Neuro-archeology

Given that man developed from previous species, and survived (and sometimes failed to survive) in different environments, it is hardly surprising that records of our biological past are to be found in our anatomy and physiology—and also in behaviour and sensations. We are indeed living fossils, carrying our biological history. It was this that was read so cogently by Darwin, as revealed in *The Expression of the Emotions in Man and Animals* (1873). This notion, of course, has not always been accepted. Thus the great Scottish anatomist and surgeon Sir Charles Bell—who was the first to distinguish sensory and motor nerves; and he discovered the 'sixth sense' of proprioception—in spite of his immense knowledge of comparative anatomy, drew a sharp line between man and the lower animals. Thus he did not allow that behaviour or expressions of animals could represent any subtle mental characteristics, because these are present only in man. Writing in this connection in 1806 he said that, for “the lower creatures there is no expression but what may be referred, more or less plainly, to their acts of volition or necessary instincts”, adding that their faces “seem chiefly capable of expressing rage and fear”. To which Darwin comments, in the Introduction to *The Expression of the Emotions in Man and Animals*, that dogs can be more expressive than humans.

Here Darwin quotes, with approval, the ardent evolutionist Herbert Spencer (who coined the phrase ‘Survival of the fittest’) from the latter’s now hardly-ever-read *Principles of Psychology* (1855):

“Fear, when strong, expresses itself in cries, in efforts to hide or escape, in palpitations and tremblings; and these are just the manifestations that would accompany an actual experience of the evil feared.”

So symbolic expressions arise from functional responses to situations that have to be dealt with. Spencer continues:

“The destructive passions are shown in a general tension of the muscular system, in gnashing of the teeth and protrusion of the claws, in dilated eyes and nostrils, in growls; and these are weaker forms of the actions that accompany the killing of prey.”

Darwin comments: “Here we have, I believe, the true theory of a large number of expressions.” He continues: “… but the chief interest and difficulty of the subject lies in following out the wonderfully complex results.” This he proceeded to do, in his now classical study of expression of emotions in man and animals, which applies his theory of organic evolution to the development of behaviour and the origins of symbols and mind.

Given that our lives now are in many ways different from those of early man, we should expect to find some inherited behaviour patterns and expressions, which, though they developed functionally, are now inappropriate. But though now functionally inappropriate, they may be serviceable as symbols, representing emotions or intentions—though display of these may now be embarrassing. This is clearly so, for much training of children goes into hiding, or restraining, behaviour and expressions now seen as antisocial. But in spite of socializing training, buried ‘fossils’ of ancient behaviour and sensations do come to light, sometimes to shame and embarrass us, as though the ghost of a long-dead animal or distant human ancestor uttered a too-frank comment from the ridiculously distant past.

Many ancient events, and especially disasters of our ancestors, have left their marks in us; but they are not records of individual events. So distant individual prehistorical events cannot now be read; but classes of historical events live on as records in us.
We must be careful, though, reading these neural records. Thus blushing, for example, is a very general and highly visible symbol of guilt, through violating social mores; but though this ancient sign remains, what produces guilt has largely changed, as our environment and social mores have changed; therefore from seeing or experiencing blushing we cannot with safety read the blushing-language of past embarrassments. This is clearly so, for we know beyond doubt that many situations evoking a blush now could not have occurred in the distant past. Also, animal behaviour can embarrass us now, or at least it did at the time of Darwin, when zoos were not polite.

Are there, however, any examples of specific reactions, from which we might read particular kinds of past events from their traces left in our nervous systems? Here we should unfortunately look for past disasters; for it is these that are likely to leave specific traces. Indeed, Darwin has far more trouble over pleasure, than with pain, fear, or aggression in his evolutionary account of expressions of emotions.

A possible example of such a particular kind of ancient neural event-record, present now, surfaced a few days ago at a party, perhaps surprisingly during discussion with the author of a book on the architecture of Tuscany. He had climbed to the top of the dome of Florence cathedral; but I had to admit, with shame, that I had never braved it. So, we compared notes on exactly what it is like to look down from such a height. We agreed to a most curious and particular sensation, in a region below the stomach, which is present only in just under half the human population. We agreed that this sensation is most odd, indeed unique. This inspired a hypothesis which might be tested by discreetly worded enquiries of ladies of our acquaintance—of what they feel looking down from Brunelleschi’s dome or some other precarious height. For on our hypothesis of its origin this should be a peculiarly male sensation.

Imagine living, as we did, in—and falling down through—trees. Would not the damage to the male be worse than to the female? And would it not immediately reduce the chance of having offspring, from this unfortunate accident? So, would it not, on evolutionary principles, rapidly make its protective mark in the (nervous) nervous system of arborial males?

This suggestion is our tentative theory for the unique in-drawing sensation, associated, at least in men, with fear of falling from a height.

Well, as they say, our enquiries are proceeding. On a sample of five, we find that women describe queasy sensations in the stomach and tingling of the soles of the feet. If successful, we may claim, though with due deference to Charles Darwin, to have invented a new science—Neuro-archeology.

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References
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Spencer, Herbert, 1855 Principles of Psychology (New York: Appleton)