'BIOGENETIC STRUCTURALISM' AND THE LOCATION OF STRUCTURES*

In the heyday of 'high' structuralism it was sometimes argued, explicitly or implicitly, that the ultimate 'explanation' of cultural structures was to be found in the properties of 'the human mind'. This argument, it was perhaps felt, shifted the problem of explanation to the realm of philosophy, which many anthropologists considered outside their concern. It was not surprising, therefore, that sceptics of a more materialist persuasion would criticize structuralist analysis for being an essentially idealist or mentalist undertaking. Even so, the analytical value of the notion of structures (in the Lévi-Straussian sense) has been increasingly recognized, even by anthropologists of a materialist stance (e.g. in the 'structural marxism' of Maurice Godelier (1973) and Jonathan Friedman (1974)), to the extent that nowadays only the most ardent 'vulgar materialists' feel they can do without it. This development has not, however, done away with the problem of the location of structures; the problem has only been pushed into the background, because other problems were felt by most to be of more immediate concern.

But whether or not we have been bothered by the location problem we should all welcome the pioneering work of two authors, Charles Laughlin, an anthropologist, and Eugene d' Aquili, a psychiatrist, in which they lay the foundations of a new structural approach, 'biogenetic structuralism'. In the introduction to the book they state:

> The major ontological assumption upon which biogenetic structuralism is founded is that <u>there exists no reality intervening between the central nervous system and the environment</u>. The corollary is that all other presumed levels of reality have analytic status only. Thus, when philosophers speak of 'mind', psychologists speak of 'personality', American anthropologists speak of 'culture', and sociologists and social anthropologists speak of 'society', they are referring to patterns abstracted from behavioral (or introspective) equivalents of internal brain processes. Behavior viewed from our perspective is the synthesis derived from the dialectic between the brain as thesis and environment as antithesis (11; emphasis original).

And faced with these two realities there is no doubt in their minds (sorry, brains) as to the location of structures:

> The strength of biogenetic structuralist theory ... lies in its capacity to explain much of the cognitive and structural aspects of classical structuralism by lodging structures squarely in specific cerebral structures and functions (14-15).

* This article was written as a consideration of <u>Biogenetic Structuralism</u> by Charles D. Laughlin Jr. and Eugene G. d' Aquili. 1974, New York: Columbia University Press. All page references, unless otherwise stated, are to this work (eds).

And they go on:

> It furthermore combines this strength with an evolutionary perspective that allows one to consider the evolution of cerebral structures in light of the sweep of hominid evolution and the probable adaptive consequences of each major structure (15).

The evolutionary perspective is emphasized throughout the book. Chapter 2 deals with the transition from the pre-hominid level to the level of Homo Sapiens in terms of the relation between brain size and intelligence, defined in the evolutionary sense as 'the capacity of a species in relation to any other species to differentiate and integrate perceptual information into adaptive neural models of their environment' (20). Besides brain size, intelligence is also a matter of the neural organisation of the brain. Some have argued in favour of size, others of organisation as the important factor in the evolution of intelligence. The authors adopt a position between the two extremes, and as the focus is on adaptation, or adaptive behaviour, the long-term increase of intelligence is seen as a systemic causality comprising increasing brain size, neural reorganisation and behavioral changes. It is argued that the interaction between those factors at a certain stage resulted in the critical shift in the functioning of the brain. 'That is, the quantitative buildup of neural complexity created by the time of australopithecines resulted in an ultimate qualitative change in the associative capabilities of the hominid brain' (35; emphasis original).

Having thus reached humanity, chapter 3 addresses the subject of 'cerebral adaptation and hominid evolution'. It does so at some length, describing the different cerebral subsystems, their structure and function, and a short review cannot do justice to the complex and detailed, but very well presented and easily readable, exposition. The same applies to chapter 4 on 'cognitive extension of prehension', a notion which refers to the critical shift just mentioned and denotes, roughly, the ability to associate events and objects other than those completely present in the sensory field. Most of the content of these two chapters is likely to be novel to the average social anthropologist; but I shall only mention a couple of points that I find particularly intriguing.

One point relates to the debate between localizationists and generalists, i.e. between those who hold that a specific area of the brain corresponds to, or controls, a specific function and those who hold that the brain is to be regarded as functionally one single organ. Both sides can bring experimental results as evidence for their position, and the authors once again take a middle position. Having listed the cerebral subsystems in a rather localizationist manner they go on to describe a quite fascinating analogy, or model, of the brain. That model agrees very well with the generalist position, the analogy being that of the holograph. (Holography is a kind of photography in which light from every point of the scene is distributed to many points

on the film, forming an interference pattern instead of a picture. Holography is three-dimensional, and the whole interference pattern is recorded simultaneously on all parts of the film so that a whole scene may be reproduced from just a fragment of the film. Furthermore, a large number of different scenes may be recorded on the same film with the result that billions of bits of information may be stored in a single square inch of film). Applying the holographic analogy to the brain 'would explain the enormous storage and retrieval capacity of our memory circuitry'(80). It is, however, only an analogy, and instead of being carried away by the marvels of technology the authors offer the following sobering observation: 'It is an interesting fact in the history of the neurological sciences that, at every stage, the brain has been likened to the most complex technology available at the time'(80). Previous analogies include clocks, switchboards, and computers, and by going on to holography 'we are continuing a time-honored, but limited, tradition'.

Another interesting theme is that of the adaptive value of certain 'behavioral' traits. As with increasing brain size a similar evolutionary systemic causality is proposed as a replacement for earlier cause-and-effect theories. The 'behavioral' traits in question are bipedalism, use of tools and use of language. To put it briefly, once the neural complexity of the brain had become sufficient to make such traits possible their superior adaptive value made individuals who possessed them favoured by selection. But at this point it seems that a certain automatism took over the selection for adaptive intelligence, with the result that 'behavioral' models emerged whose adaptive value was nil: '... the process of model building and elaboration continues and results in adaptively superfluous behavioral patterns, many of which we have learned to call "culture"'(97). A case in point is the transition from 'elementary' to 'complex' structures (Lévi-Strauss). This is not to be taken to mean that the transition from nature to culture is shifted from the emergence of the incest taboo to the emergence of Crow and Omaha systems; it only means that many of the phenomena which form the subject matter of social anthropology are to be regarded, from an adaptational point of view, as pure luxury.

In chapter 5 on 'neurognostic models' we are again reminded of the location axiom: '... we contend that models of reality and the channels through which they are judged for "fit" with the world are all comprised of real neuroanatomical material, and only such material '(100; emphasis original). Such models are, furthermore, inherited and universal, but to some extent species-specific; evidence for this proposition is deduced from the existence of archetypes (Jung), social organisation based on binary opposition (Lévi-Strauss) and deep structures of language (Chomsky). Additional evidence is derived from the fields of ethology and learning theory. Since cognition is regarded as man's primary adaptive mechanism, a main function of neurognostic models is to satisfy the 'cognitive imperative', i.e. 'man's universal compulsion to order chaotic stimuli into meaningful patterns'(114).

Fear of the unknown is seen as a reaction to the frustration of this imperative, and 'thus "powers", spirits, gods, etc., come into being, partly at least, to satisfy the cognitive imperative by supplying first causes to strips of observed reality' (117).

Chapter 6 on 'evolution and empiricism' is in my view one of the least interesting. The authors contend that theorizing, or 'sciencing', is a universal human proclivity based on inherited neurognostic models, and that it is done in the same fashion all over the world, namely by an 'inductive-deductive alternation', because man is 'genetically predetermined to do so' (142). It appears, however, that some (anthropologists) tend to violate this genetic predisposition by being pure inductivists (Lévi-Strauss,Elman Service) or pure deductivists (Radcliffe-Brown, Boas). They are criticized accordingly, and the Lévi-Strauss-Homans & Schneider-Needham-and-so-on controversy is depicted as one of induction versus deduction.

Chapter 7, allegedly on 'structuralism and language acquisition', contains a number of scattered observations which were not accommodated in the previous chapters. The biogenetic view of the nature of structures is stressed: structures are not ideal constructs, they are 'as "real" as the left ventricle or cornea. In short, they are the neurognostic models discussed at length earlier in this book'(153). Lévi-Strauss is taken to task for not subscribing to evolutionary biological explanations: 'he might have seen that prehominid group members whose brain circuitry allowed for, or compelled, a tendency toward organized intergroup exchange gave their groups survival advantage over groups not developing such circuitry' (151), but instead he resorts to 'metaphysics' in his attempt to account for structures. As for language acquisition, similarily, the problem ceases to exist once we are prepared to go beyond the level of the linguistic fact to the level of brain circuitry; the authors fully agree with Lenneberg's propositions in his Biological Foundations of Language. The chapter ends by urging anthropologists to study sleep as a universal biological phenomenon.

As will be evident by now, biogenetic structuralism is geared to the study of human universals to the almost total exclusion of cultural particulars. Or, to be more precise, cultural particulars can be taken into account only as manifestations of underlying universals. This is a consequence of the heavy emphasis on the view that all structures are inherited and exist only as real, material, neuroanatomical configurations in the brain. It is thus with growing apprehension that one turns to the two final chapters of the book, chapter 8 on 'psychopathology and evolutionary structuralism' and chapter 9 on 'implications for social science'. Under 'psychopathology' we find considerations of 'schizophrenia', 'depression', 'alcoholism', 'phobia', and 'obsessive-compulsive traits'. Among those, 'schizophrenia' is most elaborately dealt with and I shall, accordingly, restrict myself to that case.

Observing that a multitude of symptoms may be taken to indicate schizophrenia the authors list four major 'cardinal signs' of the illness (briefly, blurring of subject-object differentiation, difficulty with abstraction, looseness of associations, and disorder of affect control), and they note that 'all schizophrenic patients manifest almost all these symptoms if they are assiduously searched out' (171). They then go on to relate each of those symptoms to specific cerebral subsystems which were described earlier. They observe that even though damage to one or more of these subsystems, or areas, may produce any single symptom of schizophrenia, all necessary symptoms are produced only by schizophrenia. On this basis, and in accordance with their middle position between localizationists and generalists, they conclude that schizophrenia represents ' a partial deficit of all the cerebral adaptive mechanisms described earlier' (173; emphasis original). They then examine the evidence that exists in support of the hypothesis that the symptoms of schizophrenia are genetically determined and review the theories about how those symptoms are genetically transmitted. On that basis they construct a model which I) takes account of the great variation in the relative proportions in which the different symptoms of schizophrenia are found and 2) at the same time supports the view that schizophrenia is to be regarded, nevertheless, as one isolable cerebral condition of malfunctioning of various cerebral subsystems, and 3) emphasizes the genetic interrelationship of those multiple cerebral subsystems. The argument is presented with admirable logic and clarity, a model case of 'inductive-deductive alternation', and the model has implications, as the authors point out, that reach far beyond schizophrenia as such. The ultimate implication is that 'we can cease speaking of multiple adaptive mechanisms and refer to the entire human neocortex as the basis for man's primary and unique adaptation to his physical environment' (181). This may well have been a layman's starting assumption, but Laughlin & d' Aquili have presented the evidence and the reasoning for why that should be.

Let me preface my comments on the authors' treatment of schizophrenia by emphasizing that I have nothing but admiration for the way they state their case; I am prepared to accept that every bit is scientifically true. But just as the wave theory and the particle theory of light are, scientifically speaking, equally true, there exists likewise a complementary view of schizophrenia which to my mind carries equal conviction, and which I find just as relevant from an anthropological point of view. I am referring, of course, to the 'double bind' theory of Gregory Bateson and associates (Bateson 1972) which is completely ignored by Laughlin & d' Aquili. Suffice it here to note that the 'double bind' theory does exist. As to my own reservations about the biogenetic approach to schizophrenia, I take as the point of departure the four 'cardinal symptoms' allegedly found in all patients. They made me feel a little uneasy, as I could well imagine that any psychiatrist of sufficient assiduousness would be able to elicit them all in any person (including myself) who is, for instance, temporarily placed in a 'double bind' situation. The uneasiness is not due to a concern for my own sanity but to the fact that already (and especially) at the stage of the diagnosis 'illness'

is a question of definition. There are considerable variations in respect to which patients would be diagnosed as 'schizophrenic' in, say, Britain, USA, and Denmark, - let alone perhaps the USSR - but even if we restrict ourselves to 'American schizophrenia', defined by the manifestation of the four cardinal symptoms mentioned, the principle still stands, namely the anthropological principle that diagnosis of schizophrenia is a matter of cultural classification. My initial misgivings are precisely due to the ease with which cultural classification may be represented as scientific truth: if the cardinal symptoms of schizophrenia can be scientifically proved to rest on cerebral malfunctioning, the implications for therapy could well be some kind of 'cerebral engineering', the consequences of which are far from pleasing to contemplate.

Be that as it may, the principal issue is that of scientific truth versus cultural classification. In social anthropology we must take account of both sides. The work of Laughlin & d' Aquili is invaluable in that it presents us, for the first time, with a coherent theoretical exposition of the biological foundations of structures. But if we have to do the biology, we must also do the 'semantics of biology' (Hastrup 1977). If we concede that 'schizophrenia' can be scientifically defined as a specific biological condition, and even if we are prepared to accept that that condition can be diagnosed in a completely objective way, we are still faced with the anthropologically relevant fact that a person who is, clinically speaking, quite insane may still function as normal, if somewhat eccentric, in the community. However, as Mary Douglas (1970: 118) has pointed out, once the person is admitted to a mental hospital, the tolerance of the community is withdrawn and the person is classified as abnormal. This classification is likely to persist after the person has left hospital having become, clinically speaking, 'better', even 'cured'. (Another point is that the effectiveness of the cure may well wear off if the cured person finds himself in another kind of 'double bind' situation in that he receives the message that 'you are a normal person' simultaneously with the metamessage that 'we treat you as a normal person though we know perfectly well that you are mad because you have been to hospital').

In the final short chapter of the book, 'implications for social science', the authors, not surprisingly, undertake the demolition of 'culturology' and end up by envisaging the emergence of an all-embracing nomothetic science of man, which may be called anthropology, sociology, or whatever (205). One would have thought that 'biology' might have been listed as a candidate as well, but, paradoxically, I believe that precisely thanks to the pioneering effort of Laughlin & d' Aquili we may find also biological reasons for the necessity of incorporating and at the same time going beyond biology. Granted that humans all over the world theorize in much the same way, the salient point is that the similarity depends on whether they theorize about the same kind of phenomena with the same kind of purpose (cf. Crick 1976: 157-58). (And I believe that we can safely say that the 'schizophrenias' of biogenetic theory and of 'double bind' theory do not refer to the same kind of phenomenon). Thanks to the revolution that

occurred as a consequence of the biologically based capacity for cognitive extension of prehension, man may be viewed as a self-defining and reality-generating species (Crick 1976). So if there exists no reality intervening between the brain and the environment, we might as well generate one, or rather, we should envisage one total reality which comprises the brain and the environment, as well as the synthesis produced by the dialectical relationship between the two. Lévi-Strauss, in arguing against a view of the brain and the environment as mutually irreducible entities, has put it this way: '... any attempt to set up the mind and the world as separate entities would bring us back to metaphysics. The world outside, that is ecology, can only be apprehended through sensory perception and through the processing of sensory data which takes place in the brain. All these phenomena must share something in common which might explain their collusion' (1974:20). This statement I take as being not a refutation of biogenetic theory, but a way of incorporating it and at the same time transcending it in its present shape. 'This brief book', Laughlin & d'Aquili say, 'is not meant as the last word. We hope it will only be the first' (16). I sincerely share their hopes.

Jan Ovesen

REFERENCES

Bateson, G. 1972. Steps to an Ecology of Mind. New York: Ballantine Books.

Crick, M. 1976. Explorations in Language and Meaning. Towards a Semantic Anthropology. London: Malaby Press.

Douglas, M. 1970. Purity and Danger. Harmondsworth: Penguin.

Friedman, J. 1974. Marxism, Structuralism and Vulgar Materialism. Man (n.s.), 9, 1974.

Godelier, M. 1973. Horizon, trajets marxistes en anthropologie. Paris: Maspero.

Hastrup, K. 1977. The Semantics of Biology. S. Ardener (ed.), Women, some Cultural and Biological Perspectives. London: Croom-Helm (forthcoming).

Lévi-Strauss, C. 1974. Structuralism and Ecology. The Gildersleeve Lecture. Social Science Information, 12 (1), 1974.