

Cranial Hair and Brow Ridges

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One of the best known and most commonly observed aspects of human anatomy is the bare forehead. This essentially naked zone between eyebrows and hair line has elicited little comment, perhaps only because of its complete familiarity. In spite of the apparent lack of interest in something so obvious, I will here advance a theory to account for this trait.

Among the subhuman primates, only the stump-tailed macaque, the uacari, and the orang-utan regularly have bare foreheads as adults (Harrison and Montagna, 1969:159). These same three primates are also notable for their rather long cranial as well as body hair (Sanderson, 1957). Since the majority of humanity also has long cranial hair, our situation is not unique.

The most obvious connection would appear to be that the bare forehead somehow serves to keep the long cranial hair from falling into the face, obscuring vision and getting into the mouth. This automatically happens because the only cranial hair that would regularly fall into the face is that originating on the forehead. Other cranial hair, where present, is located more posteriorly and will fall more naturally to the sides of the head.

The trouble with this explanation is that it does not apply to man. Human foreheads are nearly vertical from eyebrows to hair line. Those people with long, more or less straight hair find it in their faces just about as much as if it grew out of the entire forehead. Some corrective means are regularly employed to avoid this situation.

Those populations with very curly, spiral, or peppercorn hair forms do not face this problem because such hair stands out from the head rather than falling down. Others, especially certain older males of Caucasoid

and Australoid types, also do not have this problem because of a very retreating hair line—a common form of balding.

Still, the majority of mankind is forced to employ various cultural means to keep hair out of their faces. It is not necessary to travel widely or to consult ethnographies to observe the full range of mechanisms to accomplish this. In many university communities one can see them all today. Cutting the hair short is perhaps the most direct solution. Various adhesive materials are often used, ranging from hair sprays to grease and dirt. Also, the hair may be kept out of the face with such devices as hair pins, by tying it in back of the head, or it can be held down with a head-band.

Human cranial hair requires some explanation while most of the body is essentially naked. Any explanation in terms of insulation or other protection of the braincase suffers from lack of accounting for the bare forehead. Why cover the rest of the braincase and leave one zone bare?

Coon (1965:238) has suggested that long cranial hair provides thermal insulation for both the head and the neck. He noted that the degree of curl in the hair of both Caucasoid and Australoid populations increases as one approaches the equator. Thus in warmer climates the hair does not hang down so freely and the neck receives little insulation, but in regions with colder winters the straighter hair hangs down further and can more effectively keep the neck warm. During times of physical exertion, such as running, long hair flies about and can have little if any insulating effect, but such activity involves increased metabolic heat production which often must be dissipated anyway.

If long cranial hair is as old as *Homo erectus*, the naked forehead would have a functional significance then which it does not have today.

Cranial architecture of *erectus* is considerably different from that of *sapiens*,

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especially in the area of concern here, the forehead. As is well known, the *erectus* frontal bone does not rise as high as ours and it slopes back considerably more. Above the eye sockets, bony brow ridges project strongly forward and have prominent lateral corners. This structural design follows from the relative size and shape of the braincase and the total face, and in itself has no direct relevance to the cranial hair.

Given the *erectus* design of frontal bone, and assuming these people had long hair of the Caucasoid-Australoid type, then it is fairly simple to reconstruct the probable results in terms of hair in the face. If long cranial hair grew from the entire *erectus* braincase including the forehead and was confluent with the eyebrows, then this hair could easily fall into the face just as among many *sapiens* today. However, if the hair line were moved back about half-way along the frontal squama, then the hair originating behind that line should tend to fall down mainly to each side and behind the lateral corners of the brow ridges. If and when the hair does happen to fall into the face, a quick shake of the head ought to return it to the more lateral positions.

In order to test the above hypothesis I attempted to duplicate the *erectus* cranial design on my own head. Since there was no reasonable way to reduce my braincase to *erectus* dimensions, the same effect was accomplished by increasing my forehead slope and brow ridge projection with an artificial addition of material. This resulted in a simulated *erectus* braincase on a greatly expanded scale.

A set of artificial brow ridges and lower forehead was cut from a piece of foam rubber and contoured to fit over my forehead. To this was added an elastic string which could be passed around the head and under the hair to hold the brow ridges in a natural position. Foam rubber was chosen as the material for its flexibility in order that other subjects could make the same test.

The size and shape of this artificial forehead was based, in general, along *erectus* lines with an allowance of extra thickness representing soft tissues of the scalp. The lateral corners were set somewhat back as in the Chellean and Broken Hill skulls rather than more forward as in other speci-

mens from east Asia. Also, the anterior projection of the brows and the backward slope of the forehead were kept to a minimum in order to be sure I did not exaggerate the effect. Actually, the resulting forehead is little more archaic than is found in classic neanderthals. No eyebrow substitutes were added though this may well have increased their effectiveness.

In order to test the function of these brow ridges I found it necessary to let my hair grow for almost a year in order for it to reach a suitable length. Given current hair styles, this posed no particular problem even when I wore a conspicuous head-band for the last few months. Still, it may not be until the publication of this paper that several of my colleagues will find out the actual reason for my 'unprofessional' hair style.

The artificial brow ridges served to confirm what originally appeared to be a reasonable expectation. When the hair is thrown forward it will hang over the brows and onto the face in an inconvenient manner. Then, with the head in a more or less horizontal position, a quick toss of the head throws the hair back and down each side where it stays reasonably well. Jogging a few steps also quickly puts the hair out of the face. (See PLATES VII and VIII illustrating the effect of these brow ridges.) Several other long-haired people have tried out these artificial brow ridges with the same results.

It should be stressed that this experiment is what might be called a typological study. It was designed to illustrate a point rather than to test an actual population situation. Accordingly, sampling techniques and statistical treatment of results have no pertinence here.

Given the known design of frontal bone and the presumed hair form and length, it would have been adaptive for *erectus* to have his hair line begin substantially behind the brow ridges. This combination of traits would represent a stable condition, or 'total morphological pattern', controlling the anterior hair fall. While *erectus* may well have utilized many of the possible cultural means for keeping the face clear of cranial hair, he also had a basic biological design to facilitate the same goal. Similar conditions

evidently continued through the so-called neanderthal stage of human evolution.

With the transition to *sapiens* forehead morphology the hair line was no longer far behind the brow ridges, but became located more nearly above what was left of them. This led to the unsatisfactory condition where long hair would regularly fall down over the forehead and into the face. It can still be shaken aside, but only with the head tilted well back, and even then it doesn't stay there very well.

It has been implied here that long cranial hair was characteristic of the entire species of *Homo erectus*. Those populations today which have spiral hair must have had *erectus* ancestors with long hair to explain their bare foreheads. If they had had spiral hair since the Middle Pleistocene there would be no reason why their cranial hair would not have covered the entire braincase. It would follow that spiral hair is a relatively recent development.

The *erectus* condition was well adapted in terms of cranial hair. The present long-

haired people must resort to cultural solutions of cutting, sticking, or tying the hair as described above. Spiral hair-form affords no neck insulation and is adaptive only in warm climates. Anterior balding reduces protection of the braincase.

The transition from *erectus* to *sapiens* cranial morphology has created a problem which has nowhere been ideally resolved. In all cases (long hair, in the face, spiralling, and balding) cultural solutions are invoked to correct the various deficiencies. Interestingly, the *sapiens* development was itself the last step in the evolution of our human cultural capacity which has provided the means to solve the problems it has created.

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