ON FREUD.

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It is my intention in the present communication to attempt to bring part of the philosophy of Freud into line with the psychic machinery outlined by me in previous papers, and I start by briefly re-describing that machinery.

We distinguish in every organ two sub-structures—the responding organ and the exciting organ respectively. The latter is the intermediary between the whole and the environment, and it frames excitation processes which evoke the proper activity of the responding organ. So far as thoughts are concerned, I have assumed that the excitation processes mediating them occur in cerebral nerve-cells, but have left undefined the nature of the organ in which the responses occur. But I have pointed out that the excitation processes probably evoke the response by "action at a distance," the relation between these excitation processes and the response being somewhat similar to the relation between the electric currents in a telephone wire and the resulting "response" of sound-waves (1, 2, 4, 5, 6,).

An excitation process results from the interaction of two independent sources of potential, salts and colloids, possessed by all living tissues. And we find from experiments on hearts that if the amount of energy coming from the one source be designated H, and the amount of energy coming from the other be designated L, then the sum of H and L cannot exceed the value of a third factor, T, the maximum capacity of the responding organ to give a response without spasm (2). Hence we arrived at the fundamental equation $H + L = T$.

This equation, when applied to mental phenomena, implies that every thought or idea possesses both size and intensity, its intensity being denoted by T, and quality by the proportions of H and L. Also, for the idea or judgment T, H provides judging capacity and L the data for judging (1).

These two factors H and L, I now suggest, are to be identified with Freud's "reality principle" and "pleasure-pain principle"

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respectively. The evidence for this may be taken from two sources, *viz.*:

1. The drugs, alcohol and cocaine, which are used on the psychic side to increase the pleasure principle and decrease, or take away from, reality, and are found on the experimental side to decrease H and increase L (7, 8).

2. The changes with age. Ageing implies increased H and decreased L, or, according to Freud, more "reality" and less "pleasure" (1).

The identification having been made, there is next found a general agreement between my own results and Freud's in that these factors are inversely proportional to each other, but I have to point out that this relationship does not necessarily imply antagonism. On the contrary it may imply synergism, because any two synergic factors kept within a limit acquire through the limitation the secondary relationship—the more of the one, the less of the other. This last proposition may be put more concretely by considering the case of an observer, capable of distinguishing between petrol-vapour and air, situated in the inlet pipe of a motor. Such an observer would find in due course that the greater the amount of petrol-vapour the less was the amount of air, and *vice versâ*. If the observations went no further than this, a reasonable inference from the results would be that petrol and air are antagonistic, whereas, in fact, they are synergistic, acquiring this secondary relationship from the limitation imposed by cylinder capacity.

Now concerning thoughts there are two postulates which I think would be generally granted. They are (1) that thoughts are somehow or other mediated by energy, (2) there are limits to thought intensity. Granting these postulates, and the granting is inferred from the common application of such adjectives as "large," "immense," "intense," "deep," "shallow," etc., to minds and thoughts, then, by adding this new factor of a limitation of thought-intensity, it can be deduced from the evidence presented by Freud that the two principles are synergistic and, through limitation to the intensity of their combined effort, acquire the secondary relationship, the more of the one the less of the other.

This result is also directly deducible from my own experiments, the results of which are summed up in the formula $H + L = T$. It indicates, as already pointed out, that thoughts are "alloys" made up of two ingredients, each ingredient contributing a common factor of size or intensity and their proportions determining its

quality (1). From the two metals, copper and tin for example, one could make a number of coins having the same weight, or size, as a penny, and to that factor of size, or weight, each metal would add its own independent contribution. But within this limitation of combined weight, or size, there could be, by varying the proportions of the two metals, infinite gradations of quality.

Freud's philosophy, however, does not embrace this finiteness of intensity of ordinary thoughts, within whose limits, as our formula shows, there is infinite gradation of quality. Each factor, or principle, we find to make its own independent contribution to intensity, and so they are here synergistic. I think also this synergism should be regarded as the primary relationship of the two principles and ideas of antagonism replaced by others concerning the quality of the resultant mixture, because, while there are many other alloys of two constituents known, in which each factor contributes its own independent quota to the weight, size, or intensity of the whole, and in which the quality of the whole is determined by the proportions of the two constituents, I do not know of any other instance where such two ingredients of an alloy are regarded as antagonistic principles.

In Freud's observations, then, I find confirmation of my own that there are two independent sources of potential for framing those psychic responses we call thoughts (1), but I think he has missed the point that these responses are of finite intensity, and that each of us probably possesses his own independent limit of normal thought-strength (1). This has determined what I consider to be an essentially misleading theory of antagonism of two really synergic factors. It has also determined, as I shall presently endeavour to show, another misleading theory which may be summed up in the word " repression."

The theory of repression attempts to explain why certain people are possessed of ideas or memories modifying their conduct, but yet not conscious possessions of their possessors. This loss, according to Freud, is a purposive matter, the individual, as it were, deliberately determining to thrust away from his consciousness some memory or idea which is not in accord with his judgment of what things ought to be. But, according to the mechanism outlined above, this loss, as we shall presently find, is partly determined by the individual's thought intensity capacity.

We get back to our fundamental equation $H + L = T$, by which we imply that the data of any sensation, or idea, are mediated by the factor L, and are made conscious and judged by

addition of the factor H. If, however, we re-write the formula $H + L = T$, in the form $H = T - L$, we learn straightway that the amount of H which can be added is the difference between the capacity of the psychic machine, T, and the amount of data or L which the environment provides. When, then, the environment provides an amount of L approximately equal to the factor T, there cannot be added to those data enough H to make them conscious. My experiments also show that a given amount of L can be developed rapidly by an environmental change of great strength, or more slowly by a weaker change acting for a longer time (1).

When the factor L has become approximately equal to the factor T we call the condition shock, and this condition we are now finding must be associated with a decalcification of the nerve-cells which received the stimulus, because no room for adequate H implies no room for adequate Ca. Unless also these nerve-cells be rendered completely functionless by receipt of such strong impulses, they should reflexly discharge impulses of similar quality. Put differently, shock impulses received from the environment should cause a reflex discharge of similar impulses within the body. Such shock impulses will also have a decalcifying quality. Calcium, however, is an important regulator of cell permeability and, moreover, one cannot decalcify a tissue sufficiently to produce alterations of permeability, *e.g.*, to KCl, without also interfering with other Ca functions (6).

Hence, associated with the approximation of the intensity of the factor L to that of the factor T, and the consequent inability to make those data conscious, we can expect to find many more tangible bodily manifestations of this decalcification, *e.g.*, alterations of permeability of capillary walls, œdema and so on. And these bodily manifestations, because of their very tangibility, as opposed to the non-tangibility of loss of consciousness, would naturally give any investigator of them the impression that he was dealing with something real, and so also that he was on the track of the real cause of shock. Yet we have to suggest that investigators of such tangible realities confuse consequence and cause.

To consider further these other possibilities, however, would be too much of a digression. They have been merely noted in passing in anticipation of possible criticism arising from the confusion of consequence and cause indicated. Reverting to shock on its neural side, we find its essential cause to be an approximation of the stimulus intensity, L, received from the environment, to the maximum thought intensity, T, of the individual who received it.

This result brings, I suggest, shock amnesia into the region of law, whereas the Freudian theory of repression would rather make it a matter of individual will and caprice. But this T factor, while varying from individual to individual, is yet a constant for a particular individual, each of us possessing his own fixed capacity T (3). It follows from this individuality of T that the possessor of the smaller T has, other things being equal, a greater liability to breakdown than the individual with the larger T. Indeed, to get away from this greater liability, we should have to assume the existence of some law making the amount of L developed in us by an event to be inversely proportional to our individual capacities in T! If such a law existed, then our equation $H + L = T$ shows that any two individuals would always be able to be equally conscious of the same event. But the experiments show that the amount of L generated in a tissue by an environmental change depends on the size and composition of the excitation processes in action at the time the change of environment took place. We also find excitation process composition varied by age, sex and disease (1, 3).

It should, of course, be possible for two individuals differing in T to obtain by chance enough L from the same environment to break both, yet, in the long run, environmental change will tend to pick out for breaking the possessor of the smaller T—for example, women before men (3).

Shock, or breakdown, however, is an extreme event of which we can conveniently distinguish two milder degrees—that of excitement and of "losing one's head." If we apply our equation $H + L = T$ to either of these other two degrees, we shall get the same result as we did with breakdown, namely that the individual with the smaller T, other things being equal, is more liable to show excitement or lose his head than the individual with the larger T.

The general conclusion reached here, that conditions of stress tend to pick out the individuals with the smaller T, has, I think, an important bearing on theories of shell-shock. The probabilities from the above are that the majority of break-downs occurred among the possessors of the relatively small T, something each had long possessed. Their previous history should therefore also present other evidence of the possession of this small T in some form of inability to add enough reality to stimuli received from the environment. This inability, however, is ordinarily expressed as "inability to face reality"—a misleading expression according to the analysis above; the inability is rather one of addition. Next,

having obtained such evidence, it would probably be difficult to refrain from adopting the "*post hoc, propter hoc*" conclusion that the previous failures of adaptation were, in part at least, responsible for the present breakdown, whereas we find here that previous and present failures had a common origin in the possession of the small T. Those who gave no previous history of failures probably possessed the large T, or else had never previously been put to the test.

It should next be noted that in the mechanism I have outlined any great sensory stimulus should be able to produce shock, great joy being capable of causing as much disturbance as great sorrow. This life, however, provides so few opportunities of sudden overwhelming good fortune, and so many chances of great disaster, that attention has been chiefly directed to explain conduct in the presence of the latter. When a person faints during disagreeable conditions, it is suggested that he had unconsciously willed to effect at least a temporary escape from an unpleasant reality, and the repression theory does, I think, explain this one point; but it fails to explain the paralysis produced by great terror, this paralysis effectually preventing escape. I think also we have yet to find the individual who wished, even unconsciously, to escape from great joy. The untoward results of these differing emotions, when in great strength, are, however, such as would be anticipated if the psychic mechanism were of the type I have outlined.

All the untoward effects hitherto considered result from the receipt by the individual of stimuli of too strong intensity from the environment. Untoward effects could also arise if the environment failed to stimulate enough to deliver adequate L. Such an environment we should term depressing. A normal environment, however, will fail to deliver adequate L if—

(1) Excitation processes already in action are of great strength.

(2) Excitation processes in action have relatively much H and relatively little L (1).

Senile excitation processes are of the type of (2) above, and we find from our experimental results that their adverse influence on the generation of L by environmental change can be, in part, compensated by a reduction in excitation process strength. I consider that in normal ageing there is, in part, compensation for altered composition by reduced strength. Melancholia, on the other hand, I consider to result from alteration in excitation process composition, with

maintained or possibly increased ordinary internal excitation process strength.

This conception of the condition of melancholia when put in Freudian terminology is equivalent to stating that there is excess of the reality principle and deficiency of pleasure-pain, which is what Freud actually suggested. There is, then, here agreement, which, being noted, enables us to pass on to the points where agreement is less.

As we have seen, Freud's antagonism theory implies non-recognition of the point that thoughts, or ideas, are alloys. Wishes, however, are ideas, and so also alloys, and in the mechanism, as I find it, the data of a wish would be mediated by the factor *L* and its conscious appreciation by the factor *H*. Hence one should not expect to find a wish either in the factor *H* or in the factor *L*, any more than one should expect to find bronze in either copper or tin. Hence also one would reject the idea of the existence of a death wish in the reality principle.

In addition to rejecting this theory on *a priori* grounds, the association of suicide and melancholia may also be considered from a different aspect, and in this connection I would first draw attention to the well-recognized difference between logic and sentiment, the difference between the judge's summing-up and counsel's address to the jury.

Now, excepting for any delusion he may possess, the internal and primary change of balance of excitation process composition in the melancholic will secondarily determine, as my experiments show, that the environment shall generate in the patient less *L* than normal (1). Thus it comes about that you cannot make the melancholic see your point of view, because your arguments cannot deliver to him enough *L* to give adequate data for good judgment. You can only deliver to him that little *L* which makes your arguments appear worthless. That same impression of worthlessness will extend to all else received from the environment, and also to his own inner stock of data, except his delusion.

Except for his delusion, then, he has not within himself the data for framing any hope, desire, or fear, nor can he obtain them from his environment. He is, however, strongly reasonable, or coldly logical, because he possesses abundant *H*, but though he has this abundant reasoning capacity, we must realize the lack of data, or *L*, on which to exercise judgment. His essential problem, therefore, is to judge a worthless existence without hopes or desires. The judgment, having been framed, is then duly carried out.

The judgment is purely impersonal, since the judge does not possess the *L* to give a biased judgment. It is, indeed, more impersonal than a Home Secretary's final review of the condemned criminal's case, so that, if a death wish in the reality principle is to be inferred from the association of suicide and melancholia, the existence of a " death wish " in Home Secretaries should be inferred from executions. We should not, I think, make such inferences, but rather realize that duty and logic can lead to action as well as wishes and desires. Also that cold logic and duty can make us do things we have no desire or wish to do.

We may now temporarily leave Freud, and attempt to bring McDougall's conceptions of the instincts and emotions into line with the machinery noted above (10). The first step towards this is taken by dividing the sources of *L* into two groups, the endogenous and exogenous respectively. The former mediate our instincts, or urges, which are transformed into the corresponding emotions by addition of *L* normally derived from the appropriate environment, *e.g.*, endogenous *L* would urge to mate-seeking, and the exogenous *L* derived from the appropriate meeting would transform the urge into the corresponding emotion.

To account for an urge I assume that particular groups of cells must be set apart to mediate it, and that these cells are somehow or other more sensitive to some one particular hormone than are other nerve-cells. The original grouping of nerve-cells and their somatic connections would thus constitute the urge machinery, as it were, and the appropriate ductless-gland hormone their activator.

To consider the nature of conscious knowledge would take us too far from our immediate objective, and so I suggest only that we have no inner store of it. To obtain knowledge, we have to learn—which is possibly another method of saying that we can only know exogenous *L*. To explain, therefore, lack of an inner store of conscious knowledge, it seems to me necessary to assume either that we cannot apply adequate *H* to endogenous *L*, or else that endogenous *L* falls below what I would term " the cognoscible level." If, however, one added what in itself was a eu-critical or normal amount of *L* to an infra-cognoscible amount, the resulting total might well take us to the para-critical or emotional level. I suggest, then, that instinctive, or urge, *L*, actually falls below the cognoscible level.

It happens, however, that at the normal period of ripening of one of our chief urges, the vast majority of humans are minors who have little or no voice in determining their environment. Instead, that

determination is performed for them by parents or guardians, whose arrangements may well be deliberate both in regard to lack of opportunity for natural attachments of exogenous to endogenous *L*, as well as in respect of supplying non-natural substitutes. But any such resulting non-natural attachment does not imply repression of the instinct, using instinct in the sense I have derived from McDougall; on the contrary, it implies full use of instinctive or endogenous *L*. Indeed, according to my results, repression of instincts is impossible, since they depend on our ductless glands. What is possible is the formation of non-natural emotions based on these natural instincts. Also, the stricter the environment, the more likely is it that non-natural emotions shall be formed.

According to the above, the prime cause of origin of non-natural emotions is lack of opportunity to form natural ones. And once they have been formed, it is necessary to appreciate the difference in our attitude towards them. On the whole we consider it "natural" that lovers should be "madly" in love, but not that young people should be "madly," say, religious. We should appreciate the part played in these affairs by the factor *T*, since, as with shock amnesia, this can determine that, of two individuals generating equal *L* for an emotion, the one with the greater *T* shall be able still to add enough *H* to be reasonable, whereas the one with the smaller *T* cannot add enough *H* to be reasonable. *T*, indeed, may determine the difference between a Ruskin and the patient at a neurological clinic.

Now, just as one would expect by analysing a theory to reach its constituent facts, so also by analysing an emotion one should also expect to reach its constituents. And if the emotion, or theory of conduct, be a non-natural one, analysis could be expected to show how it was developed. Hence, if it were developed through its possessor living in an environment which gave no knowledge of primary urges, that lack of knowledge would persist up to the point where the analyst had split up the emotion into its constituents and then supplied the urge-knowledge.

In contrast with the individuals just considered, who grow up in an environment which does not afford knowledge of one of their chief urges, there are those individuals who obtain knowledge of the significance of this urge, but are placed in an environment which forbids its normal emotional outlet, *e.g.*, a vow of celibacy. For such on the whole a virgin cult seems satisfactory, but there are instances on record where it does not. We find in these other cases that individuals were gravely disturbed by the strength of their

natural, yet unwelcome, desires, and eventually obtained relief through a vision of the superlatively beautiful.

Now for anything to be described in superlative terms implies, according to the mechanism given above, that its factor *L* is also superlative or very intense. If, then, there be added to the *L* of an urge a superlative *L* derived from the vision superlative, there might well be so much *L* mediating the emotion that its possessor should no longer be able to apply to it adequate *H* to mediate knowledge of it. He could therefore be led to believe he had conquered that particular emotion. The conquering also should be accompanied by other signs which medically might be assigned to shock, and by others, according to their prejudices, assigned to "emotional storms," etc.

In the cases just considered, it seems to me reasonable to apply the term "attempted repression" to the conditions existing before the final temptation. This last event, however, does not imply success at repression, but rather failure, because the emotion has not been repressed, but instead actually grown beyond the capacity of its possessor to be conscious of it. Moreover, the now superlatively live emotion, incapable, because beyond consciousness, of normal outlets, must find other outlets, and through its superlative energy provide its possessor with the possibilities of abnormal achievement in these other outlets.

Ordinary life provides other possibilities of conflict, and as examples of such we may take rank injustice or great misfortune. To anyone who had so suffered the friendly advice would be to try to forget it, and, as aids to forgetting, there might well be recommended a change of scene or occupation, because as everyone seems to know, the man who broods over his wrongs ceases eventually to be able to judge them accurately.

In the mechanism I give, this inability to judge accurately implies such an abundance of the factor *L* in the excitation processes mediating the idea as leaves no room for adequate *H*, and I have to suggest there is no essential difference between brooding and training, brooding being essentially a process of training applied to an idea (1). Hence, just as the overtrained man eventually loses skill, so also the overtrained idea loses the corresponding attribute of adequate judgment. Overtraining is also much more readily obtained for an idea, simply because fatigue does not enter so much as a factor limiting the amount of training.

If, then, brooding and training be similar processes, the healing influence of time, or neglect, applied to their effects will give the

same result, namely, a loss of efficiency of the acts. Deliberate neglect rather than repression seems to me the more apt description of the process. At the same time we should not lose sight of the possibility that deliberate neglect may be ineffective in an unpropitious environment, since the latter could restore what time would otherwise take away.

As regards conflict, one must appreciate the reality of its existence, but differ from Freud concerning what happens. Neglect aided by environment could reduce, under favourable conditions, the intensity of the *L* of the unwelcome idea to a more reasonable level, and so place the source of conflict among the ordinary things of life. I think the average family physician, proceeding on the commonsense lines of change of scene or occupation, sees many cures effected thereby. If, however, neglect be not possible and environment be unfavourable, then a superlative vision of the consequences of the unwelcome idea might well be the cause of a sudden breakdown. Thereafter the conflicting idea no longer directly, but instead indirectly, affects the psychic life of its possessor, who may well be fortunate if those indirect effects can be turned to useful ends, and distinctly unfortunate if they cannot.

Repression, however, is an unfortunate term to have been used to explain these happenings, though in this connection it should be noted that I have made full use of McDougall's distinction between instincts and emotions, whereas Freud on the whole neglects the distinction. But, having made the distinction, the "repression," if any, in the case of an urge is performed by those who determine the environment, and not by the individual who is deprived of knowledge of the urge by the environment. Moreover, that environment does not repress the urge, but instead determines what shall be added to form emotion. As regards those cases where the emotion has become so great as to be beyond consciousness, what happened was the exact reverse of repression.

If, for principle, we use the term "potential" and speak of bodily organs in general instead of the organ of mind in particular, some of Freud's discoveries could be generalized as follows. Every organ has at its disposal two independent sources of potential for mediating its responses, and it frames different types of responses according to the amounts of energy drawn from each source. This generalization is also my own, drawn from physiological work on hearts, and so what Freud previously discovered in the realm of psychology, I can claim to have discovered in physiology.

But, at the time when Freud made this psychological discovery,

physiology had gone no further than the conception that an induced shock, when applied to a muscle, set up therein an excitation process which culminated in a contractile response. The physiologist may, as many still do, consider the problem only from the aspect of size, and so there was no common meeting-place with one dealing in quality as well. This standard of size determined, moreover, conceptions of the anatomical existence of higher and lower centres in the brain, in which again there was no common meeting-place for a philosophy in which " higher " was a sublimation of " lower."

To the conception, however, that an induced shock directly excites contractile material, I add, always with Macdonald as guide (9), the following others, *viz.* :

1. Excitation processes and responses take place in separate structures having " action at a distance " as their connecting link.

2. There are two independent sources of potential for the framing of excitation processes.

3. Each source of potential exerts its own independent influence on the strength and quality of responses.

4. Each responding organ has a normal definite limit to the size or strength of its responses.

These additions have enabled us to approach the philosophy of Freud from a physiological basis, and show where I think he has gone astray. The guide-post he failed to reach is the one which states there must be a limit to the size or intensity of the responses of any organ. And when we take the direction indicated by this guide, we find the two principles or potentials synergically acting to give intensity to responses, and giving them quality in accord with the rates of their respective efforts, whereas Freud only got to the point where these two potentials seemed to be antagonistic. He there went astray, but nevertheless, in the course of his investigations, found much more that is new, *e.g.*, sublimation. Our guide-post *T*, however, shows there are two ways of losing conscious memory or consciousness of things. Freud has found both, but like Columbus, when he went west to reach the east, believes that what he has found in the west is actually east.

References.—(1) Burridge, *Journ. Ment. Sci.*, 1929, lxxv, p. 371.—(2) *Idem, ibid.*, 1929, lxxv, p. 395.—(3) *Idem, ibid.*, 1929, lxxv, p. 693.—(4) *Idem, ibid.*, 1931, lxxvii, p. 345.—(5) *Idem, ibid.*, 1931, lxxvii, p. 385.—(6) *Idem, Journ. of Physiol.*, 1911, xlii, p. 359.—(7) *Idem, Arch. Internat. de Pharmac. et de Thérap.*, 1921, xxvi, p. 115.—(8) *Idem, ibid.*, 1922, xxvii, p. 239.—(9) Macdonald, *Quart. Journ. Exp. Physiol.*, 1909, ii, p. 65.—(10) McDougall, *Social Psychology*.