

Inside this edition:



Elevate your mood - reflections on science in our daily lives



Make and create - art and calligraphy activities to try yourself



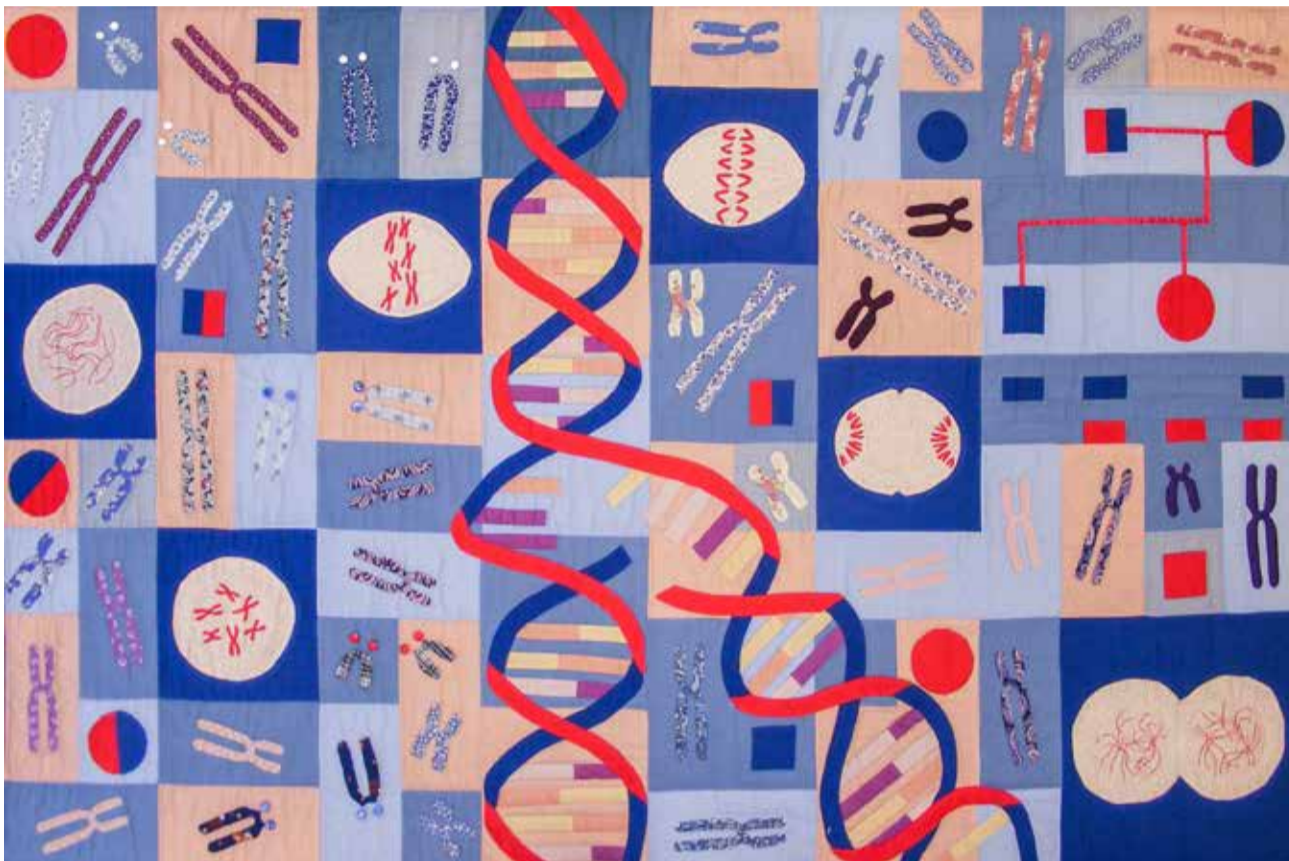
James Macpherson talks about his nature guide



# take the time

bringing colour and inspiration to you

Issue No. 6

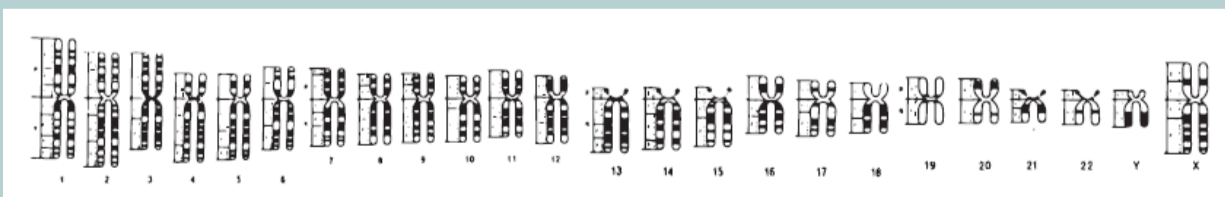


## Science inspires hospital art

As well as co-ordinating monthly exhibitions, ArtCare looks after the art that is on permanent display at Salisbury District Hospital. These artworks can help with finding your way around, add colour to the clinical environment and provide an interesting focus for patients, visitors and staff alike. They can also provide an insight into the science behind the medicine and treatment provided by the hospital.

One such example are the textiles in the Pathology waiting room made by Sarum Quilters. These use symbols that depict various aspects of genetics (chromosomes and DNA) and pathology (viruses and blood cells).

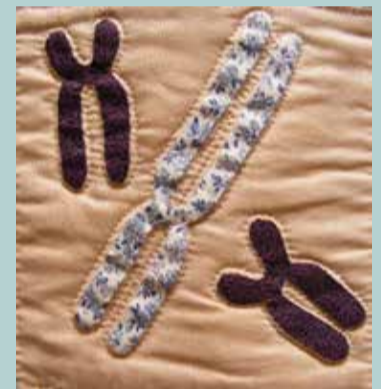
In science images are an important tool to illustrate complex information, they can tell a story of changes over time, as well as describe what you can see when



Humans have 23 pairs of chromosomes. Each parent contributes one chromosome to each pair, so children get half of their chromosomes from their mothers and half from their fathers. Chromosomes are packages of genes found in every cell in the body. There are 2 types of chromosome that determine the genetic sex of a baby. These are named either X or Y. A female baby has 2 X chromosomes and a male has 1 X and 1 Y



The DNA double helix which stores the genetic code



A chromosome is a single piece of DNA (Deoxyribonucleic acid). DNA contains the genetic instructions used in development and function of all known living organisms

viewing a sample through a microscope. Many people will be familiar with a patchwork quilt made from different scraps of fabric at home. These artworks deliberately contrast this domestic familiar feeling with creative use of clinical images to help viewers relate to science in a different way.

*A leaflet guide is available in the waiting room that explains each of the different elements used in the textiles.*

This special science edition has been made possible by a grant from The British Science Association for Science Week 2021





# Medical Images

## X-rays and MRI

### How do images help to diagnose illness?

In 1895 the discovery of the X-ray was an important milestone in the history of medicine made by Wilhelm Röntgen, Professor of Physics in Bavaria. X-rays became more commonly used to treat soldiers fighting in World War 1, finding bone fractures and imbedded bullets. In the year 1913 Salisbury Infirmary took 248 X-rays. By 1919 they were doing 4 times this amount with 1073.

X-rays are a form of electromagnetic radiation, similar to light. However, X-rays have higher energy and can pass through objects and in medicine they are used to make images of inside the body. Many of us will have had an X-ray, commonly at a dentist to look at teeth health or during an examination to check for broken bones.



Early X-rays in Salisbury Hospital's history collection were printed as a negative onto glass plates (*image top left*). Later they were printed onto film and viewed on a light box (*bottom left*). Today images are viewed as digital files on a computer screen (*image above*).

### How X-rays work

- X-rays are a type of radiation that pass through the body. They can't be seen and you can't feel them.
- A detector on the other side of the body picks up the X-rays after they've passed through and turns them into an image.
- X-rays find it more difficult to pass through dense parts of your body, such as bone, and these show up as clear white areas. X-rays can pass through more easily softer parts, such as your heart and lungs, and these show up as darker areas on the images.

### Do you remember doing this?

This advertisement, in the 1930s Salisbury Hospital Carnival programme, says you can have your foot X-rayed to get your shoes fitted. (This was common practice until late 1950s.) A child would try on new shoes, place their foot in the X-ray machine and then parents or the shop keeper could view through a scope, at the top, to see if the toes had enough wiggle room!



### Marvellous MRIs

An MRI (magnetic resonance imaging) scanner is a large tube that contains powerful magnets. You lie inside the tube during the scan. At times the scanner will make loud tapping noises because the electric current in the coils is being turned on and off. It can take 15 to 90 minutes, depending on the size of the area being scanned and how many images are taken.

### How MRIs work

The human body is mostly water, which is made of hydrogen and oxygen atoms. At the centre of each hydrogen atom is an even smaller particle called a proton. Protons are like tiny magnets. In the

scanner, the protons in your body line up in the same direction like needle of a compass. Short bursts of radio waves knock the protons out of alignment and when the radio waves are turned off, the protons line up again. This sends out signals showing the location of protons and also helps to see various types of tissue because the protons in different structures line up at different speeds.

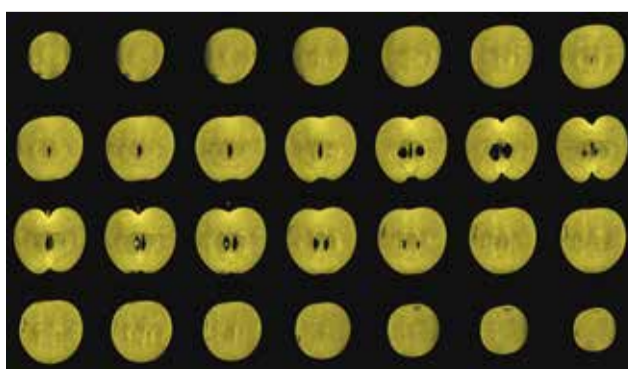


Image: Alexandr Khrapichev, University of Oxford. (CC BY 4.0)



Father Christmas & his elves delivered an extra special Christmas present on 20th December 2020. Instead of a sleigh, he drove a crane lifting a brand new MRI scanner through the roof into a new suite at Salisbury District Hospital. Funded by The Stars Appeal.

*Left*, an apple has been virtually sliced down from the top to the bottom in a series of thin layers. These images, made by MRI, show details inside the apple without damaging it.



# Microscopes

take a closer look



This is Dr Walker's microscope and glass slides from Salisbury District Hospital's historic collections. Dr Walker qualified in 1922 and was the first female doctor, looking after women's health, at the psychiatric hospital Old Manor in Salisbury.



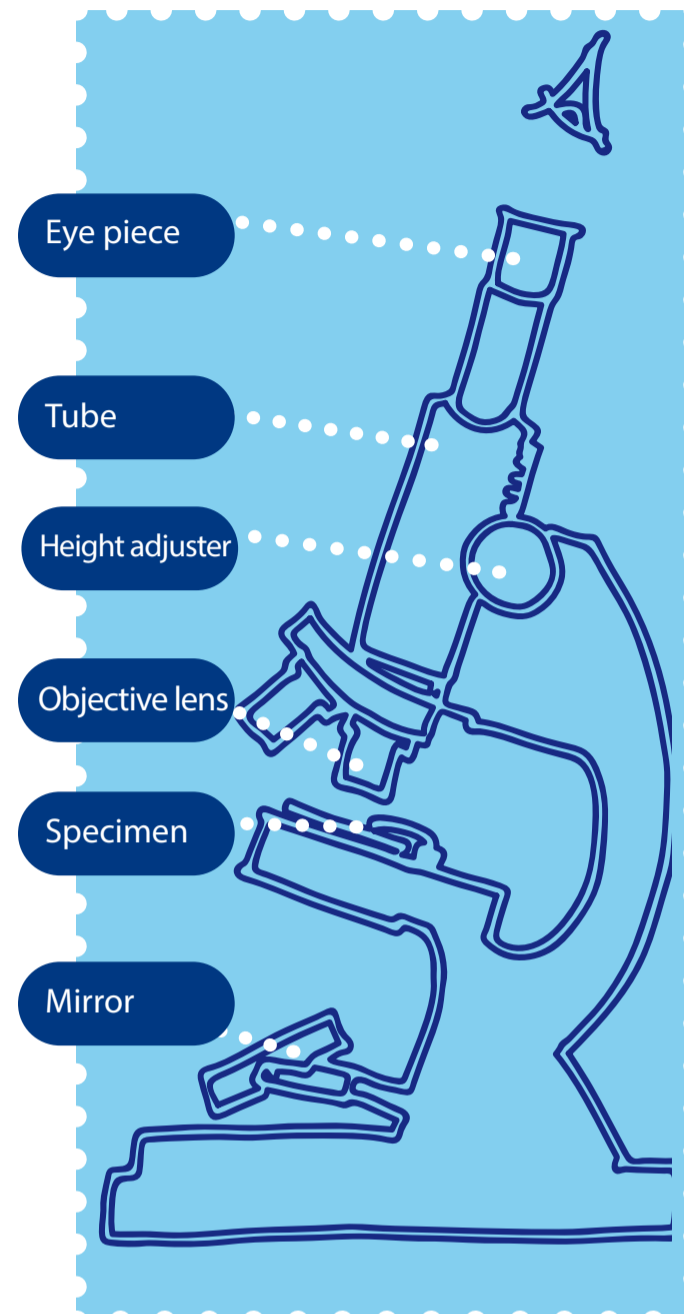
## Did you know?

In the early 20th century there were very few women doctors. In 1881 there were only 25 in England & Wales. By 1911 there were 495. Shortages of medical staff during World War 1 meant there were greater opportunities for women in medicine and surgery.

## How do microscopes work?

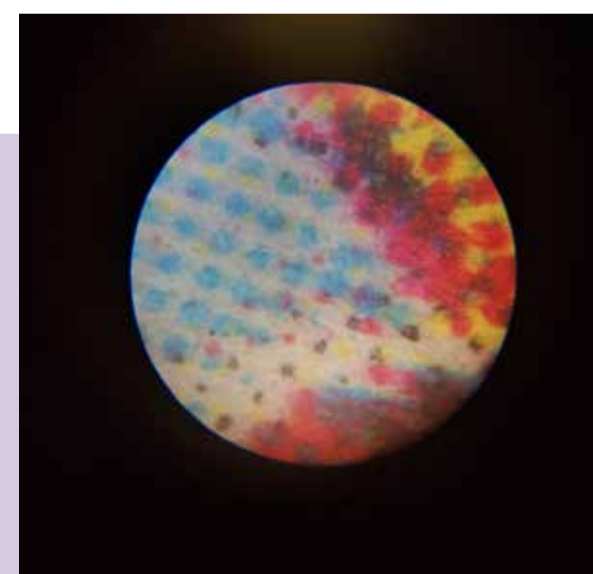
This optical microscope has two lenses. Lenses are curved pieces of glass that bend rays of light to make objects appear larger. Light from a mirror,

at the base, is reflected up through the specimen, into objective lens, which gives the first magnification. These lenses can be various sizes of magnification (On Dr Walker's microscope there are 3 different strength objective lenses to choose from). The image is then increased again by the eyepiece lens, at the top, which is like a magnifying glass. You can see the enlarged image by looking



into the eyepiece. The height adjuster helps to focus so you can see the object clearly.

Find out more about our history archives at Salisbury District Hospital [www.salisburyhealthcarehistory.uk](http://www.salisburyhealthcarehistory.uk)



## Spots before your eyes!

We viewed this newspaper print through Dr Walker's microscope and photographed the image using a phone camera looking down the eyepiece. You can clearly see the printing dots that make up colour images. This is where Cyan, Magenta, Yellow & Black (CMYK) dots make up different colours. By varying the size and density of each colour you can make up all the different shades you see in this newspaper's photographs. *\*In the same way that millions of dots on our photograph can create pictures, the signals from the millions of protons during an MRI are joined to create a detailed image of the inside of the body.*





Science permeates our everyday lives, from work to hobbies, influencing us in ways we are not always conscious of. David Davies recalls conversations with patients that reveal this hidden science.



Detail from Clarence Blackburn 'The Jetty', SDH

*"Memories of working lives can bring understanding between people..."*

Making connections with conversation is so important to our wellbeing, as is remembering things that we've enjoyed in our lives. Often to my surprise, that's where science comes in – the detail behind people's jobs or hobbies. How things work – in building, textiles, farming, fishing, engineering, nursing, caring, cooking, cycling, antiques, gardening, reading, music, dance, art – very quickly broadens our horizons, sparks our curiosity and fills gaps, bringing an understanding between people, often with tremendous fun and lively memories.

Here are some extracts, told with enthusiasm and pride, from creative conversations I've had with patients in hospital over the years about work and hobbies. *(All names have been changed to protect identities)*

Rita was a photographic colourist until colour film made that job obsolete. "It was fascinating and related a lot to water colour painting. The results were always personal and a cross between art and photography. I think this hand-colourist look has become fashionable again, but using hi-tech nowadays".

"I found school hard," Dennis told me, "but I was a retained fireman for 35 years. I was fascinated by all the equipment: the pumps, hose fixings and

how everything was maintained so you could rely on it".

Iris: "My younger brother Sam was a very good engineer. He could take anything apart and put it back together – a sense of being able to know what was wrong and mend things. When we were children, I often helped him".

Stan was a Navy photographer in Malta: "My work was cutting edge at the time. My job was to photograph target shelling after training events. It was aerial work using huge 5 inch film width."



Hand-tinted postcard showing Clock Tower, Fisherton Street, Salisbury

*"We worked as a team, using block and tackle."*

Margaret told me, "This early 1940s photo reminds me of me and my father – I was about seven or eight. I used to help him on the farm with everything including mechanical things. Nothing came for free, there was so much to be done."

From old photographs, George was able to talk about his masonry work: "You had to consider the size and weight of the undressed stone, and the dressed blocks - how you were going to move them safely. We worked as a team, using block and tackle and we used metal churns to

make trestles. Sand, lime, cement mixes were 12:4:1 ratio.

Helen had a huge interest in live music and had seen The Rolling Stones, David Bowie and The Beatles play live. "I've noticed how the sound systems have improved over the years, the mixing desks and speaker systems".

Derek remembered early tractors and paraffin fuel: "It smelt terrible, you could smell it everywhere. We used mechanical rakes and harvesting and threshing machines. We used three and two tine (prong) pitch forks – they were the only two tools you had and their design made them multi-purpose".

Ellen had a career as a scientist and a love for psychology, watercolour painting and poetry. "I love how these things link – one thing makes you understand the other better".

Stan spoke about his work with parts and accessories for the car industry. "The rhythm of car manufacturing, the assembly lines, of supplying accessories was so familiar and great fun".

Ann had taught Latin and loved language and dialect. "I enjoy the sounds that words make especially in poems – the patterns are like music".



'Lisa's Flute', David Bennett, SDH

*"...the patterns are like music..."*



# Off-grid living

Hannah Lefeuvre



The 'electronic epicentre' of Hannah's off-grid system

February is a lovely time of year to enjoy a cut-back garden, as bulbs raise their heads and winter sunshine streams through the bare trees and hedgerows, to lift the spirits. At this point in the year, with the palpable increases in daylight and moderately improved temperatures, we breathe a sigh of relief that the worst of the winter is over.

*With this edition's science theme, I'm reflecting on some of the main elements of off-grid living.*

## Solar electric

Five solar panels on the east wall of the home and twelve smaller garden panels provide enough electric for most months of the year. Positioned in a sheltered valley, we enjoy protection from storms and heavy winds, but reduced solar in the winter. In the three weeks either side of winter solstice, we depend on the east wall panels, allowing just a few solar hours each morning. As the sun emerges over the southern hill in mid January, we enjoy increased light and from thereon, generally have sufficient supplies. We happily forego many domestic plug-in items throughout the year, while the priority fridge and freezer are kept in cold store, on timers, to maximise solar hours. Our back-up electric comes in the form of lithium batteries and an emergency petrol generator, which sounds a few times each winter.

## Water

Outdoor water is harvested into multiple containers throughout the site and regular watering of the polytunnel is a

priority. Meanwhile, the outdoor home produce receives water at its seedling stage and thereafter we trust that the mulch, soil moisture and rain will suffice. For domestic use, water is stored in black barrels, and when solar allows, it is electrically pumped and stored in two small barrels in the roof arc of the mezzanine bedroom, to feed the kitchen sink, bath and outdoor shower.

## Heating

Our home and water are heated via a solid fuel Rayburn, which we tend to use from October to February. The wood mostly comes from our winter cut backs on site, and is cut and stored a year in advance. Excess Rayburn heat runs into a radiator stationed above it and the back boiler feeds the bath, shower and kitchen sink. If a frost is due, the outdoor shower is turned onto a gentle drip, to avoid pipes bursting.

The image (above left) shows the electronic epicentre of our off-grid system, complete with indoor and

outdoor temperature gauges, solar monitors, lithium and lead switches, USB ports, 12 volt sockets and an inverter for higher voltage plug-in chargers. The low voltage makes the wiring safe for the amateur. We keep a close and frequent eye on all of these aspects. It's a mindful existence, but requires constant attention to keep our life comfortable.



Solar panels on the cabin and the wood pile

## Orbiting to Spring

Ninety three million miles away  
It is central to our lives  
Every day we can count on it  
Being up there in the sky.  
The great gas ball, called Sun  
Glowing glaringly ultra bright  
Emitting electro magnetic fields  
With infra red and ultra violet light.

In winter, it hovers low  
As Earth tilts us on its axis  
Taking us into cold dark space  
Peaking with the winter solstice.  
We spend more time in darkness  
And adopt a torpid state  
Coldness creeps through our being  
And many creatures hibernate.

But Sun, is ever present  
Gently melting the morning frost  
And Earth is ever orbiting  
Towards the warmer vernal equinox.  
It is such a gradual process  
But our star is so very great  
That with every passing day  
We reclaim the energy that it radiates.

Increasing spectral light

Creates the season of renewal  
Longer, brighter days  
When hope ever springs eternal.

Warmth returns with open arms  
And plants eagerly come to life  
Flower buds start forming  
And green shoots appear overnight.

A new season brings unique gifts  
But the promise of spring in the air  
Lifts us to the greatest heights  
And expectation is everywhere.  
So yes, thank our lucky star  
Round which we go again,  
It has a truly epic stellar role  
To which we are inextricably beholden.

*Fiona Lockwood, 2021*



**Would you like to contribute a poem or image for a future edition? See the pack page for more details.**



# Kale deserves a cheer!

Stephanie Jalland



and skin, Vitamins C and E and zinc which all play a role in our eye health, it's high in fibre and water which aids a regular and healthy digestion and Vitamin K for our bones. One serving of raw kale has just 33 calories and only 7 grams of carbohydrate so it's a

*Kale deserves to be the food we love because it loves us...*

very diabetes-friendly, weight- friendly vegetable.

Kale a member of the Brassicacea, or cabbage family, has firm, curly leaves that do not form a head and is usually deep green or purple. It's a cruciferous vegetable, from the Latin 'cruciferae' meaning 'cross bearing', because the four petals resemble a cross. Have a good look at the patterns on the leaves next time you are chopping it up ready to cook. Enjoy munching that leafy goodness!

February, new life in the garden begins as the snowdrop bulbs spear through the earth. They receive so much love and affection. Whilst out in the fields a hardy vegetable has been growing and stands decorated by and positively enjoying the snow and frost. There is so much kale and cabbage ready to eat. Not surprising then that one of the Anglo-Saxon names for the month of February is 'sprout-kale'.

Kale deserves a cheer! Love it or hate it, kale might not be the food of love you associate with February, but throughout history it has been one of the most commonly grown vegetables in Europe.

In Scotland, the traditional diet is so rich with kale that the word 'kale' (also spelled 'kail') is the same as the word for 'food'. There's a common saying that when someone isn't feeling well enough to eat that person is 'off one's kale', and a small kitchen vegetable garden is

referred to as the 'kailyard'.

Kale is very hearty and able to stand up to up to temperatures as low as 10 degrees below zero. A heavy frost, doesn't do damage, in fact the frost enhances the flavour as it encourages the plant to transform starches in its leaves into sugars.

As it is so easy to grow and highly nutritious, during the Second World War the British Government encouraged citizens to grow kale to make up for nutrients potentially lost due to

rationing. Kale is a food superstar, it's so versatile you can eat it raw as well as steam, roast, braise, boil and add it to whatever you are cooking or even blend into a smoothie!

*Kale is a food superstar, it's so versatile you can eat it raw as well as steam, roast, braise, boil and add it to whatever you are cooking...*

Kale deserves to be the food we love because it loves us, it is so rich in nutrients, it can be beneficial for our bodies and health in so many ways. Kale is rich in: beta carotene, that our bodies turn into Vitamin A and is good for hair

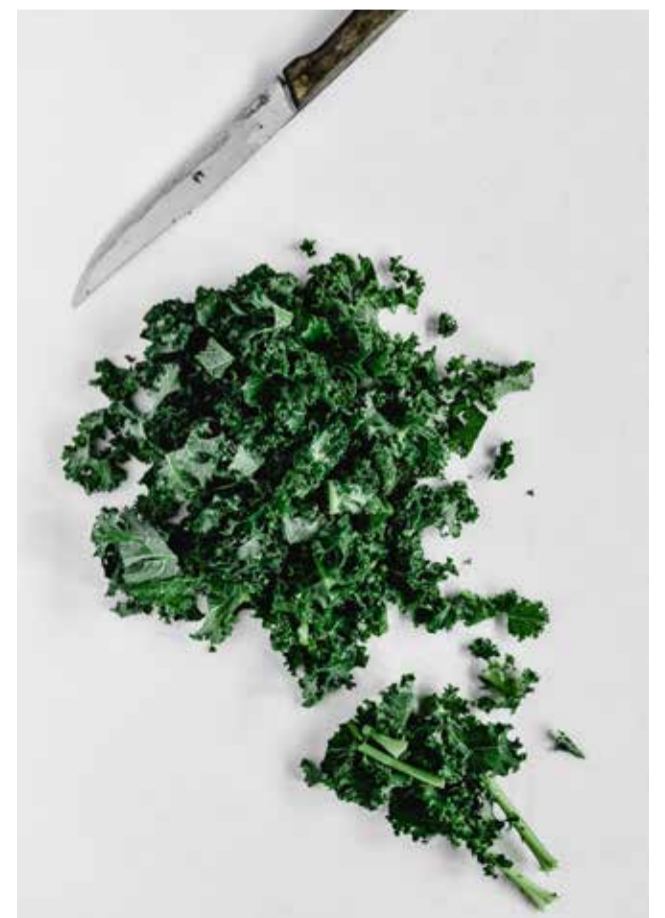


Image: Eva Eljas www.pexels.com



# Make and Create

*Have a go yourself*



## X-ray inspired artwork: Using light

Cyanotype (or sun print) is a printing process that uses light sensitive ink to create a shadow image onto paper.

- Place a flower, leaf or grasses onto a sun print sheet of paper
- Leave for a while (the instructions will suggest timings)
- Rinse the paper in water and your design is revealed!

Once dried out your print will be really good for making greetings cards, scrapbooks and collages.

TIP: If you don't want to buy sun print paper you can also use cheap sugar paper. Leave on a sunny window sill with some dried leaves or objects on top and after a few weeks the sun will have faded the exposed paper. The paper beneath the object remains the original colour.

## Get handy with calligraphy

This calligraphy artwork by Christine Marr is one of a pair installed in the Radiology Department at Salisbury District Hospital. Created in 1993 Christine uses inks and gouache paint to illustrate the historic developments of X-rays. The central drawing of a hand has been made up with words to look like the bones they represent, as seen on an X-ray.

- Phalanges = finger bones
- Metacarpals = palm bones
- Carpals = wrist bones
- Ulna & Radius = arm bones

Have a go at some calligraphy writing. Either copy the letters with some tracing paper or try out in the space below. Tip: Use chisel-tip felt / marker pen or an ink fountain pen, with a wide nib, to create the thicker upright strokes.



*a b c d e f g h i j k l m n*

*a b c d e f g h i j k l m n*

*o p q r s t u v w x y z*

*o p q r s t u v w x y z*



# Nature on your doorstep

*The hospital's green spaces are an untapped resource waiting to be enjoyed*

James Macpherson talks about his NHS nature guide recently published by ArtCare and sponsored by Salisbury Hospital League of Friends. His book contains detailed photographs to the areas around Salisbury District Hospital and is packed with information about wildlife, habitat and areas to explore locally. Copies are available from ArtCare, contact us for more details.

My motivation for this project has been partly personal and partly altruistic, arising from two strands of thought: a deep and lifelong love of natural history and the countryside, coupled with a gradual realisation that the green spaces of Salisbury District Hospital (my workplace of 30 years) – and indeed those of other hospitals – are an untapped resource for nature conservation which could be developed for the benefit of staff, patients and visitors alike.

Green issues, wildlife conservation and sustainable living are at the forefront of public consciousness as never before, while the current genre of 'mindfulness' as a means of improving mental health and general well-being should allow us to recognize that being close to nature is an invaluable, free therapy which can be harnessed to reduce stress levels in the population at large; thus, I envisage that many healthcare sites around the country could be actively managed to provide important habitat for wildlife as well as creating a community and educational facility for the common good.

If you can't live in the country, the next best thing is surely to work in the country- and I have been lucky enough to have had one of the best possible



commutes, taking in the chalkstream glory of the Avon, through the awe-inspiring architectural splendour of the Cathedral close, finally to arrive at my workplace within the hospital, situated on an elevated site with stunning views over Wiltshire's fine chalk downland. This is a rare and special habitat with which southern England is particularly blessed (its wildlife diversity comparable, in species numbers, to the tropical rainforest) and which during my frequent walks around the SDH site I have been able to enjoy on a daily basis.

Chalk grassland plants such as bee orchid, wild carrot and marjoram have readily colonized the verges, courtyards and garden areas of the hospital without any need for special management, and these have in turn attracted a plethora of insect species- effectively establishing a local nature reserve for free, but hitherto largely unnoticed by the thousands of people who pass through the grounds each day.



*Dr James Macpherson has worked as a Clinical Scientist at the Wessex Regional Genetics Laboratory, Salisbury District Hospital since 1989. He has co-authored numerous scientific publications and at the time of writing is Chairman of the Salisbury and District Natural History Society.*

Many species of bumblebee forage on chalk downland flowers from early March onwards, and a number of these can be found at SDH including the common buff-tailed *Bombus terrestris* and the red-tailed *B. lapidarius*. Also in March, the first butterflies to appear are usually Brimstones.



## Your contributions

Would you like to see your own reflections, a poem or image in our next edition? Please send your items on the general theme spring into summer:

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