Reply to Katic

I am grateful to you for giving careful attention to my essay, and I can see from your reply that you have understood it. You are quite right not to get involved with ultimate (evolutionary) explanations at this stage of clinical training; observation should come first, then attempted explanations in terms of proximate factors such as physiology, and then (possibly in old age) speculation about ultimate causes (one reason for speculating about adaptive function is to facilitate the search for proximate causes). Moreover one must bear in mind that the sort of theory we are dealing with here is far from generally accepted in medical schools and might not be palatable to examiners.

The important thing is to look at behaviour from many perspectives, if not exactly at the same time, at least one after the other. Even within the same category of explanation, such as proximate causes, one should entertain more than one model, even if they appear to be incompatible, rather as physicists regard light as both waves and particles. Also one should distinguish between the formulations one makes to oneself, and those which one communicates to patients. A diagnosis communicated to a patient is part of the treatment, and is likely to affect how he feels about himself and his compliance with other aspects of treatment. Some depressed patients benefit from being told they are ill, it helps them to slow down and gets their families off their backs. Others benefit from being told they are undergoing involuntary yielding, as it enables them to make an appropriate voluntary yielding response in submitting to the inevitable, and thus escape from the failure to achieve which led to, and may be perpetuating, the depression. Some patients suffer a fall in self-esteem if they are told they have schizophrenia; others are helped because it enables them to join organisations such as the Schizophrenia Fellowship and to obtain certain welfare benefits.

An account of how and why a certain behaviour (or illness) evolved is part of its total explanation, along with explanations in terms of physiology, learning and other "proximate" mechanisms. Some people think I put too much emphasis on yielding, but one should remember Darwin's point that in social mammals it is a social process which usually decides who succumbs to the forces of natural selection, and, until very recently, this social process took the form of agonistic behaviour of which yielding in some form or another is an essential part. In every generation for three hundred million years our ancestors have won in this social game, while their brothers and first cousins have yielded; and this yielding on the part of close relatives allowed our ancestors to compete successfully against their second and third (etc.) cousins; so successfully, in fact, that the inclusive fitness of our yielding and non-reproducing brothers and first cousins was actually increased, with the result that genes for yielding strategies have been consistently selected and have finally descended to us; therefore it should not be surprising if primitive mechanisms for yielding are built into the human genome. It is these primitive yielding strategies which I think are being manifested in some forms of depressive and anxiety states.

More modern methods of yielding are also very apparent in human life. If yielding were not a crucial issue in evolution, it would be very surprising that most world religions are basically concerned with submission and the annihilation of the self. The same is true of much philosophy. And codes of politeness are concerned with submission and with the understatement of the self. Could I not legitimately end this reply by signing myself, "Your obedient servant"? In using these sophisticated cultural forms of yielding we are avoiding the agonistic confrontations which historically have ended in depressed mood and reduced reproduction in one of the parties to the conflict. To the extent that these cultural strategies pre-empt depressive illness, they are a form of prophylactic psychiatry.

I would like to illustrate to you how this phylogenetic approach can contribute to the clinical management of depressed patients and also to research into the neurophysiology of depression.

First of all, treatment. You will have seen from previous contributions to ASCAP that the yielding hypothesis does have implications for treatment, in that it suggests that the involuntary yielding of depression can be replaced by the voluntary yielding of submission. The first act of submission that the depressed patient makes is to put himself in the hands of the doctor, or at least to agree to relatives taking him to the doctor. In the severely depressed patient, this nascent tendency to submission should be encouraged, and the patient should be advised to abdicate all responsibility for his progress, and to retain only the responsibility to follow the doctor's advice. In particular, he should be encouraged to stop "fighting the illness" and to stop trying to make himself well by an act of will (thus helping him to get out of a vicious circle of failure and increasing depression). I tell the patient that depression is like a "sprained brain", that decisions and responsibility are to the brain what movement is to the ankle, and that the patient should consider his brain to be in a plaster cast until further notice. I then allow the patient to demonstrate his submission by carrying out simple set tasks such as completing

a daily record of the intensity of depressive symptoms. I then acknowledge this submission and confirm to the patient that since he is following my advice he will get better. Meanwhile in the context of the therapeutic relationship one is exploring his attitudes, goals and lifestyle and trying to identify areas of pathological non-yielding. The skill of therapy lies not so much in identifying these areas of blocked or incomplete yielding but in reframing them in such a way that the patient gets out of the situation of "irresistable force meets immovable object". When the patient recovers from the depression, there is seldom any difficulty in getting him to take over responsibility for himself again, to examine options and take decisions. Then the role of the therapist switches from director to that of counselor or sounding board, and the previous asymmetry of power in the relationship is much reduced. Many physicians instinctively encourage this state of temporary dependency in the treatment of an episode of depression. All we are doing by supplying the evolutionary perspective is to explain why what they are doing is helpful, and to enable them to do it more insightfully and thus more efficiently. I will send the editor a case history to illustrate what I have been saying, and hopefully there will be room to print it, otherwise he can send it on to you privately.

Secondly, research. I have a hunch that the fantastic proliferation of complex forms of life six hundred million years ago (1) was due to the development of sexual selection, and the reason that the vertebrates survived was that their method of intrasexual selection (ritual agonistic behaviour) was so efficient. And since there is no reason for this method ever to have died out and thus been reevolved from different components, the likelihood is that the mechanisms underlying all forms of vertebrate agonistic behaviour are homologous. And that includes the mechanisms underlying yielding behaviour. Therefore the physiological changes underlying the development of depression in a human being may be the same as those underlying retreat in a defeated lizard. It makes more sense to explore the mechanisms in the lizard than in the depressed patient, not only because the lizard is not required to give informed consent, but because many lizards in this state change the colour of their skin to that of the immature form. The central mechanisms of defeat reach out to the periphery, providing a string which the researcher might be able to follow back to the centre. Many fish such as the green sunfish change their skin colour to match their social rank. And in other fish which change sex at a certain stage of their lives, the sex change is inhibited by the behaviour of a dominant fish. Should we not be encouraging research into this sort of phenomenon if we think that the behaviour of dominant human beings may influence the health of their subordinates?

Visible physiological changes with rank are not so common in mammals, but there is a monkey which offers itself as an experimental model in this respect. The East African variety of vervet monkey has a bright blue scrotal skin which is probably a signal of dominance, because when an animal falls in rank the scrotum turns white. Colleagues and I were able to show that the colour change was due to hydration of the dermis, thus abolishing the optical conditions necessary for the Tyndall blue (2). Blue skin is common in monkeys in various parts of the body, but there is only one area of monkey skin which is regularly subjected to hydration, and that is the genital skin. In the female baboon and chimpanzee, the genital skin becomes hydrated at oestrus, and the swelling (not a colour change) acts as a signal to the male. It seems likely that in the vervet monkey two adaptations have joined together to form a very effective signal, on the one hand the blue skin which is a widespread characteristic of the forest- dwelling guenons, and on the other the simian capacity for phasic hydration of the genital skin. Thus whereas in the baboon female the genital skin swelling signals oestrus to the opposite sex, in the vervet male the switch of scrotal skin colour to white signals yielding to other males. We were able to show that the genital skin hydration of the vervet was not mediated by sex steroids or by the common adrenal cortical hormones. It seemed likely that some other hormone was responsible, and that it might also be affecting behaviour in the way that oestrogen causes both the genital swelling and the sexually receptive behaviour. However, the funding for this research was withdrawn on the grounds that it was "out of line with current thinking" and so our search for a "yielding" hormone was brought to a close. Hopefully the "across species" evolutionary approach to psychiatry which is fostered by ASCAP may help to change current thinking.

Where possible theories should be testable (refutable) and parsimonious. Evolutionary theories have difficulty satisfying these requirements. But there is a third criterion of theory-making, that the theory should be heuristic; that is, it should lead to more effective exploration of the complexity of nature, and thus lead to testable postulates which otherwise would not have been contemplated. This is why I think it is useful to explore the yielding hypothesis of depression (and other evolutionary theories) in the sort of informal debate which ASCAP makes possible.

1. Gould, S.J. (1990) Wonderful Life: The Burgess Shale and the Nature of History. London: Hutchinson Radius.

2. Price, J.S. (1989) The effect of social stress on the behaviour and physiology of monkeys. In Contemporary Themes in Psychiatry (eds. K. Davison and A. Kerr) London: Gaskell.

Incomplete yielding due to dogged determination

A case history

This situation can be illustrated by my patient who aspired to obtain a doctorate of philosophy but did not have the intellectual capacity to organise the material for his thesis. This postgraduate student presented with complaints of poor concentration. He would sit in front of his books for hours on end, with not a sentence read and not a word written. He also complained of waking frequently in the night with worrying thoughts, tiredness during the day so that even small tasks seemed a terrible effort, and some physical symptoms including a feeling of having a tight band round his head and an aching feeling in the solar plexus. He had given up his former recreations because of the need to spend more time working, and he realised that his family were becoming exasperated with him.

His thinking was concerned obsessively with the need to get his degree, and how shameful and barren his life would be if he failed.

After my first interview with him, the cause and effect relations were not at all clear. Did he start having difficulties with his thesis because of depression, or did he become depressed because he found his thesis too difficult to write? At the time of consultation both these causal links were operating, in that each day of non-productivity made him more depressed, and, the more depressed he got, the less able he was to do any work. He was in a vicious circle of failure and depression.

One could take the view, looking at this young man's situation from outside, that he needs to stop work for a period, take a holiday, preferably an active holiday to take his mind off his work. This was advice he had already received more than once, but he had not taken it on the grounds that his grant was running out and he could not afford the time away from his books. He had practically no insight into the vicious circle he was in, not because of madness, but because he was too involved in his situation "to see the wood for the trees."

From the point of yielding theory, on the other hand, it is not desirable for him to become less depressed until he has given up everything he needs to give up. Further enquiry revealed that he had always had difficulty with exams, and tended to have stomach aches at exam time. He had always been jealous of the greater academic success of his older sister. The motivation for his postgraduate work had come entirely from himself, and his supervisor had gently tried to head him off from embarking on a higher degree. It looked very much as though the depression was due to his inability to cope with the intellectual requirements of his work. This was backed up by the lack of any other precipitant for the depression. He had not suffered a disappointment in love, there had been no bereavement or other adverse life event and he had not been physically ill.

The therapeutic problem was to help him give up his doctorate. He had not given up this aspiration in spite of a considerable degree of depression and clear evidence that he was not coping with the course. Before treating his depression and so getting him in less of a giving-up mood, it was necessary to present the yielding option to him in a more acceptable way, or as the family therapists say, to "reframe" it. To do this it was necessary to study his life and ways of thinking in some detail. Two things emerged from this. One was that his self-esteem depended very much on his natural intelligence, and his pursuit of a doctorate was motivated to prove this to himself, rather than to lead to any practical end. He was likely to be very resistant to any suggestion that he was not bright enough to get his degree. The other thing that emerged was that he was a very sociable person with considerable charm of manner, although he had lost much of this when depressed and in fact had given up playing cricket which was his main recreation.

The therapist called a formal meeting at which the patient, his parents and his supervisor were present. After summarising the recent events and obtaining from the supervisor a definite statement that the prosects of his getting his doctorate were virtually zero, the therapist gave a long discourse on the personal qualities needed for higher academic study. In the last resort, these qualities are twofold; what is required is both intelligence and introversion of personality. The higher student needs the capacity to spend long hours in libraries and in his own study, and to have very little requirement for social interaction. The therapist then pointed out that the patient was

far too extraverted to make a doctoral student, and gently chided the patient for ignoring the advice of his supervisor that he should not embark on a PhD. He said that by denying his extraversion the patient was in danger of ruining his health, and that it was imperative from the medical point of view that he should abandon his studies immediately and preferably take a job working with people. No mention was made of the patient's intellectual qualifications for academic study.

This kind of therapy is not without risk. After years of "clinging on" it might have been impossible for this student to let go of his aspiration, and the further threat to it provided by the therapist might have driven him to some other option such as suicide. However, in this case the package worked, and he was able to give up for personality reasons what he was not able to give up on the basis of intellectual capacity. He abandoned his studies and signed on with a large company to take a course as a trainee salesman. His symptoms subsided over the course of a few weeks.

I think it is true to say that most psychiatrists dealing with this case would see the therapeutic process in two stages. The first stage would be to get the patient away from his books, either on holiday or in hospital, and probably to relieve the depression with anti-depressant drugs. The next stage would be the long-term one of deciding whether or not to continue with the degree. Probably, having recovered from the depression, the patient would be in a less giving-up frame of mind, and the best that could be negotiated would be a further trial period of work, which would have been unsuccessful, and the patient would either have given up completely and been left with permanent damage to his self-esteem, or he would have given up for a period of one or more years, and be left with the pipe-dream of sometime being a successful academic.

It is more pleasant to yield voluntarily than to get depressed. Why then do we not always yield voluntarily a split second before the yielding subroutine is due to be triggered? One answer to this is that we do not know when involuntary yielding is about to occur. Why we do not know, in evolutionary terms, probably has something to do with fighting strategy: if we knew how badly we were doing, we might betray the information to our adversary, and so give him more heart and thus bring about our own defeat. Certainly the popular image of the winning mentality is not of someone who is keeping a running tally of the advantages of voluntary yielding. Milton put it vividly:

What though the field be lost?
All is not lost; th' unconquerable will,
And study of revenge, immortal hate,
And courage never to submit or yield:
And what is else not to be overcome?

According to our view, it is just this implacable resolve to win at all costs that the depressive state in the form of the yielding subroutine evolved to counteract. Social life would not be possible if everyone had the mentality of Milton's Titans.

<u>The yielding subroutine facilitates voluntary yielding.....</u>

The yielding subroutine has at least three rather separate functions. One is to stop the loser trying to make a come-back for a finite period of time; another is to reassure the winner that the loser is not going to attempt a come-back, so that the winner can get on with his life without having to stand guard over whatever it was he had won. A third is to put the subject into a frame of mind in which voluntary yielding is more likely to occur. The mood of depression is essentially one of giving-up, and also the loss of interest makes what is given up seem less important. When voluntary yielding has occurred, the conditions for ending the depression have been achieved, in that reconciliation can take place.

<u>.....but is not always successful</u>

In 1953 Edward Bibring wrote a classical paper entitled "The mechanisms of depression" in which he pointed out that many depressed patients seem to cling on grimly to their old unachievable goals. In them the yielding subroutine clearly has not worked, or at least it has performed only half its function. They are prevented from pursuing their goals by the incapacity of the depression, but the cognitive changes have not been sufficient to enable them to achieve voluntary yielding. They are reluctant yielders, yielding in spite of themselves. The clinician gets the impression that if only they could give up their unattainable goals they could begin to recover, but as it is they seem stuck in a vicious circle of depression and failure.