

PROJECT FOR A SCIENTIFIC PSYCHOLOGY¹

¹ [The title has been chosen by the translator. The title in the German edition “Entwurf einer Psychologie” was chosen by its editors.] Freud’s manuscript bears no title; in his letters he speaks of “the note-books” or “the psychology” [as well as of “the psychology for neurologists” and “the $\Phi\Psi\omega$ ”] For the position occupied by the “Project” in Freud’s development, see the Introduction, p. 25 ff.

Editorial Note

The following manuscript dates from the Autumn of 1895. The first and second parts (p. 355 ff., p. 405 ff.) were begun by Freud in the train after a meeting with Fliess. (Letter of September 23, 1895; part of the manuscript [up to the end of section 2 of Part I] is written in pencil.) They were finished on September 25 (see the date at the beginning of Part II). The third part (p. 417 ff.) was begun on October 5, 1895 (see the date at the beginning of the manuscript). All three parts were despatched to Fliess on October 8.

A fourth part, which was to deal with the psychology of repression, regarded by Freud as "the heart of the riddle", was evidently never completed. As he worked at this problem, Freud's doubts as to the fruitfulness of the line of approach attempted in the "Project" grew stronger. These doubts began to arise soon after he had concluded the work which he had begun with such feverish interest. He was already feeling sceptical on November 29, 1895 (Letter 36): "I no longer understand the state of mind in which I concocted the psychology". In his letter of January 1, 1896 (Letter 39), he attempts to give a revised account of his hypotheses on the interrelations of the three kinds of neurones, which, in particular, clears up the position of the "perceptual neurones". More than a year after he had written the "Project", his views had so far developed that he sketched out a diagram of the psychical apparatus with a sense similar to that contained in the seventh chapter of *The Interpretation of Dreams* (Letter 52, of December 6, 1896). From that time onwards, Freud lost interest in the question of representing the psychical apparatus in terms of neuro-physiology. Years later he alluded to the failure of his efforts in that direction in the following terms: "Research has afforded irrefutable proof that mental activity is bound up with the function of the brain as with that of no other organ. The discovery of the unequal importance of the different parts of the brain and their

individual relations to particular parts of the body and to intellectual activities takes us a step further—we do not know how big a step. But every attempt to deduce from these facts a localization of mental processes, every endeavour to think of ideas as stored up in nerve-cells and of excitations as travelling along nerve-fibres, has completely miscarried". (Freud, 1915 *e.*) Recent research into the physiology of the brain on the whole shares these views. (Cf. E. D. Adrian's brilliant paper on "The Mental and Physical Origins of Behaviour", 1946.)

Under the cloak of brain physiology, however, the "Project" reveals a wealth of concrete psychological hypotheses, of general theoretical assumptions and of various suggestive hints. Many of these thoughts, after the modifications necessitated by the abandonment of the abortive physiological attempt, were carried over into Freud's later writings, and some of them are numbered among the permanent stock-in-trade of psycho-analytic hypotheses. Other portions of the "Project" (such, for instance, as the treatment of the psychology of intellectual processes in the third part, p. 439ff.) received no similar consideration in Freud's published writings, though certain of the notions which he here develops could be fitted without difficulty into the system of psycho-analytic theories.

The immediate continuation of the "Project" among Freud's published writings is to be found in *The Interpretation of Dreams*. But the fresh formulation of the nature of the psychical apparatus which is attempted in the seventh chapter of that work falls short in one point at least of the hypotheses put forward in the "Project": the position of the perceptual function could not be fully explained in the later work. (Cf. Freud 1917 *d.*) The solution of this problem was only made possible by Freud's hypotheses on psychical *structure*, developed in *The Ego and the Id* (1923 *b*) and subsequently. But this very development was foreshadowed in the "Project" by the elaborately sustained hypothesis of a permanently cathected "ego organization", a hypothesis which was revived in Freud's mind after an interval of thirty years.

At the period in which Freud drew up his "Project" his interests were mainly focused on its connections with neuro-physiology. When his hypotheses on that subject broke down, he simultaneously

dropped for the time being others of the topics dealt with. And this may have been true in particular of his hypotheses about the ego, which, in the "Project", were attached to a specially designated group of neurones.

Immediately after Freud had written the "Project", his interests were diverted to other problems. With his return to clinical work during the autumn, the theory of the neuroses moved into the foreground of his thoughts, and his principal discovery of the autumn of 1895 related to the distinction between the genetic factors in obsessional neurosis and hysteria (Letter 34, etc.).

In order to make it easier for readers to follow the extremely condensed train of thought, we have drawn up a table of contents and, where a given topic is broken off, we have indicated in footnotes the point at which it is later resumed.

[A few further elucidations have been inserted in the text by the English translator and some footnotes have also been added by him. These additions are enclosed in square brackets. It will be understood that all other footnotes are by the editor of the German edition. In the English translation the sections have been numbered for purposes of reference.]

CONTENTS

PART I

General Scheme

	Page
Editorial Note	349
Introduction	355
1. First Principal Thesis: The Quantitative Line of Approach ...	356
2. Second Principal Thesis: The Neurone Theory	358
3. The Contact-Barriers	359
4. The Biological Standpoint	363
5. The Problem of Quantity	366
6. Pain	368
7. The Problem of Quality	369
8. Consciousness	372
9. The Functioning of the Apparatus	374
10. The Ψ Paths of Conduction	377
11. The Experience of Satisfaction	379
12. The Experience of Pain	381
13. Affects and Wishful States	383
14. Introduction to the Concept of an "Ego"	384
15. The Primary and Secondary Processes in Ψ	386
16. Cognitive and Reproductive Thought	389
17. Remembering and Judging	392
18. Thought and Reality	394
19. Primary Processes—Sleep and Dreams	397
20. The Analysis of Dreams	400
21. Dream Consciousness	403

PART II

Psychopathology

The Psychopathology of Hysteria

1. Hysterical Compulsion	405
2. The Genesis of Hysterical Compulsion	407
3. Pathological Defence	409
4. The Hysterical $\Pi\rho\tilde{\omega}\tau\omicron\nu$ $\Psi\epsilon\tilde{\iota}\delta\omicron\upsilon\varsigma$ [First Lie]	410
5. The Determinants of the $\Pi\rho\tilde{\omega}\tau\omicron\nu$ $\Psi\epsilon\tilde{\iota}\delta\omicron\upsilon\varsigma$ $\delta\omicron\sigma\tau$ [First Hysterical Lie]	413
6. The Disturbances of Thought by Affects	414

PART III

An Attempt at an Account of Normal Ψ -Processes	417
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PROJECT FOR A SCIENTIFIC PSYCHOLOGY

PART I

GENERAL SCHEME

INTRODUCTION

The intention of this project is to furnish us with a psychology which shall be a natural science: its aim, that is, is to represent psychical processes as quantitatively determined states of specifiable material particles and so to make them plain and void of contradictions. The project involves two principal ideas:—

1. That what distinguishes activity from rest is to be regarded as a quantity (Q) subject to the general laws of motion.
2. That it is to be assumed that the material particles in question are the neurones.

N and Q_{η} [neurones and quantity]¹.—Experiments of a

¹ In the manuscript Freud made use of numerous abbreviations, the majority of which have been filled out in the printed version. Apart, however, from customary or easily explicable abbreviations, he employed a certain number of fixed tokens: thus N stands regularly for “neurones” and Φ , Ψ and ω indicate the three systems of neurones (Φ being often used adjectivally). The system of ω -neurones is also frequently referred to as the system of “perceptual neurones” [or “ W -neurones”, cf. footnote, p. 370]. In such cases the abbreviations used by Freud have been added in round brackets. The term “quantity” is represented by Freud by two different abbreviations: Q and Q_{η} . Towards the end of the draft (p. 110) he gives criteria for distinguishing between them: Q relates to “external” quantity and Q_{η} to “psychical” quantity. The distinction is not always maintained consistently and is entirely dropped in Letter 39 of January 1, 1896, p. 140ff.). In the present printed text both Q and Q_{η} have been replaced by the word “quantity”; but the abbreviation used by Freud is in each case added in round brackets. Where no abbreviation is added, it should be assumed that Freud did not employ either symbol but wrote out the word in full.—[The translator is inclined to think, however, that Freud’s use of the abbreviations Q and Q_{η} might be more accurately distinguished as follows. Q seems to be used by Freud quite generally for quantity—including quantity in the external world—when he is not particularly concerned to characterize it more precisely. Q_{η} seems to be used by him primarily to mean quantity as it occurs in neurones; thus Q_{η} is ascribed to the Φ -system of neurones (e.g., p. 385) and to the ω -system (e.g., p. 373) as well as to the Ψ -system. The Translator also ventures to hazard an explanation of the enigmatic symbol Q_{η} . As will be seen below (footnote p. 370) Freud jokingly used the Greek ω to stand for the W of *Wahrnehmung* (perception); it seems not impossible that he made similar use of the fact that the Greek η is only an “n” with a long tail. If so Q_{η} would be an appropriate symbol for “neuronic quantity”.]

similar kind are now common.¹

[I] FIRST PRINCIPAL THESIS:

THE QUANTITATIVE LINE OF APPROACH

This line of approach is derived directly from pathological clinical observations, especially from those concerned with "excessively intense ideas". (These occur in hysteria and obsessional neurosis, where, as we shall see, the quantitative characteristic emerges more plainly than in the normal. [See Part II, p. 405 ff.]) Processes such as stimulus, substitution, conversion and discharge, which had to be described in connection with these disorders, directly suggested the notion of viewing neuronic excitation as quantities in a condition of flow.² It seemed legitimate to make an attempt at generalizing what had been found in these particular instances. With this as a starting-point, it was possible to lay down a basic principle of neuronic activity in relation to quantity (Q) which promised to be highly enlightening, since it seemed to cover the entire [neuronic] function. What I have in mind is *the principle of neuronic inertia*, which asserts that neurones tend to divest themselves of quantity (Q). On this basis it becomes possible to understand

¹ It is not possible to say definitely what "experiments" Freud had in mind. See, however, as regards views upon brain physiology, the collected papers of E. Fleischl von Marxow (1893), with a biographical sketch by Sigmund von Exner, and, as regards the relations between physiology and psychology, Exner's own writings, particularly his *Outline of a Physiological Explanation of Psychological Phenomena* (1894). In the latter the following passage occurs (p. 225): "All the phenomena of quality and quantity in conscious sensations, perceptions and ideas can be traced back to variable quantitative excitations of various portions of this totality of paths". As regards the theory of memory, Freud may have derived suggestions from the French writers on the subject as well as from a lecture on "Memory and its Abnormalities" (1885) by A. Forel, which he read attentively.

² Freud's statement that the successful application of dynamic ideas to the problems of hysteria directly suggested his present line of approach reminds us that *Studies on Hysteria* had appeared only a short time before this draft was written. It is plausible to suppose that Freud was attempting in this "Project" to solve difficulties which Breuer had been unable to solve in his theoretical contribution to the *Studies*. Freud's starting-point is sharply opposed to that of Breuer, who wrote: "In what follows there will be little said of the brain and nothing at all of molecules. Psychical processes will be discussed in the language of psychology: indeed, there is no alternative".

the structure and development of neurones as well as their functions.

The principle of inertia accounts, in the first place, for the division of neurones into two classes, motor and sensory, as a contrivance for counteracting the reception of quantity ($Q\dot{\eta}$) by getting rid of it. Reflex movement now becomes intelligible as an established method of thus getting rid of quantity. The principle of inertia provides the reason for reflex movement. If we look still further back, we can in the first instance link the neuronic system (as inheritor of the general susceptibility of protoplasm to stimulus) with the irritable outer surface of protoplasm which is interspersed with considerable stretches of non-irritable [substance].¹ A primary neuronic system, having thus acquired a quantity ($Q\dot{\eta}$), employs it only in order to get rid of it through the connecting path leading to the muscular mechanism, and thus keeps itself free from stimulus. This process of discharge is the primary function of neuronic systems.

At this point there is an opportunity for the development of a *secondary* function. For among the various methods of discharge those are preferred and retained which involve a cessation of the stimulus—*i.e.*, *flight* from the stimulus. A balance is observed here between the quantity of the excitation and the effort required for flight from that stimulus; so that the principle of inertia is not disturbed in this case.

From the very first, however, the principle of inertia *is* upset by another set of circumstances. As the internal complexity of the organism increases, the neuronic system receives stimuli from the somatic element itself—endogenous stimuli, which call equally for discharge. These have their origin in the cells of the body and give rise to the major needs: hunger, respiration and sexuality. The organism cannot withdraw itself from them as it does from external stimuli; it cannot employ their quantity (Q) for the purpose of flight from the stimulus. They only cease if certain definite conditions are realized in the external world. (Take, for example, the case of the need for nourishment.) To carry out an action [that will bring these conditions about]—an action which deserves to be called “specific”—requires an effort which is independent of endogenous quantities ($Q\dot{\eta}$) and is generally greater than they are, since the individual is

¹ Word omitted in the manuscript.

placed under conditions which may be described as “the exigencies of life”. The neuronic system is consequently obliged to abandon its original trend towards inertia (that is, towards a reduction of its level of tension to zero). It must learn to tolerate a store of quantity ($Q\dot{\eta}$) sufficient to meet the demands for specific action. In so far as it does so, however, the same trend still persists in the modified form of a tendency to keep the quantity down, at least, so far as possible and avoid any increase in it (that is, to keep its level of tension constant). All the performances of the neuronic system are to be comprised under the heading either of the primary function or of the secondary function imposed by the exigencies of life.¹

[2] SECOND PRINCIPAL THESIS : THE NEURONE THEORY

The idea of combining this “quantity ($Q\dot{\eta}$) theory” with the knowledge of neurones which has been arrived at by modern histology is a second pillar of our theory. The essence of this new knowledge is that the neuronic system consists of distinct but similarly constructed neurones which only have contact with one another through an intervening foreign substance and which terminate on one another in the same manner as on a piece of foreign tissue; that certain lines of conduction are laid down in them, in so far as they receive excitations through a cell-process [or dendrite] and discharge them through an axis-cylinder [or axone]; and furthermore, that they have numerous ramifications with diameters of various dimensions.

If we combine this account of neurones with an approach on the lines of the quantity ($Q\dot{\eta}$) theory, we arrive at the idea of a “cathected” neurone (N) filled with a certain quantity ($Q\dot{\eta}$), though at other times it may be empty. The principle of inertia [p. 356] finds expression

¹ The thoughts developed in this passage find a continuation in Freud’s discussion of the “two principles of mental functioning” (1911 *b*). Between these two lay the discussions in the seventh chapter of *The Interpretation of Dreams* (1900 *a*; *trans.*, 1953, p. 509 ff.). The distinction between a trend in the psychical apparatus towards reducing its level of tension to zero and the modification of this trend into one towards keeping the level of tension as low as possible—the distinction, that is, between the “Nirvana principle” and the “pleasure principle”—is discussed in *Beyond the Pleasure Principle* (1920 *g*; *trans.*, 1950, p. 76).

in the hypothesis of a *current*, passing from the cell-processes or dendrites to the axone. Each single neurone is thus a model of the neuronic system as a whole, with its division into two classes of neurones—the axone being its organ of discharge. The secondary function [p. 357], which requires quantity ($Q\dot{\eta}$) to be stored up, is made possible by supposing that there are resistances which oppose discharge; and the structure of the neurone makes it probable that these resistances are all to be found in the *contacts* [between the neurones] which thus function as *barriers*. The hypothesis of “contact-barriers”¹ is fruitful in many directions.

[3] THE CONTACT-BARRIERS

The first justification for this hypothesis lies in the consideration that at this point conduction passes through undifferentiated protoplasm, instead of through differentiated protoplasm (as it does elsewhere within the neurone) which is probably better adapted for conduction. This gives us a hint that there may be a connection between differentiation and capacity for conduction, so that we may expect to find that the process of conduction itself may create a differentiation in the protoplasm and consequently an improved capacity for *subsequent* conduction.

The theory of contact-barriers has, moreover, the following advantages. One of the chief characteristics of nervous tissue is that of “memory”: that is, speaking generally, a susceptibility to permanent alteration by a single process. This offers a striking contrast to the behaviour of a material that allows a wave-movement to pass through it and then returns to its former condition. Any psychological theory deserving consideration must provide an explanation of memory. Now any such explanation comes up against the difficulty that, on the one hand, it must be assumed that after an excitation neurones are permanently different from what they were before, while, on the other hand, it cannot be denied that, in general, fresh excitations meet with the same conditions of reception as did the

¹ [The term “synapses” was not introduced (by Foster and Sherrington) till 1897, two years after Freud wrote the present paper.]

earlier ones. Thus the neurones would appear to be both influenced and also unaltered—"unprepossessed". We cannot off-hand imagine an apparatus capable of such complicated functioning. The situation is accordingly saved by assigning the characteristic of being permanently influenced by excitation to *one* class of neurones, and the immutability—the characteristic of being fresh for the reception of new excitations—to *another* class. Thus has arisen the current distinction between "sense cells" and "memory cells", a distinction, however, which fits into no other context and has nothing to support it.

The theory of contact-barriers can make use of this way out of the difficulty by expressing it in the following terms. There are two classes of neurones. First there are those which allow quantity ($Q\dot{\eta}$) to pass through them as though they had no contact-barriers, which accordingly, each time an excitation has passed, are left in the same condition in which they were before. And secondly, there are those whose contact-barriers make themselves felt, so that they allow quantity ($Q\dot{\eta}$) to pass through them only with difficulty or partially. This second class may be left in a modified condition after each excitation, and thus afford *a possibility of representing memory*.¹

Thus there are *permeable* neurones (offering no resistance and retaining nothing) which serve the function of perception, and *impermeable* neurones (offering resistance and retaining quantity [$Q\dot{\eta}$]) which are the vehicles of memory and presumably, therefore, of psychical processes in general. Henceforward, accordingly, I shall call the former system of neurones Φ and the latter Ψ .²

¹ Freud has made use of some of these ideas in *Beyond the Pleasure Principle* (*trans.*, 1950, p. 27 ff.). He there states specifically that he has "adopted the views on localization held by cerebral anatomy". According to the analysis made by Dorer (1932, p. 128 ff. and especially p. 151) of Freud's relations to Meynert's theories, there can be no doubt that Freud had Meynert in mind when he wrote these words. Meynert's influence is to be suspected at several points in the development of the argument in the "Project", though it is not always possible to distinguish it at once from views which were generally held by the neurology of the 'nineties.

² From what follows below we shall find that the attributes of the two groups of neurones respectively are these: the Φ -neurones are "permeable", that is, offer no resistance, serve the purpose of mastering stimuli from the external world, and are to be identified with the grey matter of the spinal cord; the Ψ -neurones are retentive, serve the purpose of mastering internal stimuli, and are to be identified with the super-imposed grey matter of the brain.

At this point it will be advisable to make it clear what assumptions we must lay down concerning the Ψ -neurones if the most general characteristics of memory are to be covered. Here is the argument. These neurones are permanently altered by the course of an excitation; or (if we introduce the theory of contact-barriers) their contact-barriers are brought into a permanently altered condition. And since psychological experience tells us that there is such a thing as progressive learning based on recollection, this alteration must consist in the contact-barriers becoming more capable of conduction—less impermeable—becoming, that is, more like those of the Φ -system. We shall describe this condition of the contact-barriers as their degree of “facilitation” [“*Bahmung*”]. We can then assert that *memory is represented by the facilitations existing between the Ψ -neurones.*

If we were to suppose that all the Ψ -contact-barriers had equally good facilitations or, what is the same thing, offered equal resistances, the characteristics of memory would evidently not be brought out. For memory is obviously one of the determining and directing forces in relation to the path taken by excitations, and if facilitation were everywhere equal there would be nothing to explain why one path should be preferred to another. It is therefore more correct to say that memory is represented by the differences in the facilitations between the Ψ -neurones.

Now what does the facilitation in the Ψ -neurones depend on? Psychological experience shows that memory (that is, the persisting force of an experience) depends on a factor that is described as the “magnitude” of the impression and on the frequency of the recurrence of the same impression. Or, translated into our theory, facilitation depends on the quantity ($Q\dot{\eta}$) which passes through a neurone in the excitatory process and on the number of repetitions of that process. Thus we see that quantity ($Q\dot{\eta}$) is the operative factor, but that quantity ($Q\dot{\eta}$) can be replaced by quantity *plus* the facilitation resulting from quantity [Cf. p. 380].

In this connection we are reminded (almost involuntarily) of the primary effort of neuronic systems, retained through all their modifications, to avoid being burdened with quantity ($Q\dot{\eta}$) or to diminish it so far as possible. Under the pressure of the exigencies of life, the neuronic system has been obliged to lay up a store of quantity ($Q\dot{\eta}$)

[p. 358]. For this purpose it has had to increase the number of its neurones and these have had to be impermeable. But it now avoids, to some extent at least, being filled with quantity ($Q\dot{\eta}$)—avoids cathexis, that is,—by setting up facilitations. It will be seen, therefore, that *facilitations serve the primary function*.

The necessity for finding a place for memory in the theory of contact-barriers calls for something further. Every Ψ -neurone must in **general** be presumed to have several paths of connection with other neurones—that is, several contact-barriers. It is on this that the possibility depends of the excitation having a **choice of path**, determined by facilitation. This being so, it is quite clear that the condition of facilitation of each contact-barrier must be independent of that of all the others in the same Ψ -neurone. Otherwise there would once again be no possibility of one path being preferred to another—**no motive, that is**. From this we can draw a negative inference as to the nature of the condition of “facilitation”. If we imagine a neurone filled with quantity ($Q\dot{\eta}$)—i.e., cathected—we can only suppose that this quantity (Q) is uniformly distributed over all the regions of the neurone, including all its contact-barriers. On the other hand, there is no difficulty in supposing that, in the case of a quantity ($Q\dot{\eta}$) in a condition of flow, it will take only one particular path through the neurone; so that only one of the contact-barriers will be influenced by that quantity ($Q\dot{\eta}$) and acquire facilitation from it. Therefore facilitation cannot be based upon **a cathexis that is retained**, for this would not produce the differences of facilitation in the contact-barriers of the same neurone.

It remains to be seen in what, apart from this, facilitation *does* consist. Our first idea might be that it consists in an absorption of quantity ($Q\dot{\eta}$) by the contact-barriers. Perhaps more light will be thrown on this later. The quantity ($Q\dot{\eta}$) which has left behind the facilitation is no doubt discharged, precisely on account of the facilitation, which increases permeability. Incidentally, we need not suppose that the facilitation remaining after the passage of the quantity ($Q\dot{\eta}$) is necessarily as great as it was during the actual passage. [Cf. p. 378.] Perhaps only a quotient of it is left in the form of *permanent* facilitation. In the same way we cannot yet tell whether an equivalent effect is produced by the passage of a given quantity ($Q\dot{\eta}$)

three times and by the passage of a quantity ($Q\dot{\eta}$) three times as great once only.¹ All these points remain to be considered in the light of later applications of the theory to the psychical facts.

[4] THE BIOLOGICAL STANDPOINT

Thus one peculiarity of neuronic systems—their capacity to retain and at the same time to remain receptive—seems to be explained by the hypothesis of there being two neuronic systems, Φ and Ψ , of which the former consists of permeable elements and the latter of impermeable. All psychical acquisition would on this basis consist in the organization of the Ψ -system through partial and locally determined suspensions of the resistance in the contact-barriers which distinguishes Ψ from Φ . As this organization proceeds, the capacity of the neuronic system for the reception of fresh impressions would in fact reach a limit.

Anyone, however, who is occupied in the scientific construction of hypotheses will only begin to take them seriously if they can be fitted into our knowledge from more than one direction and if the arbitrariness of a *constructio ad hoc* can thus be mitigated. It will be objected against our hypothesis of contact-barriers that it assumes the existence of two classes of neurones having a fundamental difference in the conditions of their functioning, whereas there is at present no other ground for making such a differentiation. From the morphological (that is, the histological) point of view, at any rate, there is no known evidence in support of this distinction.

Where else can we look for grounds for this division into two

¹ This question is answered on p. 383. Some of this section is carried further in a modified form in Freud's hypotheses on memory and consciousness. See in this connection *The Interpretation of Dreams* (trans., 1953, p. 538 ff.), and the theory that "in the Ψ -systems memory and the quality that characterizes consciousness are mutually exclusive". Subsequently Freud formulated this idea even more drastically in the supposition that "consciousness arises *instead of a memory-trace*" (*Beyond the Pleasure Principle*, 1920 g, trans., 1950, p. 29 [where the whole line of thought is explicitly attributed to Breuer] and "A Note on the 'Mystic Writing-Pad'," 1925 a, *Coll. Papers*, V, p. 177; see also Letter 52 of December 6, 1896). A similar view had been expressed by Breuer in his theoretical chapter of the *Studies on Hysteria*, 1895, p. 164: "This perceptual apparatus, including the sensory spheres of the cortex, must be distinct from the organ which stores up and reproduces sense impressions in the form of memory-images. . . ."

classes? If possible, to the *biological* development of the neuron system, which, like all else, is regarded by the natural scientist as something that has come about step by step. We should like to know whether the two classes of neurones may have had some different biological significance, and, if so, by what mechanism they may have developed two such different characteristics as permeability and impermeability. The most satisfactory solution would of course be that the mechanism we are looking for should actually itself arise from the primitive biological part played [by the two classes of neurones]. We should thus have found a single answer to both questions.

Let us recall that from the very first the neuron system had two functions: to receive stimuli from without and to discharge excitations of endogenous origin. It was from this latter duty, it will be remembered [p. 358], that a need for further biological development emerged under the pressure of the exigencies of life. The suspicion now arises that our systems Φ and Ψ may each have taken over one of these two primary duties. The system Φ might be the group of neurones which receive external stimuli, while the system Ψ might contain the neurones which receive endogenous excitations. If that were so, we should not have *invented* Φ and Ψ ; we should have *discovered* them. It would only remain to identify them with what is already known. And in fact we know from anatomy that there is a system of neurones (the grey matter of the spinal cord) which is alone in contact with the external world, and a superimposed system (the grey matter of the brain) which has no direct peripheral contacts but which is responsible for the development of the neuron system and for the psychical functions. The primary brain gives no bad picture of the characteristics we have attributed to the system Ψ , if we may assume that paths lead directly, and independently of Φ , from the brain to the interior of the body. The derivation and original biological significance of the primary brain is unknown to anatomists; on our theory it must have been neither more nor less than a sympathetic ganglion. Here is a first possibility of testing our theory by factual material.¹

We shall provisionally regard the Ψ -system as identified with the

¹ Cf. p. 366 for a further such possibility.

grey matter of the brain. It will now be easily understood from my introductory biological remarks [p. 358] that it is precisely Ψ that is subject to further development through an increase in the number of its neurones and through an accumulation of quantity. It will also be seen how expedient it is that Ψ should consist of impermeable neurones, since otherwise it would be unable to fulfil the requirements of specific action. But how did Ψ acquire the characteristic of impermeability? After all Φ too has contact-barriers; and if *they* perform no function, why should those of Ψ perform one? To suppose that there was an original difference between the value of the contact-barriers of Φ and Ψ has once again a dubious appearance of arbitrariness, even though it would be possible, pursuing a Darwinian line of thought, to claim that impermeable neurones are indispensable and consequently bound to survive.

Another way out of the difficulty would seem more fruitful and less ambitious. Let us recall that the contact-barriers even of Ψ -neurones are in the end subject to facilitation [p. 361] and that what gives them facilitation is quantity ($Q\eta$) [p. 361]. The greater the quantity ($Q\eta$) concerned in the passage of the excitation, the greater is the facilitation—but that means the closer is the approach to the characteristics of the Φ -neurones. Let us therefore attribute the difference not to the neurones but to the quantities with which they have to deal. There is then reason to suspect that quantities pass through the Φ -neurones against which the resistance offered by the contact-barriers is negligible, but that the Ψ -neurones are only reached by quantities which are of the same order of magnitude as that resistance. If that is the case, a Φ -neurone would become impermeable and Ψ -neurone would become permeable if their locality and connections could be exchanged: they retain their characteristics because the Φ -neurones are connected only with the periphery and the Ψ -neurones only with the interior of the body. A distinction in their essence is thus replaced by a distinction in the *milieu* to which they happen to be allocated.

Now, however, we must examine our assumption that the quantities of stimulus reaching the neurones from the external periphery of the body are of a higher order than those from the internal periphery.

There is in fact much that speaks in favour of that view. In the first place, there can be no question but that the external world is the source of all major quantities of energy, for physical science informs us that it consists of powerful masses in violent movement and that this movement is transmitted by them. The system Φ , which is turned towards this external world, will have the task of discharging as rapidly as possible the quantities ($Q\dot{\eta}$) impinging on the neurones; but it will in any case be subjected to the influence of major quantities (Q).

To the best of our knowledge, the system Ψ is out of contact with the external world; it receives quantities (Q) only, on the one hand, from the Φ -neurones, and, on the other hand, from cellular elements in the interior of the body; and it is now a question of making it probable that these quantities of stimulus are of a comparatively low order. We may be disturbed at first by the fact that two such different sources of stimulus have to be attributed to the Ψ -neurones as Φ and the cells of the interior of the body; but precisely at this point we receive conclusive assistance from the recent histology of the neuronic systems. This shows us that the *endings* of neurones and the *connections* between neurones are constructed according to the same type, and that neurones terminate on one another in the same manner as they terminate on somatic elements [p. 358]; the functional side of the processes in both cases is also probably of the same kind. It is thus probable that similar quantities are dealt with at nerve endings and at intercellular connections. It is also reasonable to suppose that endogenous stimuli are of the same intercellular order of magnitude. And here, incidentally, we have a second opportunity for putting our theory to the test [p. 364].

[5] THE PROBLEM OF QUANTITY

I know nothing of the absolute magnitude of intercellular stimuli, but I venture to assume that it is of a comparatively small order and of the same order as that of the resistances of the contact-barriers. If this is so, it is easily understandable. The hypothesis I have been discussing preserves the essential sameness of Φ - and Ψ -neurones,

while their difference in respect of permeability is biologically explained.

In the absence of evidence, it is all the more interesting to consider certain points of view and possibilities opened up by this hypothesis. To begin with, if we have formed a correct impression of the magnitude of the quantities (Q) in the external world, we may ask whether the original trend of the neuronic system towards keeping its quantity ($Q\dot{\eta}$) down to zero (for what it seeks is rapid discharge) may not already be in operation in the process of reception of stimuli.¹ We find, in fact, that the Φ -neurones do not terminate in an unattached manner at the periphery, but end in cell-structures; and it is these and not the Φ -neurones which receive the exogenous stimulus. A "nerve-ending apparatus" of this kind (using the term in the most general sense) might well serve the purpose of not allowing exogenous quantities (Q) to impinge upon Φ in undiminished magnitude but of damping them down. Such pieces of apparatus would then have the function of screens against quantity (Q) which would only allow *quotients* of the exogenous quantities (Q) to pass through.

This would fit in with the fact that the other type of nerve-ending—the unattached kind, without any terminal organ—is by far the commoner at the *internal* periphery of the body. A screen against quantity (Q) seems to be unnecessary there, presumably because the quantities ($Q\dot{\eta}$) which have to be received there do not need to be reduced to the intercellular level, since they are already at that level in the first instance.

Since we can calculate the quantities (Q) which are received by the endings of the Φ -neurones, this may perhaps afford us a means of forming some notion of the magnitudes which pass between the Ψ -neurones and which will also be of the same order as the resistances of the contact-barriers.

Here, moreover, we have a glimpse of a trend which may determine the fact that the neuronic system is built up of *several* systems: a constantly increasing tendency to hold back quantity ($Q\dot{\eta}$) from the neurones. Thus the *structure* of the neuronic system would serve the purpose of *holding back* quantity ($Q\dot{\eta}$) from the neurones, while its *function* would serve the purpose of *discharging* it.

¹ See p. 358 and footnote.

[6] PAIN

Every contrivance of a biological nature has limits to its efficiency, beyond which it fails. Such failures exhibit themselves in phenomena bordering on the pathological—in what may be described as normal prototypes of the pathological. We have seen that the neuron system is contrived in such a way that the major external quantities (Q) are held back from Φ and even more from Ψ . This purpose is served by the screens provided by the nerve-endings and by the fact that Ψ is only indirectly connected with the external world. Is there a phenomenon which can be made to coincide with a failure of these contrivances? Such a phenomenon is, I think, to be found in *pain*.

Everything that we know about pain fits in with this view. The neuron system has the most decided inclination to fly from pain. In this we can see a manifestation of its primary inclination towards avoiding any increase in its quantitative ($Q\dot{\eta}$) tension, and we can conclude that pain consists in *the irruption of large quantities (Q) into Ψ* . The two inclinations are thus one and the same.

Pain sets both the Φ -system and the Ψ -system in motion. There are no obstacles to its conduction; it is the most imperative of all processes. The Ψ -neurones seem to be permeable to it, and it must therefore consist in the action of quantities of a relatively high order.

The exciting cause of pain may, on the one hand, be increase in quantity; all sensory excitations (even those of the highest sense organs) tend to turn into pain if the stimulus increases. This can without hesitation be interpreted as failure. On the other hand pain may occur where the external quantities are *small*. Where this is so, it is regularly associated with a breach of continuity: that is to say, if an external quantity (Q) acts directly on the endings of the Φ -neurones and not through the "nerve-ending apparatus", pain results. Pain is thus characterized by the irruption of excessively large quantities (Q) into Φ and Ψ —that is, of quantities (Q) which are of a higher order than the Φ -stimuli.

It is easy to understand the fact that pain passes along all the paths of discharge. On our theory that quantity (Q) produces facilitation [p. 361], pain no doubt leaves behind permanent facilitations in Ψ —like a stroke of lightning. It may be that these facilitations do away

entirely with the resistance of the contact-barriers and establish a path of conduction like those in Φ .¹

[7] THE PROBLEM OF QUALITY

Hitherto we have made no mention of the fact that any psychological theory must, in addition to meeting the demands made by natural science, fulfil another major obligation. It must explain to us the things that we know, in the most puzzling fashion, through our "consciousness"; and, since this consciousness knows nothing of what we have so far been assuming—quantities and neurones—our theory must also explain to us this lack of knowledge.

A postulate by which we have all along been guided at once becomes explicit. We have been treating psychological processes as something that can dispense with being known by consciousness, something that exists independently of it; we are prepared to find that some of our assumptions are not confirmed by consciousness. If we refuse to let ourselves be confused by this, that is because we have postulated that consciousness gives us neither complete nor trustworthy information about the neuronic processes; the whole of these are to be regarded in the first instance as unconscious and are to be inferred in the same way as other natural phenomena.

We have, however, to find a place in our quantitative Ψ -processes for the content of consciousness. Consciousness gives us what we call "qualities"—sensations which show a great variety of "differences" and whose differences depend on relations to the external world. Among these differences there are series, similarities and so on, but there is nothing quantitative about them. We may ask *how* qualities originate and *where* qualities originate. These are questions that need the most careful investigation, but they cannot be exhaustively treated here.

Where do qualities originate? Not in the external world; for out there (according to the views of natural science, to which, in this discussion, psychology too must submit) there are only masses in motion and nothing else. In the Φ -system perhaps? This would tally

¹ This topic is developed further in Section 12 on "The Experience of Pain".

with the fact that qualities are connected with perception, but it is contradicted by everything that rightly speaks in favour of the seat of consciousness being in the higher levels of the neuronic system. In the Ψ -system then? There is an important objection to this. The Φ - and the Ψ -systems are in action together in perception; but there is one psychical process which is no doubt performed exclusively in Ψ —reproduction or recollection. This process, however, is, speaking generally, *devoid* of quality. Recollection normally brings about nothing that has the peculiar character of perceptual quality. Thus we must summon up enough courage to assume that there is a *third* system of neurones—“perceptual neurones” they might be called—which are excited along with the others during perception but not during reproduction, and whose states of excitation give rise to the different qualities—are, that is to say, conscious sensations.¹

If we stick firmly to the view that our consciousness furnishes only *qualities* whereas science recognizes *quantities*, a characteristic of the perceptual neurones emerges—almost as though it were by rule of three. For whereas science has set itself the task of tracing back all the *qualities* of our sensations to external *quantity*, it is to be suspected from the structure of the neuronic system that that system consists in contrivances for changing external *quantity* into *quality*. In this latter fact the original trend towards holding off quantity seems to triumph once more. The nerve-ending apparatus was a screen for allowing only a quotient of the external quantity to become operative, while at the same time Φ dealt with the discharge of quantity in the rough. The system Ψ was already shielded from higher orders of quantity and had only to do with intercellular magnitudes. Carrying the process further, the system W ² is moved, we may suppose, by still smaller quantities. It may be that the characteristic of quality

¹ The part played by the perceptual neurones and their relation to the Φ - and Ψ -neurones is formulated afresh in Letter 39 (of January 1, 1896): “In my new scheme I insert the perceptual neurones between the Φ -neurones and the Ψ -neurones; so that Φ transfers its quality to ω and ω transfers neither quality nor quantity to Ψ , but merely excites Ψ —that ‘s, indicates the direction to be taken by the free psychical energy”.

² [W stands for “*Wahrnehmung*” “perception”. The “System W ” has usually been translated in Freud’s later works the “system *Pcpt.*” Here the “ W ” is kept because, as will be seen shortly, Freud jokingly changes the “ W ” into a Greek *omega* (“ ω ”) to fit in with the Φ and Ψ .]

(that is, conscious sensation) only appears where quantities have so far as possible been excluded. They cannot be got rid of entirely, since these perceptual neurones must, like the rest, be regarded as cathected with quantity ($Q\dot{\eta}$) and striving to bring about discharge.

But at this point we are faced by what seems to be an immense difficulty. We have seen that permeability depends on the effects produced by quantity ($Q\dot{\eta}$) and that already the Ψ' -neurones are impermeable. Since the quantity ($Q\dot{\eta}$) concerned is still smaller, the perceptual neurones must be still more impermeable. We cannot, however, attribute this characteristic to the vehicles of consciousness. The mutability of their content, the transitoriness of consciousness, the easy combination of simultaneously perceived qualities—all these tally only with complete permeability of the perceptual neurones coupled with full *restitutio in integrum* [return to their former state]. The perceptual neurones behave like organs of perception; and we could find no place in them for memory. Here then we have permeability, complete facilitation, which does not arise from quantities. Where, then, does it arise from?

I can see only one way of escape: to revise our basic hypothesis on the passage of quantity ($Q\dot{\eta}$). Hitherto I have regarded it only as a transference of quantity ($Q\dot{\eta}$) from one neurone to another. It must have another attribute, however—of a *temporal* character; for the mechanics of the physicists have assigned this temporal attribute even to the motions of masses in the external world. I shall describe this attribute briefly as “period”. Thus I shall assume that the resistance of the contact-barriers applies only to the transference of quantity (Q), but that the *period* of neuronic motion is transmitted without inhibition in every direction, as though it were a process of induction.

Much remains to be done here in the way of physical clarification, for here as elsewhere the general laws of motion must apply without contradiction. But my hypothesis goes further, and asserts that the perceptual neurones are incapable of receiving quantities ($Q\dot{\eta}$), but that they assimilate the *period* of an excitation and that this condition of theirs of being affected by a period, while being filled with only a minimum of quantity ($Q\dot{\eta}$), is the fundamental basis of consciousness. The Ψ' -neurones, too, have of course their period, but this is

devoid of quality, or, to put it more accurately, is monotonous. Deviations from this specific psychical period reach consciousness as qualities.

Where do these differences in period originate? Everything points to the sense-organs, whose qualities must be represented by different periods of neuronics motion. The sense organs operate not only as screens against quantity (Q)—like every nerve-ending apparatus—but as *sieves*; for they only let through stimuli from certain processes that have a particular period. They probably transfer these differences to Φ by communicating to the neuronics motion periods with differences that are in some way analogous [to those of the processes in the external world]—specific energy; and it is these modifications which pass from Φ through Ψ to W , and there, where they are almost devoid of quantity, generate conscious sensations of qualities.¹ This transmission of quality is not durable; it leaves no traces behind it and cannot be reproduced.

[8] CONSCIOUSNESS

Only by means of these complicated and far from self-evident hypotheses have I so far succeeded in introducing the phenomena of consciousness into the structure of quantitative psychology.

No attempt can be made, of course, to explain how it is that excitatory processes in the perceptual neurones (ωN) involve consciousness. Our only task is to find varying processes in the perceptual neurones which are parallel to the characteristics of consciousness that are known to us. And this is not difficult to do in some detail.

First, however, a word upon the relation of this theory of consciousness to others. According to a modern mechanistic theory, consciousness is no more than an appendage added to physiologico-psychical processes, an appendage whose absence would make no difference to the course of psychical events. According to another theory consciousness is the subjective side of all psychical events and is thus inseparable from physiologico-mental processes. The theory which I have

¹ [This is discussed more fully below, p. 374-5.]

here propounded lies between these two. According to it consciousness is the subjective side of a *part* of the physical processes in the neuronic system—namely, of the *perceptual* processes (ω -processes); and its absence would *not* leave psychical events unchanged but would imply the absence of any contribution from the W (ω)-system.

If we represent consciousness by perceptual neurones (ωN), several consequences follow. These neurones must have a discharge, small though it may be; and there must be some means of filling the perceptual neurones with quantities ($Q\dot{\eta}$) of the necessary small amount. As in all other cases, this discharge will be in the direction of motility; and it is to be observed that, with the change-over into motion, obviously every characteristic of quality, every periodic peculiarity, is lost. The perceptual neurones must, no doubt, be filled with quantity only from Ψ , for we should wish to exclude any direct connection between this third system and Φ . It is impossible to suggest what may have been the original biological value of the perceptual neurones.

So far, however, we have only given an incomplete description of the content of consciousness. Apart from the series of sensory qualities, it presents another and very different series—the series of sensations of pleasure and unpleasure. And these we must now interpret. Since we have certain knowledge of a trend in psychical life towards *avoiding unpleasure*, we are tempted to identify that trend with the primary trend towards inertia. In that case *unpleasure* would coincide with a rise in the level of quantity ($Q\dot{\eta}$) or with a quantitative increase of pressure; it would be the perceptual sensation when there is an increase of quantity ($Q\dot{\eta}$) in Ψ . *Pleasure* would be the sensation of discharge. Since the system W is presumed to be filled from Ψ , it would follow that the cathexis in W increases when the level in Ψ rises, and diminishes when that level falls. Pleasure and unpleasure would be the sensations of W 's own cathexis, of its own level, while W and Ψ would function to some extent like inter-communicating pipes. Thus the quantitative processes in Ψ would reach consciousness in this way too, once again as qualities. [Cf. pp. 371-2.] Along with sensations of pleasure and unpleasure, the capacity disappears for perceiving sensory qualities which lie, so to speak, in the

indifferent zone between pleasure and unpleasure.¹ This must be translated thus: the perceptual neurones (ωN) show an optimum capacity for receiving the period of neuronics motion when they have a particular amount of cathexis; if the cathexis becomes stronger, unpleasure arises, if it becomes weaker, pleasure arises—till, when there is *no* cathexis, the capacity for reception vanishes. The form of motion in question would have to be constructed in accordance with these data.

[9] THE FUNCTIONING OF THE APPARATUS

We can now form the following picture of the functioning of the apparatus constituted by $\Phi \Psi \omega$.

Sums of excitation impinge from outside upon the endings of the Φ -system. They first come up against the nerve-ending apparatus and are broken up by it into quotients, which are probably of a higher order than intercellular stimuli (or possibly of the same order?). Here we have a first threshold. Below a certain quantity no effective quotient at all comes into being. So that the effectiveness of stimuli is restricted more or less to the *medium* quantities. At the same time the nature of the nerve-coverings acts as a sieve, so that not every kind of stimulus can be effective at the various endings. The stimuli which actually reach the Φ -neurones have a quantity and a qualitative characteristic²; in the external world they form a series possessing the same quality [as the stimuli] and increasing [degrees of] quantity, rising from the threshold up to the limit of pain.

The *processes* in the external world form a continuum in two directions—according to quantity and period (quality); whereas, the *stimuli* corresponding to those processes are, as regards quantity,

¹ [This point is expanded in the third paragraph of Section I of *Beyond the Pleasure Principle* (1920 g). It is there attributed to Fechner.]

² [For the sake of clarity, it may be pointed out that neither the “processes” in the external world, nor the “stimuli” that pass through the “nerve-ending apparatus” into Φ , nor the cathexes in Φ or Ψ possess quality, but only a *characteristic*—“period”—which, when it reaches ω , *becomes* quality.]

firstly *reduced* and, secondly *limited* by excision, and are, as regards quality, *discontinuous*, so that certain periods do not operate at all as stimuli. [Fig. 12.]

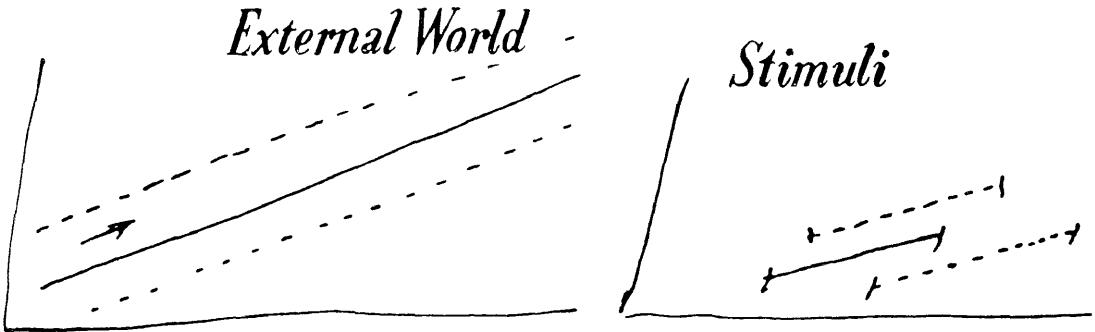


Fig. 12

The characteristic of quality in the stimuli now proceeds without hindrance through Φ by way of Ψ to ω , where it generates sensation; it is represented by a particular period of neuronic motion which is certainly not the same as that of the stimulus but has some relation to it, determined according to a reduction formula that is unknown to us. This period does not persist for long and vanishes in the direction of motility; nor, since it is allowed to pass through, does it leave any memory behind it.

The *quantity* of the Φ -stimulus excites the trend towards discharge in the nervous system, and it is converted into a proportional motor excitation. (The apparatus of motility is directly attached to Φ .) The quantities thus converted produce an effect which is quantitatively far superior to themselves; for they enter the muscles, glands, etc., and act in them as a *release* [of quantity], whereas between the neurones there is only a *transference* [of quantity].

Further, the Φ -neurones terminate in the Ψ -neurones, to which a part of the quantity ($Q\dot{\eta}$) is transferred, but only a part—a quotient, perhaps, corresponding to the magnitude of intercellular stimuli. At this point we may ask whether the quantity ($Q\dot{\eta}$) transferred to Ψ may not increase in proportion to the quantity (Q) of the current in Φ , so that a larger stimulus will produce a stronger psychical effect. A special contrivance seems to operate here, which once again holds

back quantity (Q) from Ψ . For the sensory paths of conduction in Φ have a peculiar structure. They constantly send out branches and exhibit thicker and thinner paths, which terminate at numerous end-points. This is probably to be explained as follows. [Fig. 13].

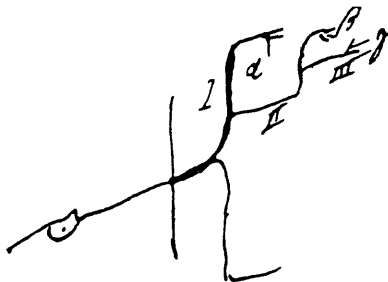


Fig. 13

A stronger stimulus pursues different paths from a weaker one. For instance, $Q\dot{\eta}_1$ will only pass along path I and will transfer a quotient to Ψ at end-point α . $Q\dot{\eta}_2$ [i.e., a quantity twice as great as $Q\dot{\eta}_1$] will not transfer a *double* quotient at α , but will be able to pass along path II, which is a narrower one, as well as along path I, and will open up a second endpoint to Ψ [at β]; $Q\dot{\eta}_3$ will open up the narrowest path and will transfer through the end-point γ [see fig.] as well. In this way the single path will be relieved of its charge and the *larger* quantity in Ψ will be expressed by the fact that *several* neurones will be cathected in Ψ instead of a single one. Each of the cathexes of the different Ψ -neurones may, in such a case, be of approximately equal magnitude. If $Q\dot{\eta}$ in Φ produces a cathexis in Ψ , then $Q\dot{\eta}_3$ will be expressed by a cathexis in $\Psi_1 + \Psi_2 + \Psi_3$. Thus *quantity* in Φ is expressed by *complexity* in Ψ . And by this means quantity (Q) is held back from Ψ , within certain limits, at least. This is very reminiscent of Fechner's law,¹ which might in this way be localized.

In this way Ψ is cathected from Φ with quantities (Q) which, in the normal course of things, are small. While the *quantity* of the Φ -excitation is expressed in Ψ by complexity, the *quality* is expressed

¹ [A formulation of the relation between changes in the intensity of a stimulus and changes in the resultant sensation. Freud appears to be suggesting that Fechner's law comes into operation at this particular point in the neuronc system.]

topographically, since, in accordance with the anatomical relations, the different sense organs communicate only with particular Ψ' -neurones. But Ψ' also receives cathexes from the interior of the body, and it seems reasonable to divide the Ψ' -neurones into two groups: the neurones of the pallium¹ which are cathected from Φ , and the nuclear neurones which are cathected from the endogenous paths of conduction.

[10] THE Ψ' PATHS OF CONDUCTION

The nuclear portion of Ψ' is connected with the paths by which endogenous quantities (Q) of excitation ascend. Without excluding the possibility that these paths may be connected with Φ , we must nevertheless adhere to our original assumption that a direct pathway leads from the interior of the body to the Ψ' -neurones [p. 364]. But this implies that Ψ' is exposed without protection to quantities (Q) from this direction, and in this fact [as we shall see (p. 379)] lies the driving force of the psychical mechanism.

What we know of the endogenous stimuli can be stated in the hypothesis that they are of an intercellular nature, that they arise continuously, and that it is only periodically that they become psychical stimuli. We cannot avoid supposing that they accumulate, and the intermittent nature of their psychical effect must lead to the view that in their path of conduction they come up against resistances which are only overcome when the quantity of excitation increases. The paths of conduction are thus arranged in a series, with several contact-barriers, leading up to the nucleus of Ψ' . When they are above a certain quantity (Q) the endogenous stimuli act continuously, and every increase of quantity (Q) is perceived as an increase of the Ψ' -stimulus. This, therefore, implies a state of affairs in which the path of conduction has become permeable. Experience further shows that after the discharge of the Ψ' -stimulus the path of conduction once more resumes its resistance.

A process of this kind is termed "summation". The Ψ' -paths of

¹[Mid-nineteenth century histologists had distinguished two main strata of nerve-cells in the cerebral cortex, and gave the name of "pallium" ("mantle") to the outer layer. Recent neuro-anatomy has revealed a far more complex stratification.]

conduction are filled by summation until they become permeable. It is evidently the smallness of the separate stimuli that enables summation to occur. Summation is also found in the Φ -paths of conduction—for instance, in the case of the conduction of pain; but it applies in their case only to small quantities. The minor part played by summation on the Φ side argues in favour of the fact that there we are concerned with quantities (Q) of considerable magnitude. Very small ones seem to be held back by the operation of the nerve-ending apparatus as a threshold, whereas on the Ψ -side there is no such apparatus and only small quantities ($Q\dot{\eta}$) are operative.

It should be noticed that the Ψ -conduction-neurones can alternate between the characteristics of permeability and impermeability, since they can almost completely resume their resistance in spite of the passage of quantity ($Q\dot{\eta}$). This is in complete contradiction to the property which we have attributed to the Ψ -neurones of becoming permanently facilitated by a current of quantity ($Q\dot{\eta}$) [p. 361]. How is this contradiction to be explained? By supposing that a resumption of resistance after a current has ceased is a general attribute of contact-barriers. There is then not much difficulty in bringing this into harmony with the fact that the Ψ -neurones are influenced [by the passage of quantity] in the direction of facilitation. We need only suppose that the facilitation which remains after the quantity (Q) has passed consists not in the removal of *all* resistance but in its reduction to a necessary minimum. During the passage of the quantity (Q) the resistance is suspended, but afterwards it is restored—but only to a particular height, according to the quantity (Q) that has passed; so that next time a smaller quantity will be able to pass, and so on. When the most complete facilitation has been established, there will remain a certain resistance, equal in amount in the case of all contact-barriers; so that quantities (Q) will have to increase above a certain threshold in order to be able to pass it. This resistance would be a constant. Accordingly, the fact that endogenous quantities ($Q\dot{\eta}$) operate by summation means no more than that these quantities are composed of very small magnitudes of excitation, less than the constant; and there is complete facilitation in the endogenous paths of conduction.

It follows from this, however, that the Ψ -contact-barriers are in

general higher than the barriers in [the endogenous] paths of conduction, so that a fresh accumulation of quantity ($Q\dot{\eta}$) can occur in the nuclear neurones. [See p. 384.] From the time when the path of conduction is filled up, no limit is set to this accumulation. Here (Ψ) is at the mercy of quantity (Q), and it is thus that there arises in the interior of the system the impulsion which sustains all psychical activity. We are familiar with this force as the "will"—the derivative of the "instincts". [Cf. p. 399.]

[11] THE EXPERIENCE OF SATISFACTION

The filling of the nuclear neurones in Ψ has as its consequence an effort to discharge, an impetus which is released along motor pathways. Experience shows that the first path to be followed is that leading to *internal change* (e.g., emotional expression, screaming, or vascular innervation). But, as we showed at the beginning of the discussion [p. 357], no discharge of this kind can bring about any relief of tension, because endogenous stimuli continue to be received in spite of it and the Ψ -tension is re-established. Here a removal of the stimulus can only be effected by an intervention which will temporarily stop the release of quantity ($Q\dot{\eta}$) in the interior of the body, and an intervention of this kind requires an alteration in the external world (e.g., the supply of nourishment or the proximity of the sexual object), and this, as a "specific action", can only be brought about in particular ways. At early stages the human organism is incapable of achieving this specific action. It is brought about by extraneous help, when the attention of an experienced person has been drawn to the child's condition by a discharge taking place along the path of internal change [e.g., by the child's screaming]. This path of discharge thus acquires an extremely important secondary function—viz., of bringing about an understanding with other people; and the original helplessness of human beings is thus the primal source of all moral motives. [Cf. p. 422-3.]¹

When the extraneous helper has carried out the specific action in

¹ In none of Freud's later formulations of this idea has the present one been equalled or surpassed: it indicates the part played by object-relations in the transition from the pleasure to the reality principle. See also p. 390 ff.

the external world on behalf of the helpless subject, the latter is in a position, by means of reflex contrivances, immediately to perform what is necessary in the interior of his body in order to remove the endogenous stimulus. This total event then constitutes an "experience of satisfaction", which has the most momentous consequences in the functional development of the individual. For three things occur in his Ψ -system: (1) A lasting discharge is effected, so that the urgency which had generated unpleasure in W is brought to an end. (2) A cathexis corresponding to the perception of an object occurs in one or more neurones of the pallium [p. 377]. (3) At other points of the pallium a report is received of the discharge brought about by the release of the reflex movement which followed the specific action. A facilitation is then established between these cathexes [(2) and (3)] and the nuclear neurones [which were being cathected from endogenous sources during the state of urgency].

(The report of the reflex discharge comes about owing to the fact that every movement, as a result of its collateral consequences, gives rise to fresh sensory excitations—of the skin and muscles—which produce a *motor* [or *kinaesthetic*] *image*.)

The facilitation arises in a manner which gives a deeper insight into the development of Ψ . Hitherto we have learned that the Ψ -neurones are influenced from the Φ -neurones and through the endogenous paths of conduction, while the separate Ψ -neurones are cut off from one another by contact-barriers with powerful resistances. There is, however, a fundamental law of *association by simultaneity*, which operates during pure Ψ -activity (during reproductive recollection); and this is the basis of all connections between Ψ -neurones. We find that consciousness (that is, quantitative cathexis) passes from one Ψ -neurone α to another β , if α and β have at some time been simultaneously cathected from Φ (or elsewhere). Thus the simultaneous cathexis α — β has led to the facilitation of a contact-barrier. It follows, in the language of our theory, that a quantity ($Q\dot{\eta}$) passes more easily from a neurone to a cathected neurone than to an uncathected one. Thus the cathexis of the second neurone operates in the same way as an increase in the cathexis of the first one; and in this case once again *cathexis is seen to be equivalent, in respect of the passage of quantity ($Q\dot{\eta}$), to facilitation*. [Cf. p. 361.]

Here then we learn of a second important factor in directing the course taken by a quantity ($Q\dot{\eta}$). A quantity ($Q\dot{\eta}$) in neurone a will go not only in the direction of the barrier which is best facilitated, but also in the direction of the barrier which is cathected on its further side. These two factors may support each other or may in some cases operate against each other.

Thus the experience of satisfaction leads to a facilitation between the two memory-images [of the object wished-for and of the reflex movement] and the nuclear neurones which had been cathected during the state of urgency. (No doubt, during [the actual course of] the discharge brought about by the satisfaction, the quantity ($Q\dot{\eta}$) flows out of the memory-images as well.) Now, when the state of urgency or wishing re-appears, the cathexis will pass also to the two memories and will activate *them*. And in all probability the memory-image of the object will be the first to experience this wishful activation.

I have no doubt that the wishful activation will in the first instance produce something similar to a perception—namely, a hallucination. And if this leads to the performance of the reflex action, disappointment will inevitably follow.

[12] THE EXPERIENCE OF PAIN

Ψ is normally exposed to quantity (Q) from the endogenous paths of conduction, and abnormally (though not yet pathologically) in cases where excessively large quantities (Q) break through the screening contrivances into Φ —that is to say, in cases of *pain* [p. 368]. Pain gives rise in Ψ to (1) a large rise in the level [of quantity], which is felt as unpleasure by W [p. 373] (2) an inclination to discharge, which can be modified in various directions and (3) a facilitation between this inclination to discharge and the memory-image of the object that generated the pain. Moreover there is no question but that pain has a special quality which makes itself felt alongside the unpleasure.

If the memory-image of the (hostile) [i.e., the pain-giving] object is in any manner freshly cathected (e.g., by fresh perceptions), a

condition arises which is not pain but has a similarity to pain. It includes unpleasure and the inclination to discharge corresponding to the experience of pain. Since unpleasure implies a heightened level [of quantity], the question arises of where this quantity ($Q\dot{\eta}$) comes from. In the experience of pain proper, it was the irrupting external quantity (Q) which raised the level in Ψ' . In its reproduction—in the affect—the only quantity ($Q\dot{\eta}$) arising is the quantity (Q) cathecting the memory; and it is obvious that this is of the same nature as any other perception and cannot result in a general increase in quantity ($Q\dot{\eta}$).

We are thus driven to assume that unpleasure is *released* from the interior of the body—is freshly provoked—by the cathexis of memories. The mechanism of this release can only be pictured as follows. Just as there are motor neurones which, when they are filled up to a certain degree, conduct quantities ($Q\dot{\eta}$) into the muscles and thus discharge them, so too there must be “secretory” neurones which, when they are excited, cause the generation in the interior of the body of something which acts as a stimulus on the endogenous paths of conduction to Ψ' . These secretory neurones must influence the production of endogenous quantities ($Q\dot{\eta}$) and accordingly do not *discharge* quantity ($Q\dot{\eta}$) but *introduce* it in roundabout ways. We shall give the name of “key neurones” to these secretory¹ neurones. Evidently they are only excited when a certain level has been reached in Ψ' . The experience of pain provides an excellent facilitation between the memory-image of the hostile object and these key neurones; and by virtue of this facilitation an unpleasurable affect is now released.

Support is lent to this puzzling but indispensable hypothesis by what happens in the case of the release of sexual feeling. At the same time a suspicion forces itself on us that in both these examples the endogenous stimuli consist of chemical products, of which there may be a considerable number. Since the release of unpleasure can be extraordinarily large where there is only quite a slight cathexis of the hostile memory, we may conclude that pain leaves behind it specially abundant facilitations. And in this connection we may suspect that facilitation depends entirely on the [magnitude of the]

¹ [The manuscript reads “motor”—evidently a slip of the pen.]

quantity ($Q\dot{\eta}$) attained: so that the facilitating effect of $3Q\dot{\eta}$ may be far greater than that of $Q\dot{\eta}$ 3 times repeated. (See p. 363.)

[13] AFFECTS AND WISHFUL STATES

The residues of the two kinds of experiences [of satisfaction and of pain] which we have been discussing are *affects* and *wishful states*. These have in common the fact that both of them involve a heightening of the quantitative tension in Ψ' : in the case of an affect this is brought about by a sudden release, and in that of a wish by means of summation. Both these states are of the greatest importance in relation to the passage of quantity in Ψ' , since they leave motive forces behind them which affect that passage in a compulsive fashion. A wishful state produces what amounts to a positive *attraction* to the object of the wish, or rather to its memory-image; an experience of pain results in a repulsion, a disinclination to keep the hostile memory-image cathected. Here we have primary *wishful attraction* and primary *defence* [or fending-off].¹

Wishful attraction can easily be explained by supposing that the cathexis of the friendly memory in a state of desire is far greater in quantity ($Q\dot{\eta}$) than it is in the case of mere perception; so that in the former case there is a particularly good facilitation between the Ψ' -nucleus and the corresponding neurones of the pallium.

It is more difficult to explain primary defence or "repression"—the fact that a hostile memory-image has its cathexis removed as soon as possible.² The explanation may nevertheless be that the primary experiences of pain were brought to an end by reflex defence. The emergence of some other object in place of the hostile one acted as a signal for the fact that the experience of pain was at an end; and the Ψ' -system, learning from biological experience, seeks to reproduce the state in Ψ' which indicated the cessation of the pain. The phrase "learning from biological experience" introduces a fresh basis of

¹ [These states are further discussed in Part III, pp. 428 and 433 ff.]

² Further on in the present paper (p. 408) Freud already distinguishes between primary defence and repression. He later separated the reaction to pain from repression. (See his paper on "Repression", 1915 d; *trans. Coll. Papers IV*, p. 85.)

explanation which must carry independent weight of its own, though at the same time it does not exclude (but indeed requires) a recourse to mechanical principles—that is, to quantitative factors.¹ In the case before us it may well be the increase in quantity ($Q\dot{\eta}$), invariably arising when hostile memories are cathected, which forces an increase in the activity of discharge and so at the same time a flow of quantity away from the memories as well.

[14] INTRODUCTION OF THE CONCEPT OF AN “EGO”²

With our hypothesis of “wishful attraction” and of a tendency to repression we have in fact already touched upon a state of Ψ which has not yet been discussed. For both these processes indicate that an organization has been formed in Ψ whose presence interferes with the passage [of quantities] if that passage occurred for the first time in a particular manner [i.e., if it was accompanied by satisfaction or pain]. This organization is called the “ego”. It can easily be pictured if we consider that the constantly repeated reception of endogenous quantities ($Q\dot{\eta}$) in certain neurones (of the nucleus) and the consequent facilitating effects of that repeated reception will produce a group of neurones which retains a constant cathexis [p. 378-9] and which thus constitutes the vehicle for the store of quantity required by the secondary function [p. 358].³ The ego may thus be defined as the totality of Ψ -cathexes at any given time; and in these a permanent portion may be distinguished from a changing one. [Cf. p. 390.] It is easy to see that the facilitations between the Ψ -neurones form part of the domain of the ego, since they represent possibilities of determining the extent of the changing ego from one moment to another.

¹ [The topic of “learning from biological experience” recurs frequently in Part III, e.g., on pp. 417 and 428.]

² [This topic is further discussed in Part III, on p. 426 ff.]

³ A constant cathexis of energy, the function of inhibiting or postponing certain discharges, and a connection with the secondary process—all of these are also among the characteristics of the “ego organization”, as Freud uses the term in his structural theory. (See *The Ego and the Id*, 1923 b. and Freud’s later writings.)

While it must be the ego's endeavour to get rid of its cathexes by the method of satisfaction, it (the ego) must inevitably influence the repetition of experiences of pain and affects; and it must do so in the following manner, which is generally called "inhibition".

A quantity ($Q\dot{\eta}$) which enters a neurone from anywhere will pursue its path through the contact-barrier which shows the greatest facilitation, and will give rise to a current flowing in that direction. To put this more accurately: the current of quantity ($Q\dot{\eta}$) will divide its course towards the different contact-barriers in inverse ratio to the resistance which they offer; and where a quotient of quantity comes up against a contact-barrier whose resistance is superior to it, nothing will in practice pass through. This distribution may easily be different for every difference in quantity ($Q\dot{\eta}$) there may happen to be in the neurone, for quotients may appear which rise above the threshold of still other contact-barriers. Thus the course taken depends on the quantities ($Q\dot{\eta}$) and the relative strength of the facilitations. We have, however, come to know a third powerful factor [p. 380]. If an adjoining neurone is simultaneously cathected, this acts like a temporary facilitation of the contact-barriers between the two neurones, and modifies the course of the current, which would otherwise have followed the direction of the only facilitated contact-barrier. A "lateral" cathexis thus acts as an *inhibition on the passage of quantity* ($Q\dot{\eta}$). Let us imagine the ego as a network of cathected neurones, well

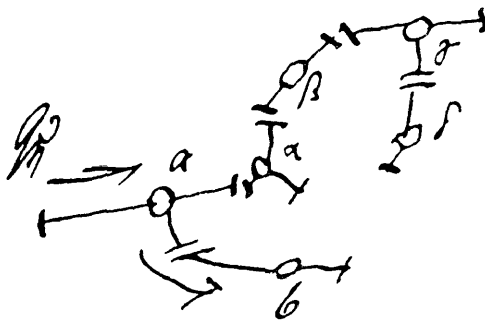


Fig. 14

facilitated in relation to one another [See Fig. 14]. Then suppose a quantity ($Q\dot{\eta}$) enters neurone *a* from the outside (Φ). If it were uninfluenced it would have proceeded to neurone *b*. But it is in fact so much influenced by the lateral cathexis in neurone α that it only passes on a quotient to *b*, or may even not reach *b* at all. Where, then, an ego exists, it is bound to inhibit psychical processes.

But inhibition of this kind is decidedly to Ψ 's advantage. Let us

suppose that a is a hostile memory and b a key neurone [p. 382] for unpleasure. Then, if a is aroused, the primary effect will be the release of unpleasure, which might perhaps be pointless—at all events in its full amount. But as a result of the inhibitory effect of α the release of unpleasure is very small and the neuronic system is spared the development and discharge of quantity without suffering damage in any other way. We can now easily see how, with the help of a mechanism which draws the ego's *attention*¹ to an imminent fresh cathexis of the hostile memory-image, the ego can succeed in inhibiting the passage of quantity from the memory-image to the release of unpleasure, by a copious lateral cathexis which can be increased as circumstances dictate. Indeed, if we assume that the initial unpleasurable release of quantity ($Q\dot{\eta}$) is received by the ego itself, it will have within itself the source of the quantity whose expenditure is necessary for the purpose of the inhibitory lateral cathexis.

Thus the stronger the unpleasure, the stronger will be the primary defence.

[15] THE PRIMARY AND SECONDARY PROCESSES IN Ψ'

It follows from what we have so far made out that there are two situations in which the ego in Ψ' (which we can treat in regard to its trends like the nervous system as a whole) is liable to fall into a helpless state in which it is exposed to damage.

The first of these arises if, while it is in a wishful state, it freshly cathects the memory of the object and then sets the process of discharge in motion, where there can be no satisfaction because the object is not present *really* but only as an imaginary idea. At an early stage Ψ' is not in a position to make this distinction, since it can only work on the basis of the sequence of analogous states between its neurones [i.e. on the basis of its previous experience that the cathexis of the object was followed by satisfaction]. Thus it requires a criterion

¹ [The function of attention is discussed at great length in Part III (p. 418 ff.).]

from elsewhere in order to distinguish between perceptions and ideas.¹

In the second place, Ψ is in need of an indication that will draw its attention to the re-cathexis of a hostile memory-image and enable it to avoid, by means of a lateral cathexis, the consequent release of unpleasure. If Ψ is able to effect this inhibition soon enough, both the release of unpleasure and the defence against it will be slight; whereas otherwise there will be immense unpleasure and an excessive primary defence.

Both a wishful cathexis and a release of unpleasure when there is a fresh cathexis of the memory concerned can be biologically damaging. This is true of a wishful cathexis whenever it oversteps a certain limit and thus encourages discharge; and it is true of a release of unpleasure at all events whenever the cathexis of the hostile memory-image arises from Ψ itself (by association) and not from the external world. Thus, in the latter case too what is needed is an indication which will distinguish a perception from a memory (or idea).

In all probability it is the perceptual neurones which furnish this indication—an "indication of reality". In the case of every external perception a qualitative excitation occurs in W . But this, as such, is of no importance to Ψ . We must therefore add that the perceptual excitation leads to a perceptual *discharge*, and that a report of this (as of all other kinds of discharge) reaches Ψ . *It is this report of a discharge coming from W (ω) that constitutes an indication of quality or reality to Ψ .*

If the wished-for object is fully cathected, so that it is activated in a hallucinatory manner, the same indication of discharge or reality will follow as in the case of an external perception. In this instance the criterion fails. But if the wishful cathexis is subjected to *inhibition*, as will be possible if the ego is cathected, a quantitative case may occur in which the wishful cathexis will not be intense enough for an indication of quality to be produced, as it would be in the case of an

¹ What follows contains the earliest formulation of a notion to which Freud gave frequent and varying expression and to which he finally gave shape in his statement that "reality-testing" is a function of the ego. Earlier formulations, which immediately follow upon the account given in the "Project", will be found in *The Interpretation of Dreams* and in Freud's paper on the two principles of mental functioning (1911 b; *trans. Coll. Papers IV*, especially p. 14).

external perception. In this instance, then, the criterion retains its value. The distinction between the two instances resides in the fact that, whereas indications of quality derived from outside make their appearance *whatever* the intensity of cathexis, those derived from Ψ only do so if the intensities are large. Accordingly, *it is the inhibition brought about by the ego that makes possible a criterion for distinguishing between a perception and a memory*. Biological experience will then teach the lesson that discharge must not be initiated until an indication of reality has arrived, and that for this reason the cathexis of the desired memories must not be carried beyond a certain degree.

On the other hand, the excitation of the perceptual neurones can also serve to protect the Ψ -system in the *second* situation: namely, by drawing the attention of Ψ to the fact of the presence or absence of a perception. For this purpose we must assume that the perceptual neurones (ωN) were originally connected anatomically with the paths of conduction from the different sense organs and that their discharge was directed back again to the motor apparatus belonging to these same sense organs. Then the report of this latter discharge (the report, that is, of *reflex attention*) will act as a biological signal to Ψ to send out a quantity of cathexis in the same direction.

To sum up. Where inhibition is operated by a cathected ego, the indications of ω -discharge serve in general as indications of reality which Ψ learns, by biological experience, to make use of. If the ego is in a state of wishful tension at the moment when an indication of reality emerges, it will allow discharge to follow along the lines of the specific action [p. 379]. If an increase of unpleasure coincides with the indication of reality, Ψ will institute a defence of normal magnitude by an appropriately large lateral cathexis at the point indicated. If neither of these is the case [i.e., if there is neither a wishful state nor an increase of unpleasure at the moment when an indication of reality is received], the cathexis will be allowed to proceed unhindered, according to the nature of the facilitations prevailing. Wishful cathexis carried to the point of hallucination and a complete generation of unpleasure, involving a complete expenditure of defence, may be described as "psychical primary processes". On the other hand, those processes which are only made possible by a good cathexis of the ego and which represent a moderation of the primary processes

may be described as “psychical secondary processes”. It will be seen that the *sine qua non* of the latter is a correct exploitation of the indications of reality and that this is only possible when there is inhibition on the part of the ego.¹

[I6] COGNITIVE AND REPRODUCTIVE THOUGHT²

We have thus put forward a hypothesis to the effect that, during the process of wishing, inhibition on the part of the ego leads to a moderation of the cathexis of the object wished-for, which makes it possible for that object to be recognized as not being a real one. Let us now carry our analysis of this process further; and here there is more than one different possibility.

In the first case, the wishful cathexis of the memory-image may be accompanied by a simultaneous perception of it [that is, of the object to which the memory relates]. The two cathexes will then coincide (a situation from which no biological profit can be derived). In addition to this, an indication of reality arises from *W*, which, as we have seen, is followed by a discharge that is successful.³ Thus this case is easily disposed of.

In the second case, the wishful cathexis that is present may be

¹ For purposes of comparison with this section, we may quote a passage from *The Interpretation of Dreams* (trans., 1953, pp. 598-600): “A current of this kind in the apparatus, starting from unpleasure and aiming at pleasure, we have termed a ‘wish’. . . . The first wishing seems to have been a hallucinatory cathecting of the memory of satisfaction . . . All that I insist upon is the idea that the activity of the *first* Ψ -system is directed towards securing the *free discharge* of the quantities of excitation, while the *second* system, by means of the cathexes emanating from it, succeeds in *inhibiting* this discharge and in transforming the cathexis into a quiescent one, no doubt with a simultaneous raising of its level. I presume, therefore, that under the dominion of the second system the discharge of excitation is governed by quite different mechanical conditions from those in force under the dominion of the first system. When once the second system has concluded its exploratory thought-activity, it releases the inhibition and damming-up of the excitations and allows them to discharge themselves in movement”.

² [The topics of this and the two next sections are further elaborated in Part III.]

³ Compare in connection with this and with what follows a later formulation dealing with this extended group of problems: “Thus the first and immediate aim of the process of testing reality is not to discover an object in real perception

accompanied by a perception which agrees with it only partly and not wholly. This is the moment at which to recall the fact that perceptual cathexes are never cathexes of single neurones but always of complexes. Hitherto we have neglected this feature and the time has come to take it into account. Let us suppose that the *wishful* cathexis, speaking quite generally, is attached to neurone a + neurone b ; whereas the *perceptual* cathexis is attached to neurone a + neurone c . This being the commoner case—more common than that of identity—it deserves close study. Here, too, biological experience teaches that it is unsafe to initiate discharge if the indications of reality confirm only a part of the complex and not the whole of it. Now, however, we come upon a method of turning the similarity into a complete identity. If we compare this W -complex with other W -complexes, we are able to analyse it into two portions: a neurone a which on the whole remains the same and a neurone b which on the whole varies. Language later applies the term “judgement” to this process of analysis, and discovers the resemblance which exists between the nucleus of the ego and the constant portion of the perceptual complex on the one hand and between the changing cathexes in the pallium and the inconstant portion of the perceptual complex on the other [cf. p. 384]; language describes neurone a as a “thing” and neurone b as its activity or attribute—in short, as its “predicate”. [Cf. pp. 393 and 423.]

Thus judgement is a Ψ -process which is only made possible by the inhibition exercised by the ego and which is brought about by the difference between the wishful cathexis of a memory and a similar perceptual cathexis. It follows from this that when these two cathexes

corresponding to what is imagined, but to *re-discover* such an object, to convince oneself that it is still there. The differentiation between what is subjective and what is objective is further assisted by another faculty of the power of thought. The reproduction of a perception as an image is not always a faithful one; it can be modified by omissions or by the fusion of a number of its elements. The process for testing the thing's reality must then investigate the extent of these distortions. But it is evident that an essential precondition for the institution of the function for testing reality is that objects shall have been lost which have formerly afforded real satisfaction”. (“Negation”, 1925 *h*, *trans. Coll. Papers*, V, p. 184.) The connection with an early object relation which is stated in this last sentence is often only implicit in the “Project”. But the example used by Freud for his discussion of the establishment of an identity between the image and what is imagined is the infant's image of his mother's breast (pp. 391 and 393).

coincide, the fact will be a biological signal for ending the activity of thinking and for initiating discharge.¹ When they do *not* coincide, an impetus is given to the activity of thinking which will be brought to a close when they *do* coincide.

The process can be analysed further. If neurone *a* is present in both the wishful and the perceptual cathexis but if neurone *c* is perceived instead of neurone *b*, the efforts of the ego follow the connections of this neurone *c* and, by means of a flow of quantity ($Q\dot{\eta}$) along these connections, cause fresh cathexes to emerge until at last the missing neurone *b* is reached. As a rule, what is interpolated between neurone *c* and neurone *b* is a motor image, and, when this image is revived by the actual carrying out of a movement, the perception of neurone *b* is obtained and the desired identity established. Suppose, for instance, that the memory-image wished for is—to take the case of a baby—an image of the mother's breast with a front view of its nipple, but that the baby begins by having a perception which is a *side* view of the same object without the nipple. Now, he has in his memory an experience, made accidentally while he was sucking, of a particular movement of his head which changed the front view into the side view. Accordingly, the side image which he now sees leads to the head-movement, and an experiment will show him that the reverse of the movement must be performed and the perception of the front view will thus be obtained.

This case still has little of judgement about it; but it is an example of the possibility, by reproducing cathexes, of arriving at an action which is one of the chance off-shoots of the specific action.

There is no doubt that what underlies this travelling along the facilitated neurones is quantity ($Q\dot{\eta}$) from the cathected ego, and that the travelling is not controlled by the facilitations but by an aim. What, then, is this aim and how is it attained?

The aim is to get back to the missing neurone *b* and to release the sensation of identity—that is, the moment at which only neurone *b* is cathected and the travelling cathexis finds its way into *b*. The aim is attained by experimentally displacing the quantities ($Q\dot{\eta}$) in all directions, and for that purpose sometimes a greater and sometimes a less

¹[Cf. the very similar remarks on judgement in Freud's paper on "Negation" (1925 *h*).]

expenditure of lateral cathexis will clearly be necessary, according to whether one can make use of the existing facilitations or must work against them. The struggle between the fixed facilitations and the changing cathexes is characteristic of the secondary process of reproductive thinking as contrasted with the primary succession of associations.

What is it that directs the course of the travelling? The fact that memory of the wishful idea is kept cathected, all the while the chain of association is followed from neurone *c*. As we know, the fact of the cathexis of neurone *b* will increase the facilitation and accessibility of any connections it may have.

In the course of this travelling it may happen that the quantity (Q) comes up against a memory which is related to an experience of pain, and will thus give rise to a release of unpleasure. Since this is a sure sign that neurone *b* cannot be reached along this path, the current will at once be diverted from the cathexis in question. The unpleasurable paths retain their great value, however, in directing the current of reproduction.

17] REMEMBERING AND JUDGING

Thus reproductive thinking has a practical purpose and a biologically established end: namely, to lead a quantity ($Q\dot{\eta}$) that is travelling away from the undesired perception back to the missing neuronic cathexis. Identity is then achieved together with a right to discharge—provided that the indication of reality appears from neurone *b*. But the process can make itself independent of the second of these aims [i. e., discharge] and can strive for identity alone. In that case what we have before us is a pure act of thought, though it can always be put to practical use subsequently. Moreover, in such cases the cathected ego behaves in exactly the same fashion.

We will now turn to a third possibility which can arise in a wishful state. [For the first two see above p. 389.] With a wishful cathexis present, a perception may emerge which does not coincide in *any* way with the memory-image that is wished for (which we will call *Mem +*). It will then become a matter of interest to cognize—to get

to know—this perceptual image, so that in spite of everything it may perhaps be possible to find a way from it to *Mem* +. For this purpose the [whole] perception is presumably hypercathected from the ego, just as happens in the former case with the portion of the perception constituted by neurone *c* [p. 391]. If the perception is not an absolutely new one, it will now recall and revive the *memory* of some perception with which it will have at least something in common. And now the process of thought that I have previously described will be repeated in connection with this memory-image, though to some extent without the aim provided by the cathected wishful idea.

In so far as the cathexes coincide, they give no occasion for activity of thought. But the differing portions of the cathexes “arouse interest” and may give occasion for thought-activity of two sorts. The current will either be directed on to the revived memories and set an aimless activity of *memory* at work (which will thus find its motive in differences and not in resemblances), or it will remain concentrated on the newly presented portions of the perception and so set at work an equally aimless activity of *judgement*.

Let us suppose that the object presented by the perception is similar to the [percipient] subject himself—that is to say, a fellow human-being. The theoretical interest taken in it is then further explained by the fact that an object of *a similar kind* was the subject’s first satisfying object (and also his first hostile object) as well as his sole assisting force. For this reason it is on his fellow-creatures that a human being first learns to cognize. The perceptual complexes arising from this fellow-creature will in part be new and non-comparable—for instance, its features (in the visual sphere); but other visual perceptions (for instance, the movements of its hands) will coincide in the subject with his own memory of quite similar visual impressions of his own body—a memory with which will be associated memories of movements experienced by himself. The same will be the case with other perceptions of the object; thus, for instance, if the object screams, a memory of the subject’s own screaming will be aroused and will consequently revive his own experiences of pain. Thus the complex of a fellow-creature falls into two portions. One of these gives the impression of being a constant structure and remains as a coherent “thing”; while the other can be

understood by the activity of memory—that is, can be traced back to information about the subject's own body.¹ This process of analysing a perceptual complex is described as “cognizing” it; it involves a judgement and is brought to an end when that has been achieved. Judging, as will be seen, is not a primary process, and presupposes a cathexis from the ego of the disparate (non-comparable) portion of the complex. Judging has in the first instance no practical purpose; and, in the process of judging, the cathexis of the disparate portions is probably discharged, for this would explain why the activities or “predicates” have only a loose path of connection with the “subject” portion of the complex. [Cf. pp. 423 and 440 f.]

This might lead us deep into the analysis of the act of judging; but it would be a diversion from our theme.

Let us be satisfied with bearing firmly in mind that it is the original interest in establishing the situation of satisfaction that produces in the one case *reproductive reflection* and in the other case *judging* as methods of proceeding from the perceptual situation that is really presented to the situation that is wished for. It remains a *sine qua non* for this that the Ψ -processes shall not run their course without inhibition, but shall be subject to the activity of the ego. The eminently practical bearing of all thought-activity will thus be demonstrated.

[18] THOUGHT AND REALITY

Thus the aim and end of all processes of thought are the establishment of a *state of identity*, the transportation of a cathectic quantity ($Q\eta$) emanating from outside into a neurone cathected by the ego. Cognitive or judging thought seeks for an identity with a somatic cathexis; reproductive thought seeks for an identity with a psychological cathexis (an experience of the subject's own). Judging thought

¹ These reflections on the roots of our understanding of other people's expressive actions were never adequately pursued in Freud's later writings. A section in his book on jokes (1905 c) makes use of the hypothesis that a recollection of one's own expenditure of nervous energy is what enables one to understand the facial play and gestures of other people. (Cf. p. 395.) Recent investigations of the “body schema” place these formulations of Freud's in a fresh light. Cf. Schilder, 1942. For the relation between earliest body contacts and identification, see Kris, 1952.

operates in advance of reproductive thought, since the former furnishes the latter with ready-made facilitations to assist further associative travelling. If at the conclusion of the act of thought the indication of reality also reaches perception, then a *judgement of reality*, a *belief*, is achieved and the aim of the whole activity is attained.

There is this more to be said about judgement: its basis is evidently the presence of somatic experiences, sensations and motor images of the subject's own. So long as they are absent the variable¹ portion of the perceptual complex cannot be understood; that is, it can be reproduced but cannot point a direction for further paths of thought. For instance (a fact which will be of importance later [in Part II]) no sexual experiences can produce any effect so long as the subject has no sexual feelings—that is, generally speaking, until the beginning of puberty.

Primary judgement seems to presuppose a lesser degree of influence by the cathected ego than do reproductive acts of thought. Though it may happen that an association is followed owing to there being a partial coincidence [between the wishful and the perceptual cathexes] and no need for modification, there are also instances in which the associative process of judging is performed with a full current of quantity. Perception may be said to correspond to a nuclear object *plus* a motor image. While one is perceiving *W*, one copies the movements oneself; that is to say, one innervates one's own motor image (which has been aroused to coincide with the perception) so strongly that one actually performs the movement. Thus one can speak of a perception as having an "imitative value". [Cf. p. 423.] Or the perception may arouse the memory-image of a sensation of pain of one's own, so that one feels the corresponding unpleasure and repeats the appropriate defensive movements. Here we have the "sympathetic value" of a perception.

No doubt these two cases show us the primary process at work in judging; and we may assume that all secondary judging has come about through a mitigation of these purely associative processes. Thus judging (which later becomes a means of cognizing an object that may be of practical importance) is in its origin a process of

¹[So in the MS. Wrongly printed "*verarbeitende*" in the German edition of 1950.]

association between cathexes arriving from without and cathexes derived from one's own body—an identification between reports or cathexes coming from Φ and from the interior. It is perhaps justifiable to suspect that judging also indicates the way in which quantities coming from Φ can be transmitted and discharged. What we term "things" are residues that have evaded judgement.

The example of judgement gives us a hint of the quantitative difference which must be presumed to exist between thinking and the primary process. It is reasonable to suppose that in the act of thinking a small stream of motor innervation passes from Ψ' —but only, of course, if during that act a motor or a key [i.e., secretory, see p. 382] neurone is innervated. Yet it would be wrong to regard this discharge as the thought-process itself—of which it is merely an unintended subsidiary result. The thought-process consists of the cathexis of Ψ' -neurones accompanied by a change in the previously operative facilitations brought about by a lateral cathexis from the ego. It is intelligible from a mechanical standpoint that in this process only a portion of the quantity ($Q\dot{\eta}$) is able to follow the facilitations and that the magnitude of this portion is constantly regulated by the cathexes. But it is equally clear that in this way enough quantity ($Q\dot{\eta}$) is at the same time economized to make the reproduction profitable. Otherwise the *whole* of the quantity ($Q\dot{\eta}$) which is needed for final discharge would be given off to the points of motor outlet during its passage. Thus, *the secondary process is a repetition of the original course of excitation in Ψ' , but at a lower level and with smaller quantities.*

With quantities, it may be asked, even smaller than those which normally pass through the Ψ' -neurones? How is it possible for such small quantities ($Q\dot{\eta}$) to make their way along paths which are, indeed, only passable by larger ones than Ψ' usually receives? The only possible answer is that this must be a mechanical consequence of the lateral cathexes. We must conclude that matters are so constituted that when there is a lateral cathexis small quantities ($Q\dot{\eta}$) can flow through facilitations which could normally be passed only by large ones. The lateral cathexis, as it were, "binds"¹ a certain amount of the quantity ($Q\dot{\eta}$) passing through the neurone.

¹ [This term is explained in Part III, p. 425 f., where this whole question is further discussed.]

Thought must further satisfy another condition. It must make no essential change in the facilitations laid down by the primary processes, or otherwise it would falsify the traces of reality. It is enough to say of this condition that facilitation is probably the result of the single passage of a major quantity, and that cathexis, though very powerful at the moment, leaves behind it no comparably lasting effect. The small quantities (Q) that pass during thought-processes cannot in general prevail over the facilitations.

Nevertheless there can be no doubt that thought-processes *do* leave permanent traces; since thinking something over a second time demands so much less effort than the first time. Therefore, in order that reality may not be falsified, there must be special traces (indications of thought-processes) which constitute a "thought-memory"—something which it has not so far been possible to formulate. We shall hear presently of the means by which traces of thought-processes are distinguished from traces of reality.¹

[19] PRIMARY PROCESSES—SLEEP AND DREAMS

The question now arises as to the *source* of the quantitative means by which the primary Ψ -process is carried out. In the case of the experience of *pain* the source is obviously the quantity (Q) which irrupts from without; and in the case of *affect* it is the quantity released by facilitation. In the case of the secondary process of *reproductive thinking* a greater or less quantity can be transferred to neurone *c* from the ego [p. 391];² this may be described as "thought interest" and it is proportional to the "affective interest" where this is able to develop. The only question is whether there are Ψ -processes of a primary nature for which the quantity ($Q\dot{\eta}$) contributed from Φ suffices, or whether the Φ cathexis of a perception is automatically supplemented by a contribution from Ψ (namely, attention), and that

¹ [This whole question is discussed much more fully in Part III, p. 436 ff.]

² [What Freud here describes as "thought interest" seems to be the same as what is termed "attention" in the next sentence and on p. 399, as well as in Part III, where this subject is dealt with at greater length (p. 417 ff.).]

this alone makes a Ψ' -process possible. This question remains an open one, though it may perhaps be decided by reference to some particular psychological facts.

One such important fact is that primary Ψ' -processes, of a kind that have been gradually suppressed by biological pressure in the course of the evolution of Ψ' , are daily presented to us during sleep. A second fact of equal importance is that the pathological mechanisms which are revealed by the most careful analysis in the psychoneuroses bear the greatest similarity to dream-processes. The most momentous conclusions follow from this comparison, which I shall discuss later. [See also p. 402.]¹

But first the fact of sleep must be fitted into our theory. The essential precondition of sleep is easily recognizable in children. Children sleep so long as they are not tormented by physical needs or external stimuli (e.g., by hunger or by sensations of cold from wetting). They fall asleep when they have obtained satisfaction (at the breast). So, too, adults fall asleep easily *post coenam et coitum* [after eating and copulating]. Accordingly the precondition of sleep is a *lowering of the endogenous charge in the Ψ' -nucleus*, which renders the secondary function unnecessary. In sleep the subject is in the ideal state of inertia, with the store of quantity ($Q\eta$) discharged.

In the waking state this store is collected in the "ego", and we may assume that it is the discharging of the ego which is the precondition and characteristic of sleep. And here, we can see at once, we have the precondition of primary psychical processes.

It is not certain whether, in adults, the ego is *completely* relieved of its charge in sleep. In any case it withdraws a large number of its cathexes, though on awakening these are re-established immediately and without trouble. This contradicts none of our presuppositions; but it draws attention to the fact that we must assume that between neurones which are effectively interconnected there must be currents which affect the total level [of cathexis] as happens in intercommunicating pipes—although the height of the level in the different

¹ Cf. in this connection *The Interpretation of Dreams*, particularly (*trans.* 1953) p. 597 f. It seems as though Freud lost sight of the discovery which he here reveals of the "similarity" between dream-processes and the mechanisms of the psychoneuroses, and did not rediscover it till the beginning of 1899 [in Letter 105]. See also p. 410 and the footnote to p. 209.

neurones need only be proportional [see p. 427] and is not necessarily uniform.

The characteristics of sleep reveal some things which could not have been guessed.

Sleep is characterized by motor paralysis, a paralysis of the will. [See below, p. 400.] The will is the discharge of the total Ψ -quantity ($Q\dot{\eta}$). [Cf. p. 379.] In sleep the spinal tonus is partly relaxed (it seems likely that motor Φ -discharge is manifested in tonus); other innervations persist, together with the sources of their excitation.

It is a highly interesting fact that the state of sleep begins and is evoked by the closing of those sense organs that are capable of being closed. Perceptions should not be made during sleep and nothing disturbs sleep more than the emergence of sense impressions, cathexes entering Ψ from Φ . This seems to indicate that in daytime a constant, though displaceable, cathexis (i.e., "attention")¹ is sent into the neurones of the pallium which receive perceptions from Φ ; so that it is quite possible that the primary Ψ^2 -processes may be performed with this contribution from Ψ . [Cf. p. 397-8.] (It remains to be seen whether the pallium neurones themselves or the adjoining nuclear neurones are already pre-cathected.) If Ψ withdraws these pallium cathexes, the perceptions reach uncathed neurones and are slight and may perhaps even be unable to give an indication of quality.² And as we have just hinted, along with the emptying of the perceptual neurones (ωN), an innervation of discharge that increases attention comes to a stop. At this point, too, we might approach the enigma of hypnosis. The apparent unexcitability of the sense organs in that condition would seem to rest on this withdrawal of the cathexis of attention.

Thus, by an automatic mechanism which is the opposite of the mechanism of attention, Ψ excludes Φ -impressions so long as it itself is uncathed.

But what is strangest of all is that during sleep there occur Ψ -processes—dreams which have many characteristics that are not understood.

¹ [See footnote, p. 397.]

² [So in the MS. Wrongly printed "*Quantität*" in the German edition of 1950.]

[20] THE ANALYSIS OF DREAMS ¹

Dreams exhibit every degree of transition to the waking state and of admixture with normal Ψ -processes; nevertheless, their essential character can easily be extracted.

1. Dreams are devoid of motor discharge and, for the most part, of motor elements. We are paralysed in dreams.

The easiest explanation of this characteristic is the absence of spinal pre-cathexis owing to the cessation of Φ -discharge. Since the neurones are uncatheted, the motor excitation cannot pass over the barriers. In other dreamlike conditions movement is not excluded. This is not the essential characteristic of dreams.

2. The connections in dreams are partly nonsensical, partly feeble-minded or even meaningless or strangely demented.

The last of these attributes is explained by the fact that the compulsion to associate prevails in dreams, as no doubt it does primarily in all psychical life. Two cathexes that are simultaneously present must, so it seems, be brought into connection with each other.² I have collected some amusing examples of the dominance of this compulsion in waking life. (For instance, some provincial spectators who were present in the French Chamber during a bomb outrage concluded that whenever a deputy made a successful speech a shot was fired as a sign of applause.)³

The two other attributes, which are in fact identical, show that a part of the dreamer's psychical experiences have been forgotten. In

¹ The following first attempt at a theory of dreams is fragmentary in so many essential portions that it seems scarcely worth while to compare it in detail with the hypotheses developed in *The Interpretation of Dreams*. We can see that Freud approached the study of dreams from two directions: his attempts to establish the nature of the psychical apparatus enabled him to understand the general mechanisms of dream-formation, but it was only the analysis of his own dreams—and the concrete experience of his self-analysis—that made it possible for him to take the step forward which carried him from the views expressed in the 'Project' to those in *The Interpretation of Dreams*.

² [This point was insisted on by Freud in the course of a long footnote to the case history of Emmy von N. (under the date of May 15), in Breuer and Freud's *Studies on Hysteria* (1895). He recurs to it in Chapter V, Section A, of *The Interpretation of Dreams* (1900a).]

³ Freud made use of these examples in *The Interpretation of Dreams* (trans. 1953, p. 500), and explained them as "efforts at making an intelligible pattern of the sense-impressions that are offered to us".

fact, all those biological experiences have been forgotten which normally inhibit the primary process, and this is due to the insufficient cathexis of the ego. The senseless and illogical nature of dreams is probably attributable to the same fact. It seems as though Ψ' -cathexes which have not been withdrawn find their level partly in the adjoining facilitations and partly in neighbouring cathexes. If discharge from the ego were complete, sleep would necessarily be dreamless.

3. Ideas in dreams are of a hallucinatory nature; they awaken consciousness and meet with belief.

This is the most important characteristic of dreams. It becomes obvious at once in alternate fits of sleeping and waking. One shuts one's eyes and hallucinates, one opens them and thinks in words.¹ There are several explanations of the hallucinatory nature of the cathexes in dreams. In the first place, it might be supposed that the current from Φ to motility [in waking life] acts as an obstacle to any retrogressive cathexis of the Φ -neurones from Ψ' , but that when that current ceases, Φ is retrogressively cathected and the conditions fulfilled for the production of quality.² The only argument against this is the consideration that the Φ -neurones should be protected from cathexis from Ψ' by the fact of their being uncatheted (just as motility is so protected [p. 400]). It is characteristic of sleep that it reverses the whole situation: it stops the motor discharge from Ψ' and makes the retrogressive one to Φ possible. It is tempting to assign the determining role to the great waking current of discharge from Φ to motility. In the second place, we might turn back to the nature of the primary process and point out that the primary recollection of a perception is always a hallucination [cf. p. 402] and that it is only inhibition on the part of the ego which has taught us never to cathect \mathcal{W} in such a way that it can transfer cathexis retrogressively to Φ . This hypothesis can be made more plausible by the consideration that conduction from Φ to Ψ' is in any case easier than from Ψ' to Φ ; so that a Ψ' -cathexis of a neurone, even if it is far more intense than the perceptual cathexis of the same neurone, need not involve retrogressive conduction. This explanation is further supported by the fact that in

¹ Cf. *The Interpretation of Dreams* (1900a), Chapter I, Section E.]

² [This explanation of regression in dreams is considered and criticized in Chapter VII, Section B, of *The Interpretation of Dreams* (1900a).]

dreams the vividness of the hallucination is in direct proportion to the importance (that is, to the quantitative cathexis) of the idea concerned. This indicates that it is quantity (Q) that conditions hallucination. If a perception comes from Φ in waking life, Ψ' -cathexis (interest) makes it more distinct but not more vivid; it does not alter its quantitative character.

4. The purpose and meaning of dreams (or at least of normal ones) can be established with certainty. Dreams are *the fulfilments of wishes*¹—that is, primary processes following on experiences of satisfaction; and they are not recognized as such, merely because the release of pleasure (the reproduction of pleasurable discharges) in them is slight, since in general they run their course almost without affect (*i.e.*, without motor release). But it is very easy to prove that this is their nature. And it is for this very reason that I am inclined to infer that *primary wishful cathexes too are of a hallucinatory character.*

5. It is noticeable how bad the memory is in dreams and how little damage dreams do compared with other primary processes. But this is easily explained by the fact that dreams mostly follow old facilitations and thus cause no changes, that Ψ' -experiences are kept back from them and that, owing to the paralysis of motility, they leave no traces of discharge behind them.

6. It is, moreover, interesting that consciousness furnishes quality in dreams as easily as in waking life. This shows that consciousness is not restricted to the ego but can be attached to any Ψ' -process. This is a warning against a possible identification of primary processes with unconscious ones. *Here are two invaluable hints for what follows.*

If, when dreams are remembered, we enquire from consciousness as to their content, we shall find that the meaning of dreams as wishfulfilments is concealed by a number of Ψ' -processes all of which we meet with once more in the neuroses and which are characteristic of the pathological nature of those disorders.²

¹ Freud reached this conclusion after interpreting his "dream of Irma's injection" in July 1895 (see Letter 137). It seems that the analysis of this dream was not yet correlated with his self-analysis. The analysis of the dream was dynamically directed but not genetically.

² Cf. p. 398 and footnote. [Cf. also pp. 407 and 410.]

[21] DREAM CONSCIOUSNESS

Our consciousness of dream ideas is above all a discontinuous one. It does not become aware of a whole chain of associations but only of separate points in it; and between them lie unconscious intermediate links which we can easily discover when we are awake. If we investigate the reasons for these leaps, here is what we find. Suppose [Fig. 4] that *A* is a dream-idea that has become conscious and that it leads to *B*. But, instead of *B*, *C* appears in consciousness and it does so because it lies on the path between *B* and another cathexis *D*, which is simultaneously present. Thus there is a diversion owing to a simultaneous cathexis of another kind, which is not, moreover, conscious.

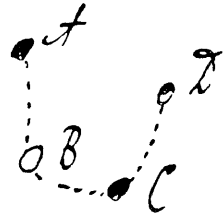


Fig. 15

C has therefore taken the place of *B*, though *B* fits in better with the chain of thought, that is, with the wish-fulfilment.

For instance, [I have a dream that] O. has given Irma an injection of propyl [*A*]¹. I then see “trimethylamin” very vividly before me, and hallucinate its formula [*C*]. The thought that is simultaneously present is of Irma’s illness being of a sexual nature [*D*]. Between this thought and that of propyl lies an association [*B*] of a conversation on sexual chemistry with W. Fl. [Wilhelm Fliess] in which he drew my special attention to trimethylamin. This latter idea is then pushed into consciousness from both directions. It is a puzzling fact that neither the intermediate link (sexual chemistry [*B*]) nor the diversionary idea (the sexual nature of the illness [*D*]) are also conscious. And this needs explaining. One might suppose that the cathexis of *B* or *D* alone would not be intense enough to bring about a retrogressive hallucination, but that *C*, being cathected from both of them, would be able to do so. But in the example I have given *D* (the sexual nature of the illness) was certainly as intense as *A* (the injection of propyl), and the derivative of these two (the chemical formula [*C*]) was prodigiously vivid.

The problem of unconscious intermediate links applies equally to waking life, in which similar events occur daily. But what remains

¹ See the discussion of this part of the “dream of Irma’s injection” in *The Interpretation of Dreams*, (trans. 1953), p. 115 f.

characteristic of dreams is *the ease with which quantity ($Q\dot{\eta}$) is displaced* in them and thus the way in which B is replaced by a C which is superior to it quantitatively.

And the like is true of wish-fulfilment in dreams generally. We shall not find, for instance, a wish that is conscious and afterwards its fulfilment hallucinated; but the latter only will be conscious and the intermediate link [the wish] will have to be inferred. It has quite certainly occurred, but without being able to give itself a qualitative shape. It is obvious, however, that the cathexis of the wishful idea cannot possibly be stronger than the motive impelling to it. Thus the psychical course of excitation in dreams takes place in accordance with quantity (Q); but it is not quantity (Q) that decides what shall become conscious.

We may also perhaps infer from dream-processes that consciousness emerges *during the passage* of a quantity ($Q\dot{\eta}$), that is to say that it is not aroused by a *constant* cathexis. On the other hand we might suspect that an intense current of quantity ($Q\dot{\eta}$) is not favourable to the emergence of consciousness, since consciousness is attached to the *outcome* of the current—to some extent, that is, to a comparatively quiescent persistence of cathexis. It is hard to find one's way to the real determinants of consciousness in view of these mutually contradictory preconditions. And we must also take into account the circumstances in which consciousness emerges in the secondary process.

This last peculiarity of dream-consciousness may perhaps be explained by supposing that a retrogressive current of quantity ($Q\dot{\eta}$) towards Φ is incompatible with a relatively energetic current towards the Ψ -paths of association. Other conditions seem to apply to the conscious Φ -processes.

PART II

PSYCHOPATHOLOGY

25 Sept. 95.

The first part of this project included what could, as it were, be inferred *a priori* from its basic hypothesis, moulded and corrected in accordance with a few factual experiences. This second part seeks by an analysis of pathological processes to determine further features of the system founded on the basic hypothesis. A third part, based on the two earlier ones, will endeavour to construct the characteristics of the course of normal psychological events.

THE PSYCHOPATHOLOGY OF HYSTERIA

[1] *Hysterical Compulsion*

I shall start with some things which are to be found in hysteria but are not necessarily peculiar to it.

Every observer of hysteria is at once struck by the fact that hysterical patients are subject to a *compulsion*, which is operated by means of *excessively intense ideas*. An idea may emerge into consciousness with special frequency, without the course of events justifying it; or it may be that the arousing of this neurone is accompanied by psychological consequences which are unintelligible. The emergence of the excessively intense idea has results which, on the one hand, cannot be suppressed and, on the other hand, cannot be understood: releases of affect, motor innervations, inhibitions. The subject is by no means without insight into the strangeness of the situation.

Excessively intense ideas also occur normally. They are what lends an ego its peculiar character. We are not surprised at them, if we know their genetic development (education, experiences) and their motives. We are in the habit of regarding these excessively intense ideas as the product of powerful and reasonable motives. In *hysterics*, on the contrary, excessively intense ideas strike us by their oddity. They are ideas which produce no effects in other people and whose importance we cannot appreciate. They appear to us as intruders and usurpers and accordingly as ridiculous.

Thus hysterical compulsion is (1) incomprehensible; (2) incapable

of being cleared up by any process of thought, and (3) incongruous in its structure.

There is a simple neurotic compulsion which may be contrasted with the hysterical kind. For instance, suppose a man runs into danger by being thrown out of a carriage and that afterwards driving in a carriage becomes impossible for him. Such a compulsion is (1) comprehensible, since we know its origin; and (3) not incongruous, since the association with danger makes it justifiable to link driving in a carriage with fear. It, too, however, is incapable of being cleared up by any process of thought. This last characteristic cannot be described as entirely pathological; our *normal* excessively intense ideas as well are often incapable of being cleared up. One would be inclined to regard neurotic compulsions as completely non-pathological, if it were not that experience shows that a compulsion of this kind in a normal person only persists for a short time after its occasion, and then disintegrates by degrees. Thus the persistence of a compulsion is pathological and points to a *simple neurosis*.

Now our analyses show that a hysterical compulsion is cleared up at once if it is explained—that is, made comprehensible. Thus these two characteristics are essentially one and the same. In an analysis we also learn the process by which the appearance of absurdity and incongruity comes about. The result of analysis is, in general terms, as follows.

Before the analysis, *A* is an excessively intense idea, which forces its way into consciousness too often, and each time it does so leads to tears. The subject does not know why *A* makes him weep and regards it as absurd; but he cannot prevent it.

After the analysis, it has been discovered that there is an idea *B* which rightly leads to tears and which rightly recurs often until a certain complicated piece of psychical work directed against it has been completed by the subject. The effect of *B* is not absurd, is comprehensible to the subject and can even be fought against by him.

B stands in a particular relation to *A*. For there has been an event which consisted of $B+A$. *A* was a subsidiary circumstance, while *B* was well calculated to produce a lasting effect. The production of this event in memory now occurs as though *A* had taken *B*'s place. *A* has

become a substitute, a "symbol", for B.¹ Hence the incongruity; for *A* is accompanied by consequences which it does not seem to deserve, which are not appropriate to it.

Symbols are formed in this way normally as well. A soldier will sacrifice himself for a piece of coloured cloth on a pole, because it has become the symbol of his native country; and no one considers this neurotic. But a hysterical symbol behaves differently. The knight who fights for a lady's glove *knows*, in the first place, that the glove owes its importance to the lady; and, secondly, his worship of the glove does not in the least prevent him from thinking of the lady and serving her in other ways. But the hysteric who is reduced to tears by *A* is unaware that this is because of the association *A—B*, and *B* itself plays no part whatever in his mental life. In this case the symbol has taken the place of the thing completely.

This assertion is true in the strictest sense. One can convince oneself that whenever a stimulus from outside or an association ought properly to cathect *B*, *A* emerges into consciousness instead. Indeed, one can infer the nature of *B* from the occasions which bring about the emergence of *A* in such a remarkable fashion.

We can sum the matter up by saying that *A* is compulsive and *B* repressed (at least from consciousness).

Analysis has revealed the surprising fact that for every compulsion there is a corresponding repression, that for every excessive irruption into consciousness there is a corresponding amnesia.

The term "excessively intense" points to *quantitative* characteristics. It is plausible to suppose that repression has the quantitative sense of being denuded of quantity, and that the sum of the two [*i.e.*, of the compulsion *plus* the repression] is equal to the normal. If so, only the *distribution* of quantity has been altered. Something has been added to *A* that has been subtracted from *B*. The pathological process is one of *displacement*, such as we have come to know in dreams, and is hence a primary process.

[2] *The Genesis of Hysterical Compulsion*

Several significant questions now arise. Under what conditions

¹ After *Studies on Hysteria* Freud only rarely used the word "symbol" in this sense.

does a pathological formation of a symbol such as this occur (or, conversely, a repression)? What is the operating force concerned? What is the state of the neurones of an excessively intense or of a repressed idea?

Nothing could be discovered about this and nothing further could be inferred from it, if it were not that clinical experience teaches us two facts. Repression is exclusively brought to bear on ideas that, firstly, arouse a distressing affect (unpleasure) in the ego, and that, secondly, relate to sexual life.

We may at once suspect that it is this unpleasurable affect which brings about repression. Indeed, we have already assumed the existence of a "primary defence", which consists in a reversal of the current of thought as soon as it comes up against a neurone the cathecting of which releases unpleasure [pp. 383 and 392].

The justification for this assumption lay in two observations: (1) that a neuronic cathexis of this latter kind is certainly not what is being sought for when the original purpose of the thought-process was to establish a Ψ -situation of satisfaction, and (2) that when an experience of pain is brought to an end in a reflex manner the hostile perception is replaced by another [p. 383].

We can, however, convince ourselves in a more direct manner of the part played by defensive affects. If we investigate the condition of the repressed [idea] B , we find that this idea can easily be found and brought into consciousness. This is surprising, for we might well have supposed that B was really forgotten and that no trace of it remained in Ψ . But no; B is a memory-image like any other. It is not extinguished; but if, as is usually the case, B is a complex of cathexes, then an uncommonly strong *resistance*, and one that cannot easily be eliminated, opposes any activity of thought in relation to B . This resistance to B can at once be recognized as a measure of the *compulsion* exercised by A , and we can conclude that the force which originally repressed B is at work once more in the resistance. And at the same time we learn something else. We had only known so far that B could not become *conscious*; we knew nothing of B 's behaviour in regard to thought-cathexis. But we now find that the resistance is directed against any occupation of one's thoughts with B , even though it has already been made partly conscious. So that

instead of "excluded from consciousness", we can say "excluded from thought-processes".

Thus it is a defensive process emanating from the *cathected ego* that results in hysterical repression and at the same time in hysterical compulsion. To this extent the process seems to be differentiated from the primary Ψ -processes.

[3] *Pathological Defence*

Nevertheless we are far from having found a solution. As we have seen, the outcome of hysterical repression differs very widely from that of normal defence, about which we have very accurate knowledge. It is a general fact that we avoid thinking about things that only cause us unpleasure, and that we achieve this by directing our thoughts to something else. But even though we contrive that the intolerable *B* idea shall rarely emerge in our consciousness, we never succeed in forgetting *B* to such an extent that we can never be reminded of it by some fresh perception. Nor can a re-awakening of the idea in this manner be precluded even in hysteria. The difference lies only in the fact that in hysteria what becomes conscious (*i.e.*, what is cathected) is always *A* instead of *B*. Thus it is this immovable symbolization which constitutes the function that is so far in excess of normal defence.

The most obvious explanation of this excessive function would be to attribute it to a greater intensity of the defensive affect. Experience shows, however, that the most distressing memories, which must necessarily arouse the greatest unpleasure (memories of remorse over bad actions), cannot be repressed and replaced by symbols. The existence [p. 408] of a second necessary precondition of pathological defence—sexuality—suggests that the explanation must be looked for elsewhere.

It is out of the question to suppose that disagreeable sexual affects so greatly exceed all other unpleasurable affects in intensity. There must be some other attribute of sexual ideas to explain why they alone are subject to repression.

One further remark must here be made. Hysterical repression clearly takes place by the help of symbolization—of *displacement* on

to other neurones. It might be supposed that the riddle lies in this displacement and that the repression itself requires no explanation. But we shall find when we come to analyse (for instance) obsessional neurosis that there repression occurs *without* symbolization, and, indeed, that repression and substitution are there separated in time. Accordingly, the process of repression remains the core of the riddle.

[4] *The Hysterical* Πρώτον Ψεῦδος [*First Lie*]

As we have seen, hysterical compulsion originates from a peculiar kind of quantitative movement (symbolization), which is probably a primary process since it can easily be seen at work in dreams.¹ The motive force in this process is defence on the part of the ego, which, however, is here performing nothing in excess of a normal function. What we need to explain is how an ego-process can be accompanied by consequences which we are accustomed to meet with only in primary processes. We must expect to find special psychical conditions in operation. Clinical observation tells us that all this happens only in the sexual sphere. Perhaps, then, the special psychical conditions are to be explained by the natural characteristics of sexuality.

As it happens, a special psychical concatenation is to be found in the sphere of sexuality which might serve our purpose. It is known to us empirically, and I will illustrate it by an example.²

Emma is at the present time under a compulsion not to go into shops *alone*. She explained this by a memory dating from the age of twelve (shortly before her puberty). She went into a shop to buy something, saw the two shop-assistants (one of whom she remembers) laughing together, and rushed out in some kind of *fright*. In this connection it was possible to elicit the idea that the two men had been laughing at her clothes and that one of them had attracted her sexually.

Both the relation of these fragments to one another and the effect of the experience are incomprehensible. If she felt displeasure at her

¹ For the primary process see p. 386 ff.

² This example is not used in Freud's published writings.

clothes being laughed at, this should have been corrected long ago—ever since she began to dress as a lady. Nor does it make any difference to her clothes whether she goes into a shop alone or in company. It is not simply a question of being protected, as is shown by the fact that (as happens in cases of agoraphobia) the company of a small child is enough to make her feel safe. Then there is the totally disconnected fact that one of the men attracted her. Here again nothing would be changed if she had someone with her. Thus the memories aroused explain neither the compulsion nor the determination of the symptom.

Further investigation brought to light a second memory, which she denies having had in mind at the moment of Scene I. Nor is there any evidence to support its presence there. On two occasions, when she was a child of eight, she had gone into a shop to buy some sweets and the shopkeeper had grabbed at her genitals through her clothes. In spite of the first experience she had gone to the shop a second time, after which she had stopped away. Afterwards she reproached herself for having gone the second time, as though she had wanted to provoke the assault. And in fact a "bad conscience" by which she was oppressed could be traced back to this experience.

We can now understand Scene I (with the shop-assistants) if we take it in conjunction with Scene II (with the shopkeeper). All we need is an associative link between them. She herself remarked that a link of this kind was provided by the *laughter*. The shop-assistants' laughter had reminded her of the grin with which the shopkeeper had accompanied his assault. The whole process can now be reconstructed thus. The two shop-assistants *laughed* in the shop, and this laughter (unconsciously) aroused the memory of the shopkeeper. The second situation had the further point of similarity with the first that she was once again in a shop alone. The shopkeeper's grabbing through her clothes was remembered; but since then she had reached puberty. The recollection aroused (what the event when it occurred could certainly not have done) a sexual release, which turned into anxiety. In her anxiety she was afraid the shop-assistants might repeat the assault, and ran away.

It is quite certain that here we have a series of Ψ -processes of two sorts, and that the recollection of Scene II (with the shopkeeper)

It may be said to be quite usual for an association to pass through a number of unconscious intermediate links before arriving at a conscious one, as happened in this case. The element that enters consciousness is probably the one that arouses special interest. But in our example the remarkable thing is that what entered consciousness was not the element that aroused interest (the assault) but another which symbolized it (the clothes). If we ask what the cause of this interpolated pathological process may have been, we can only point to a single one—the sexual release, of which there was also evidence in consciousness. This was linked to the memory of the assault; but it is a highly noteworthy fact that it was not linked to the assault when it was actually experienced. Here we have an instance of a memory exciting an affect which it had not excited as an experience, because in the meantime the changes produced by puberty had made possible a new understanding of what was remembered.

Now this case is typical of repression in hysteria. We invariably find that a memory is repressed which has only become a trauma *after the event*. The reason for this state of things is the retardation of puberty as compared with the remainder of the individual's development.¹

[5] *The Determinants of the Πρῶτον Ψεῦδος ὕστ.* [*First Hysterical Lie*]

Although it is unusual in mental life for a memory to arouse an affect which the actual experience has not produced, this is nevertheless what quite ordinarily happens in the case of sexual ideas, precisely because the retardation of puberty is a general characteristic of the organization. Every adolescent carries memory-traces which can only be understood after his own sexual feelings have appeared; every adolescent, accordingly, must carry within him the germ of hysteria. Other, concurrent factors must, of course, also be present, if this general tendency is to be restricted to the small number of people who actually become hysterics.

Now analysis shows that what is disturbing in a sexual trauma is

¹ Freud's later discovery of the importance of infantile sexuality has not completely invalidated this view; it points to the regressive cathexis of infantile material at puberty.

clearly the release of affect; and experience teaches us that hysterics are persons of whom we know in some cases that they have become precociously excitable sexually through mechanical and emotional stimulation (by masturbation) and of whom we can assume in some cases that they have a predisposition to precocious sexual release. A precocious *onset* of sexual release and a precociously *intense* sexual release are obviously equivalent. This factor is reduced to a quantitative one.

What, then, is the significance of this precocity of sexual release? All the stress must be laid on the precocity, since it cannot be maintained that sexual release in general gives rise to repression. For this would once more make repression into a process of normal frequency.

[6] *The Disturbance of Thought by Affects*

We have been unable to avoid the conclusion that disturbance of the normal psychical process depends on two conditions: (1) on the sexual release being attached to a memory instead of to an experience; and (2) on the sexual release occurring precociously.

If these two conditions are present, it seems, a disturbance will be produced which exceeds the normal amount though it is foreshadowed in normal cases.

We know from everyday experiences that the generation of affect inhibits the normal course of thought, and that it does so in various ways. In the first place, many trains of thought may be forgotten which would otherwise be taken into account—as occurs, that is, in dreams [p. 402]. For instance, it has happened to me that in the agitation caused by a great anxiety I have forgotten to make use of the telephone, which had been introduced into my house a short time before. The recently established path succumbed to the state of affect. The facilitation—that is to say, what was old-established—won the day. Such forgetting involves the loss of the power of selection, of efficiency and of logic, just as happens in dreams. In the second place, without forgetting, paths may be followed which would otherwise be avoided: in particular, paths leading to discharge—actions, for instance, performed under the influence of the affect.

In a word, the affective process approximates to the uninhibited primary process.

Several things follow from this: first, that, when affect is released, the releasing idea itself becomes intensified, and secondly, that the chief function of the cathected ego lies in avoiding fresh affective processes and in reducing the old affective facilitations. The position can only be pictured as follows. Originally a perceptual cathexis, being the heir to an experience of pain, released unpleasure; the cathexis became intensified by the quantity ($Q\dot{\eta}$) thus released and proceeded towards discharge along paths which were already in part pre-facilitated. After the formation of a cathected ego, the function of "attention" to fresh perceptual cathexes developed in the manner we know [p. 399], and this attention now follows with lateral cathexes the course taken by the quantity from W .¹ In this way the release of unpleasure is restricted in quantity, and its start acts as a signal to the ego to set normal defence in operation. Thus the generation of fresh experiences of pain, with their facilitations, is made more difficult. But the more intense the release of unpleasure the harder becomes the ego's task; for it is only up to a certain limit that it is able, by means of its lateral cathexes, to provide a counterweight to the quantities ($Q\dot{\eta}$) concerned, and accordingly it cannot wholly prevent the occurrence of a primary process.

Furthermore, the greater the quantity that is endeavouring to pass through, the more difficult does the ego find thought-activity, which, as everything goes to show, consists in an experimental displacing of small quantities ($Q\dot{\eta}$) [p. 396]. "Reflection" is an activity of the ego which demands time, and it becomes impossible when the affective level involves large quantities. Hence it is that where there is affect there is hastiness and a choice of methods similar to that made in the primary process.

Thus it is the business of the ego to permit no release of affect, since this would at the same time permit a primary process. Its best instrument for this purpose is the mechanism of attention. If a cathexis which releases unpleasure were able to escape attention, the ego's intervention would come too late. And this is precisely what

¹ [This process is described at much greater length in Part III, e.g., p. 419 ff.]

happens in the case of the hysterical *proton pseudos* [first lie]. Attention is focused on perceptions, which are the normal occasions for the release of unpleasure. But here it is not a perception but a memory-trace which unexpectedly releases unpleasure, and the ego discovers this too late. It has permitted a primary process, because it did not expect one.

There are, however, other occasions on which memories release unpleasure; and in the case of recent memories this is quite normally so. If a trauma (an experience of pain) occurs for the first time when there is already an ego in existence—the very first traumas of all escape the ego entirely—there is a release of unpleasure; but the ego is simultaneously at work creating lateral cathexes. If there is afterwards a cathexis of the *memory-trace*, the unpleasure is repeated; but the ego-facilitations are already present, and experience shows that the second release of unpleasure is less—until, after further repetition, it is reduced to no more than a signal of an intensity acceptable to the ego.¹ Thus the essential thing is that there should be an inhibition by the ego on the occasion of the *first* release of unpleasure, so that the process does not occur as a “posthumous” primary affective experience. But this is precisely what *does* occur when, as in the case of the hysterical *proton pseudos*, the release of unpleasure is occasioned by a *memory*.

This confirms the importance of one of the preconditions that were indicated by clinical experience: *the retardation of puberty makes possible the occurrence of posthumous primary processes.*

¹ [Discussed in greater detail in Part III, p. 437 ff.]

PART III

AN ATTEMPT AT AN ACCOUNT OF NORMAL Ψ' -PROCESSES

5 Oct. 95.

[I]

It must be possible to give a mechanical explanation of what I have termed "secondary processes" based on the effects produced by a group of neurones with a *constant* cathexis (the ego) upon other neurones with *changing* cathexes. I shall begin by attempting to give a psychological description of these processes.

On the one hand we have the ego, and on the other hand W (perceptions)—that is, cathexes in Ψ' arising from Φ (from the external world). We now have to find a mechanism which shall cause the ego to follow perceptions and influence them. This mechanism lies, I believe, in the fact that, according to my hypotheses, a perception invariably excites ω^1 , that is, passes on indications of quality.² To put it more accurately, it excites consciousness (consciousness of a quality) in W ; and the discharge of the perceptual excitation furnishes Ψ' with a report which in fact constitutes the indication of quality. I therefore suggest that it is such indications of quality which *interest* Ψ' in the perception. [Cf. p. 397.] Here we seem to have the mechanism of *psychical attention*.³ I find it hard to give any mechanical (automatic) explanation of its origin. I believe, therefore, that it is *biologically* determined: that is, that it has been left over in the course of psychical evolution because any other behaviour on the part of Ψ' has been excluded owing to its generating unpleasure. The effect of psychical attention is to cathect the same neurones which are the bearers of the perceptual cathexis. This state of attention has a prototype in the "experience of satisfaction" [p. 380] (which is of such

¹ The system W .

² [So in the M.S. The 1950 German edition reads wrongly *Quantität*.]

³ The part played by attention in the following discussion explains how it is that it contains relatively few points of connection with Freud's later writings. He already insists in *The Interpretation of Dreams* (trans. 1953, p. 593), that "the most complicated achievements of thought are possible without the assistance of consciousness" and that "becoming conscious is connected with the application of a particular psychical function, that of attention". See also p. 430 below.

importance for the whole course of development) and the repetitions of that experience—states of craving which developed into states of wishing and states of expecting. I have shown [Part I, Sections 16-18] that these states contain the biological justification of all thought. The psychological situation in these states is as follows. The craving involves a state of tension in the ego; and as a result of it the idea of the loved object (the “wishful idea”) is cathected. Biological experience has taught us that this idea must not be cathected so intensely that it might be confused with a perception, and that its discharge must be postponed till indications of quality arise from it which prove that it is real—that the cathexis is a perceptual one. If a perception arises which is identical with or similar to the wishful idea, the perception finds its neurones precathected by the wish—that is to say, some or all of them are cathected, according to the degree to which the idea and the perception tally. The difference between the idea and the perception then gives rise to the process of thought; and this reaches its conclusion when a path has been found by which the discordant perceptual cathexes can be merged into ideational cathexes. *Identity* is then attained.¹

Attention consists in the situation of expectation being established even in regard to perceptions that do not even *partly* coincide with wishful cathexes. For it has become important to send out a cathexis to meet *all* perceptions. Attention is biologically justified; the question is merely one of how to give the ego guidance as to *which* expectant cathexis it is to establish: and this purpose is served by the indications of quality.

The process of setting up a psychological *attitude* [of attention] can be followed with more exactitude. At the start, it seems, the ego is not forewarned. A perceptual cathexis arises, followed by its indication of quality. The close facilitation between these two reports intensifies the perceptual cathexis still more and a cathexis of attention now

¹ See in this connection a passage in *The Interpretation of Dreams* (trans. 1953, p. 566) in which, after discussing the relation between perception and wish-fulfilment, Freud goes on: “Thus the aim of this first psychological activity was to produce a ‘perceptual identity’—a repetition of the perception which was linked with the satisfaction of the need”. The “Project” enters into greater detail. Freud attempts here to trace back thinking and reality-testing to the tension to which a child is subjected while it is waiting for satisfaction. See also p. 389 ff.

becomes attached to the perceptual neurones. The next perception of the same object results (in accordance with the second law of association) in a fuller cathexis of the same perception and it is only this latter perception which will be available psychically.

(This piece of description already yields a highly important conclusion. The first time a perceptual cathexis occurs it is of little intensity and involves only a small quantity; the second time, when there is a Ψ -precathexis, the quantity is greater. Now attention involves no intrinsic change in the judgement made upon the quantitative attributes of the object. Consequently the external quantity (Q) of objects cannot be expressed in Ψ by psychical quantity ($Q\dot{\eta}$). [Cf. p. 429.] Psychical quantity ($Q\dot{\eta}$) signifies something quite different, which is not represented in reality; and external quantity (Q) is in fact expressed in Ψ by something different, namely, by complexity of cathexes. By this means external quantity (Q) is held back from Ψ [p. 376].)

Here is a still more satisfactory account [of the process described in the last paragraph but one]. As a result of biological experience Ψ -attention is constantly directed to indications of quality. These indications thus occur in neurones that are already precathected and they thus attain a quantity that is of adequate magnitude. Thus intensified, the indications of quality are able, by their facilitation, to intensify the perceptual cathexes. And the ego has learnt to arrange that its cathexes of attention shall follow the course of this associative movement as it passes from indications of quality to perception. It is in this way enabled to cathect precisely the right perceptions or their environment. Indeed, if we assume that it is the same quantity ($Q\dot{\eta}$), coming from the ego, which travels along the facilitation from the indication of quality to the perception, we shall actually have found a mechanical (automatic) explanation of the cathexis of attention. Thus attention leaves the indications of quality, and turns to the perceptual neurones, which are thereafter hypercathected.

Let us suppose that for some reason or other the mechanism of attention fails to operate. In that case there will be no Ψ -cathexis of the perceptual neurones, and the quantity (Q) which has reached them will be transmitted (purely associatively) along the best facilitations, so far as the relations between the resistances and the quantity

of the perceptual cathexis permit. This passage of quantity will probably finish soon; for the quantity (Q) will split up and in some neurone near-by will become too small to flow any further. The passage of the quantities attached to the perception (Wq) may subsequently, in certain circumstances, attract attention, or it may not. In the latter case it will end, unobserved, in the cathexis of some neighbouring neurones of whose later vicissitudes we know nothing. This is the course of a perception unaccompanied by attention, such as must occur countless times every day.¹ As an analysis of the process of attention will show, the current is not able to travel far, and we may infer from this the small magnitude of the quantities (Wq) attached to perception.

If, however, the system W has received a cathexis of attention, a number of things can happen; in particular, two situations may be noticed—the occurrence of *ordinary* thought and that of purely *observant* thought. The latter case would seem to be the simpler; it may be said to correspond to the state of an investigator who has had a perception and asks himself: “What does this mean? Where does this lead?” What happens is this—but for the sake of simplicity I shall now have to substitute a single neurone for the complex perceptual cathexis. The perceptual neurone is hypercathected. The quantity that is compounded of external and psychical quantity (Q and $Q\eta$) flows away along the best facilitations and will overcome a certain number of barriers, according to the resistance and quantity concerned. It will cathect some further, associated neurones; but it will fail to overcome other barriers, because the quotient which reaches them does not rise above their threshold.² It is certain that more numerous and more distant neurones will be cathected than in the case of a merely associative process occurring without attention. But finally the current will come to an end in this case too in one or more terminal cathexes. The outcome of attention will be that in place of the perception, one or more memory cathexes will appear, connected by association with the initial neurone.

¹ What follows is in contradiction to Freud's later view (already developed in *The Interpretation of Dreams*) of the importance of preconscious psychical processes. See, on the other hand, pp. 430-1.

² [Nine words in this sentence were accidentally omitted in the German edition of 1950.]

For the sake of simplicity let us suppose that it is a *single* memory-image. If this could once again be cathected (with attention) from Ψ , the game would be repeated, the quantity (Q) would once more begin to flow and would cathect (awaken) a fresh memory-image along the path of best facilitation. Now it is obviously the purpose of observant thought to get to know the paths leading from the system W to the furthest possible extent; and in this way an exhaustive knowledge of the perceptual object can be obtained. (It will be noticed that the method of thought here described leads to *cognition*.) For this reason a Ψ -cathexis is once again required for the memory-images which have been reached; but some mechanism is also required which shall direct that cathexis to the right places. How else are the Ψ -neurones in the ego to know where the cathexis is to be directed to? A mechanism of attention, such as the one described above [p. 419], once more presupposes, however, the presence of indications of quality. Do these appear during the course of association? Normally not, according to our presuppositions. They might, however, be obtained by means of a fresh contrivance of the following kind. Indications of quality normally arise only from perception. Thus it is a question of obtaining a perception from the passage of a quantity ($Q\dot{\eta}$). If, in addition to the mere passage, there were a *discharge* attached to the passage of the quantity ($Q\dot{\eta}$), that discharge, like any other movement, would give rise to a *report* of the movement. After all, indications of quality are themselves reports of discharges. (We may later consider what *kind* of discharge.) Now it may happen that during the passage of a quantity (Q) a *motor* neurone may be cathected, which will then discharge quantity ($Q\dot{\eta}$) and give rise to an indication of quality. But what we require is that *all* the cathexes shall give rise to such discharges. They are not all motor neurones, and for this purpose, therefore, they must be brought into a firm facilitation with motor neurones.

This purpose is served by *speech-associations*. These consist in the linking of Ψ -neurones with neurones which are employed by auditory images and are themselves intimately associated with motor speech-images. These speech-associations have the advantage over others of possessing two further characteristics: they are circumscribed (*i.e.*, are few in number) and exclusive. The excitation

proceeds from the auditory image to the verbal image, and thence to discharge. If, therefore, the memory-images are of such a kind that a branch stream can pass from them to the auditory images and motor verbal images, then the cathexis of the memory-images is accompanied by reports of a discharge, and these are indications of quality and at the same time indications of the memory being conscious. Now if the ego precathects these verbal images as it earlier precathected the images of the discharge of perceptions, it has created a mechanism for directing the Ψ' -cathexis to the memories which emerge during the passage of the quantity ($Q\dot{\eta}$).¹ Here we have *conscious, observant thought*.

Besides making cognition possible, speech-associations effect something else of great importance. The facilitations between the Ψ' -neurones are, as we know, the "memory"—the representation of all the influences from the external world which Ψ' has experienced. But the ego, too, itself cathects the Ψ' -neurones and sets currents in motion which must also certainly leave traces in the form of facilitations. Now Ψ' has no means of distinguishing these (the results of thought-processes) from the results of perceptual processes. It may be possible to recognize and reproduce perceptual processes through their being associated with discharges of perception; but the facilitations produced by *thought* leave only their result behind them and not a *memory*. A thought-facilitation may have arisen equally well from a single intensive process or from ten less impressive ones. Now the indications of discharge by way of speech help to make good this lack. They put thought-processes on a level with perceptual processes; they lend them reality and *make it possible to remember them*. [See below p. 436 f.]

It is also worth considering the *biological* development of these highly important speech-associations. The innervation of speech is originally a discharge in the nature of a safety-valve for the benefit of Ψ' , serving to regulate the oscillations of quantity ($Q\dot{\eta}$) in it—a

¹ In *The Interpretation of Dreams* (trans. 1953, p. 617) we find: "In order that thought-processes may acquire quality, they are associated in human beings with verbal memories." In his later writings Freud chose the following formulation: "A conscious idea comprises a concrete idea *plus* the verbal idea corresponding to it, whereas an unconscious idea is the concrete idea alone." ("The Unconscious", 1915 e, *Coll. Papers*, IV, p. 134.)

part of the path to *internal change*, which is the sole means of discharge until the "specific action" has been discovered [p. 379]. This path acquires a secondary function by attracting the attention of some helpful personage (who is usually the wished-for object itself) to the child's longing and distress, and thenceforward it serves the purpose of bringing about an understanding with other people and is thus absorbed into the specific action.

When (as we have already seen [pp. 390 and 393]) the function of judgement is beginning, perceptions arouse interest on account of their possible connection with the object wished-for, and their complexes are analysed into an unassimilable portion (the "thing") and a portion that is known to the ego from its own experience (the thing's "attributes" or activities). This process, which is known as "understanding", affords two points of contact with expression by means of speech. There are, in the first place, objects (perceptions) which make one scream because they cause pain; and it is an immensely significant fact that this association of a sound (which also gives rise to motor images of the subject's own movements) with a perception that is already a complex one emphasizes the *hostile* character of the object and serves to direct attention to the perception. Where otherwise, owing to the pain, one would have received no clear indications of quality from the object, the report of one's own scream serves to characterize the object. This association is thus a means of making conscious memories that cause unpleasure and of bringing attention to bear on them: the first class of *conscious memories* has been created.¹ It is a short step from here to the discovery of speech. There are objects of a second kind which are themselves constantly giving vent to certain noises—objects, that is, in whose perceptual complex a sound plays a part. In consequence of the impulse to *imitate* which emerges during the process of judging [p. 395], it is possible to find a report of a movement [of one's own] attaching to this sound-image. So that this class of memories too can now become conscious. It remains to associate *deliberately produced* sounds with perceptions.

¹ This may be expressed as follows in Freud's later terminology. Situations of frustration in earliest infancy make in general an important contribution to the development of the sense of reality; and in particular they provide a reason for recognizing and identifying the person who is in charge of the child and who is the source both of satisfaction and frustration.

When this is done, the memories that arise when one observes indications of discharges by way of sound become conscious like perceptions and can be cathected from Ψ .

Thus we have found that the characteristic thing about the process of cognitive thought is that the attention is from the start directed to the indications of the discharge of thought—that is, to indications of speech. It is well known that what is known as “conscious” thought is accompanied by a slight motor expenditure.¹

The process of following the associative course of a quantity (Q) can be continued for an indefinite length of time—usually until terminal associative elements are reached which are “completely familiar”. The fixing of this path and of its terminal points constitutes the “cognition” of what was perhaps a new perception.

We should be glad now to have some *quantitative* information about this process of cognitive thought. The perception is in this case hypercathected in comparison with what happens in a simple associative process. The process itself consists in a displacement of quantities ($Q\dot{\eta}$) which is regulated by association with indications of quality. At each halting-point the Ψ -cathexis is renewed, and discharge finally takes place from the motor neurones of the speech-path. We may now ask whether this process involves the ego in a considerable loss of quantity ($Q\dot{\eta}$), or whether the expenditure in the activity of thinking is relatively slight. The answer to this question is suggested by the fact that the current of speech-innervations while thought is proceeding is obviously very small. We do not *really* speak, any more than we *really* move when we picture a motor image. But the difference between imagining and moving is only a quantitative one, as we know from experiments in “thought-reading”. When we think intensely, we may even actually speak aloud. But how can such small discharges be effected, since, after all, small quantities ($Q\dot{\eta}$) cannot flow and large ones are levelled down *en masse* through the motor neurones?

It seems probable that the quantities involved in displacement

¹ Thought “is essentially an experimental kind of acting accompanied by displacement of smaller quantities of cathexis together with less expenditure (discharge) of them”. (“Formulations on the Two Principles of Mental Functioning”, 1911 *b*; *Coll. Papers*, IV, p. 16.)

during the process of thinking are also of no great magnitude. For, in the first place, the expenditure of large quantities ($Q\dot{\eta}$) means a loss for the ego which must be kept within the narrowest possible limits, since the quantity ($Q\dot{\eta}$) is in fact required for use in the exacting "specific action" [p. 357]. And in the second place, a large quantity ($Q\dot{\eta}$) would pass simultaneously along several paths of association, which would leave no time for the thought-cathexis and would cause a large expenditure. Accordingly, the quantities (Q) that flow during the process of thinking must no doubt be small. Nevertheless¹, according to our hypothesis, perception and memory during the process of thinking must be hypercathected [p. 419], and more intense than in simple perception. Moreover, there are various degrees of intensity of attention; and this can only be interpreted as various degrees of intensification of the cathecting quantities ($Q\dot{\eta}$). It would then follow that the greater the attention the greater would be the difficulty in the way of the process of following (that is, of observing). And this would be so inexpedient that we cannot suppose it true.

Thus we are faced by two apparently contradictory requirements: a strong cathexis and a weak displacement. If we are to bring these into harmony, we are led to the hypothesis of what may be described as a "bound"² condition in the neurones, which, though there is a high cathexis, permits only a small current to flow. This hypothesis may be made more plausible by the consideration that the current in a neurone is clearly affected by the cathexes surrounding it. Now the ego itself is a mass of neurones of this kind which hold fast to their cathexis (which, that is, are in a bound condition), and this can only occur, no doubt, as a result of their mutual influence. We can therefore imagine that a perceptual neurone which is cathected with attention may on that account be, as it were, temporarily absorbed into the ego, and may thereafter be subject to the same binding of its

¹ [*Democh*" in the MS. Wrongly printed "*dennach*" ("accordingly") in the German edition of 1950.]

² The distinction between "bound" or "quiescent" psychical energy on the one hand and "free" or "mobile" psychical energy on the other is one of Freud's most fundamental concepts and occurs throughout his later writings. It appears, for instance, in Section E of Chap. VII of the *Interpretation of Dreams* (1900a) (trans. 1953, p. 601). Freud attributes the distinction to Breuer, who discussed it in the second section of his theoretical contribution to *Studies on Hysteria* (Breuer & Freud 1895) which had been published a few months before Freud wrote the present "Project".]

quantity (Q_1) as all the other ego-neurones. If it is more strongly cathected, the quantity (Q) of its current may accordingly be *diminished*, and not necessarily increased. We may perhaps suppose that, as a consequence of this binding, the external quantity (Q) remains free to flow, while the cathexis of attention is bound—a state of things which need not, of course, be permanent.

Thus the process of thought would be characterized mechanically by this bound condition, which combines a high cathexis with a small flow of current. We can think of other processes in which the current would run *parallel* to the cathexis—processes with an uninhibited discharge.

I hope that the hypothesis of a bound condition of this kind will turn out to be tenable mechanically. I should like, however, to throw some light on the psychological implications of this hypothesis. It seems at first sight to labour under an internal contradiction. If the bound condition means that, when there is a cathexis of this sort, only small quantities (Q) are left over for displacement, how can it bring about the inclusion of fresh neurones—that is, cause large quantities (Q) to travel into fresh neurones? And, to push the same difficulty further back, how has it been in any way possible to evolve an ego put together in this same manner?

Thus we have unexpectedly arrived at the most obscure of problems—the origin of the “ego”, a complex of neurones which hold fast to their cathexis, and which thus constitute, for short periods of time, a complex with a constant level.¹ A genetic treatment of the question will be the most instructive. The ego consists originally of the nuclear neurones [p. 377], which receive endogenous quantity (Q_1) along paths of conduction [p. 377] and discharge it by the method of internal change [p. 379]. The “experience of satisfaction” [p. 380] brings this nucleus into association with a perception (the wishful image) and the report of a movement (the reflex portion of the specific action) [p. 380]. The education and development of this original ego take place in states in which there is a repetition of the craving, in states of *expectation*. The ego learns first that it must not cathect the motor images (with consequent discharge), until certain conditions have been fulfilled on the perceptual side. It learns further that it must not cathect the wishful idea beyond a certain degree, because,

¹ [For what follows cf. p. 384 ff.]

if it does, it will deceive itself in a hallucinatory manner. If, however, it respects these two restrictions and turns its attention to the new perceptions, it has a prospect of attaining the desired satisfaction. Clearly, therefore, the restrictions which prevent the ego from cathecting the wishful image and the motor image beyond a certain degree are the cause of an accumulation of quantity ($Q\dot{\eta}$) in the ego and oblige the ego, it seems, to transfer its quantity ($Q\dot{\eta}$) within certain limits to the neurones that are accessible to it.

The hypercathected nuclear neurones abut ultimately upon the paths of conduction from the interior of the body, which have become permeable owing to being continuously filled with quantity ($Q\dot{\eta}$) [p. 377]; and since the nuclear neurones are prolongations of these paths of conduction, they too must remain filled with quantity ($Q\dot{\eta}$). The quantity in them will flow away in proportion to the resistances met with in its course, until the next resistances are greater than the quotient of quantity ($Q\dot{\eta}$) available for the current. But at this point the whole cathectic mass is in a state of equilibrium, held back on one side by the two restrictions against motility and wish, on the other by the resistances offered by the furthest neurones attained and towards the interior by the constant pressure of the paths of conduction. In the inside of this structure which constitutes the ego, the cathexis will by no means be everywhere equal; it need only be *proportionally* equal—that is, in relation to the facilitations [cf. p. 399].

If the level of the cathexis in the nucleus of the ego rises, the ego will be able to extend its area; if it sinks, the ego will narrow concentrically. At a given level and a given extension of the ego, there will be no obstacle to displacement taking place within the region of its cathexis.

It only remains now to enquire into the origin of the two restrictions which guarantee the constant level of the ego, and in particular into the origin of the restriction upon motor images, which hinders discharge. Here we find ourselves at a decisive point in regard to our view of the whole organization. All we can say is that at a time when these restrictions were not yet operating and when motor discharge occurred simultaneously with the wish, the expected pleasure failed to make its appearance and the continuing release of endogenous stimuli eventually generated unpleasure. It is only this threat of

unpleasure, which became attached to premature discharge, that can correspond to the restrictions we are considering. In the course of subsequent development, facilitation took over a portion of the task [of carrying out the restrictions]. But it still remains an established fact that the quantity ($Q\dot{\eta}$) in the ego refrains from immediately cathecting the motor images because, if it did, a release of unpleasure would follow.

Everything that I describe as a “biological acquisition” of the neuronic system is, I believe, represented by a *threat of unpleasure* of this kind, the effect of which is that neurones which lead to a release of unpleasure are not cathected. This constitutes *primary defence*, and is an intelligible consequence of the original trend of the neuronic system [p. 356-7]. Unpleasure remains the sole means of education. The question of how we are to give a mechanical explanation of primary defence—of non-cathexis owing to the threat of unpleasure—is, I must confess, one to which I can offer no answer.

From this point onwards I shall venture to omit any mechanical representation of biological rules of this kind; and I shall be content if I can henceforward keep faithfully to a clearly demonstrable course of development.

There is no doubt a second biological rule, derived by abstraction from the process of expectation, to the effect that one must direct one’s attention to indications of quality (because they belong to perceptions that may lead to satisfaction) and then allow oneself to be led from the indication of quality to the perception which has emerged. In short, the mechanism of attention must owe its origin to a biological rule of this kind, which will regulate the displacement of ego-cathexes.¹

Here it may be objected that a mechanism like this, operating by the help of indications of quality, is redundant. The ego, it will be said, might have learnt biologically to cathect the perceptual sphere in states of expectation on its own account, instead of only being led to this cathexis through the agency of indications of quality. There

¹ See the continuation of this line of thought in Freud (1911 *b*) where attention is assigned the task of “periodically searching the external world, in order that its data may be already familiar if an urgent internal need should arise”. (*Coll. Papers*, IV, p. 15.)

are, however, two points to be made in justification of the mechanism of attention. (1) The sphere of the indications of discharge from the system W (ω) is clearly a smaller one, comprises fewer neurones, than the sphere of perception—that is, of the whole pallium of Ψ which is connected with the sense organs. Consequently the ego saves an extraordinarily large expenditure if it cathects the discharge instead of the perception. (2) The indications of discharge or the indications of quality are also primarily indications of *reality*, and are intended to serve the purpose of distinguishing the cathexes of real perceptions from the cathexes of wishes. Thus we see that we cannot do without the mechanism of attention. But it consists in every case of the ego cathecting those neurones in which a cathexis has already appeared.

The biological rule of attention, in so far as it concerns the ego, runs as follows: *If an indication of reality appears, the perceptual cathexis which is simultaneously present must be hypercathected.*

This is the second biological rule. The first one is that of primary defence.

[2]

From what has been said, we may gather a few hints of a general nature as well as for a mechanical representation—such, for instance, as the one already mentioned [p. 419] to the effect that external quantity cannot be represented by $Q\eta$, psychical quantity. For it follows from the representation that has been given of the ego and its oscillations [p. 427] that the level [of cathexis], too, has no relation to the external world—that a general lowering or raising of it makes no difference normally to the picture of the external world. Since this picture is based upon facilitations, this means that general oscillations of level make no difference to the facilitations. A second principle, too, has been mentioned already [p. 427], namely, that small quantities can be displaced more easily when the level is high than when it is low. Here we have a few points which must be borne in mind when we set about describing the characteristics of neuronics motion, which are still quite unknown to us.

Let us now return to our account of observant or cognitive processes of thought. Here, in contradistinction to what occurs in

expectant processes, perceptions do not light upon *wishful* cathexes. And here, accordingly, it is the first indications of reality that direct the ego's attention to the perceptual region which is to be cathected. The course of association taken by the quantity (Q) brought with them [by the perceptions] passes along neurones that are precathected; and the $Q \Phi$ (the quantity belonging to the Φ neurones) which is displaced [along these precathected neurones] is set free again at each stage. During this course of association the indications of quality (of speech) are generated, and, as a consequence, that course becomes conscious and capable of being reproduced.

Now here once again the usefulness of indications of quality might be questioned. All that they achieve, it might be argued, is to induce the ego to send out a cathexis to the point at which a cathexis emerges in the course of the associations. But they do not themselves provide these cathecting quantities ($Q\eta$), or at most they only make a contribution to them. And, if so, the ego could cause its cathexis to travel along the course taken by the quantity (Q) without their assistance.

This is no doubt true; but nevertheless mindfulness of the indications of quality is *not* redundant. For it must be emphasized that the biological rule of attention stated above [p. 429] is an abstraction made from *perception* and in the first instance applies only to indications of *reality*. Indications of discharge by way of speech are also in a certain sense indications of reality—indications of *thought*-reality though not of *external* reality¹; but no biological rule of the kind in question has become established in the case of these indications of thought-reality, since no regular threat of unpleasure would be attached to a breach of it. The unpleasure arising from a neglect of cognition is not so striking as where the external world is ignored, though the two cases are at bottom the same. There is in fact, therefore, a kind of observant thought-process in which indications of quality are never, or only sporadically, aroused, and which is made possible by the ego following the course of association with its cathexes *automatically*. This kind of thought-process is indeed far the more frequent and by no means abnormal; it is our ordinary kind of

¹ [This distinction is often stressed in Freud's later writings: e.g., in the last pages of *The Interpretation of Dreams* (1900a).]

thinking, unconscious, but with occasional intrusions¹ into consciousness—what is described as conscious thinking with unconscious intermediate links, which can, however, be made conscious.²

Nevertheless, indications of quality are of indisputable value for thinking. In the first place, the arousing of indications of quality intensifies the cathexes in the course of association and assures the automatic attention which, we do not know how, is evidently attached to the emergence of cathexis. Moreover—and this seems more important—attention to the indications of quality ensures the impartiality of the course of association. For it is very difficult for the ego to put itself into the situation of pure “research”. The ego almost always has purposive or wishful cathexes, whose presence during an investigation has, as we shall see [p. 433 ff.], an influence on the course of association, and thus produces false knowledge about the perceptions. Now there is no better protection against this falsification of thought than by the ego directing a normally displaceable quantity ($Q\dot{\eta}$) to a region which cannot produce (that is, provoke) any such diversion of the course of association. There can be only one device of this kind, namely, the directing of attention to the indications of quality; for these are not purposive ideas, but, on the contrary, their cathexis places greater emphasis on the course of association by contributing to the cathecting quantity.

Thus, thought which is accompanied by the cathexis of indications of thought-reality or of indications of speech is the highest and most secure form of cognitive thought-process.

Since the arousing of indications of thought is of undoubted value, we may expect to find contrivances to guarantee their occurrence. For indications of thought, unlike indications of reality, do not arise spontaneously, without the participation of Ψ . Now observation shows that such contrivances are not so effective in the case of all thought-processes as in investigatory ones. It is a *sine qua non* of the arousing of indications of thought that they shall receive a cathexis of attention; they arise when this is so by virtue of the law that where there are two neurones which are connected and simultaneously

¹ [The German word is “*Einfall*”—which is also the word commonly rendered in English by the highly ambiguous term “association”, especially in the phrase “free association”.]

² Freud’s earliest description of preconscious processes of thought. Cf. p. 420.

cathected the conduction between them is improved [p. 480]. Nevertheless, the "enticement" offered by the precathexis of the indications of thought only has a certain degree of power to over-ride other influences. Thus, for instance, every other cathexis (such as purposive or affective cathexes) in the neighbourhood of the course of association will compete with it [the precathexis of attention] and tend to make the course of association unconscious. A similar effect, as experience confirms, is produced if the quantities involved in the course of association are considerable, for they will increase the current and consequently accelerate the whole course of association. The common assertion that something "happened in one so quickly that one didn't notice it" is no doubt completely correct; and it is also a familiar fact that affects can interfere with the arousing of indications of thought.

All this leads us to a new proposition in our mechanical representation of psychical processes: namely, that the course of association, which is not altered by the level [of cathexis], can be influenced by the magnitude of the quantity (Q) in passage itself. [Cf. p. 436.] *Generally speaking, a quantity (Q) of large magnitude takes a different path through the network of facilitations from that taken by a small one.* There is no great difficulty, I think, in illustrating this.

For every barrier there is a threshold of value below which no quantity (Q)—let alone a quotient of that quantity—can pass it. When a quantity (Q) is too small, it will distribute itself along two other paths, of whose facilitations it is large enough to avail itself. But if the quantity (Q) increases, the first path will now come into use and assist the passage of the quantity's quotients; moreover, cathexes lying beyond what has become a surmountable barrier will now be able to make themselves felt. Indeed, yet another factor may become significant. It may perhaps be assumed that the paths through a neurone are not all equally receptive to a quantity (Q), and we may describe this difference as "breadth of path". Breadth of path is in itself independent of resistance; for the latter can be altered by the quantity which is in passage (Abq)¹, whereas the breadth of path remains constant. Let us now suppose that, with the increase of quantity (Q), a path is opened which can make its breadth felt; we

¹ [German "*Ablaufquantität*".]

can then see that it is possible for the course of the quantity (Q) to be fundamentally altered by an increase in the magnitude of the quantity (Q) in passage. Everyday experience seems to lend positive support to this conclusion.

Thus the arousing of indication of thought seems to be bound up with the passage of *small* quantities (Q). This is not to assert that passages of any other sort must remain unconscious—for the arousing of indications of thought is not the only way in which consciousness can be invoked.

How then can we give a clear picture of thinking that becomes *sporadically* conscious—with sudden intrusions into consciousness [p. 430]? Our ordinary purposeless thinking, although it is accompanied by precathexis and automatic attention, lays no stress upon indications of thought. Nor have we found biological grounds for regarding such indications as indispensable for the process. Nevertheless they usually emerge (1) when the whole smooth course of association has reached an end or has come up against an obstacle; and (2) when it has aroused an idea which, for other reasons, gives rise to indications of quality, *i.e.*, consciousness. But here I will break off the present discussion.

[3]

Obviously there are other kinds of thought-process which, instead of the unselfish aim of cognition, have some practical aim in view. The state of expectation, from which thinking in general has developed, is an example of this second kind of thought. In that state there is a wishful cathexis which is firmly retained, while a second cathexis, a perceptual one, emerges and is followed with attention. But the purpose of this is not to discover where it will lead *in general*, but to discover by what paths it will lead to the activation of the wishful cathexis which has meanwhile been retained. This kind of thought-process, biologically the earlier one, can easily be represented on our hypothesis. Let $+V$ be a wishful idea, which is kept specially cathected, and let W be the perception which is to be followed. Then the first result of the cathexis of W with attention will be that the $Q\Phi$ [see p. 430] will pass into the best facilitated neurone a . Thence it

would once more pass along the best path if it were not interfered with by the presence of lateral cathexes [p. 385]. If three paths lead from $a \dots$ in the order b, c and d , according to their degree of facilitation—and if d lies in the neighbourhood of the wishful cathexis $+V$, the outcome may be that, in spite of the facilitations, the $Q\Phi$ may flow, not to c and b , but to d , and thence to $+V$; so that the desired path will be revealed as $W \dots a \dots d \dots +V$. Here we see in operation the principle we have long been familiar with [cf. p. 380-1] that cathexis diverts facilitation and can thus work against it and that accordingly lateral cathexis can modify the course of quantity ($Q\dot{\eta}$). Since cathexes can be changed, it lies within the choice of the ego to modify the course taken from W in the direction of any purposive cathexis.

And by purposive cathexis is here to be understood not a uniform one, such as affects a whole region in the case of attention, but an emphatic one, standing out above the level of the ego. We must probably also assume that, in this kind of thinking with purposive cathexes, quantity ($Q\dot{\eta}$) also travels out from $+V$ at the same time, so that the course of association from W may be influenced not only from $+V$ itself but also from the further points reached by it. In this case, however, the path leading from $+V \dots$ is known and fixed, whereas the path leading from $W \dots a \dots$ has still to be discovered. Since in reality our ego always entertains purposive cathexes—and often many at the same time—we can now understand both the difficulty of carrying on purely cognitive thinking, as well as the possibility that, in the case of practical thinking, the most various paths may be traversed at various times, in various circumstances, by various individuals.

We can also appreciate the difficulties in thinking in the case of practical thought, difficulties with which we are familiar from our own experience. Let us return to our earlier example in which the $Q\Phi$ current would naturally flow to b and c , while d is characterized by a close connection with the purposive cathexis or its derivative ideas. Then it may be that the influence of the facilitation from $b \dots c$ is so great that it far outweighs the attraction of $d \dots +V$. In order, in spite of this, for the course of association to be directed to $+V$, it would be necessary for the cathexis of $+V$ and its derivative ideas to be still more intensified; perhaps, too, it would be necessary for the

attention to W to be modified, in order that a larger or smaller degree of "binding" [p. 425] might be attained and a level of current which would be more favourable to the path to $d . . . + V$. The expenditure required in order to overcome better facilitations and to entice the quantity (Q) into paths that are poorly facilitated but that lie nearer to the purposive cathexis corresponds to the difficulty in thinking.

The part played by indications of quality in practical thinking differs little from that played by them in cognitive thinking. The indications of quality ensure and fix the course of association, but are not absolutely indispensable for it. If we replace the single neurones and the single ideas by complexes of neurones and complexes of ideas, we are brought up against a complication of practical thinking which it is no longer possible to picture, while we can well understand that in such cases rapid conclusions are desirable [cf. p. 440]. But here the indications of quality are as a rule not fully aroused, and indeed their generation serves to slow up and complicate the course of association. Where that course, from a particular perception to particular purposive cathexes, has already been repeatedly followed and has become stereotyped by means of mnemonic facilitations, there will usually be no occasion to arouse the indications of quality.

The aim of practical thinking is *identity*—the moment at which the displaced $Q \Phi$ cathexis finds its way into the wishful cathexis which has meanwhile been firmly retained. As a purely biological consequence, there then ceases to be any necessity for thinking, and, instead, a complete innervation of the motor images which have been touched on during the passage [of the quantity] becomes permissible—motor images which constitute what is in the circumstances a permissible accessory portion of the "specific action". Since during the passage the cathexis of these motor images was only of a "bound" sort, and since the thought-process started from a perception (W) which was only followed as a memory-image, the whole thought-process is able to make itself independent both of the expectational process and of reality and can proceed to identity without any kind of modification. Thus it starts from what is merely an *idea*, and, after it is completed, does not lead to action; it has, however, produced a piece of *practical knowledge*, which can be used if there is a real occasion for it. For experience shows that it is expedient to have the

practical thought-process ready at hand to meet such an occasion and not to have to leave its construction till the very moment when the real need for its use arises.

The time has now come to qualify a statement that I previously made [p. 422] to the effect that the recollection of a thought-process is only made possible by indications of quality, because otherwise its traces could not be distinguished from the traces of a perceptual facilitation. It remains true that a real memory ought not to properly be modified by thinking over it. But on the other hand it is an undeniable fact that thinking over a topic leaves extremely important traces upon any subsequent thinking over the same topic;¹ and it is highly doubtful whether this result is produced only by thought that is accompanied by indications of quality and by consciousness. There must therefore be such things as thought-facilitations; and yet the original paths of association must not be obliterated. But since there can only be one kind of facilitation, it might be supposed that these two conclusions were incompatible. Nevertheless it must be possible to find a means of reconciling and explaining them in the fact that *thought*-facilitations all originated when there was a high level [of cathexis] and also probably make themselves felt once again when the level is high; whereas *associative* facilitations originated in complete or primary passages of quantity and reappear if the conditions characterizing an unbound passage² of quantity are re-established. Accordingly it is impossible to dispute the fact that thought-facilitations might have some possible effect upon associative facilitations.

We thus arrive at this further characteristic of the unknown neuron motion. Memory consists in the facilitations. Facilitations are not changed by a rise in the level [of cathexis], though there are facilitations which function only at a particular level. The direction taken by the passage of quantity is not altered in the first instance by an alteration of level, but it is no doubt altered by the quantity of the current [cf. p. 432 ff.] and by the lateral cathexes. When the level is high, smaller quantities (Q) are more easily displaced.

¹ [This subject was touched upon earlier, on p. 397 f.]

² [*Ungeb.* for *ungebunden* in M.S. Wrongly given in the 1950 German edition as *umgebenden* ("surrounding").]

Alongside of *cognitive* and of *practical* thought we must distinguish *reproductive or recollecting* thought, which is partly included in practical thought but does not cover it completely. This recollecting is a precondition of any testing carried out by critical thought. It follows a given thought-process in a reverse direction, as far back, it may be, as a perception; and it does so, once again, without an aim (as contrasted with practical thinking), and, in the process, makes use to a great extent of indications of quality. In pursuing this backward course, the process meets with intermediate links which have hitherto been unconscious, which have left no indications of quality behind them but whose indications of quality emerge *ex post facto*. It follows from this that the passage of thought in itself, without any indications of quality, has left traces behind it. In some cases, indeed, it appears as though we are only able to conjecture certain stretches of a train of thought because their starting-points and terminations are given by indications of quality.

In any case, the reproducibility of thought-processes extends far beyond their indications of quality; they can be made conscious subsequently, though perhaps the outcome of a train of thought leaves traces behind it more often than do its intermediate stages.

In the course of thinking—whether it is cognitive, critical or practical—events of all kinds may occur that deserve to be described. Thinking may lead to *unpleasure* or it may lead to *contradiction*.

Let us take the case in which practical thinking, accompanied by purposive cathexes, leads to a release of unpleasure. Everyday experience teaches us that such an event acts as an obstacle to the thought-process. How is it that it can come about at all? If a memory generates unpleasure when it is cathected, this is due, generally speaking, to the fact that the corresponding perception generated unpleasure when it occurred—that is, formed part of an experience of pain [p. 381]. Experience shows that perceptions of this kind attract a high degree of attention, but that they arouse fewer indications of quality belonging to the perceptions themselves than to the reaction which those perceptions generate: they are associated with their own manifestations of affect and defence. If we follow the vicissitudes of perceptions of this kind when they become memory-images, we shall find that their *first* repetitions still arouse affect as well as unpleasure,

but that in course of time they lose this capacity. And at the same time they undergo another change. To begin with they retain the characteristic of sensory qualities, but when they cease to be capable of producing affects they also lose these sensory qualities and come to resemble other memory-images. If a train of thought comes up against a memory-image of the still "untamed" sort, its indications of quality (often of a sensory kind) are generated, as well as unpleasurable feelings and an inclination to discharge, the combination of which characterizes some particular affect—and the train of thought is interrupted.

What is it that happens to memories capable of generating affect which leads to their becoming "tamed"? We cannot suppose that "time" weakens their capacity to repeat the generation of affect, since that factor normally contributes rather to *intensify* an association. No doubt something must happen during the "time" in which these repetitions occur which brings about the subjugation of the memories; and this can only be that some relation to the ego or to the ego cathexes obtains power over them. If this takes longer in such cases than it does normally, we can point to a special reason—namely, to the origin of memories that are thus capable of generating affect. Being traces of experiences of pain, they have been cathected (according to our hypothesis about pain [p. 368]) with excessive $Q \Phi$ and have acquired an excessively strong facilitation towards the release of unpleasure and affect. They must therefore receive especially large and repeated "binding" from the ego before this facilitation towards unpleasure can be counterbalanced.

The fact that memories continue for so long to be of a hallucinatory character also calls for an explanation—and this would have an important bearing on our view of hallucinations. It is plausible to suppose that, like the capacity of a memory to generate affects, its capacity to generate hallucinations is a sign that the ego cathexis has not yet acquired any influence over it, that primary methods of discharge and the complete or primary process [p. 388] predominate in it.

We must necessarily suppose that in states of hallucination the quantity (Q) flows back to Φ and at the same time to W (ω). Thus a bound neurone does not permit such a flow-back to occur. It must further be asked whether what makes a flow-back possible is the

excessive magnitude of the cathectic quantity of the memory. But here we must bear in mind that a quantity (Q) of this large magnitude is only present on the first occasion, when the actual experience of pain occurs. When it is repeated, we are dealing with a mnemonic cathexis of no more than the usual magnitude, and yet it generates hallucination and unpleasure. We can only presume that it does so owing to an unusually powerful facilitation. It follows from this that an ordinary Φ -quantity suffices to bring about flow-back and to excite discharge; and the inhibiting affect of binding by the ego accordingly gains in importance.

It becomes possible in the long run to cathect the memory of the pain in such a way that it can no longer exhibit any flow-back and can only release minimal unpleasure. It has now been "tamed"—and by a thought-facilitation powerful enough to exercise a permanent effect and to operate as an inhibition whenever there is a subsequent repetition of the memory. The path leading to the release of unpleasure, owing to disuse, gradually increases its resistance—for facilitations are subject to gradual decay (that is, to forgetting). Only when this has occurred does the memory become a tamed memory like any other.

Nevertheless, it appears that this process of subjugating a memory leaves permanent traces behind it on the thought-process. Since previously the train of thought was interrupted each time the memory was activated and unpleasure aroused, so now too there is a tendency to inhibit the train of thought as soon as the tamed memory generates its trace of unpleasure. This tendency is very opportune for the purposes of practical thinking, since an intermediate element that leads to unpleasure cannot lie on the desired path to identity with the wishful cathexis. Thus a primary "thought-defence" comes into being, which, in practical thinking, takes the release of unpleasure as a signal that some particular path must be abandoned—that is, that the cathexis of attention must be directed elsewhere.¹ Here, once again, unpleasure directs the flow of quantity (Q), just as it

¹ Cf. *The Interpretation of Dreams*, (trans. 1953, p. 602): "It is easy to see, too, that the unpleasure principle, which in other respects supplies the thought-process with its most important signposts, puts difficulties in its path towards establishing 'thought-identity'. Accordingly, thinking must aim at freeing itself more and more from exclusive regulation by the unpleasure principle and at restricting the development of affect in thought-activity to the minimum required for acting as a signal".

does according to the first biological rule [p. 428]. It might be asked why this thought-defence is not directed against the memory while it is still capable of generating affect. Presumably, however, the *second* biological rule [p. 429] comes into operation at that point—the rule which calls for attention when there is an indication of reality—for the untamed memory is still in a position to enforce the production of real indications of quality. As we can see, both of the two rules serve a useful purpose and they are consistent with each other.

It is interesting to observe how *practical* thought lets itself be directed by the biological rule of defence. In *theoretical* (cognitive and critical) thought, the rule is no longer observed. This is intelligible; for in purposive thinking it is a question of finding *some* path and those paths to which unpleasure attaches can be excluded, whereas in theoretical thinking *every* path has to be investigated.

[4]

The further question arises of how *error* can occur during the passage of thought. What is error?

The process of thinking must be considered in still greater detail. Practical thought, in which it originated, remains the final goal of all thought-processes. Every other species branched off from it. It is an obvious advantage if the conduction of thought which takes place in practical thinking can take place in advance, and not be put off until the state of expectation arises. This is so for two reasons: (1) because it saves time in arriving at the specific action; and (2) because the state of expectation is far from being particularly favourable for a train of thought. The value of promptitude during the short interval between perception and action becomes clear when we consider that perceptions change rapidly. If the thought-process lasts too long, its outcome will have become valueless in the interval. For this reason we “think in advance”.

The beginning of the thought-processes that branched off from practical thinking lies in the process of making judgements. The ego arrived at this through a discovery made in its organization—through the fact (which has already been indicated [pp. 393 and 423]) that perceptual cathexes partly coincide with reports from the subject’s

own body. In this way perceptual complexes are divided into a constant, uncomprehended portion—the “thing”—and a changing, comprehensible portion—the attributes or movements of the thing. Then, since the “thing-complex” keeps re-appearing in connection with a variety of “attribute-complexes”, and since conversely the latter keep re-appearing in connection with a variety of “thing-complexes”, it becomes possible to work out paths of thought that lead from these two kinds of complex to the desired state of the “thing” in a manner which is, as it were, valid *generally* and independently of the perception that happens to be real at the moment. Thus thinking with judgements instead of with single, orderless perceptual complexes is a great economy. We must leave on one side the question whether the psychological unity thus attained is represented by a corresponding neuronic unity in the train of thought (apart from the unity presented by the verbal image).

Error can already make its way in during the making of a judgement. For the thing-complexes (or movement-complexes) are never entirely identical, and there may be some among their divergent portions whose neglect will vitiate the outcome in reality. This defect has its origin in the tendency (which, indeed, we ourselves are imitating here) to substitute a single neurone for a complex—for this is necessitated by the immense complexity of the material. These are *mistaken judgements due to faulty premisses*.

Another source of error may lie in the fact that the real objects of perception were not completely perceived because they were outside the scope of the senses. These are *errors due to ignorance*, which no human being can avoid. But where this is not the case, there may have been defective psychical precathexis (owing to the ego being distracted from the perceptions) and inaccurate perceptions and incomplete trains of thought may result. These are *errors due to insufficient attention*.

If now we take as the material of thought-processes complexes that have been judged and reduced to order, instead of unsophisticated ones, an opportunity will then be found for shortening practical thought-processes themselves. For if it has happened that the path from perception to identity with the wishful cathexis has passed through a motor image M , it is biologically certain that after identity

has been achieved this M will be fully innervated. The simultaneity of the perception and M will produce an intense facilitation between them, and an immediately subsequent perception will arouse M without any further course of association. (This, of course, presupposes that it is possible at any time to set up a connection between two cathexes.) What was originally a laboriously established thought-connection becomes, as a result of simultaneous full cathexis, a powerful facilitation. The only question about this facilitation is whether it always follows the path that was originally discovered or whether it can form a more direct line of connection. The latter alternative seems both more likely and more expedient, since it avoids the necessity for fixing paths of thought which should remain free for other connections of the most various sorts. If the original path of thought is not followed again, we shall not expect to find it facilitated, and the outcome will be better fixed by a *direct* connection. It remains an open question, however, where the new path originated. The problem would be made easier if the two cathexes, W and M , had a common association with a third one.

The portion of the thought-process that passes from perception to identity through a motor image may also be brought into prominence and will lead to a similar result, if attention fixes the motor image and brings it into association with the perceptions—these having also been fixed once more. Here, too, the thought-facilitation will be set up again when there is a real occurrence.

In this kind of thought-activity the possibility of errors is not at first sight obvious. But no doubt an inexpedient path of thought may be taken or a wasteful movement may be emphasized, since, after all, in practical thinking the choice depends solely on reproducible experiences.

With an increasing number of memories, fresh paths of displacement are constantly coming into existence. For that reason it has been found advantageous to follow out all the different perceptions fully, so that the most favourable of all the paths may be discovered. This is the task of *cognitive* thought, which thus emerges as a preparation for practical thought, though in fact it only developed out of the latter at a late stage. Its findings are of value for more than one kind of wishful cathexis.

The errors that may occur in cognitive thinking are self-evident. They are due to partiality, which may arise unless purposive cathexes have been avoided, and to incompleteness, which may arise unless every path has been investigated. It is clearly an enormous advantage here if indications of quality have been aroused at the same time. When these thought-processes are picked out and introduced into the state of expectation, it becomes possible for the whole course of association from beginning to end to pass by way of the indications of quality instead of through the entire extent of thought; nor is it even necessary for the train of quality to correspond completely to the train of thought.

In theoretical thought no part is played by unpleasure, and for this reason it can be carried on even in connection with "tamed" recollections.

One more species of thought remains to be considered: critical or examining thought. The occasion for this is when, in spite of all the rules being obeyed, the state of expectation, followed by the specific action, has led not to satisfaction but to unpleasure. Critical thought, proceeding in a leisurely manner, without any practical aim, seeks, while calling up all the indications of quality, to repeat the whole passage of quantity ($Q\eta$)¹ in order to trace some intellectual error or some psychological defect. Critical thought is cognitive thought operating on a particular object, namely, on a train of thought. We have already formed an idea as to the nature of the latter [? psychological defects], but in what do *logical errors* consist?

Briefly, in disregarding the biological rules that govern trains of thought. These rules lay down where it is that the cathexis of attention is to be directed on each occasion, and when the thought-process is to come to a stop. They are protected by threats of unpleasure, they are arrived at from experience and can be directly transposed into the rules of logic. (This will have to be shown in detail.) Thus the intellectual unpleasure of a contradiction, which brings critical thought to a stop, is nothing other than the unpleasure stored up for the protection of the biological rules, which is stirred up by the incorrect thought-process.

¹ [So in the original MS. The 1950 German edition wrongly reads *Qualität*.]

*The existence of these biological rules can, in fact, be demonstrated from the feeling of unpleasure provoked by logical errors.*¹

Action, again, is to be understood as the full cathexis of the motor images brought into prominence during the thought-process, and also, perhaps, of the motor images which form part of the intentional portion of the specific action (if we are dealing with a state of expectation). Here the "bound" state is abandoned and the cathexes of attention are withdrawn. As regards the former [the abandonment of the "bound" state], what happens is, no doubt, that at the first passage of quantity from the motor neurones the level in the ego falls irresistably. It is not to be expected, of course, that the ego will be *completely* discharged as a result of single actions; this will only occur in the case of actions involving satisfaction of the most abundant kind. It is instructive to observe that action does not take place by reversing the path travelled by the motor images, but along special motor paths. For this reason, too, the affect attaching to the movement is not *ipso facto* the one that is desired, which would necessarily be the case if there were merely a reversal of the original path. A fresh comparison has therefore to be made during the action between the motor reports coming in and the movements which are pre-cathected, and there must be an excitation of corrective innervations until identity has been attained. Here we have the same situation as we found in the case of perceptions, only that here there is less multiplicity, greater speed and an invariably *complete* discharge not found with perceptions. The analogy between practical thought and efficient action deserves notice, however. It shows us that the motor images are *sensory*. But the peculiarity that in the case of action new paths are traversed instead of the far simpler reversal of the original ones seems to show that the line of conduction of the neuronc elements is one that is firmly fixed; so that it is possible that the

¹ An approximation, though admittedly not a very far-reaching one, to this idea is to be found in Freud's published writings in his hypothesis of a synthetic function of the ego, which includes a need for getting rid of contradictions. Freud only touched incidentally on this problem in *The Interpretation of Dreams* (trans. 1953, p. 499): "Our waking (preconscious) thinking behaves towards any perceptual material with which it meets in just the same way in which the function we are considering behaves towards the content of dreams. It is the nature of our waking thought to establish order in material of that kind, to set up relations in it and to make it conform to our expectations of an intelligible whole".

neuronic motion in the two cases may have different characteristics.

Motor images are perceptions and as such, of course, they possess quality and arouse consciousness. Nor can it be disputed that they sometimes attract great attention to themselves. But their qualities are not very striking and are probably not so various as those of the external world; and they are not associated with verbal images, but on the contrary are themselves in part employed by such associations. It must be remembered, however, that they do not arise from highly organized sense organs, and that no doubt their quality is monotonous. [Cf. p. 371-2].