The origins of racism

Them

Racial discrimination may be easier to eradicate than was previously thought

IN THE bad old days of 19th-century eugenics, scientists who had supped at the table of social Darwinism would construct evolutionary trees that had twigs within the species *Homo sapiens*. Each twig was a racial group. The top twig was, of course, the white Caucasian one—since the scientists who did this work were themselves white Caucasians.

Modern genetics has shown the error of their ways. Systematic genetic differences between people from different parts of the world, though they exist, are small compared with variations between people from the same place. The visible differences, such as skin colour, are the result of a mere handful of genes. Under the skin, humanity is remarkably homogenous.

Racism, however, is ubiquitous. It is not only white Caucasians (whatever that term means, in the context of current knowledge) who are guilty of it. That has led to another biological hypothesis, that people are somehow "programmed" to recognise race and be racist.

Robert Kurzban, John Tooby and Leda Cosmides, three evolutionary psychologists who work at the University of California, Santa Barbara, find this hypothesis unlikely. And this week they have published a paper in the *Proceedings of the National Academy of Sciences* that supports an alternative hypothesis.

That hypothesis is that racism is actually an unfortunate by-product of another phenomenon—a tendency to assign people to "coalition groups", and to use whatever cues are available, be they clothing, accent or skin colour, to slot individuals into such groups (or "stereotype" them, as modern usage might term it). The good news is that experiments done by the researchers suggest that such stereotypes are easily dissolved and replaced with others. Racism, in other words, can be eliminated.

You want to be in my gang?

For many years, psychologists have believed (and have found data to support) the idea that, when somebody encounters a stranger, the stranger's characteristics are slotted into three pigeon-holes: sex, age and race. These pigeon-holes are assumed to be long-established, biologically programmed mental faculties.

The sexes and ages of other people are social contexts in which decisions have to be made all the time, so the idea of evolved pigeon-holes to deal with these categories makes sense. The reason for scepticism about the third category is that, for most of their evolutionary history, human beings would never have been exposed to individuals of other races. It is therefore hard to see how a specifically racial pigeon-holing system could have arisen.

On the other hand, there was probably good reason to want to be able to place a stranger within the system of tribal groups, coalitions and alliances that early man would have had to deal with among his neighbours. To the extent that the individuals in those groups had things in common, those things might mark an unknown individual as a group member.

Learning the wrong associations between markers and groups, though, would be maladaptive, so a flexible approach to such markers, discarding them when they prove useless, might be expected. Following this line of thinking, Dr Kurzban, Dr Tooby and Dr Cosmides predicted that, in circumstances in which race was irrelevant to the ways that groups of allies form, prejudice would vanish, possibly rapidly.

To test this idea they used an established psychological technique called the "memory confusion protocol". This involves showing subjects a series of photographs of people, together with sentences of a conversation that those people are supposed to be having.

After that (and without having been warned what to expect) the subject is ▸▸

▸ shown the sentences in a random order, and asked who said what. The information the protocol provides stems from misattributions of words to pictures. Subjects tend to confuse who said what within groups that they have constructed mentally from the information available, rather than between those groups. But the only data available to construct those groups are the words and pictures, so the researcher can work out which criteria are, perhaps unconsciously, being used.

Dr Kurzban, Dr Tooby and Dr Cosmides used two variations of the protocol. In both, the photographs (all of young men) were assigned by computer to one side of the conversation or the other, with each side receiving two black and two white men. In the first variation, the content of the conversation was the only clue to coalition membership. In the second, the individuals on either side wore different-coloured shirts (grey and yellow).

The researchers made four specific predictions: that race would not be "encoded" into a subject's reactions equally in all social contexts; that shared appearance is not necessary for encoding membership of a coalition; that arbitrary cues other than race can assume the properties that race tends to exhibit in predicting membership of a coalition; and that, when that happens, the strength of racial stereotyping will drop. All of these predictions were shown to be correct.

In the first experiment, in which there were no visual clues about coalition membership, a lot of misattribution was correlated with skin colour. However, such misattribution was not overwhelming. Subjects misattributed statements on the basis of which side of the conversation they came from about half as often as they did on the basis of race; appearance is therefore not everything.

It is, however, important. In the second experiment, the results were reversed. Given the extra clue of shirt colour, the preponderance of misattribution was connected with apparent membership of a coalition. Race dwindled into insignificance.

The subjects had been given no prompting about the purpose of the experiment. They did not know that they were supposed to be looking for coalitions. But, subliminally, they noticed them anyway. That suggests their brains were more attuned to clustering by signals that would point immediately to group membership, than by prejudices about which individuals should be forming groups. In turn, that suggests that racial characteristics are operating merely as badges of convenience, rather than pressing deep, biologically determined buttons of discrimination. And that, though by no means a solution to the problems of racially divided societies, might provide a small chink for social policy to work on. ■

Malaria vaccines

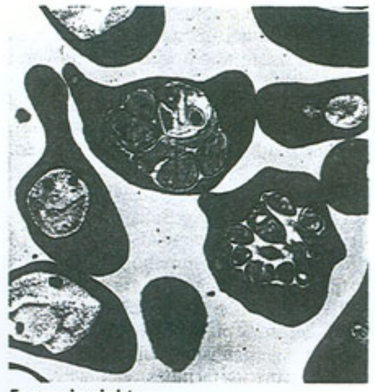
Unintended consequences

No vaccine at all may be better than an imperfect one

ACCORDING to the World Health Organisation, malaria kills about 3,000 people a day, as many as 70% of them children under the age of five. Many groups of researchers are working on vaccines against the disease, but most agree that any vaccine that results will be imperfect. Nobody is expecting to confer full immunity with a vaccine, because the organisms that cause malaria are not viruses or bacteria (the traditional targets of vaccination) but single-celled animal-like creatures. These are a lot more complex and diverse than traditional vaccine targets. It is therefore hard to prime the immune system against all the strains of them that may cause the disease.

That might not be thought to matter much, on the basis that some protection is better than none. But a paper by Sylvain Gandon, Margaret Mackinnon and their colleagues at the University of Edinburgh, published in this week's *Nature*, shows that this ain't necessarily so. Partially effective vaccines may end up doing more harm than good. The researchers' mathematical models suggest that such vaccines may provoke the evolution of particularly virulent strains of the pathogen that causes the disease.

To understand why an imperfect vaccine might increase a disease's virulence, consider the matter from the pathogen's point of view. The main cost of increased virulence is that it will shorten the lifespan of the host, reducing the chances of the disease being transmitted to new hosts. On the other hand, a pathogen benefits from increased virulence because pathogenic organisms that are more virulent are less easily defeated by a host's immune system. That means that once a pathogen gets into a new host, it has a better chance of establishing itself.



Enemy in sight

In nature, the balance between these two forces is what governs the virulence of a given disease. The effect of a vaccine that confers full immunity, from the pathogen's point of view, is to reduce the size of its host population, since only unprotected individuals can then be infected. If anything, that will tend to reduce virulence, since the pathogen will have to hang on longer between transmission opportunities, and so will "want" its host to survive. But a vaccine that confers only partial immunity will increase host survival anyway, allowing pathogens that are not affected to "bank" this increased survival by becoming more virulent themselves.

This means two things. First, in the long run, the vaccinated will be no better off than they would otherwise have been. Second, the unvaccinated are actually worse off, since the newly virulent strain will spread at the expense of the older, less virulent ones. That is something that policymakers need to consider carefully if and when they are presented with a vaccine against malaria. ■

Cosmology

Gravity's elusive ripples

Why spend huge sums on experiments not expected to produce any results?

IMAGINE buying an expensive new telescope and setting it up in a remote spot. You would be pretty disappointed if you couldn't see anything with it, especially if you were expecting it to give you a complete new view of the universe. But that is exactly what some American astrophysicists expect to happen when they start collecting data from a new kind of telescope at the end of this month.

Their $365m observatory, called LIGO, is not built around a huge mirror or a vast dish. Instead, it consists of two pairs of 4km-long metal tubes, located more than 3,000km apart in the states of Washington and Louisiana. It is designed to look not for light or radio waves, but for gravity waves. These have never been seen directly, although their existence was predicted by Einstein in 1916.

Gravity waves should occur whenever a mass is accelerated. Although an accelerating human-sized, or even earth-sized, object would produce infinitesimally small gravity waves, the waves that emanate from, say, the collision of two black holes ought to be detectable. So should echoes ▸▸