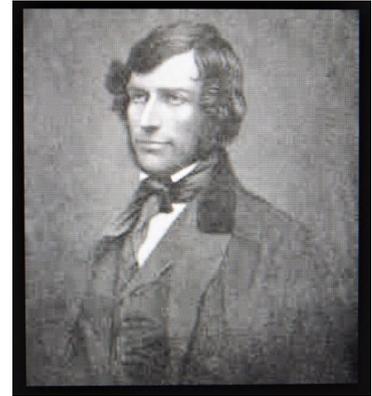


John Mitchell and the Black Hole

I threatened you with this a week or two ago, when we were discussing the contribution to history of the Parrish of Eakring. As I said then, John Mitchell was the son of Gilbert Mitchell, Rector of Eakring. He was born in Eakring, on Boxing day 1724, educated in Cambridge at Queens College, appointed a College Fellow in 1750 and filled a variety of positions during the 1750s. These involved the subjects of Arithmetic, Theology, Geometry, Greek, Hebrew, Philosophy and Geology (the concept of ‘Specialisation’ which we take for granted today had yet to be invented!). During this period he was also Rector of St Botolphs Church in Cambridge. Though there purports to be a likeness of Mitchell (which we attach to this article), it seems of doubtful authenticity. However, there is a well-authenticated description of him as being: “a little short man, of a black complexion, and fat.” Just imagine the furore that would be created by such a categorisation, today! Times certainly change!



Given all the tutorial and religious demands on his time, one might imagine that he had little time for scientific research but not so! In 1750 he published a significant study of magnetism, including the ‘inverse square law’ (the attractive force between a north and a south pole falls off as the reciprocal of the square of the distance between them). It also contained much practical detail concerning the best method of making artificial magnets, an aspect aimed principally at seamen, who were always interested in the use of compass needles. It was partly on the basis of this work that he was awarded Fellowship of the Royal Society in 1760.

However, his period of office in Cambridge came to an end in 1764, when he married a wealthy young woman, Sarah Williamson (Cambridge Fellows were not allowed to be married), though, sadly, she died just one year later. This left him jobless until he was appointed to the Rectorship of St Michaels Church in Thornhill (near Wakefield in Yorkshire), where he remained for the rest of his life. It was frequently the case in the eighteenth century that clerics were able to find time for extra-curricular activities. It was here that he did most of his scientific work, including his proposal that extremely large stars might be massive enough that their gravitational attraction would be strong enough to capture any matter within reach. What was even more significant was his idea that this would include light, thus making the star invisible to us. We see a star by virtue of the fact that it emits light or that light is reflected from it but, as Mitchell surmised, if that light is sucked back in by gravity, it can never reach our eyes. However, Mitchell went one step further – he suggested that we could nevertheless ‘see’ such a ‘dark star’ (the name ‘black hole’ is a much later invention) by observing the effect it has on the movement of other celestial bodies in its vicinity. If, for example, we could not see our sun, we could still ‘know’ of its existence by noting the behaviour of its various planets. Indeed, that is precisely what has happened – we know of the existence of many black holes precisely because of such effects.

This concept of a black hole had even greater significance because it implied that light must consist of a stream of particles with *mass* – gravitational attraction only ‘worked’ between two masses (such as Newton’s apple and the earth!). If, as several scientists, such as the Dutchman Christiaan Huygens and the Englishman Robert Hooke, had earlier believed, light consisted of waves, there could be no such gravitational force and black holes would not exist. However, Newton was convinced that light consisted of a stream of particles and his superior position in the scientific hierarchy had won the day and Mitchell’s hypothesis was therefore accepted by those (rather few) scientists who understood what he was talking about.

“BUT”, I hear you all say, “we know now that light is made up of photons which have wave-like properties but definitely no mass, so Mitchell was wrong all the time and black holes couldn’t have existed, after all!” You certainly have a good point – indeed, had it not been for that other ‘superior’ character, Einstein, science would be seriously embarrassed. He realised that, though Newton’s theory of gravity was undoubtedly a brilliant concept, it was based on rocky foundations (so-called ‘action-at-a-distance’) and it was necessary to look again at the origin of gravitational attraction. This he famously did – his General Theory of Relativity showed that gravity was the result of a *local* effect, the distortion of ‘space-time’ by the presence of a mass and this would influence not only other masses but also (thank goodness) light – so black holes *could* exist after all! Phew! Mitchell was right, after all but for all the wrong reasons! And, let me assure you, he was not the only scientist to find himself in that particular predicament – what we know now takes away nothing from his remarkable intuition – he was absolutely ‘right’ in the context of the physics of his time.

So black holes can exist – of course they can – we all remember those fascinating photographs which appeared in the newspapers about a couple of years ago (even before lockdown), showing quite clearly a dark centre surrounded by a striking red halo, the very first sight of a black hole in all its reality. This image was reaching our telescopes from a distance of 55million light-years and the mass of the star was estimated at six billion times that of our sun - there are some numbers to juggle with! “BUT” (another but) you must ask “Why is it that we can ‘see’ this object when it’s supposed to be a black hole which absorbs all the light from round about itself?” The



answer is complicated (of course!) but runs something like this: the star is spinning on its axis, just like our earth, so, as it attracts matter from all around, it drags it round just as our earth drags its atmosphere round, and this forms an ‘accretion disc’ of very hot gas. It is this disc which radiates the light that we can see. As Mitchell (and, much later, others) showed, this light is generated just far enough away from the star that it can escape – light generated closer in is absorbed, so we ‘see’ a black centre, surrounded by a bright disc. The ring which demarks the centre from the accretion disc is known as the ‘event horizon’ – so here you have two phrases to remember, so that, when the subject crops up in the next Knit and Natter Group or the forthcoming Real Ale Group meeting, you will have some useful ammunition with which to impress your fellow U3A members (but remember, they will have read all this too, so be careful how you use it!).

Speaking, as we were, of the General Theory of Relativity, reminds me that it was this theory which led to the prediction of the existence of Gravitational Waves, which have also been discovered recently – yet another boost for the Einstein success story. But something tells me you may have had enough of this scientific melodrama for the moment. Perhaps it would be better left until next week? Or even next year?

By the way, you probably know that the term ‘Black Hole’ was first used in 1756 in the guise of ‘The Black Hole of Calcutta’. One hundred and forty-three English soldiers were locked up all night in a small room with two small widows and in the morning only twenty-three came out alive. Some widows!

(The omission of the letter ‘n’ makes all the difference!)

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Some More Dialect Words

Now to something a little lighter. You will remember the word ‘smickle’ introduced to us by Jim Benn in connection with the two lions. He has kindly sent us a few more dialect words to puzzle over:

Family Words

John has kindly written about our family’s use of the word “smickle” to denote catching a yawn from someone else. Something we all have done! I thought I would expand on the story.

Firstly let me say that I am a mongrel! I was brought up in Farnborough, Hampshire but I was born in Malvern, Worcestershire. My father was born in Kent of Yorkshire stock and my mother was part Norwegian.

My wife, however, was born and brought up in Goole in the West Riding of Yorkshire (now the East Riding of Yorkshire, not ideal but better than the hated Humberside). After we married I realised the family had a rich vocabulary of words I had never come across and I would like to share these with you.

I have already mentioned “**smickle**”.

After tea someone was asked to “**siden**” the table. I can guess where that comes from.

When it was raining heavily it was said to be “**sileing**” down.

When it is too hot you become “**mafted**”.

When the roads are dirty after melting snow I learnt to say that they were “**blattery**”.

Ladybirds were always called “**cushy cow ladies**”.

The things you put on Christmas trees were never baubles but were called “**mistletoes**”. A much prettier word.

A narrow alley between houses was called a “**ginnel**”, “**snickle**” or “**snickle way**”. I believe this is a fairly common series of words.

There used to be a street in a poor part of Goole called Maison Terrace and, whenever the curtains were poorly drawn they were said to be “**Maison Terrace**” curtains.

It is a rich tapestry. The more so because I cannot remember any similar words I picked up in my youth.

Jim Benn

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Musical Memories

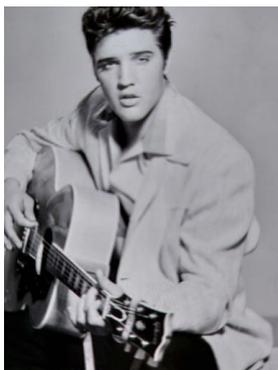
Sometime last February, Michael O'Connor sent me an account of his Musical Memories from his early years. I duly stored it on my computer, then lost it and, finally, forgot about it! Such are the hazards of editing a Weekly Letter! However, he, thoughtfully, reminded me of its existence and kindly agreed to re-send it, together with appropriate photographs of famous artists, so here it is as a reminder of all our early years (some a little earlier or later than others, perhaps).

My Memories of Music at an Early Age

I grew up in an Irish/Welsh family in Southern Wales, so I suppose it was to be expected that I would be interested in Music. Lacking a wireless or TV, the families would gather round an old piano. A relative was of Italian extraction and played the accordion in the Newport music halls. Each family member had their own song to be sung. One uncle had 'Song of Songs', another had 'I'll take You Home Again Kathleen', my dad sang 'Goodbye' from the 'White Horse Inn', and aunt sang 'Galway Bay'. My dad had a sense of humour and always sang 'Paddy McGinty's Goat' and I can still sing all the verses. An aunt was in John Hansen's 'Desert Song' musical troupe.

Of course, Mario Lanza was a favourite but Josef Locke was the king. 'Hear My Song', 'Rose of Tralee' and many more rang out. I still have many of his records and I would recommend the recent film 'Hear My Song' if you want a gentle watch. As time passed, the 'Dubliners' became favourites with 'The Old Triangle', 'Whiskey in the Jar', 'Irish Rover' and, of course, 'The Fields of Athenry', now an Irish rugby anthem. I would also recommend that you might listen to 'The Contender', about Jack Doyle, the legend of Cork.

Anyway, I used to listen to Radio Luxemburg in the late 50s for pop music. As the UK became more influenced by American jazz, swing, trad and, gradually, rock and roll, I began my musical love affair. My first memories were of Bill Halley and the Comets, 'Rock Around the Clock', Johnny Ray and 'Crying'. Although I was never much into Blues, Jazz Skiffle or Folk, I was aware of Muddy Waters, Howling Wolf, Ray Charles and, of course, Lonnie Donnegan with 'My Old Man's a Dustman'.



The biggest impact on me was Elvis and 'Heartbreak Hotel'. Buddy Holly was the big favourite, though and Eddie Cochran's 'That'll Be the Day', 'It Doesn't Matter any More', 'Peggy Sue' 'Everyday' – 'True Love' was played at my wedding!!! Don Mclean's 'American Pie' has a resonance – I can remember reading the news in 1959 when Buddy died in a plane crash. I still have the original LPs of Buddy priced at 11s/9p. I believe that Buddy and the Crickets appeared in Nottingham, as did many of the acts.



Mario Lanza

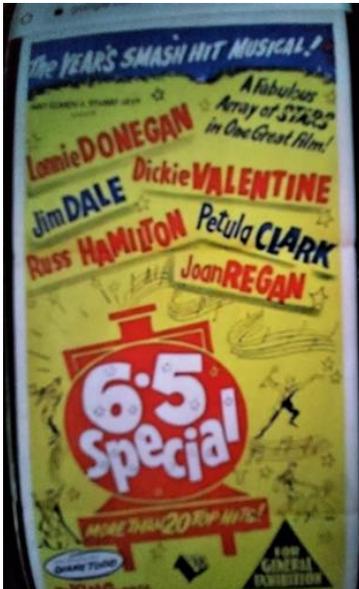


Josef Locke

Then we had the British – Cliff Richards, Billy Fury, Adam Faith and The Beatles, Gerry and the Pacemakers, The Searchers, Johnny Kidd and the Pirates, Dove Clarke and, obviously, Cilla and the incomparable Dusty Springfield. I also remember the Royal Variety Performance in the cold winter of 1962, when John Lennon asked the posh seats to rattle their jewellery!



The Beatles



I never had much interest in playing an instrument or joining a band, as some of my gang did. We had the old Dansette record player and the first album I bought 'GI Blues' by Elvis and the 45 was 'We Ain't Gonna Wash For a Week' by the British version of the Everly Brothers. I do recommend that you look up the Zombies group, who had some great songs. I think that there were so many groups and singers that this would become a rather long list. I didn't get to see many of these acts but relied on wireless or TV. 'Top of the Pops' and 'Ready, Steady, Go' were mandatory watching, as was 'The 6.5 Special'. Then there was David Jacobs with 'Juke Box Jury' – I'll give it foive!

Going to University in the sixties, my party trick was singing 'Good Vibrations' and 'Unchained Melody, Miming to a Parking Light'. At Lancaster, we had Radio Caroline off-shore, to listen to. I also helped out as a bit of a roadie for the University Committee and saw many of the bands or carried their luggage. Perhaps another set of memories?



Buddy Holly

Having a number of children and grandchildren has kept me abreast of developments over the years. Chris Soar and I often talk about songs and lyrics. Anyway, late 60s and onwards comes next – I'll keep you posted.

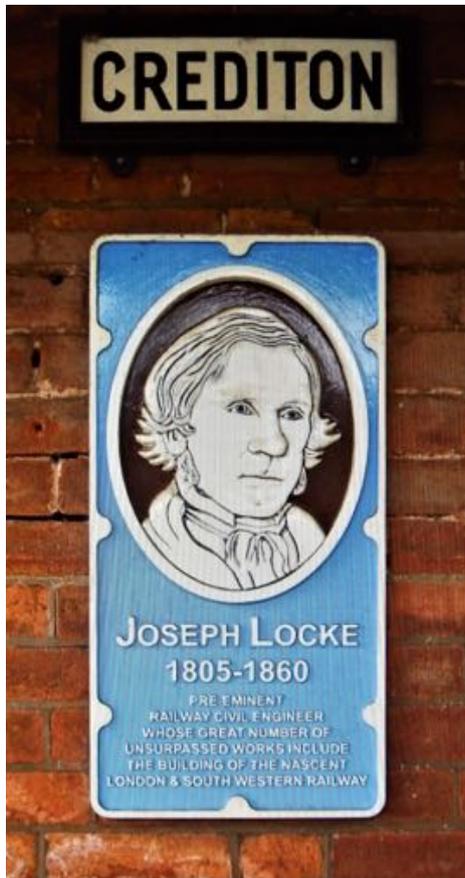
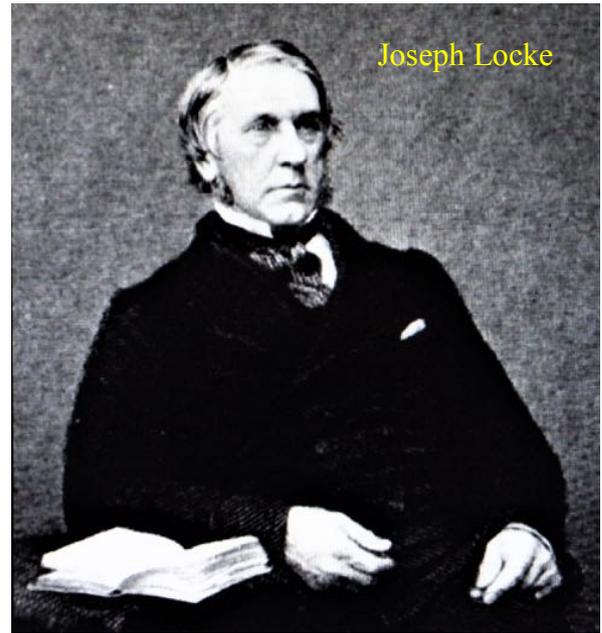
Michael.

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Joseph Locke

Mention of Josef Locke in Michael's article reminds me that there was another famous man with almost the same name, though he was a civil engineer, rather than a singer.

Locke was born in Sheffield in 1805 and soon showed his ability as an engineer. He worked for George Stephenson in Newcastle, building locomotives for the newly opened Stockton-to-Darlington railway and actually drove the 'Rocket' at the line's opening ceremony. He later worked with Stephenson on the design of the Liverpool-Manchester railway and it is thought that he was largely responsible for solving the problem of crossing Chat Moss (a nasty bog). Again, working with Stephenson on the design of the Grand Junction line linking Manchester with Birmingham, he outshone his boss, which resulted in their falling out. However, Locke remained friendly with Robert Stephenson (George's son) and worked with him on several later projects.



Two of Locke's major works were the Lancaster-to-Carlisle railway and the west country line, where he worked with Isambard Kingdom Brunel. There is a plaque dedicated to Locke at Crediton station. He also was elected MP for Honiton and appointed President of the Institution of Civil Engineers. He died in 1860 at the young age of fifty-five. Similarly, both Robert Stephenson and Brunel also died young, worn out by their strenuous working schedules.

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Puzzle Corner

Firstly, the answer to last week's puzzle from Sue Hillyard about the boys with their sweets:

Three boys are talking about how many sweets they have.

A says "B has most sweets"

B says "If C gave me one sweet, I'd have twice as many as A"

C says "It'd be better if B gave me two sweets; then we'd all have the same number."

How many sweets were there altogether?

We can write the second two statements in algebraic form like this:

$$B + 1 = 2A$$

$$C + 2 = B - 2 = A$$

So $A = (B + 1)/2 = B - 2$ and therefore $B + 1 = 2B - 4$, giving $B = 5$

It then follows that $A = 3$, $B = 5$ and $C = 1$ so the total number of sweets is 9

Sue doesn't give up – this week she has presented us with an interesting challenge. Here is her list of English words which contain redundant letters – we would still pronounce the word the same way even if they were not there. The challenge is: can anyone find examples for the initial letters 'V' and 'Y' (The redundant letters are in capitals).

- A. breAd
- B. thumB
- C. kiCk
- D. juDge
- E. hEart
- F. difFicult
- G. reiGn
- H. Honest
- I. plaIce
- J. maniJuana
- K. Knee
- L. Llama
- M. comMent
- N. columN
- O. rOugh
- P. sapPhire
- Q. lacQuer
- R. iRon
- S. iSland
- T. twiTch
- U. troUgh
- V. ?????
- W. Write
- X. rouX
- Y. ????
- Z. fraZZle

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Cartoon Corner

Sadly, we have no cartoons this week but a story to gladden the heart, instead. Malt whiskey is now being made in Derbyshire, would you believe?

The White Peak Distillery was started just three year ago in an old wire works, part of the Derwent Valley Mills UNESCO World Heritage site in Ambergate. It takes three years before the whisky is allowed to be referred to as 'Single Malt', so the new product has only recently qualified. Keep an eye open for it in the shops – though it may be another seven years, at least, before it can compete with its better-known competitors. I'm not sure that I shall have the pleasure of finding out.



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Creative Writing Group

The contribution from the Creative Writing Group, this week, is a sequel to that of last week – also by Sue Hillyard – on the subject of settling in the Canadian Outback.

THE HOUSE - extracts from a diary

Sue Hillyard

August 1798

Fergus has been gone for a week or more now. Mary is missing him and cries for him each night. I've explained to her that we will join him in Canada one day but the blessed wee bairn doesn't understand - all that she knows is that daddy isn't here to carry her on his shoulders or to hide peas in his beard.

March 1799

How I miss Fergus. The birth of our son was not easy and I thank God for my mother and for her wisdom. Mary is delighted with her little brother who I have called Angus after my husband's late father.

August 1799

A year has passed since Fergus left for his new life in Canada. Father McKenzie has read his letters to me and he has helped me with my letters back to Fergus. He was delighted to know that he has a son - he will also be delighted when he finds out that Father McKenzie has been teaching me to read and write a little. I expect to join Fergus before too long and will save that little secret for him.

September 1800

The decision has been made - I am to move out from the croft and journey with the two little ones to Canada in the spring! I will miss Orkney but cannot wait to see my beloved husband again. He has provided for us so well over the last two years and has told me in his letters that he has built a large cabin for us all. He has described the tall trees and the clear waters and the friendly native people and I am worried, yet excited, about what I might find there. He has warned me not to expect sheep roaming freely as there are dangerous animals there. He has reassured me that he will keep us safe.

March 1801

The ship is one of the largest I have ever seen. Our quarters, however, are small and cramped. Mary and Angus have both been sick but I have been told that the sickness will end when we land in a few days time.

April 1801

Fergus greeted me and the bairns with the biggest embrace! We all cried; Fergus with (I think) relief, myself with (can I admit it) passion, Mary with concern for us both (she couldn't remember her father at all) and wee Angus with terror at the huge bearded man who held him so tightly in strong brown arms. Fergus was a little quiet as we drove out to the cabin so I told him all the news from home. I was the opposite of Fergus - I couldn't stop talking. We were both dealing with being back together in our own ways I suppose. Perhaps he was worried that I might not like the cabin or the Indian people that had become his friends.

May 1801

We have all settled so well into the cabin. Fergus had done an amazing job of building it with local timbers and with an array of furniture. The kitchen is perfect and he keeps me well supplied with fresh meats and with dry goods from the cold store at the back. He's had to build a strong cage around the cold store to keep out the bears. They have been in hibernation over the winter and are now hungry to feed their own little ones. I have yet to see a bear but I have seen beavers, moose and racoons.

June 1801

Oh my! The bears are huge! And the wolves at night make such a haunting sound. I think that Angus quite likes the sound of the wolves as they act as a lullaby to help him sleep.

We all journeyed to the trading post last week. There was so much I needed. Fabric for curtains and bedding and clothes. Larger pans and more plates and cutlery. I also found two colourful native made rugs which will brighten up the cabin. The wolfskin rugs we already have are soft to our feet but the colourful rugs remind me a little of some of the craftwork produced back home.

When we returned to the cabin after three days away, I found a bunch of wild flowers on the step. As I picked them up a native woman with a small child in hand emerged quietly from the forest and came to greet me with a friendly smile. Fergus introduced her to me - her name is Tanihana. She and her husband, Tworivers, have two children, the same as Fergus and I. She told me how much Fergus had missed me and how tenderly he had spoken about me - I could almost have felt jealous except for Fergus' strong arm which held me close. If they have some sort of bond then I felt reassured that it was nothing compared to the ties that bind me to Fergus and Fergus to me.

September 1801

How I love this land and this hard, hard life. The cabin now is bright and cheerful and full of love. I bake every day and the children are blossoming. Perhaps I might tell Fergus my secret tonight - that very soon he will have to build a cradle for our new baby - who will be born a Canadian!

And the cabin.....now, instead of being just a house,...is our home. May God bless us all.

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Interest Group News

After several years of running the Singing for Pleasure group, Sue Hillyard has decided to step down as leader. Having said that, if someone would come forward to work alongside her and take over the admin side of things (venue liaison, cash etc), then she would be willing to take the group forward and continue to lead the actual singing.

It is Sue's intention, however, to start a brand new group.

LINE DANCING!

The day, time, venue etc. have yet to be decided, but Sue is very keen to know if there are sufficient members interested in joining such a group.

If you are interested in joining LINE DANCING then please let John Haskell (cotgraveu3a@hotmail.com) know and then await more news.

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That's all for this week, I'm afraid and, what is worse (we would like to think) is that next week's Letter will be the last – at least, until the next Lockdown! Keep well until we can all meet together again, which may not be long, now.

John

