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## Some Notes on Skin Colour Evolution and the Sociology of Race

by

Wilmot James\*

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The colour of the human skin marks our physical presence in the environment like no other feature.

To a visual species as ours, where we are able to recognize colour, it is the one thing that most obviously marks us from a distance.

In time skin colour signaled the stranger, the different, and became the outward badge of inferiority for some and superiority for others.

We developed elaborate systems of ranking where esteem and honour were assigned to those with whiter skins and little of both for those who were darker.

For those of us who knew and experienced apartheid, only too well are we familiar with an order where skin colour became an obsession and where mechanisms were created to segregate people and define, what the sociologist Max Weber called, their chances in life. An extreme expression was apartheid of what was of a more general tendency globally to assign value to the colour of that which is a mere wrapping of the human form. We took appearance to pathology but we were not alone in the more general presumptive habit of thinking racially.

This unchangeable thing that we inherit from our mothers and fathers, and they from theirs', has been the cause of great pain and misery in human history.

It is at the heart of bigotry and racism.

It is the point of the segregation of populations.

It became the by-word for the enslavement of millions of Africans into bondage in the south and north Americas, and much geographically in-between.

Mixed up with the range of other equally noxious considerations, it became tied up with the eugenics movement that took human history, in the 1930s and 1940s, into the death camps of Auschwitz.

Legalised racism is now gone against the advance of democracy and rights-based advocacy and is globally indefensible in the arena of public policy.

Apartheid has become part of the lexicon of that which is, simply, unacceptable.

Banished into the private domain, skin colour nevertheless carries with it a range of assumptions, or is a shorthand for all sorts of anxieties and fears, a 'signifier' of one or the other value, positive or mostly negative, of defining still the stranger in our midst, white among black, black among white.

Stavanthi Challapalli writes about a cream called *Fair & Lovely* by telling the story about an Indian woman named Rupa: she 'has just finished college' and is 'on the look-out for a job and a husband' he says:

Here are what would be euphemistically called 'dusky' looks but to those who matter, she is plain dark. And they 'know' she doesn't stand too many chances of getting a good match. Her job prospects look gloomy too – and that is attributed to her complexion. Rupa, a 21<sup>st</sup> century lass, though disheartened by her failure to

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land either guy or job, deals with it in a typically 21<sup>st</sup> century way – she uses a fairness cream and hey presto! Jobs and bachelors queue up to win her hand!<sup>1</sup>

Sexual selection towards paler skin is no stranger to us, as it also is a common feature of many former colonial and other societies where less aesthetic value is placed on a darker appearance. Challapalli talks about how ‘Indians at large, and most of Asia, for that matter, are partial towards light skin’.<sup>2</sup> Perhaps more revealing as a marketing strategy, *Hindustan Lever*, which made a fortune with the launch of *Fair & Lovely* in the Indian market in 1976, claims that across Asia – from Japan to India – the peoples there have ‘historically have demonstrated a marked preference for skin lightening and glow.’<sup>3</sup> It is, as always, difficult to separate truth from marketing.

Here are some more marketing anthropology:

In certain areas in the Arab world, the lighter you are the more beautiful you are considered. In some countries the implications of this hierarchy go so far as to affect one’s social class and job opportunities. In other places it leads to surgery to ‘correct’ certain characteristics which stray from European-based ideal of a small, straight nose, straight soft hair, big eyes (preferably blue) and fair-skin. Many South Asian women grew up constantly being told to avoid sunlight for fear of growing darker. Growing darker, of course, meant becoming ‘less attractive’.

All of the actors in popular Indian movies and magazines are light skinned, interesting since most Indian women are darker than those in the movies.

In Jamaica a ‘brown’ complexion is often considered more attractive than a ‘black’ one.<sup>4</sup>

The skin-lightening industry is a multi-billion dollar business. It accounts for 60 per cent of the skin care industry, involving almost all of the major cosmetic companies.<sup>5</sup>

It is a growing not a declining market.

The products are creams, soaps, lotions and other skin preparations.

Many of the products are dangerously toxic.

Some of the creams contain mercury and its compounds, hydrogen peroxide, steroids or hydroquinone, the latter effectively a bleaching agent:

Hydroquinone is the most effective skin-bleaching chemical there is. People buy on the streets and in shops even it was made illegal because it caused exogenous ochronosis – permanent damage to the skin including infected cysts, dark blotches and stubborn acne.<sup>6</sup>

Toxic skin-lightening creams are banned in South Africa since 1992. But they are smuggled into South Africa. The *Sunday Times* reported of the existence of a small factory in Ndola, Zambia, that receives runners from South African shopkeepers buying thousands of tubes of *Bu-Tone Complexion Cream*. Swiza Laboratories, as with most of these companies, have the license to manufacture but not to export, making the skin-lightening business a massive smuggling business, involving – in Africa – Angola,

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<sup>1</sup> Sravanthi Challapalli, ‘All’s fair in this market’, *Business Line*, September 5 2002 p.1 (<http://www.blonnet.com> Accessed 4 June 2003).

<sup>2</sup> Challapalli, ‘All’s fair in this market’ p.1.

<sup>3</sup> Quoted by Challapalli, ‘All’s fair in this market’ p.1.

<sup>4</sup> ‘Skin bleaching vs. tans’, *TheSite.org* ([http://www.thesite.org/magazine/specials/body\\_image](http://www.thesite.org/magazine/specials/body_image) Accessed 4 June 2003) p.1.

<sup>5</sup> Ratna Bhushan, ‘Leveraging Lakme’, *Business Line*, February 7 2002 p.1 (<http://www.blonnet.com> Accessed 4 June 2003).

<sup>6</sup> *Sunday Times* 12 December 1999 (<http://www.suntimes.co.za> Accessed 4 June 2002) p.1.

Botswana, Congo, Kenya, Mali, Senegal, South Africa, Zambia, Zimbabwe and many others.<sup>7</sup>

This is no small thing. Mercurial based soaps, purchased mostly by Africa's poor, have devastating health consequences, including among men, women, children under the age of 15 and university students, who all tend to use them:

Visible damages of this practice are the cancers of the skin that develop on the sensitive parts of the cheeks, the neck, the shoulders and the chest. It is very common to meet persons that cover the neck or the chest or the shoulders to hide the damages from these products. The skin of certain parts of the body becomes rough and very dark – indeed blackish, greenish, reddish ...<sup>8</sup>

Then there is the tanning industry, motivated more by health considerations and some measure of vanity among paler skinned human beings. One could say that while so many black and Asian women seem to be after a lighter skin, equally many white western women are chasing that St Tropes tan!

Our skin contains melanin, biological material that gives us protection against the sun's ultra-violet light. There are two types, melanin-cumelanin which is a black-brown and pro-melanin which is red-yellow. Melanin provides the tan when people sunbathe, but is not a sign of health but rather an indication that the skin has been damaged.

Tanning means premature aging of the skin not to mention the risk of developing skin cancer.

The tanning industry is also a multi-billion dollar one. In the United Kingdom alone the market is worth an estimated \$200 million, and growing.<sup>9</sup>

It can also be deadly. In the UK the number of deaths by skin cancer has doubled since the early 1980s.

Over the last five years 8,000 individuals have died from malignant melanoma and rising by 7 per cent per year.

Increasing health warnings have led British consumers to demand products having a higher sun protection factor (now at 25) than before.

Changing skin colour by the application of external agents might be changed by a post-genomic drug, a so-called 'cosmoceutical' which is hybrid of a medicinal drug - that deals with birth marks and skin irregularities - and a cosmetic.

*OSI Pharmaceuticals* in collaboration with one of the world largest pharmaceutical companies *Pfizer* (which is also responsible for the San-based appetite suppressant drug) are planning to manufacture and market a drug that 'blocks the action of an enzyme involved in the manufacture of melanin, the dark pigment that is made in the skin' reports the science editor Robin McKie of the *The Observer*.<sup>10</sup> 'As a consequence of interrupting this chemical blockade, levels of melanin in the skin drop and the skin lightens. Similarly, by stimulating the production of the enzyme, more melanin is made in the body – and a person's skin darkens.'<sup>11</sup>

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<sup>7</sup> Joan Baxter, 'The heavy cost of light skin' *BBC News Africa* 18 April 2000 (<http://news.bbc.co.uk> Accessed 4 June 2002); 'Senegal doctors demand skin cream ban' *BBC News Africa* 3 September 2000 (Accessed 4 June 2003); Cathy Jenkins, 'Fighting against skin lightening' *BBC News Africa* 12 January 2001 (Accessed 4 June 2003).

<sup>8</sup> Julie Chadwick, 'Arklow's toxic soap factory' *WicklowToday.com* 22 July 2002 (<http://www.wicklowtoday.com> Accessed 4 June 2003) p.2.

<sup>9</sup> Daniel Thomas, 'Clouds aren't hurting the tanning industry' *Marketing Week* 15 May 2003 p.22.

<sup>10</sup> Robin McKie, 'Want a new colour? Just rub in the cream' *The Observer* 15 July 2001 (<http://www.observer.co.uk> Accessed 4 June 2006) p.1.

<sup>11</sup> McKie, 'Want a new colour?' p.1.

McKie ends by saying that the drug, 'which is applied as a cream, has been tested in the United States on the Yucatan pig, a creature whose skin has similar properties to that of a human being. These trials will be followed by clinical tests on people.'<sup>12</sup>

The science journalist Steve Olsen in *Mapping Human History* writes about Charles Darwin's notion of natural selection and how mutations, modifications in heritable materials be the vehicles sperm or egg cells, would tend to diffuse in the descendent populations.

When it comes to skin colour evolution, he says:

When people live in equatorial regions, dark skin is a great advantage because it is less susceptible to damage by the sun's ultra-violet rays. Dark skin helps prevent both skin cancer and severe sunburn, which can lead to serious infection.

However, in parts of the world where sunlight is less intense, dark skin can be a liability. Our bodies use ultraviolet light that penetrates the skin to synthesise vitamin D. If vitamin D is insufficient, people's bones cannot grow properly, which can lead to the painful and disfiguring disease of rickets.

One common consequence of childhood rickets is a narrowing of the pelvis. Women who have suffered from the disease are at much greater risk of dying during childbirth.<sup>13</sup>

The story about skin cancer is about right, but because it almost always develops later in life after a person has already reproduced, there is some doubt whether natural selection works on this health aspect of evolution.

In her examination of research says Gina Kirchweger, '[S]kin color ... is largely a matter of vitamins.'<sup>14</sup>

And in the most recent work on the subject, Nina Jablonski and George Chaplin's study is given the headline of introduction as '[T]hroughout the world, human skin color has evolved to be dark enough to prevent sunlight from destroying nutrient folate but light enough to foster the production of vitamin D.'<sup>15</sup>

Jablonski and Chaplin built their findings on two earlier scientific studies: 'One study showed that folate (part of the B vitamin complex) in the human body', writes Blake Edgar, 'breaks down rapidly during exposure to intense ultraviolet (UV) radiation, especially in light-skinned people; up to half the folate in blood plasma can be lost under an hour.' And the second study, he continues, found 'that too low folate levels can cause debilitating neural tube defects (NTDs) in fetuses (the reason why woman should take folic acid before and during pregnancy)'.<sup>16</sup>

Jablonski and Chaplin's conclusion is a combination of anthropology (Jablonski holds the chair of anthropology at the *California Academy of Sciences*), human biology and high-technology satellite data.

What they did as method was take the global ultraviolet measurements established for the first time by NASA's *Total Ozone Mapping Spectrometer* and compared these with published materials on the global distribution of human skin colour variation.

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<sup>12</sup> McKie, 'Want a new colour?' p.2.

<sup>13</sup> Steve Olsen, *Mapping Human History: Genes, Race and our Common Origins* (New York, Mariner, 2003) pp. 40-1.

<sup>14</sup> Gina Kirchweger, 'The biology of skin color: Black and white', *Discover* 22 no.2 (February 2001) p.32.

<sup>15</sup> Nina G. Jablonski and George Chaplin in *Scientific American* (October 2002), p.11. Jablonski and Chaplin, 'The evolution of human skin coloration' *Journal of Human Evolution* 39 no.1 (July 2000) pp.57-106.

<sup>16</sup> Blake Edgar, 'Why skin comes in colors' *California Wild* 53 no.1 (Winter 2000) pp.6-7.

'To their delight' writes Kirchweger, 'there was an unmistakable correlation: The weaker the ultraviolet light, the fairer the skin.'<sup>17</sup>

Changes in skin colour appears to be a natural adaptation to climactic variation in human exposure to the sun's ultra-violet rays that comes about as human populations migrate. Here then is the first body of evidence that modern social science held to be true, more as a matter of faith and conviction, which is that race as category of sub-division of the human species is nonsensical, without foundation.

Skin colour is a point of variation that came about as a consequence of natural selection picking out and then reproducing the most adaptive features to ultra-violet ray exposure among populations.

Making a number of assumptions about molecular time, among endogenously reproducing populations it takes about 13,000 years for natural selection to do its work, to, as Charles Darwin had it, effect change by modification.<sup>18</sup>

Our earlier ancestors, different to us in a variety of respects but unmistakably *hominid*, left the forests and entered the savannah plains with the dual problem of not possessing a device of dissipating the sun's heat and having to work much harder foraging for food; many of the earlier hominids probably perished of heat stroke as a result.

The survivors lost their hair, save for some parts, as a result of developing over 2 million sweat glands, a thermo-regulation device, and evolved to become, like us, long-legged, strident, elegant bipeds.

The fossil evidence, looking at the evolution from the skeleton of Lucy dated at 3.2 million years to the Turkana Boy of 1.6 million years, bears out the changes in anatomical structure.

Underneath the hair there probably was a pinkish skin, like that of our closest living relative, the chimpanzee.

Here, then, we encountered the challenge of protecting our bodies from the dangerous reproductive health effects of the sun's ultra-violet rays.

We could speculate that our earliest human ancestors became like the Masai of Kenya today: dark-skinned as protection against the ultra-violet dangers and elegantly slim to minimize sun exposure, maximize heat dissipation, and able to move quickly and efficiently over long distances in foraging expeditions.

Of African origin, a claim based on the fossil and DNA record, came modern human beings thus, dark in skin colour, inherited from our *hominid* ancestors who had natural selection work on their original pinkish skin by modification.

DNA bears out the African origins hypothesis. The oldest human DNA is found among African populations today, particular the San of Southern Africa.

Himla Soodyall of the *University of the Witwatersrand* and *National Health Laboratory Service* is Africa's foremost and one of the world's specialists in using DNA to trace human migrations over the last 200,000 years or so.

In an *HSRC* published *Africa Human Genome Initiative* occasional paper titled *Walking in the Garden of Eden*, she traces mutations in what is known as mitochondria DNA (genetic materials handed down through female ancestral lines only) to their source and is thereby able to geographically determine who must have moved where, and when.<sup>19</sup>

This is her story:

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<sup>17</sup> Kirchweger, 'The biology of skin color: Black and white', p.33.

<sup>18</sup> Charles Darwin, *Origin of Species*

<sup>19</sup> Himla Soodyall, *A Walk in the Garden of Eden: Genetic Trails into our African Past* (Africa Human Genome Initiative Occasional Papers Series no.2, HSRC, 2003).

The mitochondria DNA of present African populations is between 130,000-170,000 years old. European DNA, so beautifully depicted by the molecular biologist David Sykes in his book *The Seven Daughters of Eve*, is younger at 39,000 to 51,000 years.<sup>20</sup> The Indonesian archipelago features an age of 56,000 to 73,000 and the Americas, anywhere between 7,000 to 34,000 years.

Broad sweeps in time, certainly, it appears as if one group of early Africans left the continent via the middle-east more than a 100,000 years ago, one or more groups of descendants, David Sykes' *Seven Daughters*, became European populations, another group or more broke into a series of Asian lines some of whom migrated to Australia, the Indonesian archipelago and Polynesian islands, another group or series of groups into the Americas via what today is known as the Bearing Straits.

Demographically it was neither linear nor one way, we are unsure whether the migrations were multiple and how populations were affected by the various ice ages and the rise and fall of oceanic water levels.

Still, the broad dating represents the periods over which skin colour evolution must have taken place, from dark to lighter skins as people moved north, yellowish skins as people moved east, and reddish skins as people moved into the central parts of the America's.

The Swedish botanist Carolus Linnaeus' - who lived from 1707 to 1778 – first path breaking work established a system of classification for plant, fish and animal species.<sup>21</sup> He later gave human beings their formal name – *homo sapiens* – and then divided us into four sub-categories: red Americans, whom he described as 'ill-tempered ... obstinate, contented, free', yellow Asians who were 'severe, haughty, desirous', black Africans who were 'crafty, slow, foolish' and white Europeans who were 'active, very smart, inventive'. He suggested that we came from different ancestors within the broader hominid family, that our origins were therefore polygenetic.

It is a point of view that survived and flourished among especially physical anthropologists in the 19<sup>th</sup> century, who measured skulls left and right in confirmation of Linnaeus' notions.

And it crept into the public discourse.

Charles Darwin overturned the classification tradition by defining a device for the growth, development, differentiation, speciation and extinction of living organisms including that the various offshoots of the *hominid* family and called it natural selection, or change by modification.<sup>22</sup>

Still, he had little sense of how genetic inheritance worked on a microbiological level – how could he? – and it took a Gideon Mendel, an Austrian monk who studied pea-pods, to argue that there is such a thing as a gene, the thing that stores information and is passed down the lines of descent.

It took a further fifty years for James Watson and Francis Crick – and as it turns out Rosalind Franklin too – to establish the famous double helical structure that holds *deoxyribonucleic acid* (DNA) together in their millions of human base-pairs and which in this year 2003 will finally be visible as a result of the completion of human genome sequencing project.<sup>23</sup>

M Ridley describes the human genome as a book in which there are twenty-three chapters called CHROMOSOMES; each chapter contains several thousand stories called GENES; each story is made up of paragraphs called EXONS, interrupted by advertisements called INTRONS; each paragraph is made up of words called CODONS

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<sup>20</sup> David Sykes, *The Seven Daughters of Eve*

<sup>21</sup> Carolus Linnaeus, *Systema Naturae*

<sup>22</sup> Charles Darwin, *The Origin of Species*

<sup>23</sup> The Double Helix; HGP



and each word is written in letters called BASES. Whereas English books are written in words of differing lengths, genomes are written entirely in three-letter words, using only four letters A,G,T,C (which stand for adenine, guanine, thiamine, cytosine). Instead of being written on flat pages, the bases are written on long chains of sugar and phosphate collectively referred to as DNA.<sup>24</sup>

In this somewhat potted history is the story of the genetic material that determines skin colour variation.

James Sakwa of the HSRC gives one of the most succinct summaries of the to-date genetic science and functional biology of skin colour variation:

The exact number of genes is not known however several studies have shown two genes; *melanocortin 1 receptor (MC1R)* and *P* genes play an important role and have an influence on human pigmentation. The first gene *MC1R* is found on chromosome 16. There are approximately 30 genetic variants or mutations within this gene and some mutations have been associated with red hair and pale skin phenotypes in individuals of European descent, while others have been associated with skin cancer. The second gene *P* is found on chromosome 15 and genetic mutations or changes in the DNA sequence within this gene have been associated with albinism.<sup>25</sup>

Sakwa goes on to note that skin colour has a multi-factorial genetic foundation, it is not reducible to the functioning of two genes only, and therefore a great deal more work has to be done before there is any real certainty.

The work is being done by scientists, most of whom are associated with laboratories at universities and pharmaceutical companies seeking biotechnological answers to genetically inherited diseases affecting the skin such as *pie baldism* (white patches), albinism (lack of pigmentation), the six types of *Hermansky-Pudlak* syndrome (lack of pigmentation), *vittiligo* (white skin patches) and skin cancer.

Still, we are fairly certain, as Luca Cavalli-Sforza put it at the *Human Genome and Africa* conference, that racial diversity is 'really a small part of human variation because they are very recent and are adaptations to local climate, and thus also to local flora and fauna, which determines diet and includes parasites. It is ridiculous that we are racist because we are merely different for having adapted to different climates.'<sup>26</sup>

It is a human folly of appalling consequence.

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<sup>24</sup> M Ridley, *Genome. The Autobiography of a Species in 23 Chapters* (New York, Harper-Collins, 1999).

<sup>25</sup> James Sakwa, 'Human evolution and skin pigmentation' (HSRC, unpublished paper, 2003) p.3.

<sup>26</sup> Luca Cavalli-Sforza as quoted in *Genome News*, Supplement to the *Mail & Guardian*, 6 June 2003, p.3.