from the bell's resonance, and a continually vibrating frame would be a nuisance! The gudgeons that allowed the headstock to swing freely were set in bronze or white metal bearings, although a hardened steel roller bearing is now far more probable.

Metallurgy's answer to the range of properties required.

Apart from the bronze bell-metal already discussed and the matter of bearings still to be mentioned, there are three ferrous materials likely to be met with: wrought iron; cast iron of several compositions; steel, containing several different carbon contents.



Wrought iron: the metal that ushered in the IRON AGE. Before the industrial use of coal/coke was established in 1709, metallic iron could be produced only by the use of charcoal to react with the iron ore. The temperature reached was too low to melt the iron, so billets of the spongy extracted metal had to be compacted by manual forging: an expensive, small-scale process.

Cast iron: Abraham Darby's 1709 development of the smelting process relied upon the greater crushing strength of coke compared with charcoal. This allowed him to build taller, larger blast furnaces than he was using for copper smelting; these could reach temperatures sufficient to melt the iron, making it possible to cast and shape it more easily, and cheaply! The melting point of copper is 1083°C, whereas pure iron does not melt until 1539°C is reached. Molten iron readily dissolves carbon, thereby lowering its melting point (1135°C at 4.3weight%), along with any sulphur, phosphorus and silicon from impurities in the coke or iron ore.

When this material is cast the silicon causes the carbon in the iron to separate from the solidifying metal as sharply edged flakes of graphite whose presence makes the alloy rather brittle in tension, but readily machineable; the dark colour of the fracture surface gives this cast iron its name – grey iron. Cast iron with a low silicon content and fast solidification by contrast produces a white iron, so named because the fracture surface is a shiny white colour. White iron is very brittle in tension, extremely hard and strong in compression, and cannot be drilled or machined. Each of these properties can be traced to the behaviour of the carbon dissolved in the liquid iron: rather than forming graphite flakes, an iron carbide (cementite) is formed throughout the casting, giving great hardness but accompanied by brittleness.

About 90 years ago work in the USA indicated that 0.05% of either of the two metals magnesium or cerium, in the presence of silicon produced a cast iron with a characteristic microstructure of spheroidal nodules of graphite. Having no sharp corners at which stresses might be concentrated, these nodules of graphite do not seriously embrittle the alloy which is fairly called 'ductile iron' or SG iron; this material is now commonly used when cast iron is required, and can be seen marked as such for sewer and hydrant covers in the pavement and roadway.

Steel is a particularly versatile alloy, containing as it does between 0.1% and 1.2% carbon; modern steels benefit also from the addition of a number of different alloying elements. The steel-making process takes the molten iron from a blast furnace, dilutes the impurities with scrap and rusty steel, and then selectively oxidises the silicon, sulphur and phosphorus so that they form a liquid slag that can be separated from the heavier molten steel. Plain carbon steels can be cast to shape or poured into ingot

moulds. Each ingot is then hot-rolled to break down and refine the coarse cast structure of the ingot. Between about 0.05% and 0.78% carbon, the microstructure of the rolled steel shows a mixture of two finely mixed constituents, ferrite or substantially pure iron, and pearlite which is a very fine assembly of ferrite and iron carbide (cementite) sheets. The lower the carbon the greater the proportion of ferrite; the higher the carbon the more the pearlite, and the greater the strength of the steel. Increasing the carbon content above the 0.78% limit mentioned above allows the deposition of the hard but brittle iron carbide in the grain boundaries, but iron has one further characteristic that can be harnessed to produce yet harder – while still tough – carbon steels.

The manner in which the iron atoms nestle together at higher temperatures is different to that found at lower temperatures; in particular the amount of carbon dissolved in the high temperature structure is much greater than in the lower temperature form, so when a red hot steel containing between 0.4 and 1.2% carbon is quenched into cold water the carbon cannot move fast enough to form the iron carbide but remains trapped in solid solution while the steel changes its structure from the hotter to the colder form. This quenched structure has a characteristic spiky appearance under a microscope: in this form the metal is very hard and brittle, but by heating at 250°C for varying times, some of the hardness-inducing strains can be relaxed (tempering) producing a very hard but resilient material, suitable for, for instance, the rollers in a roller bearing. Without the means either to measure carbon content or tempering temperature, the production of a Medieval sword was a 'hit-and-miss' affair, and it should be of no surprise that several different cultures have tales in their literary tradition that are parallel to that of Excalibur.

Headstocks: cast iron or fabricated mild steel plate. The rigidity of this component is of prime importance, so designing for adequate rigidity with a suitable box section will also provide sufficient strength.

Bell clappers: traditionally wrought iron, but now frequently spheroidal graphite cast iron.

Bell frames: in the design of these items their rigidity is the major concern so that the movement of the bells is constrained within a cast iron and mild-steel composite structure. This ensures that the swinging of the bells does not damage the masonry structure of the tower. The cast iron is generally meeting the load bearing need, while the mild-steel is providing the shear bracing necessary for rigidity.

Bearings: hardened steel roller bearings are now the preferred solution. Comparable to the more familiar ball race, the roller bearing has an inner race (of smaller diameter) that fits tightly on the gudgeon of the head-stock; then come the series of hardened steel rollers that surround the inner race, held by a restraining cage, and finally the concentric outer race, which is set into the bearing housing. The bearing may either be of the 'sealed for life, self-lubricating' variety, or arrangements may have been, made with a greasing point, for periodic maintenance. Earlier solid bearings, that preceded the arrival of roller bearings, depended on a two-phase microstructure – and regular greasing maintenance. The earlier alloy was a tin-antimony alloy, to which some copper was then added, as the initial alloy's harder, and load-bearing, component invariably floated to the surface. Phosphor-bronze, a low tin copper alloy containing phosphorus then became popular – the phosphorus not only preventing the unhelpful formation of copper oxide as a potential inclusion, but reacting with the copper to form load-bearing particles of copper phosphide Cu_3P.

Conclusion

This essay has covered a lot of metallurgy in a qualitative, and not necessarily rigorous way; its intention has been to inform and entertain practitioners of an equally ancient art and science, although one not perhaps so unutterably changed in the past sixty years. It is interesting that one well-received national bell-founder prefers a manual method of bell tuning, rather than reliance on computerized numerical controlled lathes, so that the human artistic element still allows for a marginal uniqueness in each of their products.

The Czar Bell outside The Kremlin in Moscow.

Cast in November 1735, the bell was still cooling down in May 1737 when attempts to extinguish a nearby fire caused cold water to spray unevenly on the casting and it cracked. The bell weighs over 200 tonnes and is over 6 metres tall: the broken piece alone weighs 11.5 tonnes. Computer based calculations have suggested that its Fundamental frequency would have been about 81 Hz.

Attribution: Dates, weights and other metrics are derived from the Wikipedia article on this subject. Author's own photograph.

92 Years Old and still Ringing!

Well known Devon bell ringer Harry Bardens of Bigbury celebrated his 92nd birthday back in July. It was also the month in which Stephen Came of Loddiswell and Jereme Darke of Stokenham celebrated their birthdays and in early August Michael Adams of Kenton celebrated his. A day of ringing was organised to celebrate this unique A, B, C, and D occasion. The date chosen was Saturday 13th August. Generally the weather during the month of August is uncertain but this year was quite the exception. In keeping with the rest of the summer Saturday 13th August was hot, very hot, with temperatures hovering around 28 Centigrade, a bit too hot for ringing.

The day began with a ring on the six bells at St. Winwalloe Onolaus, East Portlemouth. After a slightly rusty start several good peals were struck and everyone agreed what a privilege it was to be able to ring at a tower that once fielded one of the top call-change teams in Devon. The scenery from the church looking across to Salcombe, with the tidal inlet running towards Kingsbridge and southern Dartmoor in the background, must rate as some of the most outstanding views in Devon.

The second tower was St. Sylvester's Chivelstone. On the approach to this unspoilt hamlet we were all struck with the recent pointing that had taken place on the external walls of the church and its tower. Tower Captain Ross Wakeham was there to greet us and he explained a little about the project and the grants that were obtained. Display boards detailing the stages of the work were positioned inside the entrance to the church. Interestingly amongst many historical details the church has been brought right up to date with toilet facilities and even a shower unit!! Ideal for anyone wanting a quick freshen up after ringing

We found the bells at Chivelstone quite a challenge to ring. Considering the extensive work that has been carried out to preserve the fabric of the building attention to the bells would be worth considering. However, with such large sums of money involved, and given the small size of the parish, only so much can be attempted at any one time.

Lunch was taken at The Bear and Blacksmith at nearby Chillington. Initially dining outside was thought to be the best option but it was just too hot and everyone retreated inside. A delightful meal was served and enjoyed and, much to the surprise of the traditional beer drinkers in the group, draft Bass was on offer. We all sung Happy Birthday to the four birthday boys. After this Harry stood up and gave a brief speech saying what an honour he felt it was being one of the oldest ringers in Devon and being treated to such a wonderful day's ringing and to celebrate his long ringing career with his friends.

Fully refreshed and hydrated we made our way to St. Martin's, Sherford where we were met by Tower Captain Ben Johnson. The tone of this 12cwt peal in F# is a real delight to the ear, but rather tricky to ring due mainly to the fact that they are hung on old plain bearings. Nevertheless, some decent peals were struck but most agreed that re-hanging the bells on roller bearings would make a tremendous difference.

The last tower was St. Michael and All Angels at Stokenham; Jereme's home tower. Ringing here brought back many fond memories of ringing competitions which were held there in the distant past, when pasties costing six old pence could be purchased in the nearby Church House Inn. Well those days are long gone but the bells sound the same and go very well. After some enjoyable ringing we all retired to the beer garden of the Church House Inn to slake our thirst and reflect on what was a very enjoyable get together after such a long absence due to the pandemic and the subsequent series of lockdowns.

To their credit Harry and his wife Ellen remained with us throughout the day and it was a real pleasure to see them sitting and talking enthusiastically to everyone after such a long and hot day. Quite amazing when you consider they are both in their nineties.

Apart from the four 'birthday boys' ringers in the party were: Sue Ashton, Suzanne Driscol, John Dietz, Graham Sharland, David & Hilary Trout. Pauline Ward and Colin Adams.

Non ringers were: Ellen Bardens and Sheila Adams.

Colin Adams

Success at Saint Winifred's Branscombe

Tower Captain John Bass held a very successful 'Open Day' at St. Winifred's, Branscombe on Saturday 3rd September 2022. CCTV had been installed in the bell chamber to enable visitors to see the bells in action. Ian Avery had brought along the Frank Mack mini ring which attracted a lot of interest. Ringing demonstrations took place periodically throughout the day and visitors plucky enough to have a go were encouraged to try their hand at bellringing.

The event was well supported by ringers. John wishes to thank them all and particularly Ian Avery and Michael Adams for all they did towards making the day such a success. In his words he 'could not have managed without them.'

The amount of interest created has enabled John to plan a series of practice nights for beginners and he was so pleased to have had the opportunity to give his granddaughter her very first lesson.

Congratulations John for taking the initiative and organising such a successful day.

Colin Adams

For Religion, Death and Pleasure - and don't miss the Sally

In the tower of our wonderful and ancient Church of St Martin of Tours, Exminster hang eight magnificent bells. They ring out regularly for church services, special occasions, like the recent Jubilee celebrations, and often on a Thursday evening as a team of dedicated ringers come together for practice. It seems to me that there is little that defines English village life more than the sound of church bells, each with their unique tone and music. It's a tradition that stretches back hundreds of years and still lives on.

Four of the bells are over 260 years old and were cast up the road at Cullompton by Thomas Bilbie Jnr. in 1758. They each carry inscriptions, with the tenor including the phrase: ***'Religion, death and pleasure causes me to ring.'***

It was with a sense of curiosity and excitement that, late last year, I took up the offer to head along one Saturday morning to get a feel for what is involved in ringing the bells. I was warmly welcomed by the team Captain, Colin Adams and quickly taken under his wing.

While looking at an experienced ringer in action, it can look so easy, but rest assured, the technique is one that has to be developed step by step and after seven months or so, I still feel a novice. Once you get a basic feel for the bell rope, you start striving for consistency, constantly adjusting to speed up or slow down, until it starts to become a more natural rhythm. There's a fair bit of jargon, with the 'back stroke', 'hand stroke'; the latter containing the fluffy wool 'Sally' woven into the rope. I've just reached the stage now when I can join in a simple peal in 'rounds' – from the first, 'treble' bell to the last – the 'tenor'. For the more experienced ringers they will launch into what can seem to be a bewildering series of 'changes', where a caller regularly switches the order of the bells, eventually returning to the starting scale from 1 to 8.

Besides the challenge of learning something new and helping to keep an ancient tradition alive, bell ringing has also introduced me to a kind and supportive bunch of new friends, who often head off to the pub afterwards. I'm really pleased I went along on that frosty, Saturday morning to open the door to a whole new experience. The team is always keen to welcome new potential learners – so get in touch if you think it might be for you too.

Jeremy Pyne

This article first appeared in Scene the local magazine for the parish of Exminster.

Photo: Simon Cobb

2022 Association Competition Results

Novice Competition, 12th March 2022
Zeal Monachorum

Rounds Section

1	Chagford X	14 3/4
2	Kingsteignton	15 1/2
3	Drewsteignton	17 1/2
4	Chagford Y	25

Half Peal Section

1	Chagford	23
2	Kingsteignton	23 1/4
3	South Molton	27 3/4
4	Tiverton St Paul 1	28 1/4
5	Tiverton St Paul 2	38 3/4
6	Kentisbeare	44 3/4

Full Peal 'Intermediate' Section

1	Kingsteignton	37 1/2
2	Bow	60
3	Tiverton St Paul	84 1/2
4	Chagford	941/2
5	Berrynarbour B	113
6	South Molton	133
7	Berrynarbour A	138 1/2

Judges: Graham Sharland, James Steer

North Devon Qualifier, 14th May 2022
Dolton

1	Down St Mary	22 1/2
2	Bow	33
3	Sampford Courtenay A	39 1/3
4	Sampford Courtenay B	52
5	East Anstey	53
6	Tiverton St Paul	59 1/3
7	Swimbridge	off course

Judges: Ken Down, Mervyn Way, Paul Wright
Scrutineer: Margaret Down

South Devon Qualifier, 14th May 2022
Sherford

1	Combeinteignhead A	20 2/3
2	Shaugh Prior	22 2/3
3	South Brent	38 1/3
4	Stoke Gabriel	41 1/3
5	Broadhempston	63
6	Combeinteignhead B	69 1/3
7	Stokenham	99 1/3

Judges: Tim Chapman, John Cole, Owen Borlaise
Scrutineer: Hayley Young

Minor Final, 28th May 2022
East Ogwell

1	Tiverton St Paul	22 1/2
2	Combeinteignhead B	25
3	Swimbridge	33 1/2
4	Stokenham	74 3/4

Intermediate - Full Peal Section

1	Kingsteignton	58 1/4
2	South Brent	72 3/4
3	Chagford	90 1/2

Intermediate - Top Ringing Section

1	Kingsteignton	25
2	South Brent	40 3/4
3	Chagford	60

Judges: Tim Chapman, Owen Borlaise

Major Final, 11th June 2022
Molland

1	Combeinteignhead A	28 1/4
2	Down St Mary	30
3	Shaugh Prior	30 1/4
4	Bow	46
5	Sampford Courtenay A	51 3/4
6	South Brent	57
7	Stoke Gabriel	67
8=	Tiverton St Paul	77 1/4
8=	Sampford Courtenay B	77 1/4
10	East Anstey	81 3/4
11	Combeinteignhead B	94 1/4

Judges: Ken Down, Mark Lovell, Paul Wright
Scrutineer: Margaret Down

Finally, this year's eight bell final was cancelled as it fell in the period of national mourning for the Queen, so here is a reminder of times gone by...

Eight Bell Final, April 1980
Exminster

1	North Tawton	27
2	Georgeham	29 1/4
3	Buckland-in-the-Moor	34 3/4
4	Chittlehampton	51
5	Plymstock	56 1/2
6	Braunton	71
7	Tavistock	104 1/2
8	Pilton	104 3/4
9	Appledore	114

Results kindly supplied by Dr. James Kerslake

Bell Ringing After the Demise of Horace Clements of Stoke Gabriel

Horace Clements of Stoke Gabriel died on the 29 May 2021. At the time of publication it will have been at least 12 months ago and how have we, as ringers at Stoke Gabriel continued in his absence?

Horace had been ringing at Diptford since 1938 and by 1949 had been ringing for Stoke Gabriel when he married a local girl, Eileen, and then lived in the village.

He led by example. There was no compromise in his loyalty, devotion and commitment. He would consider it his duty to put the team first. He was reliable and punctual and could be depended upon to ring whether for service ringing, practice nights or competition ringing.

Being blest with good health and a supportive family, Horace continued to ring for almost every weekly services and practice sessions and in his retirement from work enjoyed the many day long ringing trips provided by the Ringkly Ringers. Throughout this long career of ringing he had always been loyally supported by his wife, Eileen.

The restrictions of the COVID pandemic did not deter Horace from ringing. He was anxious for ringing to resume when there were relaxations to the lockdown. Ringing at 91 with a mask was a wonderful feat, especially as we were only permitted to ring 3 of the 6 bells at that time however this showed his commitment and determination. The last peal that he rang for was on Sunday 1 November 2020. Another lockdown followed and unfortunately he did not return to the ringing chamber after that.

Ringers moving into the area

It was a great loss to Stoke Gabriel and the bell ringers when Horace died, however ringing does adjust. He had encouraged regular ringing and the bells were frequently heard throughout the village. We were lucky in having new people move into the village who were or had some ringing experience and were keen to support the local church and the bell ringers there.

Numbers wise we have probably kept even in 2022 however two younger learners of school age have not returned due to work and study commitments. Regular articles about bell ringing are printed in the Parish Magazine. The Good Neighbours Facebook page for the village, as well as the Facebook page for the church has occasional articles. I have found that people will ask questions about ringing and will comment upon any articles written, especially if these writings are submitted on a regular basis.

Recruitment and retention

I know that recruitment and retention of new ringers is a current topic and we should all share our recent experiences should we gain new ringers.

A poster campaign and notices read in services are always good for setting the scene and a personal appearance and appeal by one or more ringer at a service could be really helpful; the side-effect is that you are appealing to people likely to be available only on a Sunday! It also establishes a personal connection as potential recruits will know your face.

Getting people to come to an open evening on a specific date is a good start as many people may try bellringing and it can be specifically oriented towards the recruits. Providing contact details such as, email addresses and mobile numbers and using them to remind people to come and join the next practice is a good approach. However, there is a fine line between reminding people and over burdening them with information! Anyone who is thinking about ringing will have the personal contact details to encourage them to attend their first practice.

Finally, we have always given priority to learners. We allocate them specific time slots to learn to handle a bell and get them into round ringing swiftly. In our case, with reduced members this meant that the oft-heard complaint of "We don't get to ring well struck peals anymore because of the time spent teaching the learners" is not an issue because we may have reached a point of not having enough experienced ringers to ring to a competition standard. A decision needs to be made by the whole team of ringers though as it is a huge time commitment and not just by the one or two people specifically acting as teachers. The demand increases according to the number of people wanting to learn. I think having more than one learner is helpful because they are able to support and learn from each other.

Michael Webster

Mark Andrew Lovell
9th April 1965 - 1st September 2022

On a bright, still, September morning a large number of mourners gathered for the Commendation and Committal of one of Devon and Cornwall's most popular ringers – Mark Lovell. On Wednesday 21st September people came from far and wide to pay their final respects to Mark at the Glynn Valley Crematorium, Bodmin. This was followed in the afternoon by a 'Celebration of Mark's Life' which was held at St. Andrew's Church, Calstock, both services being conducted by The Reverend Robert Oakes.

At the crematorium the service began with the 'Theme from Inspector Morse' by Barrington Pheloung. Jeremy Lovell read from Isaiah 25: 1, 6-9 and his brother Kevin gave a reflective account on Mark's life. The hymn 'Dear Lord and Father of mankind' was sung and Rosie Lovell read a poem by Joyce Grenfell. During a period of reflection 'What a Wonderful World' by Louis Armstrong sounded in the background. Prayers were offered up for Mark's wife Fiona and his family followed by 'The Lord's Prayer'. The Commendation and Committal took place following The Blessing. The exit music consisted of a video recording of The 'Lovell' Peal which formed a fitting close to a well planned and dignified ceremony.

In the early afternoon the bells of St Andrew's Church, Calstock rang out prior to the commencement of a service at 2.00p.m. 'To Celebrate the Life of Mark'.

Approximately 100 mourners attend the earlier service at the crematorium. This number increased considerably for the service at St. Andrew's. The opening music consisted of 'One Day Like This' by Elbow. The welcome was given by The Reverend Christopher Painter. A fitting poem 'The Dash' by Linda Ellis was carefully read by Ruth Martin. This was followed by the singing of the hymn 'Tell out, my soul, the greatness of the Lord!' and a reading from John 2: 1-11 by Nikki Burns.

Tributes to Mark were given by: David Moon, representing St. Mellion Golf Club, where Mark began his career in hospitality and where he eventually rose to become Catering Manager. Stephen Brothwood, representing Combe House Hotel, Gittisham, where Mark was the manager, spoke of his passion for his work and the professional standards that he always strived to achieve. It was at Combe House that he met the lady who eventually became his wife - Fiona. Stephen referred to the valuable part she played in helping Mark to carry out his managerial duties. His last job was working as H.R. Manager at Tamar Fresh, Callington. Tony Spreadborough, representing the company, echoed the words of the previous speakers by saying just how conscientious Mark was in his work, how much he cared for people and the excellent example which he always set.

An '80's Medley for Mark' was played on the piano by brother Jeremy Lovell. This was followed by a tribute by Scott Adams on behalf of all the bellringers that Mark had known for so long and with whom he had rung. A tribute on behalf of the family was given by brothers Kevin and Jeremy Lovell.

Music for reflection consisted of 'Never Let Her Slip Away' by Andrew Gold. A closing message was delivered by The Reverend Robert Oakes. Closing prayers were led by The Reverend Christopher Painter which included 'The Lord's Prayer'. The final hymn sung was Jerusalem and the service closed with the Blessing.

Mourners were asked to remain in their seats whilst the bells were rung. A short peal of call-changes was rung including a rise and fall. The ringers who took part were: Treble, Will Carew, 2nd Suzanne Driscoll, 3rd Lee Avery, 4th Graham Sharland. 5th Ryan Trout. Tenor, Scott Adams. At the conclusion of the ringing there was generous applause from all the mourners. The ringing helped to put a seal on what had been a fitting tribute to a wonderful man.

A bright, warm, sun, shone over Calstock that afternoon as if to typify Mark's warm and bright personality. He was a true Christian and a gentleman through and through. He will be greatly missed by us all.

We send our condolences to Fiona and Mark's family.

An obituary to Mark will feature in the Early 2023 edition of Devon Calls.

Colin Adams

Urban Frank Pidgeon - "Ringing was his life"

Frank Pidgeon of Winkleigh was a life-long ringer who died on 18th June 2022. As his widow Queenie said – "ringing was his life".

He was born on 18th February 1934 at Lane End Farm in Wembworthy. After attending Hollocombe and Chulmleigh schools he went to Barnstaple Technical College where he studied engineering and then he worked for Leonard Holland doing agricultural contracting.

He did National Service in the Royal Electrical and Mechanical Engineers and always liked to say he went in serving a King and came out serving a Queen. He was posted to Honiton, then Yorkshire and ended his service at the Mill Hill workshops in London. He later drove lorries for a soil fertility company, then for Dunn's Seeds and finally for Gregory's of North Tawton before retiring at 70.

He married Queenie in 1965 and their son Stephen was born in 1969.

He started ringing by tolling the bell in Wembworthy at the age of 15 and then learnt at Coldridge with Sam Dart who was a somewhat robust teacher. When he moved to Winkleigh he started ringing there and continued to do so for the rest of his life. The ringers always went to his home after practice night and during weddings for a pint or two of the local Winkleigh Cider. He became Winkleigh Tower Captain in 1996.

He also rang regularly at many local towers including Broadwoodkelly and North Tawton. He rang all over the West Country on regular day ringing trips and all over the country, joining the annual week-long outings organised by Zeal Monachorum ringers.

He was often to be found up Winkleigh Tower doing maintenance of some sort or another. His expert rope splicing services were much in demand all around the area and Winkleigh Ringers often visited other towers with Frank, coming back with ropes to splice or a date to return to splice ropes in situ.

Frank rang until he fell down the stairs (at home) in 2017 and broke his neck. Despite this life-changing injury the doors of his home were always open and all visitors were welcomed. He retained his great sense of humour and always listened to the bells when they were being rung. Until the Covid lockdown the ringers continued to go back to Frank's after ringing as they had before. Frank was a well-known village character, husband, father, ringer, rope splicer, Church Council member, British Legion Standard Bearer for 40 years and keen gardener, who would chat to anyone about anything and he is sadly missed. May he rest in peace.

Andrew Ware