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HERE COMES THE SUN: SUNSHINE AND ITS EFFECTS ON HEALTH, SLEEP AND MEMORY

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A week Last Monday was, according to the pundits at the Sun newspaper, the most depressing day of the year, as based on a quasi-scientific analysis of day-length, temperature, and accumulated depression over the months of darkness. In fact today feels even worse

Well, there is hope, at the other end of the Earth. Daily Mail, early January 2018 – Daily Mail forecasts heat wave.

That's all well and good, but can cause problems – skin cancer; Damage to DNA by ultraviolet light; can be lethal.

Australians – slip, slap, slop with Sid the Seagull, but skin cancer still rising.

Experts – *sunshine is dangerous!*

But, what they should be saying is that sunshine is good for you!

In fact effect of sunlight on skin cancer discovered in survey of US Navy in 1930s; sailors had more skin cancer – much publicised. However, often forgotten, the survey also found that OTHER cancers – much more common than skin cancer – were LESS frequent among the sailors than in the general population – first hint of the powerful effect of sunlight on health.

I know that only too well; take it from me, ladies and gentlemen, here in the soft and sensuous south, you have it easy. I spent ten years in Edinburgh as a student, a postgraduate and a junior academic; and thought it was a wonderful place, except of course for the weather. Billy Connolly put it well: *There are two seasons in Scotland: June and winter.*

In fact a lack of sun that is more than unpleasant, and may have a severe effect on health, which is what this talk is all about. Robert Louis Stephenson; died of TB aged 44 Wrote of Edinburgh: 'The weather is raw and boisterous in winter, shifty and ungenial in summer, and a downright meteorological purgatory in the spring. ...

Happy the passengers who shake off the dust of Edinburgh, and have heard for the last time the cry of the east wind among her chimney-tops!" He left for California and, and died young in sunny Samoa, and it may well be that the Edinburgh weather had something to do with his early death, which is the theme of this talk.

Most striking difference is not the temperature but sunshine.

Edin and Glasgow among the most northerly large cities in world. Tend to forget just how north Scotland actually is – there few large cities in the world north of Glasgow, and less than 2% of the world's population lives north of that city.



Sun filtered by atmosphere; also gulf stream brings clouds

Sun map of Europe – shows how exceptional they are

Sun map of UK – see a great difference. The south coast of England has c1600 hours bright sunshine vs

Much of Scotland that has only 1200 and in the NW only 900. And Edinburgh has it worse, because of the haar – sea mist.

And there's another difference between Scotland and England; the Scots die younger. And if you draw a map of life expectancy in UK, striking decrease; particularly Glasgow – see Glasgow blob.

Why is this? Some obvious causes – higher smoking and alcohol rates, poor diet, still poor housing in many places. Figures often shocking. Mean life expectancy for men in Somalia is 28 years less than in England; but in Glasgow, men in the inner borough of Calton has a male life expectancy 28 years less than that of the suburb of Lenzie, five miles away. The Glasgow effect; went to a conference last week in Edinburgh about inflammatory bowel disease; Glasgow doctor quoted differences in mental attitude to death – San Francisco; death is avoidable; London, death is inevitable; Glasgow, death is imminent. Can see this on the map.

An old problem; Scotland seen as sick man of Europe; when I went in 1962 it was a four year difference, now down to two and a half years – but the gap is not getting smaller.

In fact, for older people is getting bigger; remarkable coincidence that this started in 2010 just when there was a change of government in both Scotland and England.

Scotland is worse for a great variety of diseases, cancer, heart disease etc. Also mood; twice the suicide rate of England in men.

Classic case of sun-related disease – rickets. First known case 5000 year old woman in T'ree.

Rickets – shortage of vitamin D; in oily fish but sunlight most importantly.

But why? More and more it seems that it has to do with climate; and not just political climate, but climate in the scientific sense, sunlight most of all. Sun's rays attenuated by the atmosphere; reduces the amount of UV light. Causes tanning, and does much more; for involved in vitamin D synthesis.

Vitamin D not really a vitamin, but a hormone; once thought to be simple stuff involved in calcium metabolism, but in fact has a role in brain cells, the immune system, and much more. In oily fish, mushrooms and the like, but most important source is sunlight on naked skin; and – take it from me – in Edinburgh both those are rare commodities!

If draw map of the world, can see that when it comes to much of world not enough UV light to make enough vitamin D every month of the year. Nowhere in Europe can do this, even in S Spain; and if you draw a line through Birmingham, as so many people would like to, there is nowhere north of there that it is possible to make enough D from sunlight alone. Effects are striking – Bordeaux has twice as much UV as Edin. Alters ability to make vit D dramatically – Edin can make enough only 4 months a year; Marrakesh can do it for 10.

In fact the Europeans have evolved to deal with this – loss of black skin pigment when moved out from Africa. Fossil DNA – Ukraine – still dark c5000 years ago

Scots – extreme example of melanin loss; the palest people. Many have red hair – remarkable; now know that this came in from hybridisation with Neanderthals – lived in a very cold Europe

Rickets first sun-related disease to be tackled h definition: Rickets: bones become “flexible like wax that is rather liquid, so that the flabby and toneless legs scarcely sustain the weight of the superimposed body ... the back, through the bending of the spine, projects hump fashion in the lumbar region.



Oldest known case - T'ree

Once known as the English disease; first described in 1645 by English David Whistler: described bones as being plastic. Universally known as the English disease. In fact strongly related to sunlight. Now know – due to shortage of Vitamin D, made in the skin. By far most important part of natural input is sunlight – only 10% of what is needed found in average British diet.

In 1930s – determined attempt to apply this to the inner city, where any or even most children had rickets. I now live in Camden Town, next door to Amy Winehouse, but then Camden was a slum and in fact there were more than twenty people living in the house in which my wife and I live. Previously I lived in Islington, even more crowded in those days. Rickets was rife, and nearly all children had signs of it.

Then came the War: 1942 – collapse of morale. Singapore had fallen, Leningrad was under siege, and in North Africa the British were in retreat. To combat defeatism, the government put out thousands of propaganda posters showing handsome houses, new schools, charming villages, or beautiful countryside, each bearing the slogan “Your Britain: Fight for it Now”. On the insistence of Winston Churchill, just one was kept from the public eye. It showed a modernistic health centre that fronts a piece of urban waste. Upon it stands a stooped and half-crippled child. It was the Finsbury Health Centre: Churchill claimed Churchill banned the poster because to his eyes it seemed “a disgraceful libel on the conditions prevailing in Great Britain before the war”. Has inner shot – solarium et

1945 – Attlee; NHS set up in 1947 – I was born in 1944; member of that generation – UV lights, dried milk, sun lamps. Massive attack on rickets by government; rickets declared extinct in 1954. But then came move away from Nanny State – school milk removed, school playing fields sold off; 10 000 sold off in the 1980s and 1990s.

Dramatic effect – rickets before and after treatment.

But not just rickets!

Even infectious diseases treated with UV – lupus vulgaris (TB); ditto respiratory infections.

Striking global fit for all cancer, breast cancer, prostate cancer, type 1 diabetes, multiple sclerosis and more.

General health – big Swedish survey of women who expose themselves to a lot of UV, to some, and to almost none. Dramatic difference in survival rates; heart disease the biggest killer for the low UV group.

A difference between the high and low UV groups equivalent to that between smokers and non-smokers

Now rickets is back; although not at the level of the 1930s. Since 1960s, up by 10 times in UK, and true all over the world. True all over world; 2016 WHO report – rickets and osteomalacia are “fully preventable disorders that are on the rise worldwide and should be regarded as a global epidemic”.

Why? Almost certainly a change in human relationship with the sun. 1930s and after war – sunlight seen as desirable; but now seen as either uninteresting or even dangerous. Notable how much related to behaviour – e.g. renaissance Italy, rickets a disease of the rich as children kept inside to save pale skins; then shifted to poor in C19.

British rickets also on rise

How can we measure how much UV people get?

Let me embarrass myself by talking about my own research, briefly.

Single helix. One of the world's top six experts



Polymorphism in snails –Extreme variation in colour – almost black to almost white.

based on a stable yellow paint mixed with a blue dye that breaks down in sunlight. That green mixture then fades back to yellow at a rate that depends on the amount of light to which it is exposed. I became briefly involved in a scheme to use the system on men. Albinism – a lack of skin pigment – is quite common in parts of southern Africa and those with the condition are advised to stay out of the sun because they are at real risk of skin cancer, incidence a thousand times greater than in their dark-skinned fellows. Nine out of every ten die before they reach forty. Once worked in Botswana; discussed the idea of making caps out of a yellow cloth soaked in the blue dye to measure how much time young people with that problem actually spent in sunshine, rather than what they told their parents. The idea went nowhere for it failed its ethics exam, as the authorities told us that we would have to tell our subjects what the caps were for. That meant, we were sure, that the kids would simply take them off as soon as they were out of their parents' sight, and we abandoned the idea.

But now – plastic sensor; polysulphone badges – break down in sunlight; pinned onto Manchester citizens. In fact weekday most people spend only an hour a day outdoors, and most of that when little UVC

The sun is at its highest in the two hours around noon, but even in summer each subject went outside in that period, on average, for no more than nine minutes on weekdays and twice that at the weekend. From ten in the morning to three in the afternoon (the only time with enough ultraviolet to make any significant amount of the vitamin) exposed themselves for just twenty minutes each weekday, and forty on Saturday and Sunday. Their vitamin D levels were at their highest in September, although even then only one in four managed to generate the recommended amount. By February, several among them were dangerously deficient.

For children, part of that is due to new age of screen life, Young people now avoid the open air. average, sixty minutes a day less outside than they did even a decade ago. British children are among the least active in the world. Just one in six in their early teens takes the recommended hour of exercise in the open air each day (and Scotland is at the bottom of the list, sharing that ignoble position with Estonia and Qatar).

In other words, when it comes to Here Comes the Sun, everything has changed since the 1960s. Other things have changed, too. Edinburgh has survived better than some places, but lots have been destroyed – the New Club then and now. More of its monuments have decayed, Jones picture new PhD 1969.

However, some things have improved. One thing is for sure; the weather has improved – number of snow days and frost days in Scotland has collapsed since my day. And global warming will put up the temperature to civilized levels by 1980.

Of course the sun did shine in Edinburgh sometimes even before global warming; as shown in this picture of 1930s Princes Street. This picture was seen by an important political figure who admired the city: Goebbels 1938 – Edinburgh will make a delightful summer capital when we invade Britain.

Fortunately, he was saved from having to live through an Edinburgh winter; and now that we are crashing out of Brexit we are even safe from having any political input from Germany or the rest of Europe ever again.