~~(Rough draft, for discussion only; please do not quote or circulate.)~~

The Death Drive

> The theory of the drives is so to say our mythology. Drives are mythical entities, magnificent in their indefiniteness. In our work we cannot for a moment disregard them, yet we are never sure that we are seeing them clearly...Actually what we are talking now is biological psychology, we are studying the psychical accompaniments of biological processes....(Freud, New Introductory Lectures, SE XXII, 97)

As the above quotation indicates, Freud's thinking about the notion of a Trieb (drive or instinct) was marked by two features. The first was an empirical tentativeness, which shows in his speaking of these particular theoretical entities as mythical, or again, as elsewhere, particularly capable of modification or replacement in the light of experience. The second was a remarkable empirical scope. In his consideration of the drives he was conducting a particularly far-reaching kind of investigation, which he called biological psychology, and which was the first sustained version of what has become two families of disciplines.

In its modes of thinking and argument, and in many of its conclusions, Freud's biological psychology encompassed what is now called physiological psychology, including computational, cognitive, and affective neuroscience; and also what is now called evolutionary psychology, which seeks to relate these disciplines to the evolutionary function and history of brain and mind. The scope of Freud's enquiry thus partly explains the tentativeness of his conclusions. Insofar as we are seeking integrate psychology with both neuroscience and evolutionary biology, our conclusions are liable to uncertainty from many directions.

1. The concept of a drive and its overall role.

Freud's use of the notion of a drive, including his postulation of the death drive, was meant to serve two connected purposes. The first was that of explaining certain psychological phenomena. The second, and that responsible for this combination of scope and hesitation, was that of overall explanatory unification. This was the task of understanding the mind as part of the natural and physical world.

The notion of a drive serves to accomplish these tasks together. The concept is introduced at the point at which a family of activities, and the motives upon which they depend, have been traced to their most basic psychological roots. Here further understanding of the whole family can be achieved only in physiological or biological terms. If we can achieve such understanding we therefore locate the whole family of motives in relation to their physiological basis and its biological functions, and hence in relation to the physical sciences more generally. To see the mind in terms of drives, therefore, is to see the mind in its place in nature.

2. The concept is based in everyday psychological explanation by reference to motive.

This general idea, in turn, can be seen as drawing on the overall structure of commonsense psychological explanation, which is partly shared by psychoanalysis. In this structure we explain actions by motives, and these motives by prior motives, which we take to be deeper and more basic; and so on back. Thus we can trace a whole range of human activities -- including hunting, farming, foraging; the preserving and transporting of foodstuffs; the practices of cooking, distributing, and sharing food -- to motives explained by the desire to have food. Likewise we might trace another range of human activities -- those connected with making clothes, finding and constructing shelter, and so forth -- to the desire to keep the right degree of warmth (to keep the right body temperature). Something similar, again, would hold for the activities connected with having access to water.

These vast and overlapping ranges of human activity can thus be traced to a few distinct psychological roots. For any of the activities in these ranges, if we ask why people are engaged in that activity, the answer will always ultimately be traceable back to the fact that people want food and water, and clothes and shelter which enable them to keep warm enough. (These things may be connected with other motives as well, since food, clothing, and houses can also be used for such purposes as display and courting; but we will come to that.) These basic wants for material resources we can in turn trace to our recurring desires to eat or drink, to be warmer or cooler, to avoid hunger, thirst, the discomforts of exposure, and so on. When we reach this point, however, we seem to have exhausted our capacity to explain things in terms of desire or feeling. For there seem no further or more basic desires or feelings to cite, except perhaps the desire to stay alive.

3. The concept serves to carry explanation below the level of motive, to that of physiological mechanism and biological function. The concept marks the place where the explanatory task of psychological thinking is continued, but in non-psychological terms. It thus provides a bridge, or crossing of the frontier, between psychology and the physical sciences.

Any further explanation of any of these vast complexes of activity therefore requires us to go below the level of desire or feeling, to that of the physiological states or mechanisms which we take to give rise to them. There is a straightforward way to do this. We can hypothesize that desires to eat, feelings of hunger, and so forth, are manifestations of a drive, which is realized in the brain and which functions to provide the body with nutrition. Similarly we can hypothesize that there is a which functions to provide the body with water, and likewise one which functions to keep body temperature within certain limits. On such an account there will be a drive related to the desires at the root of each psychological family we have traced back in this way, and each drive will reflect the functioning of a physiological system, which subserves basic bodily or biological needs.

Thus although our capacity for motivational psychological explanation runs out when we reach certain basic desires, this is consistent with our still being able to continue with explanation. Such explanation is no longer psychological; but since it concerns the physiological processes at the source of the most basic motives it is nonetheless still relevant to psychological understanding. In tracing the roots of motive below the psychological level we must perforce make use of concepts or descriptions which are physiological or biological. At this point in explanation, therefore, the notion of a drive comes into play, as Freud says, as 'the concept of the frontier-line, between the somatic and the mental' (XII, 74). Hence, as he also says, 'Drives and their transformations are at the limit of what is discernible by psycho-analysis. From that point it gives place to biological research.' (XI, 136)[1] But then the concept of a drive

is precisely the notion which enables us to cross this frontier, and to start to integrate psychology with physiology and biology.

4. This involves consideration of two large philosophical topics: the relation of the mental and the physical ('the somatic and the mental'); and the relation of distinct explanatory discourses (on the one hand that of motivational psychology, including psychoanalysis; and on the other those of physiology and biology, including neuroscience.)

Consideration of the notion of a drive, and with it the integration of psychology with physiology, thus involves two large philosophical topics. The first is the relation of the mental and the physical generally. The second is the relation of the distinct explanatory discourses whose integration we are considering. In this case the discourses are those of motivational psychology, including psychoanalysis, and those of physiology and biology (including neuroscience) to which the notion of a drive is meant to provide a bridge. Clearly we cannot discuss these topics in full here, but we can gain a useful perspective on them as follows.

(a) In speaking in connection with drives of the level below that of motive we use the idea of *levels of description*. We can describe reality, including human motive, in a series of different ways, each of which provides a basis for the one preceding it. The deepest levels in this series appear to be those of the physical sciences, particularly chemistry and physics.

In speaking here of the physiological or biological level as *below* that of motive we are making use of the notion of *levels of description*. The idea is that we can describe reality -- including human motives and their realization in the brain -- in a number of different ways, depending upon our explanatory purposes; and that these descriptions can (in principle) be arranged in a series, each of which would provide a basis of application for those prior to it.

Thus consider everyday objects like cups, forks, watches, and so on. The idea is that as well as describing these things in such everyday terms, we could describe them in further ways, such as in terms of their parts and the way they were put together and the materials of which they are made. Thus we might describe a particular cup, for example, as a piece of a particular kind of ceramic with a certain shape. This further description would in a sense provide a basis for the prior description as a cup, for if something were a piece of ceramic of this same kind and shape, that thing would also be a cup. So we might speak of the level at which we described the shape and materials which made up the cup as a level below that of the everyday description in We might go further, and describe the ceramic in terms of the chemical kinds of which it was composed, and the same would hold: something of those chemical kinds, in that arrangement, would be a cup. And so on, if we were to describe the cup in terms of physics, that is, in terms of the molecules of which it was composed, and so forth. This would be the deepest level of description, which (in principle at least) would provide a basis for each of the higher ones in turn.

Like many today, Freud assumed that this held for human beings as well. Thus we could describe a person as having certain beliefs, desires, thoughts, feelings, and so on, and this would constitute one level of description, which psychoanalysis has considerably extended. Then also, in principle at least, we could describe the mechanisms in that person's body and brain which realized these beliefs, desires, thoughts, feelings, phantasies, and the like. This would be another level of description, which would provide a basis for the first; and beneath this would be the cellular level, the biochemical level, and so on. So Freud says, for example, 'for the psychical field, the biological field does in fact play the part of the underlying bedrock' (XXIII, 252); and

again that '...all our provisional ideas in psychology will some day be based on an organic sub-structure.' (XIV, 78)

(b) As an adherent of the rigorously physicalistic 'school of Helmholtz' Freud held that descriptions at the physiological or chemical level might actually replace those of psychology.

Freud was educated in the rigorously physicalistic 'school of Helmholtz,' named after the great German scientist of the time, whose contributions ranged from neurophysiology through fundamental physics. Freud's mentor Bruke -- whose piercing glance Freud recalled in his 'Non-Vixit' dream -- was a leading figure in this school, whose 'oath' was as follows:

> Bruke and I pledged a solemn oath to put into power this truth: no other forces than the common physical-chemical ones are active within the organism. In those cases which cannot at the time be explained by these forces one has either to find the specific way or form of their action by means of the physical-mathematical method, or to assume new forces equal in dignity to the chemical-physical forces inherent in matter, reducible to the force of attraction and repulsion.[2]

As we shall see, there is reason to think that this goal of finding physical forces 'equal in dignity' to 'the force of attraction and repulsion' was to prove important to Freud. And in accord with this physicalistic line of thought he seems to have held not just that the physiological or neurological level of description was basic to psychology, but also that once we attained this level of description, we might use it to replace that of psychology. Thus he seems to have held that we could regard certain psychological descriptions or hypotheses as 'substitutes' for physiological or chemical ones which we were as yet unable to formulate. For example he took it to be

> probable that special substances and special chemical processes control the operation of sexuality and provide for the continuation of the individual life in that of the species. We take this probability into account when we substitute special forces in the mind for special chemical processes. (XIV, 79)

And in accord with this view he stresses that 'The deficiencies on our description would probably vanish if we were already in a position to replace the psychological terms by physiological or chemical ones.' (XVIII, 60).

(c) By contemporary philosophical standards, however, this view seems too reductive. We can acknowledge different levels of description without holding that higher levels reduce to lower levels, and this conceptual pluralism seems a more realistic view.

Freud's view here anticipates the role of specialized hormones and neurotransmitters in regulating sexual and parental motivation. Still in speaking of psychology as substituting 'special forces in the mind' for 'special chemical processes', or again of 'replacing psychological terms by physiological or chemical ones' Freud suggests a view that by contemporary standards is unduly reductive.

Philosophical discussions of this question over the last thirty years have stressed that accepting the idea that the level of psychological description can be seen as based on that of physiological description does not entail accepting that the psychological level of description is in any sense replaceable. Rather the tendency has been to acknowledge that it is very rarely

the case that descriptions or explanations at one level can actually be replaced by those at another, and that this holds with particular clarity for the descriptions and explanations of motivational psychology.[3] So in particular the basic role of the brain does not entail that the concepts of psychology should be replaced by other concepts describing the brain, or that the practices of commonsense or psychoanalytic explanation should yield to those of neuroscience or any other discipline.

Although this view is characteristically buttressed by complex philosophical arguments the gist of it is straightforward and easy to understand. When we actually consider our descriptive and explanatory practices we find that they enable us to understand and order things, to relate them to other things that we are familiar with or have theoretical or practical knowledge about, in many distinct ways. Each explanatory practice has its own vocabulary and priorities in explanation; and these distinct priorities characteristically require that the terms or concepts of one discipline do not strictly match those of another. This is particularly clear in the case of psychology via-a-vis the brain, it also holds in other areas which are simpler.

Thus consider the concept of a cup. Most people would probably be prepared to be physicalists about cups, in that we have no difficulty in accepting that every cup (every drinking cup, tea cup, trophy cup, bra cup, protector cup, etc.) is a physical and chemical thing of one kind or another. Still we can also see that it would be hopeless to try to reduce the concept of cup to the concepts of physics or chemistry, or to try to replace the concept of a cup in our thinking by concepts from these disciplines. The concept cannot be defined in physical or chemical terms, because cups can be made in countless ways from countless kinds of materials, so that any attempted definition would either leave out many cups or include many things that were not cups. And clearly in thinking about cups in terms of physics or chemistry we would risk losing our sense of what cups are for, since this is no part of those sciences. So the fact that every cup is a physical and chemical object does not tend to make it possible to replace the idea or concept or notion of a cup (or of the word 'cup') by those of physical science.

Something similar holds for desires and other psychological entities. Even if we suppose that every desire is realized by some sort of physiological mechanism in the brain of the person who has the desire, still we can see that it would be hopeless to try to reduce the concept of desire to the concepts of physiology, or to try to replace this concept with others from neuroscience, as Freud seems to have had in mind. In thinking of desires, belief, and other motives we do not merely think of mechanisms in the individual who has them, we also think of how that individual is embedded in, and related to, the world. Every desire, wish, or phantasy, for example, is a desire, wish, or phantasy that such and such be the case, where this relates to the world in which the desiring subject is embedded. This relatedness to the world is built directly in to our concepts of belief, desire, and other motives, in a way in which it is not built in to the concepts of physiology or neuroscience.

In consequence just as trying to use concepts of physics or chemistry in place of the concept cup would in effect deprive us of our understanding of what cups are, so trying to use concepts of neuroscience in place of concepts like desire and belief would deprive us of our sense of how motivated persons are related to the world which gives meaning to their actions. So even if we were to accept physicalistic monism -- the view that all objects and events are ultimately physical objects and events -- we should still maintain a conceptual pluralism, which would maintain the distinctness and significance of the many forms of understanding of the world which we frame in terms other than those of the physical sciences.

(d) Even fundamental unification in the physical sciences need not produce reduction of this kind. Rather higher levels of description are linked with more basic ones in a piecemeal and case-by-case way. The example of contemporary biology.

To see more about the limits of reductionism it may be worth taking an example from the physical sciences themselves. One of the most striking scientific achievements of our time is the unification of evolutionary biology, which stems from the work of Darwin, with the genetic study of heredity, which stems from the work of Mendel. Darwin discussed evolution in terms of the way offspring tend to resemble their parents, albeit with variation; and both the resemblance and the variation were crucial to his theory. Mendel began to see that hereditary resemblance could be understood in terms of 'particles' carried in the seeds and distributed among offspring in regular ways. As is well known, Mendel's particles of inheritance came to be called the genes, and these were later located in the chromosomes of cells and found to be composed of molecules of DNA.

This is a particularly clear case of the unification of previously disparate physical sciences. On the one hand it provides very powerful grounds for accepting Darwin's general account of evolution. It seems that the only explanation we can frame for the fact that all plants and animals have virtually the same basic hereditary molecules at the core of their cells is that -- as Darwin claimed -- they are all descended from a few common ancestors. On the other, it has meant that these hereditary molecules could be investigated chemically. The molecules could be sequenced, cultured, snipped, re-assembled, and so on, with the results that we are beginning to see today.

Yet despite this very thorough scientific unification, it has not in fact been possible to reduce or replace the Mendelian description of the gene as the vehicle of inheritance, as this is actually used by evolutionary biologists, with any of the more precise and particular descriptions of the gene as portion of the DNA, which have emerged in molecular biology. Despite the fact that both evolutionary biologists and molecular biologists use the one word 'gene', and also accept the same scientific theories about genes, the physiological units which correspond to the evolutionary use of 'gene' do not coincide one-to-one with any particular molecular unit which has been devised or which is likely to be devised.

This is a consequence of the different explanatory priorities of these different areas of biology. In trying to explain the passing of characteristics from generation to generation it is necessary to take account of many cellular and biological mechanisms beyond the DNA molecules themselves, and so to think in terms of units which are located and specified via their overall role in reproduction and inheritance rather than in specific molecular terms. The relation of DNA molecules to inherited characteristics is highly complex; and what is required for such inheritance encompasses more than DNA itself. So the 'particles of inheritance' cannot be specified solely in these terms.

This constitutes no mystery for the scientists concerned. As long as investigators have differing explanatory aims they are liable to need to use different explanatory concepts, and hence concepts which are not precisely equivalent. This does not mean that different disciplines are providing descriptions of different realms of being, or even descriptions which cannot both be true in the same realm. They are describing the same world, but doing so in different ways, as is appropriate to distinct but compatible explanatory aims.[4]

5. In marking the place where the explanatory work of our system of psychological descriptions is continued, but in other terms, the concept of a drive carries two requirements. First, there must be an underlying order in psychological explanation, through which various motives can be traced back to a common source; and secondly this source must have a unified basis in physiological and biological organization.

The application of the notion of a drive thus presupposes both an order in the psychological phenomena to which it is related, and an order in the physiological or biological phenomena which underlie the psychological ones. The psychological phenomena really must admit of explanation which unifies them by representing them as derived from a distinct set of basic motives, such as the desires for food, drink, or comfortable temperature considered above. These basic desires, in turn, must stem from distinguishable physiological systems, which subserve distinct biological functions.

These are both very strong requirements. In supposing that certain phenomena are related to a drive, and hence that they constitute a unified psychological family with a unified physiological basis, we are assuming that the categories of our interpretive psychology will prove to home in on the same underlying behaviour-governing mechanisms as those of physiology and evolutionary biology. We may be right to think that this is so; but it can be demonstrated only by a genuine and far-reaching explanatory co-ordination between psychology, physiology, and biology. This, indeed, is the kind of co-ordination which Freud's use of the concept of a drive was intended to anticipate and facilitate.

6. Drives will be realized by physiological mechanisms which have biological functions, and these can be understood in terms of evolution.

A drive conceived on this model will have a biological function, and this will be effected by physiological structures or mechanisms, which work via the nervous system. Thus the function of the nutritive drive, say, will be to provide the body with nutrients, and thereby to sustain life; and this will be effected by mechanisms which detect lacks of the appropriate substances and prompt activities which remedy this. Something similar will hold for thirst. Again, the theromoregulative drive will function to keep body temperature within certain limits, and this will be effected by mechanisms which are sensitive to temperature and prompt people to actions which affect it.

These drive-related mechanisms and functions, in turn, will be understood in terms of evolution. The physiological mechanisms which govern the desires to eat, drink, and stay at a satisfactory temperature will have developed and been saved in the course of evolution in virtue of their roles in sustaining the lives (and thereby facilitating the reproduction) of the creatures who have them; and in specifying these life-sustaining roles we specify their biological or evolutionary functions. These functions, in turn, will be passed on to the further mechanisms which are recruited for these roles through learning and experience. Thus a desire to eat this bacon sandwich now will arise on a particular occasion as a result of learning and experience in a particular culture. Still, considered as a manifestation of the nutritive drive, this desire will have been produced by mechanisms which evolved long before there was culture, or bacon sandwiches, for it to be exercised upon. The new desire, as fitted to the present occasion, is nonetheless also a manifestation of a function which is biologically ancient.

On this kind of account biological function is inseparable from evolutionary function, and hence from evolutionary history. It is unclear how far Freud understood the notion in this way,

but taking the notion as having this unambiguous sense will enable us to get a clearer perspective on the issues involved. Before Darwin's theory of evolution by natural selection there was no satisfactory answer to questions as to why living things have the features that they do. One might ask, for example, why the whale was so like land-dwelling mammals on the one hand, and so like sea-dwelling fish on the other. There was no answer to this, and indeed there was also no answer to the question why fish had the features they had, or land-dwelling mammals the features they had. One could describe the features, and investigate their intricate order and working; but as to why they existed, no explanation could be given except that God had made things that way.

Darwin's account made these features intelligible by enabling us to see them as resulting from descent and adaptation. Thus it was possible understand why the whale was like both land mammals and fish, by seeing that it was descended from land mammals, and so was also a mammal, but also that it was adapted, like fish, to life in the sea. Such adaptation, in turn, could be understood as the result of natural selection. Living things reproduced themselves in particular environments, and with variations. Some variants had features which enabled them to have more offspring than others in a particular environment; and as this process was repeated these features became characteristic of the population there.

A group or population of living things could thus change over generations in a way which no individual could change; and in this process the population could become more adapted to the environment, in the sense of having more and more features which had facilitated reproduction in it. There has also been a constant pressure for this kind of change, since by and large creatures start more offspring than their environment can support. Members of each population are therefore liable in effect to be in reproductive competition with one another, as regards which will reproduce successfully. Where populations are reproductively separated their development can take different courses; and radically differing developments are made possible by the continual underlying molecular variation in the genetic material itself. In this way biological structures and functions can be seen as structures and functions which are, or which once were, adaptive -- that is, which evolved and were maintained in virtue of their role in facilitating the reproduction of the things which had them.

The biological functions of things which we can understand in this way are thus the functions we take them to have evolved for, that is, to have evolved in virtue of performing. In this sense we take the eyes to be for seeing, the eyeblink reflex to be for protecting the eyes, the teeth for chewing, the ears for hearing, the heart for pumping blood, the womb for carrying the foetus while it develops, the breast for feeding the infant once it is born, and so on and on. The same reasoning also applies, but in a more complicated way, to things which now have no function but once did (the human appendix, which once apparently served for the digestion of cellulose, or the hipbones of whales, which once served for walking, but in ancestors of whales rather than whales themselves), or to things which were once advantageous but are now deleterious (our appetites for sweets and fat, our tendencies to lethal aggression).

We have no deep or systematic mode for understanding biological function besides this Darwinian one; and it is only features of this (once- or now-) adaptive kind, or others which for one reason or another go with them, which we can understand in this way. So insofar as we cannot understand features in this way (as might be the case with homosexuality, for example), they remain biologically mysterious. As we shall see, this applies particularly to the death drive as Freud described it.

7. These requirements of the concept of a drive are reflected in psychoanalytic controversies about the notion.

We thus see that the concept of a drive is a complex and far-reaching one, in the use of which we are required to bear in mind considerations relating psychology, physiology, and biological (and hence evolutionary) function. Focussing on these distinct considerations enables us to start to attain an overall picture of what is at issue in psychoanalytic disputes about drives.

Many analysts decline to use the notion of a drive at all, because they do not want to commit themselves to biological or physiological claims as well as psychological ones; and since the point of the notion is indeed to connect psychology with these other sciences, this is a reasonable response. Again, many analysts reject the notion because they do not think that the explanatory unifications that have been achieved by psychoanalysis so far are really so full or clear as to warrant use of the notion; and they are right to think that this is something which requires to be shown. By contrast, many who use the notion do so because they take it to mark a genuine explanatory unification, at least at the psychological level; and this is a claim which can be given empirical support. And finally, many advocate the use of the notion because they wish to continue the project of unifying psychology with the natural sciences as this was marked out by Freud; and this is surely a worthy aim. Such arguments thus all reflect distinct but reasonable lines of thought, based in the project and requirements implicit in the notion of a drive.

8. How Freud sought to meet these requirements in psycho-analysis:

(a) the emotions and sexuality, in the context of a Darwinian understanding of evolution.

We have seen that the concept of a drive requires an explanatory rooting for a family of motives, which is underlain by a distinctive family of physiological mechanisms. We can find at least the beginnings of this kind of psycho-physiological correlation in both commonsense and psychoanalytic thinking about the emotions. We speak of behaviour as arising not only from bodily needs such as hunger and thirst, but also from a range of emotions, such as fear, anger, love, hate, envy, and guilt. (And of course the thwarting of the drives which secures the bodily needs can trigger the most overwhelming emotions -- such as terror, rage, and panic -- that we are capable of feeling.) We also think of each of these emotions as giving rise to recognizable and specific patterns of desire and other motives, and as likely to be subserved by distinct physiological mechanisms.

The emotions themselves thus constitute at least a preliminary locus of explanatory unification of the kind associated with the notion of a drive. This is reflected in psychoanalytic discussions, in which emotions are often taken as the mental representatives or expressions of drives. Thus sexual and nurturing love are often taken together with such motives as hunger, thirst, and lust as representative of the life drives; likewise anger and hate are taken as representatives of aggressive drives, envy as a representative of the death drive, and so on. So the question then becomes whether once we have explained things by reference to such motives it is possible for us to go still further -- whether, beneath the apparent multiplicity of the emotions, there are deeper psychological factors, which might also connect with physiology and biology in a deeper way.

As is well known, Freud first sought such further explanation via the notion of sexuality. According to Freud's early clinical experience psychoanalysis showed that many emotions and

motives not previously regarded as sexual could be seen to derive from emotions and motives which were sexual, at least in an extended sense. In analysis these emotions and motives -- which included love and hate, the seeds of erotic love, jealous rivalry, and so forth -- could be traced to early childhood. They were apparently first and most powerfully felt in early relations with the parents, particularly those which involved feeding and the management of bodily waste; and they involved stimulation of zones of the body, including the mouth and anus, which were to be important in later sexual behaviour.

These early emotional episodes were the basis of prototypes which influenced feeling and desire throughout life. So the apparent multiplicity of human emotions could be seen as unified both by their relation to the field of sexuality (and hence to reproduction), and by their history of original direction in the family. The notion of a sexual drive, moreover, was already relatively well established, since it was accepted that sexuality had far-reaching manifestations which were both psychological and physiological, and that these were systematically connected. On the one hand many well known and distinctive patterns of motive and activity (those involved in courtship, sexual jealousy, and so on) were already taken as sexual; and on the other these apparently stemmed from a physiological system which functioned to ensure copulation and hence reproduction.

So both Freud's clinical experience and the physiological and Darwinian background of his thinking rightly converged on sexuality as a powerful and pervasive source of motivation and a likely physiological and biological candidate for a drive (albeit one which worked in a particularly flexible and plastic way). Hence in his Three Essays Freud expanded on both the psychological and physiological aspects of sexuality simultaneously, and in systematic co-ordination with one another.

The remarkable diversity which Freud found in the sexual drive -- its variations in aim and object, its early division into components linked to various bodily zones, its diphasic onset, and so forth -- all served to trace diverse phenomena to components of adult sexuality, and thence to the sexual drive. Freud's thinking on this matter can thus be seen as a paradigm of an attempt to fulfil the explanatory requirements latent in the notion of a drive; and so also to put sexual reproduction, as seen in a Darwinian perspective, on a footing with other basic psycho-biological processes, which as we have seen ramify very widely into human motivation.

(b) The ego drives and the sexual drive.

In a Darwinian perspective the ensuring of copulation and reproduction is a biological function which is among the most general and basic. The physiological capacities which subserve breathing, eating, drinking, and staying warm are in a sense less basic than those which subserve copulation and reproduction, for the capacities which enable one to stay alive are understood as having developed, and having been preserved in the evolutionary process, just insofar as they enabled creatures, and hence their genes, to reproduce themselves.

This was the basis of Freud's distinction between ego-drives and the sexual drive. As he puts the idea in Drives and their Vicissitudes: 'Biology teaches that sexuality is not to be put on a par with the other functions of the individual; for its purposes go beyond that of the individual and have as their content the production of new individuals...[in this perspective] the individual is a temporary and transient appendage to the quasi-immortal germ-plasm, which is entrusted to him by the process of generation.' (125) Thus, perhaps paradoxically, eating has both the particular and immediate biological function of sustaining life, and also the more general and

long-term function of ensuring copulation and reproduction; and the last of these, from the perspective of explaining things in terms of the way they have evolved, is the most basic function of all.

For this reason it has been traditional to list the motives which ensure copulation as among those connected with the basic needs, even though depriving an animal of the capacity to copulate or reproduce may actually be good for its health (eunuchs characteristically live healthier and longer lives than intact males, for example). This sometimes creates confusion, and for clarity in this context the word 'needs' might be replaced by something like 'biological imperatives', where these latter would be basic because of the way they sustain reproduction and hence the species rather than the way they sustain life in the individual. At the physiological level, however, there is often close connection between the systems that deal with bodily needs and those which deal with biological imperatives like copulation, which are seemingly less pressing. The evolutionary importance of lust and other biological imperatives is shown in the way they are realized together with the systems that deal with bodily need, and in the evolutionarily older subcortical areas of the brain. Still, because these imperatives are set to be met only over the course of a whole life-cycle, they are characteristically also realized in such a way as to permit a degree of flexibility in their operation, which Freud particularly stressed in the case of sexuality, and which is not possible for the constant basic needs.

(c) <u>The libidinal drive and the life drive (or drives)</u>

This in turn enabled Freud to hazard a further unification. Given the central role which he assigned to sexuality, he postulated a single drive, the <u>libidinal</u> drive, which was a source of all the activities which he had traced to sexuality (or the reproductive drive) in the extended sense he gave it. As we have seen, however, there is also a sense in which the reproductive function can be said to encompass all others, since all motivational phenomena will owe their evolution ultimately to their role in promoting reproduction. And Freud was also inclined to regard all motivational processes -- or at least all those which subserved the maintenance and reproduction of life -- as stemming from the a single drive, the libidinal or life drive, or Eros.

Freud hesitated about the postulation of a single life drive, and there is a particularly clear reason for doing so. As we have been taking the notion, drives are supposed to be connected with basic desires, physiological mechanisms, and biological functions. As we have seen, each physiological organ or system of organs will have biological functions which are distinctive (thus the lungs have the function of providing Oxygen for the blood, whereas the stomach has that of providing nutrients, and so on). Each of these distinctive functions, in turn, will contribute to the overarching functions of maintaining and reproducing life. So if we concentrate on these overarching functions, we can always assign the most general functions, and hence the same functions, to diverse physiological mechanisms, and to mechanisms which are related to diverse desires.

Thus take drinking water and feeding one's children. These are distinct activities which apparently stem from distinct desires. It would surely be artificial to say that both these activities and the desires which prompt them really stem from a more basic desire, namely, a desire to maintain and reproduce life. Again, these desires are apparently the products of different physiological systems, which have distinct biological functions, which in turn contribute to the overall functions of maintaining and reproducing life. So while we can say that drinking and feeding one's children share a general biological function (that of reproduction), they nonetheless remain distinct at the level of desire and mechanism. In cases like this we

have, on the one hand, some reason for saying that we are dealing with one drive (there is a common biological function); and on the other we have a number of reasons for saying that we are dealing with distinct drives (there are distinct sets of desires, distinct physiological mechanisms, and distinct particular functions). So we would hesitate to postulate one drive rather than two drives which shared the general function of reproduction.

Freud seems to have wanted to postulate a single life drive partly because he saw that very many desires, and hence very many drives, all subserved the overarching functions of sustaining and reproducing life. At the same time he was aware that these desires and drives were otherwise distinct. Hence he hesitated over the postulation of a single drive, and the same hesitation can be observed today. Analysts sometimes speak of the life drive in the singular, and again of life drives in the plural, as if unsure whether they are speaking of one drive, or of a number of drives, which work to maintain life. We shall return to this question below.

(d) The brain, homeostasis, and wish-fulfilment.

The overall conception of a drive which Freud elaborated in the Three Essays had been a constant in his thinking from the beginning, and was to remain so until the end; and this conception was itself rooted in ideas about the working of the brain. Freud gave these ideas their only fully detailed formulation in his Project of 1895. As Freud there puts his conception,

> ...the nervous system receives stimuli from the somatic element itself -- endogenous stimuli...These have their origin in the cells of the body, and give rise to the major needs: hunger, respiration, sexuality....They only cease subject to particular conditions, which must be realized in the external world (Cf., for instance, the need for nourishment). In order to accomplish such...an effort is required...' (I, 297).

In the case Freud here takes -- that of hunger -- the 'effort' required by the endogenous stimuli and the basic need they signal is that required to obtain nourishment. Although this requirement is laid down in the nervous system, it must be accomplished via the world outside the body; and Freud also sketches an account as to how this is brought about.

Freud conceived the fulfilling of this requirement in terms of what Cannon was in 1929 to call the notion of homeostasis, that is, a form of natural maintenance of neural and bodily equilibrium. How Freud took this process to work and develop can be seen by considering what he says about the hunger drive in the human infant. The internal stimuli which result from a lack of nutrients constitute a departure from equilibrium, which is felt as unpleasurable; and the requisite equilibrium can normally be restored only by the satisfaction of the need. During restoration, say by feeding, the neural pathways activated by the disequilibrating stimuli are perforce linked into a fuller network with those activated by the processes through which need is satisfied; and these include the perceptual networks active in perception of the external satisfying object, the intermediate networks involved in synthesizing information about this, and the networks for generating the motor activities of meeting the breast, sucking from it, and so on. The processes which lead to the recovery of neural equilibrium are felt as pleasurable, and strengthen neural connections throughout these networks. Thus the neural disequilibration caused by unmet need comes to cause the kind of activities through which the need is satisfied in the external world, so that such disequilibrim comes to be self-righting.[5]

This is a basic biological process governed by the working of the brain; but in the course of it the drive develops in a specifically psychological way, by acquiring 'psychic

representatives'. The specific unpleasure caused by the lack of nutrients gains definition as the feeling of hunger, which is now directed on to external objects and situations; and this is also associated with a neural representation of the activities connected with eating as providing relief and pleasure, and hence with the range of psychological phenomena we relate to the desire to eat.

The intensity of these psychic representatives, moreover, can be considered as an index of the strength of the underlying drive, and hence as 'a measure of the demand made upon the mind for work in consequence of its connection with the body.' (XIV, 112. Compare VII, 168; XXIII, 148.) And note how the 'effort...required' to satisfy need in the Project becomes the 'demand for work' in the later formulations, through to the 'somatic demands' in the final formulation in the Outline.) This notion of a demand for work, in turn, is related (via the interdefinition of work and energy formulated in the 19th century) to that of a quantity of energy, namely the energy required to do the work demanded. This, as Freud says, is 'the conception of neuronal excitation as quantity in a state of flow', which he took as 'derived directly from pathological clinical observation especially where excessively intense ideas were concerned' such as 'hysteria and obsessional neurosis'. (I, 296)

Freud wrote the Project before starting the Interpretation of Dreams, but after he had framed his basic idea that both dreams and symptoms were to be understood as wishfulfilments. Hence he integrated this fundamental psychoanalytic concept with his homeostatic conception of the drives. As we saw, the process of the restoration of equilibrium through the fulfilment of the basic need strengthens (or facilitates) the neural pathways involved in fulfilment. This facilitation constitutes the laying down of a kind of neural record of the satisfying activities and their physiological consequences. This record was then reactivated when the need reasserted itself, and the neural image of satisfaction, which was part of this record, was automatically reactivated by the need. This image, however, was a part of the network which operated to pacify the drive in the first place; so it could now play this role independently of the meeting of the need.

This pacifying of the original internal drive-stimuli via the neural image of satisfaction -- as opposed to real satisfaction itself -- was the process of wishfulfilment, which Freud had discerned in both dreams and neurotic and psychotic symptoms. The idea was thus that these symptoms involved the overuse of a mechanism by which the brain could pacify the drives in the absence of satisfaction. Freud also held that this was the primary process in the pacification of the drives. The whole structure of connections depended on the image of satisfaction, and this was the image the helpless baby at first most depended on for self-control. There was thus an inbuilt tendency for this image to be activated more readily than any other part of the network. This meant that if the image of satisfaction was not constantly modified and updated by the sense of reality it was liable to be overused, and so to perpetuate both the non-satisfaction of the drive and the pressure from the drive which prompted the overuse. This was a neurological version of the vicious circle which Freud had already seen in neurosis and psychosis.

9. Freud's use of the concept was remarkably correct and prescient, and parallels contemporary thinking.

Freud thus sketched a comprehensive linkage between his notion of a drive and the associated notions of need, desire (or psychic representative more generally), homeostasis, and wishfulfilment. The way Freud linked these notions is important enough to merit detailed spelling out, but for our present purposes, however, the important point is that Freud saw

wishfulfilment (and by extension such related processes as phantasy) as subserving basic homeostatic functioning. Wishfulfilment enables brain to deal with a desire or need or drive which for one reason or another is not now going to be satisfied, by pacifying it with a neural representation of the kind of situation in which it would be satisfied, felt as real.

This made good overall psychological and biological sense. In general, the operation of a desire is shut down by our experience of the satisfaction of that desire. Thus for example we stop eating when we experience satiation; and this happens well be before the nutrients have been digested and so are available to meet the bodily needs which prompted the hunger. There is an evolutionary rationale for this. If we felt no relief from the demands of a need until the need was fully met -- if we were nagged by hunger, for example, until the required nutrients were actually circulating in the bloodstream -- then we would not be able to get on with satisfying other needs even though we had already done all that was required to satisfy one. Hence the control of appetite by an experience of satiation which operates prior to the actual meeting of need is observed in all except very primitive animals. But once this control of desire by satisfying experience is in place, there is the possibility that the neural image of such experience can be exploited in the service of further self-control, in the way Freud found to occur in us.

We can now see that Freud's work on the drives was prescient. As neuroscience has progressed, his original conceptions-- as rediscovered and refined by others -- have come to direct research in a way which was not possible at the time he wrote. Thus a major recent neuroimaging project on the emotions is 'guided by a theoretical framework that proposes that emotions are part of a multi-tiered and evolutionarily set neural mechanism aimed at maintaining organismic homeostasis.'[6] And indeed, as this framework requires, the areas of the brain active when persons enter states of emotion turn out predominately to involve subcortical regions interwoven with those which direct the basic need-fulfilling processes.[7] So the theoretical framework now guiding research in the neuroscience of emotion appears in essentials to be that set out by Freud when he first sketched his account of the working of the drives.

This gives hope that the homeostasis-assisting role which Freud assigned to wishfulfilment may now be recognized and studied in the natural sciences, as it has been in psychoanalysis. It may also be worth noting that something similar holds for evolutionary psychology. Despite the unremitting hostility which many evolutionary psychologists show towards psychoanalysis, their focus on reproductive competition has led them to find evidence of many unconscious mental processes related to sexuality (as well as to competitive aggression); and they are now coming to recognize the likely role of mate choice and sexual selection in the evolution of brain and mind.[8] Hence they are starting to see human mentality as potentially suffused with features which relate to courtship, sexual display, and the like, and so link closely with the reproductive function. To see the mind this way is to start to see it as Freud did in the Three Essays, and as it is seen in much subsequent psychoanalytic work involving the symbolization of sexual and other biological processes -- although from an entirely different vantage point.

In a Darwinian perspective Freud's discoveries seem to concern aspects of our minds which we have evolved not to acknowledge[9]. Insofar as this is so then we may expect psychoanalysis always to encounter a degree of hatred and resistance, as it pushes us towards learning what we are built not to know. Still, since research in both neuroscience and evolutionary psychology shows increasing consilience with psychoanalysis, the materials for at least starting on the kind of unificatory project which Freud intended may be coming to hand.

10. But Freud's use of the concept also embodied a radical error, the idea of neural equilibrium at zero excitation. This seems to have been taken from work by Helmholtz and Fechner, according to which the Second Law of Thermodynamics showed that all things tended to 'a state of eternal rest'.

Still it is important to note that Freud's conception had serious faults. In particular, while Freud thought of the energy connected with the drives as neural excitation (cf. 'neuronal excitation as quantity in a state of flow' above), he thought of neurons, including those in the brain, as lacking any capacity to generate energy or excitation themselves. On his account neurons received energy from external sources, and acted to divest themselves of it as rapidly as possible. Hence, as Freud held, the whole nervous system had an 'original trend to inertia', that is, 'to bringing the level of [neural excitation] to zero' (I, 296). It is this trend that the 'endogenous stimuli' of the drives interrupt, by pumping energy into the brain with their 'demands' for work or action. So homeostasis as conceived in the Project is a process in which brain works to reduce the level of neuronal excitation, ideally to nothing.

This may well have been how things looked in the perspective of the reflex arc, to which Freud refers as showing the essence of neural functioning. Also it was an application to neural processes of the second law of thermodynamics, as enunciated by Helmholtz, who as we noted was the dominant figure in the approach to the natural sciences in which Freud was educated. According to this law ordered systems tend in general to dissipate their energy, and hence their order, in transactions of mechanical causality, in which the flow of energy runs from states of higher to lower potential energy. (The flow of heat, which is always from warmer to cooler, and in which heat is always dissipated, provided the paradigm for this account.) Hence things in general tend towards a sort of zero state as regards their energy or order, described by Helmholtz for the universe as a whole as 'a state of eternal rest'.

The was a basic and general claim of the physics of Freud's time about the flow of energy. Freud was probably particularly familiar with it the form of Fechner's conception of 'Absolute stability, in which there exists no energy or movement in a given system'[10], since he cites Fechner specifically in his work on the death drive.[11] In assuming that neuronal processes worked via energy 'in a state of flow' Freud naturally made this claim part of his model. So in hypothesizing a zero state as an equilibrium for the brain, Freud was extrapolating current scientific views.

11. This Fechnerian conception misrepresents the thermodynamic nature of organic homeostasis, and of living things generally.

In an important sense, however, this extrapolation yielded the direct opposite of the truth. As we now know, far from working to divest itself of energy, the brain works to accumulate and concentrate it; and the brain does not simply dissipate this energy, but rather uses it constantly to order and maintain the life of the body. Each neuron builds up within its own membrane the electro-chemical potential which it uses in firing, and so in an important sense manufactures its own energy on site. Hence although the brain accounts for just 2% of the weight of the body, it concentrates to itself, and then employs, something like 40% of the glucose we bring into ourselves by eating. (This shows in the way we are able to create images of the active brain by tracking the blood-borne glucose which fuels the neurons as they work.)

This in turn reflects the nature of life itself. Living systems are always highly ordered, and hence loci of potential energy; and they concentrate further energy within themselves, so as to maintain the complex order inherent in their parts and the working of their vital processes. Living things thus constitute a kind of continuing local defiance of the second law as Helmholtz described it. In a thermodynamic perspective life is a sort of eddy in the pool of our biosphere, which collects energy from the sun, and so enables the general trend charted by the second law to be temporarily reversed. (The second law holds for closed systems, but the biosphere is an open system with a constant influx of energy.) Accordingly living things have come to possess an energic order which enables them to create further order by further concentrating energy in themselves, which they use to maintain both their individual life-cycles and the processes by which they reproduce and multiply. The results of these process are in turn systematically collected and saved via the further ordering induced by evolution itself. In this way life has managed to swim here for a time, against the slow dissipation of the thermodynamic tide.[12]

The basic principle which Freud wrote into his account of homeostasis -- the principle of neural dissipation of energy, towards equilibrium at zero -- thus reverses the real situation. Instead of seeing the brain as creating order, and so working in the opposite direction of the second law, Freud wrote a version of the second law into his model of the brain, and so made its disordering direction the essence of neural functioning.

12 The Fechnerian conception figures in Freud's psychology as the 'necessary postulate' that 'the nervous system is an apparatus having the function of abolishing stimuli which reach it, or of reducing excitation to the lowest possible state: an apparatus which would, if this were feasible, maintain itself in an altogether unstimulated condition.' (XIV 120). This leads directly to Freud's idea that the aim of life is death.

In consequence Freud seems to have misconceived the homeostatic working of drives in two ways. First, he took drives as the sources of the brain's energy, and so as interrupting its trend towards inertness. Instead, however, they operate via relatively low-energy signals which instruct the brain as to how to use the energy already constantly being transformed there. This is a relatively insignificant mistake, although marks of it are to be seen in things Freud says about the flow of energy from the drives, the libido, and so forth. But secondly, in taking homeostasis to turn solely on the dispersal of energy, Freud directly reversed its real ordering and life-sustaining nature. The way he originally set up his neural model made it look as though the goal of homeostatic functioning (staying at level zero) would really be achieved only when the organism was in its analogue of Helmholtz's 'state of eternal rest'. This was the underlying thrust of this aspect of Freud's model, and unfortunately this was the direction his thought was subsequently to take.

Thus in Drives and their Vicissitudes Freud reaffirmed the 'necessary postulate' that that 'the nervous system is an apparatus having the function of abolishing stimuli which reach it, or of reducing excitation to the lowest possible state: an apparatus which would, if this were feasible, maintain itself in an altogether unstimulated condition' (XIV 120; emphasis supplied). Then in Beyond the Pleasure Principle he took a further step. He argued that the compulsion to repeat is to be seen as instinctual (a manifestation of a drive) precisely because it is an instance of 'an urge inherent in organic things to restore an earlier state of things which the living entity has been obliged to abandon under the pressure of external disturbing forces.' (XVIII, 36; Freud's emphasis) This again is a characterization of drives as working to maintain an equilibrium, where this is conceived as re-establishing a state of low active internal energy (an 'unstimulated condition') after the disequilibrating input of energy from outside ('external disturbing forces').

But if this is what drives do then their working will tend towards a state in which there is no active internal energy at all, that is, the state of inorganic things. So finally, and after so many years, we see Freud drawing the conclusion latent in his use of equilibrium at zero in the Project. He argues that the ultimate goal of drives as such is 'an initial state from which the living entity has at one time or another departed and to which it is striving to return': that 'the aim of all life is death' (XVIII, 38).

The idea that Freud's reasoning here turns on his Fechnerian conception of homeostasis at zero is made clearer in other statements. Thus later he says that 'It will be remembered that we have taken the view that the principle which governs all mental processes is a special case of Fechner's 'tendency towards stability' [see above], and have accordingly attributed to the mental apparatus the purpose of reducing to nothing, or at least keeping as low as possible, the sums of excitation which flow in upon it.' (XIX 159). Hence, as he says, 'If it is true that Fechner's principle of constancy governs life, which thus consists of a continuous descent towards death, it is the claims of Eros, of the sexual instincts, which, in the form of instinctual needs, hold up the falling level and introduce fresh tensions.' (XIX, 47; emphasis supplied) Since the instinctual needs hold up the falling level of tension in the nervous system, the 'principle of constancy' is the homeostatic tendency there, which otherwise constitutes 'a continuous descent towards death.'

13. Since this conception is based on error and biologically unsustainable it should be rejected.

Thus, ironically, Freud completed his far-sighted and pioneering attempt to unite psychoanalysis with biology and the other natural sciences by framing an account of the drives which was inconsistent with the most solid and fundamental aspects of the sciences with which he hoped to unify. In particular, his idea of a drive which works against life and to foster death is contradicted by the basic and thoroughly substantiated claim that biological evolution occurs via the successful reproduction of life, and therefore works to save and maintain structures only insofar as they subserve this function. This has long been a guiding idea of biological research, and so far nothing has been found to contradict it. Spandrels there may be, but they are evidently spandrels in the cathedral built by the working of natural selection. Science is tentative in its nature; but this is not a tentative part of science.

So it seems worth stressing that in scientific terms Freud's Fechnerian notion of a death drive, as formulated in these passages -- the drive as the servant of homeostasis at degree zero, and so as tending towards death -- is based on a mistake, and itself mistaken. It is of course always possible, particularly with Freud, that an idea which now seems mistaken may yet harbour some insight which will turn out to be valid as against present science. There is no reason to think this here. For we can see the origin of Freud's error quite clearly, in the ideas from the physical sciences which he explicitly wrote into the Project and then consistently maintained from that time on. So Freud's thinking on this particular head should just be rejected; as indeed many analysts, from Ernest Jones on, have rejected it.

With this in mind, let us look briefly at Freud's final formulation of the dialectic of the drives.

> ....[it is] possible to distinguish an indeterminate number of drives, and in common practice this is in fact done. For us, however, the important question arises whether it might not be possible to trace all these numerous drives back to a few basic ones...After long hesitations and vacillations we have decided to assume the

> existence of only two basic drives, Eros and the destructive drive...[whose] final aim is to lead what is living into an inorganic state...In biological functions the two basic drives act against one another or combine with one another. Thus, the act of eating is a destruction of the object with the final aim of incorporating it, and the sexual act is an act of aggression with the purpose of the most intimate union. This concurrent and mutually opposing action of the two basic drives gives rise to the whole variegation of the phenomena of life. The analogy of our two basic drives extends from the sphere of living things to the pair of opposing forces -- attraction and repulsion -- which rule in the inorganic world. (XXIII, 149)

Two points about this Fechnerian conception, noted at the outset, are worth remarking here. The first is the clear evidence of Freud's intention to unite psychoanalysis with the natural sciences. Indeed his final sentence, in which he compares the life and death drives to 'the pair of opposing forces -- attraction and repulsion -- which rule in the inorganic world' seems almost deliberately to echo the challenge of the Helmholtz school quoted above, to explain everything by chemical-physical forces, or 'to assume new forces equal in dignity to [those of].... attraction and repulsion'. Accordingly Freud's life and death drives subserve biological functions which hold for everything that lives. The death drive is 'inherent in organic life' (see the previous quote), and so acts in everything which may be led 'into an inorganic state'. On this account even the flowers wither because of the death drive within; and this puts the Fechnerian conception far beyond support which could be gathered from the observation of human beings alone.

Secondly, and in accord with this, Freud does not claim empirical support for the notion. Rather he treats this matter as one which is the subject of hesitant and vacillating postulation. The drives, as he says, are

> ....nebulous, scarcely imaginable conceptions, which [psychoanalysis] hopes to apprehend more clearly in the course of its development, or which it is even prepared to replace by others. For these ideas are not the basis of the science upon which everything rests: that, on the contrary, is observation alone. They are not the foundation-stone but the coping of the whole structure, and they can be replaced or discarded without damaging it. (XIV, 77; Brill's translation.)

It seems clear, using Freud's metaphor, that the particular Fechnerian coping which he fashioned requires to be replaced. As already indicated (section 9 above), the specifications of his original plans have recently been executed by others, and using the latest technology. So if we are interested in continuing Freud's project new materials are at hand, which have the right form. Before considering these, however, we should review some other aspects of Freud's and later thinking about the drives.

14. Although Freud's Fechnerian conception of the death drive cannot be justified by clinical evidence, he can also be regarded as having a distinct clinical conception; and this has been legitimately extended in post-Freudian work.

Although Freud's biological conception cannot be supported clinically, he nonetheless held it on partly clinical grounds. When he later wrote that the idea of a death drive had 'gained such a hold on me that I can no longer think in any other way' what described was 'an inclination to aggression [which] is an original, self-subsisting instinctual disposition in man.' (XXI, 122) This was a 'drive of aggressiveness and destructiveness' which also showed itself in 'self destruction', and which seemed required to explain 'the ubiquity of non-erotic aggressivity and

destructiveness' disclosed by psychoanalysis and common observation. (XXI, 119-20). This destructiveness was notably employed against the self, for the super-ego which 'rages against the ego with merciless violence' embodies 'a pure culture of the death drive', which may actually lead to self-killing. (XIX, 53).

We can usefully regard this as a purely clinical conception of the death drive -- that is, a conception of the drive as unifying this range of clinically observable phenomena -- and separate it off from the Fechnerian conception considered above.[13] It was this clinical conception which was developed by Melanie Klein and her co-workers. Klein took the aggressivity which she found manifested in the analysis of children to spring from an original destructiveness which was also directed against the self, and which, in a projected from, animated the super-ego. And of course she considered this aggression to be earlier and more ferocious than even Freud had envisaged. As she wrote:

> The idea of an infant of from six to twelve months trying to destroy its mother by every method at the disposal of its sadistic trends -- with its teeth, nails, and excreta and with the whole of its body, transformed into dangerous weapons -- presents a horrifying, not to say unbelievable, picture to our minds. And it is difficult, as I know from my own experience, to bring oneself to recognize that such an abhorrent idea answers to the truth. But the abundance, force, and multiplicity of the cruel phantasies which accompany these cravings are displayed before our eyes in early analyses so clearly and forcibly that they leave no room for doubt.[14]

Speaking schematically, we can say that both Freud's and Klein's clinical conception was of the death drive as a form of aggression, paradigmatically expressed in the emotion of rage, and capable of being directed against the self. And we can see Kleinian (and other post-Freudian) work on the death drive as seeking to unify manifestations of aggression of this kind. This is both clinically and biologically supportable, for aggression in general has a clear evolutionary function, and the way it is directed against the self in our species seems also to have a further function in self- and social regulation. This is, indeed, explicit in the way Freud and Klein both link this aggression with the super-ego; for the Freudian super-ego -- whose optimal expression is in the properly regulative moral conscience -- is an organ both of individual self-control and group functioning.[15] (The same holds for internal objects generally. The dialectic of projection and introjection by which they are established is that which in effect creates a regulative internal map of the familial and social world.)

In Darwinian terms, then, we can see Klein and her successors as investigating the working of a very powerful form of aggression which is used in human self-regulation and self-control, and which, accordingly, seems from early in life to be directed towards one's own self. This has involved charting many ways in things can go wrong in the development and direction of such aggression. As is familiar, the list (taking now the individual level only) includes not only suicide and self-wounding, but also various kinds of valorization of death, death, deadliness, and annihilation, and the ruthless attacking from within of one's most basic capacities to experience, think, and know. (These latter might of course also originate in hatred of the external situation which might be experienced or thought about.)

Such phenomena seem to have a range and variety partly comparable to those through which sexuality expresses itself. Some might be regarded as perversions of the use of aggression in regulating the self, while others seem to reflect deeper developmental failures, and so are more primitive and destructive. This pattern is consistent with the idea that Kleinian

investigations have started to unify these phenomena in something like the way Freud sought to unify those relating to sexuality. (And this might be so even if these phenomena are less striking and pervasive than those of sexuality, and their derivation from a single source less clearly marked. This would be because aggression directed towards the self, however important in our species, still does not play the biologically commanding role of the reproductive drive itself.)

15. Accepting this role for the drive, however, entails regarding it as a particular form of aggression, and hence in terms of one among a number of drives or emotions which all seem basic. This is supported by reflection on the realization of emotion in the brain.

This line of thought suggests that post-Freudian work on the death drive both has real connections with Freud's original conception, and also makes an explanatory contribution which is independent of any error which that conception contains. (Whether this gives intellectual as opposed to historical reason for continuing to use the Freud's terminology is another matter. In abandoning Fechner and seeing the kind of aggression with which we are concerned as having an evolutionary function we cease to regard it as a death drive in Freud's original sense, that is, a drive whose function is to promote death; but the term itself still carries the implication of this biological version of the flat earth.) But on this account the drive itself no longer enjoys its former status. It is no longer one of the two great forces, whose interaction determines the whole variegation of psychological nature. Rather it is a particular form of aggression, and so apparently just one aspect, albeit a very important one, of the working of aggression in general (or, if we like, of the general working of the aggressive drive).

Aggression seems to have a special role in human self-regulation, and hence in the internal conflicts of human beings. Psychoanalysis indicates that these connected features -- conflict and failures in self-regulation -- are central to many kinds of psychpathology, and hence to psychoanalytic accounts of what goes wrong with people. Considered apart from this special role, however, aggression seems to be be just one of a range of basic emotions, no one of which (the evolutionary priority of sexuality aside) seems much more basic than the others. Thus aggression seems distinct from fear, for example, and in general terms scarcely more fundamental than it; and the two seem often to be in conflict, as when the alternatives are fight or flight. This is borne out, furthermore, by the realization of these motives in the brain. We noted above that many neuroscientists now take the basics of emotion to be realized together with the mechanisms which govern the securing of bodily needs, just as Freud's did in his account of 'the major needs: hunger, respiration, sexuality...' which inspired his theory of drives. Thus the subcortical regions of the brain pivotal to homeostasis also include 'emotion induction zones' in which the stimulation of distinct sets of neural circuits causes the onset of distinct emotions, such as those of lust, rage, fear, distress at separation, engagement of maternal nurturance, play, and probably a range of others; and the pattern thus set in motion characteristically includes basics of the behaviours by which the associated emotions are consummated.[16]

Thus stimulation of the rage circuitry will cause an animal to threaten or attack, and to undergo the physiological changes involved in doing so, in the ways characteristic of its particular species. (One can stimulate rage of this kind in cats who have had their cerebral cortices entirely removed.) Something similar holds for fear; and the complementations and oppositions between these emotions are shown in the way that the circuits for the one can both activate and inhibit those for the other. This also seems to be the most basic level for understanding motives of these kinds. For on the one hand there is no clear level below these subcortical induction regions at which coherent motivation can be induced; and on the other it

seems that these basic circuits are linked with perception and orchestrated by the higher cortical regions to provide the complex and cognitively rich emotions which we find in human life. In this perspective aggression and fear form, as it were, one interacting pair in the overall ensemble of emotion. In this ensemble each basic emotion (or drive) has a distinct role of its own, and taking one or two of them as somehow the sole and ultimate root of things seems, on the face of it, a misleading simplification.

16. Contemporary accounts of the neural realization of basic needs and emotions have striking parallels with Freud's account of the drives.

This raises again the question as to what the basic drives or emotions are, and how many of them actually operate. This is the same question as: from how many distinct roots does the 'vast variegation' of human mental life ultimately stem? Is there just one root, as talk of 'the life drive' might be taken to suggest? Or are there just two, as Freud held, and we have been putting in question? Or are there as many roots are there are distinct subcortical circuits for needs and emotional patterns, so that human motivation is more like a grove growing from a multiplicity of distinct roots than like a single oak, or an oak being strangled by mistletoe?

As we have been noting, recent work in neuroscience has many parallels with Freud's thinking about the drives. Roughly, Freud thought of drives as the fundamental motive-producing processes, and took their working as bound up with homeostasis. Neuroscientists like Damasio and Panksepp take emotions to be fundamental motive-producing processes, and link them with homeostasis in a way which is comparable. Freud thought of a variety of needs as subserved by a single libidinal drive, and as Solms has stressed, there is also a neuroscientific parallel to this. The various needs, and aspects of emotion, secure their objects through the arousal of a general-purpose motivational system, which Panksepp calls the seeking system.[17] This arousal of this general appetitive system moves us to seek whatever we want or need, with as it were a single form of excitation; so that its working has a kind of correspondence to Freud's single libidinal drive. Finally, Freud thought that the drives could be pacified by wishfulfilment in dreams or symptoms; and Solms has given strong reasons for holding that dreaming depends on the arousal of the seeking system, which is also thought to be implicated in schizophrenia, various kinds of delusion, etc. Basic needs and emotions in their relations to the seeking system, as studied by these neuroscientists, thus occupy the same overall place in physiology and psychology as the drives Freud hypothesized. This makes these basic needs and emotions good candidates for the real things Freud was discussing in his consideration of drives.

17. And their compatibility with psychoanalytic accounts becomes clearer when we consider how such basic emotions might be combined, co-ordinated, and controlled by the complex systems of representation and cognition which have developed in our species.

It is also very intelligible that the basic emotions studied by neuroscience should be something like ingredients of others, and in particular of those studied in psychoanalysis. Thus take Klein's description of infantile rage quoted above. The idea that such rage can be triggered so early, and is so early (or innately) connected with the destructive use of the body, has struck many as incredible. But in fact this seems what one might expect, given the innate and automatic circuitry for rage in the mammalian brain. Since this circuitry can govern expressions of rage with little or no cortical assistance, one might well expect it to be active from very early in life, and in response to a great variety of discomforts and frustrations; and this seems to be what we observe. Again, its operation would from the beginning involve the body, and this in what was to develop into, and might already be felt as, a very destructive way. Infantile rage at

another's possession of something desirable might be an important part of a kind of infantile destructive envy; and what started as infantile rage might become a more constant hatred when integrated with a representation of an object such as to permanently enraging. Likewise, although rage and fear are distinct, something which regularly caused the discomfort of envy or fear could likewise become an object of rage and thence hatred on that account; and so on.

Again, one would expect the circuitry for rage or other basic emotions to come into more and more complex interrelations, and so to constitute forms of homeostatic self-regulation, as the infant's system of representation developed. Thus as the infant came to understand its mother as the cause of both enraging frustrations and gratifying satisfactions, this might lead to emotional development. The raging infant might, for example, imagine that it had destroyed its mother, and this in turn might activate the innate circuitry for distress at loss of contact with the mother, and the depression which characteristically follows on this. This in turn might lead the infant to mitigate its rage on further occasions; and so on. Thus we might find that the development of cortical control of rage and other basic emotions, as hypothesized by neuroscientists, was bound up with such phenomena as the depressive position, as described by analysts. The two perspectives seem potentially compatible and complementary.

18. Finally the case of play suggests that consideration of neuroscientific accounts might enrich psychoanalytic ones.

Finally, it is a striking feature of the neuroscientific inventory of basic emotions that it is considerably richer than the psychoanalytic theory of drives. This suggests that attention to this framework may prove useful for considering clinical phenomena in ways the present psychoanalytic framework does not. It seems particularly striking, for example, that in almost all mammals there are distinct neural circuits which govern play. The mother-child or parent-infant relation often consists largely in play, which is interwoven with feeding; and play requires (and manifests) an absence of emotions such as rage and fear. This suggests that we can take play -- or such likely adult versions of it as recreation, humour, and laughter -- as issuing from a distinct drive, which is on a par with rage and fear, but which operates in opposition to these emotions.

Now of course play has long been of great importance to psychoanalysis, and psychoanalysis has studied play and linked it with other phenomena as no other psychology has done. Among other things analysts have attended its role in the development of the child, in child analysis, and to its relations to dream, phantasy, symbolism, and art. Still it seems that play might have been understood differently, and perhaps more thoroughly, had the pioneers of child analysis thought of it as stemming from a drive of its own, which was systematically related to others. Child analysts frequently remark on the importance of the child starting to play again, of its play developing in this way or that, and so on; and adult analysts often note the importance of the patient being able to relax about something, or to laugh about something or appreciate the humour of it. In focusing on these things we seem to be focusing on manifestations of play, and marking their importance by the role which we assign them, but in a relatively unsystematic way. This suggests that there is something further to be unified here, which we might better do if we took these phenomena as marking the engagement of particular drive or motivational system. If play or recreation or humour do stem from a distinct drive, then this should give rise to a family of manifestations related to it and thereby to one another; and the only psychology which might unify this family is psychoanalysis.

[1] It is important to understand Freud's idea correctly. His claim is not that that above the level of the drive we are not talking about a biological system. We may well hold, as Freud seems to have done, that the whole family of motives to which the drive gives rise are also realized in the brain. The point is that we can talk or think about these things without using the vocabularies (or concepts) of physiology and biology, for we already do so in our everyday psychological vocabulary of motive, and its psychoanalytic extension. The introduction of the concept of the drive marks the place where this vocabulary (or system of concepts) runs out, so that we are thrown back on those of physiology and biology alone.

[2] This oath is quoted and discussed in F. Sulloway, Freud, Biologist of the Mind, Basic Books, 1979 p 14ff; and in Kaplan Solms and Solms, Clinical Studies in Neuro-Psychoanalysis, Karnac,. 2000, p 11ff.

[3] The best-known and most influential source of this conception is the work of Donald Davidson: see his Essays on Actions and Events, Oxford: Clarendon Press, 1982.

[4] On this question see Ch 7, 'Reduction: for and against' in Sterelny and Griffiths, Sex and Death: an Introduction to the Philosophy of Biology, Chicago: University of Chicago Press, 1999.

[5] Thus it is worth noting that from the beginning in Freud it is not a question of drives as opposed to object-relations. The drives naturally manifest themselves in desires which are about other persons

[6] Damasio et al, 'Subcortical and cortical brain activity during the feeling of self-generated emotions', Nature Neuroscience, October 2000.

[7] On this see also Damasio, The Feeling of What Happens, New York, Harcourt Brace, 1999, esp Ch 2; Panksepp, Affective Neuroscience, Oxford 1998; and Kaplan-Solms and Solms, Clinical Studies in Neuro-Psychoanalysis, Karnac, 2000, Ch 10.

[8] See Miller, The Mating Mind, London: Heinemann Publishers, 2000.

[9] See Trivers, Social Evolution, California: Benjamin/Cummings 1985; Nesse and Lloyd 'The Evolution of Psychodynamic Mechanisms' in Cosmides and Tooby, The Adapted Mind, Oxford, 1992.

[10] This characterization is from the description of Fechner's views in Sulloway, cited above, p. 404.

[11] See, e.g., XVIII, 8 -10; XIX, 47, 159, quoted below; XX, 59, 78; and Strachey's discussions of the role of Fechner at III, 64ff, including his reference to Jones, and at XIV, 121.

[12] For a basic introduction to the thermodynamic approach to life see Churchland, Matter and Consciousness, Bradford Books, 1996.

[13] This is partly artificial, since the Fechnerian and the clinical seem to have been fused in Freud's mind, and it seems unlikely that his clinical conception would have encompassed just the material it did (e.g. the Fort-Da game) except for its Fechnerian component.

[14] Melanie Klein, The Psycho-analysis of Children, London: Hogarth 1975, p 130.

[15] Freud's account of the super-ego can be seen as a description of how we regulate ourselves, both as individuals and in groups, via the use of images derived partly from others in our environment, starting with the family. Such self-regulation seems readily observable in a whole range of human activities, including such obvious things as the way little children master tasks partly by talking themselves through them, as in the role (sometimes friendly, sometimes severe) of an instructor or teacher. One does not have to be a psychoanalyst to recognize that this is an important aspect of human psychology, but psychoanalysis has made clear how fundamental it is for the whole structure of the mind.

[16] On this see the works by Damasio and Panksepp cited above, especially the latter.

[17] As Panksepp says: 'Many bodily needs access the SEEKING system and thereby arouse appetitive search tendencies that motivate animals to approach and learn about resources. It would have been wasteful for evolution to have constructed separate search and approach

systems for each bodily need. The most efficient course was for each bodily need to control two distinct functions: a generalized, nonspecific form of appetitive arousal and various need-specific resource-detection systems.'