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On the Nature of Psychograms

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The discovery in Australia of parietal *Montmilch* finger lines which appear to be of Pleistocene antiquity is, in my opinion, one of the archaeologically most significant finds made in this country so far. I shall explain how I arrive at such a seemingly bold statement by discussing three hypotheses.

PARIETAL FINGER LINES – THE OLDEST SURVIVING ART TRADITION

Although a current study of all known sites of this phenomenon in the world (Bednarik and Bednarik 1982) is still incomplete some interesting concepts have already emerged. In Europe, I distinguish three 'styles' of rock art composed of finger lines. They are, as Baume Latrone and Bara Bahau demonstrate, of greatly differing antiquities. The two earlier styles (we are not concerned with finger paintings here) are executed in soft *Montmilch* (*cf*. Schmid 1958: 19 for definition). The more recent of these two, the macaroni-style, sometimes obscures the older, which I term "digital fluting" and which consists of predominantly rectilinear, usually complete sets of four finger grooves that are commonly less than 0.5 metres long.

Digital fluting is the only such style found in Australia. Fourteen sites of occurrence are located along the continent's south, from Perth to Buchan (Bednarik 1984). Other types of linear markings from a large number of caves in Australia and Europe are discussed elsewhere in considerable detail (Bednarik, in preparation a) and need not concern us here. Some Australian reviewers of digital fluting seem to think that in the Franco-Cantabrian region Koonalda-like sets of finger markings generally merge into iconic images. This is reminiscent of Breuil's superseded evolutionary theory which was probably prompted by Pech Merle, Gargas and Altamira. However, as Marshack (1977) has argued, the ability to see an image in a random cluster requires culture, and a conventional concept of iconography. Animal figures entwined by non-iconic finger lines do not 'emerge', they are an integral part of the arrangements in question and I have no difficulty subscribing to Marshack's view that they are not the most primitive, but the most complex component present (Bednarik, in preparation b).

No iconic elements occur together with digital fluting, which is totally devoid of orientation (Eppel 1959: 54) and consists of pure psychograms (Anati 1981: 206). An impression of excitement and spontaneity is conveyed by these presumed externalisations of sensations. Their only post-Pleistocene counterparts are, as far as I am aware, the modern additions adjacent to or defacing the Palaeolithic flutings, and I suggest that the impulse experienced by Wright's expedition members at Koonalda Cave to 'make marks' (Maynard and Edwards 1971: 79) were not prompted by the smooth soft surface. They were more likely a human reaction to existing artefacts (Bednarik, in press a) and investigation of their nature might produce very useful information.

Following his study of the Koonalda psychograms Gallus (1977) developed his elaborate concept of a hominid neural evolution demanding the externalisation of 'engramme complexes' that are able to command some response or action. Marshack postulates an evolved tradition of non-iconic expression that may extend back as far as the Acheulian in Europe. Although I disagree

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with some of his propositions (he contradicts himself on the subject of priority of either language or cognitive perception; Marshack 1976: 281; 1977: 300;), my study of many widely distributed sites of *Montmilch* finger lines confirms his idea of an evolved mode of behaviour.

How could such a distinctive tradition be maintained, diffused or communicated? *Montmilch* deposits are quite rare in Australia, and they are far from common in most other parts of the world. One could consider the possibility that many more caves may have been exposed along the Australian coastal regions during stadial epochs but this explanation is invalidated by the geomorphological dictum assigning *Montmilch* to a warm period *i.e.* a transgression. Some more sites may yet to be found but the problem of temporal and spatial distribution will not be solved thereby. I have proposed that *Montmilch* is the only soft, pliable material readily available to Palaeolithic man whose surface may survive without alteration for tens of millennia (Bednarik, in press b). Only one other material, cave clay, has any such potential at all but in the exceedingly rare instances where its surfaces have endured since the Upper Palaeolithic (in Pech Merle, Niaux, Montespan) they are usually extensively corroded. *Montmilch*, however, may survive if its parietal environment maintains an equilibrium of air humidity, rock moisture, convective temperature, and other factors, and may even become desiccated, in which case it is rendered as mechanically resistant as calcareous flowstone. Its scarcity suggests, however, that it could not possibly have been the sole medium of such a widely distributed, distinctive tradition. As I have in addition to this consideration been unable to convince myself that Palaeolithic man deliberately restricted his finger lines only to those surfaces that could survive to the present, I propose that the extant restriction of this form of expression to caves and to *Montmilch* indicates, in fact, that it was restricted neither to caves, no to *Montmilch*. In all probability it is but a minute sample of a formerly wide-spread mode of behaviour.

By virtue of being processed, *i.e.* sensually perceptible forms of neural structures, such markings could have had an evocative potential. If the marker's cerebral structure was shared by other, beholding humans – which we can reasonably assume – the lines may have communicated a non-conscious message, or perhaps a mental stimulus. Since the vocalisation of a concept could only be achieved much later than cognitive comprehension (knowledge is still largely non-linguistic today), and taking into consideration the complexity of evolved verbal expression, it seems plausible that early man made extensive use of non-verbal communication.

THE DERIVATION OF PSYCHOGRAMS

The semantics or purpose of digital *Montmilch* fluting have been the subject of a number of speculations. I find none of the approximately ten explanation attempts quite satisfactory – although I contributed some of them myself. It appears, however, that the question of derivation at least has been solved. Despite their elementary appearance the flutings comprise no less than six of the fifteen phosphene types established by Knoll (Knoll and Kugler 1959). The impact of this striking observation is enhanced by another reflection: nearly all the remaining of Knoll's types are very common among the non-figurative petroglyphs of Australia (fig. 1). For example, nearly all motifs found at the thirteen known sites in Tasmania (Sims 1977) and in S.E. Australia (Aslin and Bednarik 1983) represent pure phosphene types (– the exceptions being presumed animal track images) and most of the simple and composite motifs listed by Maynard (1977) on Tables 2,3, and Fig. 3 are phosphene types, or compositions of them.

Early man, it seems, did not model the patterns of his psychograms on shapes he observed in his environment. His templates were acquired from the subjective images in his own visual cortex. As these are genetically fixed by the physiological structure of the neural system, their form is only variable by modifications to the optical nerves, or to the cerebral centre of vision. Most importantly, they cannot be influenced by cultural factors, they could at best be supplanted by adaptive/cognitive systems. That possibility is suggested by the waning susceptibility of modern adolescents to phosphenes, and phylogenetic longevity of the phosphene types is suggested by their persistence in the human species. They, and the psychograms which I believe they prompted, remain our only means of direct communication with prehistoric man – archaeo-psychology's chief source of information.

Perhaps the most interesting phosphene forms are those of a *moire* effect, produced by fields of orderly arranged lights in motion relative to each other, causing a dynamic and sometimes scintillating pattern. The "chequerboard" component of these phosphenes possibly relates to the retina's network, whilst other elements may be generated farther along the visual nerve system (Oster 1970: 83-84). These "animated" lattice images, one might speculate, should have aroused the curiosity of early humans. Could they have conveyed the possibility of a *Tektonik* (structure in art), and of an orderly organisation of the objective world? Eppel (1959) directed our attention to the lack of orientation in early rock art, still a distinctive feature in some societies. Is it possible that phosphenes are ultimately responsible for the development of the human concepts of space?

When considering the essence of the universe we must bear in mind one fundamental truism: the evolution of our sensory facilities and intellect can be assumed to have only equipped us with adequate faculties to make them useful; they were not selected on the basis of their suitability in defining the reality of the cosmos – in fact *there was no survival value in that ability*. There was, however, a survival value in the creation and application of the anthropocentric, *ersatz* concept devised by humans themselves. Not only was it adequate (and thus hardly conducive to a quest for a more realistic concept), its origin ensured its success. The orderliness and symmetry of the neural processes prompting the phosphenes is no doubt derived from the ultimately mathematical axioms by which any natural process is governed. To put it crudely, phosphenes could be seen as phenomena translating obscure principles into a form which is perceptible by our visual centre. Naturally, our ancestors did not "discover" this fact, they merely happened to "experiment" with a communications system that was in tune with some aspects of objective reality. We know that somehow hominids discovered that they all lived in a common world. This would have been impossible but for two conditions: in the physical world, processes spread out from centres and retain certain characters, enabling different individuals to perceive the same object; and somehow humans managed to communicate their awareness of this to each other. This does not, however, constitute an advanced state of communication or consciousness. But when humans externalised certain patterns (beginning perhaps with parallel lines), it may have enabled a beholding individual to recognise them as something existing within his own neural system, and he may well have responded with some excitement. Abstract communication was born, and new neural pathways proliferated. But the success of the emerging system of consciousness was not so much due to an evolutionary selection process that had chosen the best suited alternative, it was due more to the characteristics of the phosphenes. The system I claim they have prompted is, however, restricted by much the same limitations that also apply to the human sensory systems: they can only perceive a small spectrum of reality, and for us to deduce from this spectrum (or from our similarly-limited consciousness) the nature of the whole, resembles the naive belief that the consensus of humanity constitutes truth.

The human technological ascent is not a side effect of our successful adaption to the loss of physiologically-determined models of action by the creation of a "mythic framework" (Gallus 1977: 371-374). It seems more plausible to see the emerging human consciousness, and appreciation of the human condition, as the result of a rather successful attempt to define the nature of the cosmos with the aid of a common frame of reference. Its form did not even need to be communicated, it had long been present in the brain.

The model of a slowly evolving intellect moulded by some undefined process of natural selection is not easily reconciled with current evolutionary theory. Evolution may proceed according to the "punctuated equilibria" model, perhaps mostly at times of environmental stress, and the archaeological record suggests a fairly sudden emergence of fully modern humans. The rapid acceleration in the growth of intellectual capacity is the cause of the characteristics we have been accustomed to view as typically Upper Palaeolithic innovations (White 1982). But at the same time the initial source of this development is also responsible for the gulf that is widening in the present century between objective reality, fading away on the horizon as we try to approach it, and the common sense world of Euclid and Newton. It is difficult to grasp the former with our essentially Palaeolithic intellect.

SUMMARY

Three hypotheses are proposed concerning the advent of the modern human intellect. Two are of archaeological content, the third involves philosophical significance:

1. *Montmilch* fluting is the externalisation of a formerly widespread mode of human behaviour.
2. The more frequently phosphene types occur in rock art, the more archaic it is. In the oldest traditions they may dominate to the point of exclusiveness. This suggests that the ability to externalise concepts of reality (*i.e.* art) was derived from phosphenes.
3. Advanced systems of communication, appreciation of the human condition, conscious interpretation of the physical world, and art, all emerged from a single source. Experimenting with phosphene experiences, perhaps predominantly by young people, led to these developments, and the corresponding establishment of new neural facilities.

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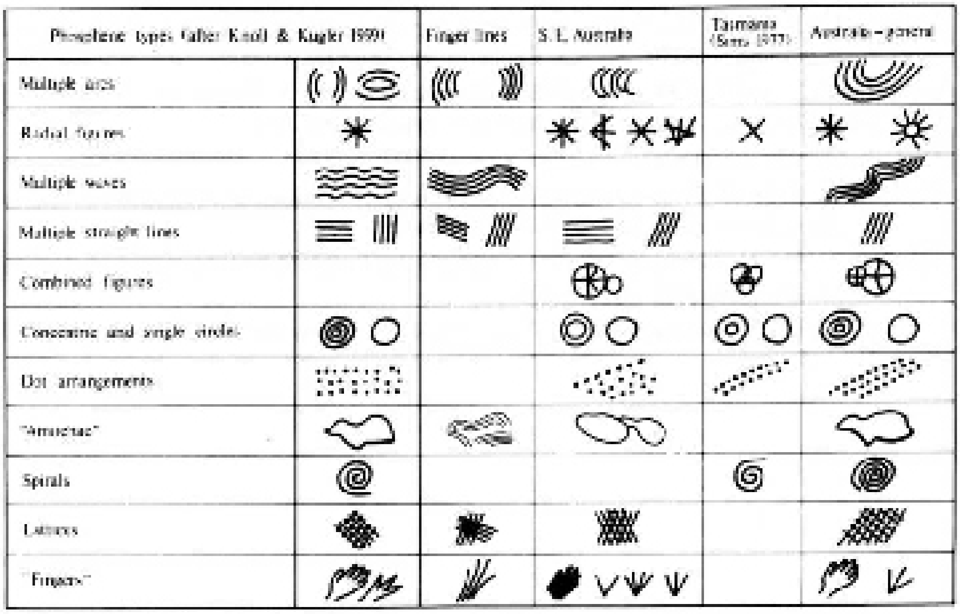

Figure 1

Legend for Figure 1:

COMPARISON BETWEEN PHOSPHENE TYPES AND ARCHAIC PETROGLYPHS IN AUSTRALIA

The changes in the petroglyph traditions from left to right are believed to be in roughly chronological order. The motifs in the last column include combinations of Phosphene Types, and are already associated with traditions using iconic externalisations. All examples of finger lines and S.E. Australian petroglyphs are from Koongine and Karake Caves.