THE SYNDROME OF NEUROTIC ANXIETY: THE SOMATIC AND PSYCHIC COMPONENTS OF ITS GENESIS AND THERAPY.

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WHILE the best accounts of anxiety appear in the French literature, which contains a number of monographs on anxiety (19, 23, 32, 34, 40), psychoanalysis regards anxiety as the primitive reaction of the pain principle, and deals with it in a fair proportion of its investigations.

In 1895 Freud (25), in one of his first analytical communications, a model of clinico-scientific presentation, separated off anxiety as a syndrome connected with the discharge of somatic excitations.

We regard anxiety as a somato-psychic syndrome which can spring from various sources, and in the course of our investigations have reached the conclusion that there are a number of anxiety states which represent the psychical side of a primitive organic happening.

In these investigations we have not considered the various states of anxiety regarded as secondary.

(*a*) Those accompanying the different forms of heart disease, organic and nervous, characterized by a distinct præcordial distress (*cf.* 4, 64).

(*b*) Those accompanying functional and organic disease of the respiratory tract, such as asthma, characterized by the prominence of the fear of asphyxia.

(*c*) Those arising from psychotic ideas.

In contrast there are a number of forms of anxiety which can be designated primitive or primary, and the genesis of which must be said to lie in an excitation of primitive apparatus. To this group belongs the anxiety in anaphylactic states of all sorts (*cf.* Dattner (16), and more especially Freud's anxiety neurosis, which was the starting-point of our investigations. These primitive states of anxiety may secondarily become psychically fixated and manifested.

An attempt is here made to work out a symptomatology of anxiety states, permitting a rapid differential diagnosis.

SYMPTOMATOLOGY OF NEUROTIC ANXIETY.

The starting-point of the investigation was the "acute major anxiety attack", which is to be regarded as the prototype of anxiety.

* With the collaboration of Dr. Kate Misch, who examined most of the cases. The cases are Berlin patients, examined in 1931 and 1932.

Such an attack commences with paræsthesias, such as a cold shiver up the back. There follows a feeling of oppression, with palpitation and shortness of breath, rapidly increasing; then a feeling of cold, with shivering, trembling, and chattering of teeth sets in; the skin is pale and cold to the touch, and covered with sweat. At the same time the feeling of anxiety increases to the highest pitch of bodily sensation. Finally there is giddiness and nausea, occasionally followed by diarrhœa. The patient sees everything as in a haze; there is flickering in front of the eyes, and acroparæsthesias are present. The whole motor apparatus is, as it were, paralysed; the legs no longer give support, speech becomes extremely laborious and slow, and the voice is weak. Every movement entails enormous effort. The patient feels that he is in a fog, isolated from the external world; sometimes there is a distinct feeling of dissociation, and the patient looks upon himself as a stranger. He surrenders helplessly to the fear which overwhelms him, without being able to offer any resistance or even to call for help. The whole psychical apparatus is inhibited, processes of comprehension tremendously slowed; questions are not appreciated, or only answered after some minutes.

When observing the patient during an attack of anxiety the general immobility is the first feature that attracts the attention. The face is motionless and mask-like, gestures extremely slow, hesitating and diminished; vocal utterances are few, slow, and interrupted by long pauses. The expression, as a rule, does not actually show anxiousness; it is not strained, but rather sagging and helpless. The patient remains where he is, standing or sitting. Every alteration in space occurs as with the greatest effort, slowly and with slight, hesitant movements. The pallor is very noticeable, as well as the cool skin frequently covered with a cold sweat. The eyes are wide, the pupils dilated and the rate of blinking is reduced. The pulse is greatly accelerated (up to 120 per minute); the blood-pressure is raised up to 140 or 150.

In the foreground of the psychical experience is a feeling of annihilation, similar to that felt in angina pectoris, but there is no localization to the region of the heart; the feeling permeates the whole body. It is not directly interpreted as anxiety by the patient, but rationalized and given a content. The feeling is always "This is death", or "This is the beginning of insanity". The patient never declares that he is anxious, but that he believes that he must die or become insane.

Even when the attack is receding or has ended, it is usually not designated as anxiety. The patient comes to the doctor, either in order to be examined for mental disease, or with complaints of the accompanying somatic symptoms, heart trouble, giddiness, stomach and intestinal disturbances, etc., so that a careful exploration will alone detect the presence of the anxiety state. For the same reason many sufferers from anxiety states are treated for years symptomatically for their somatic symptoms.

The acute attack can last from 1 to 20 hours, during which it may change in intensity and character of symptoms, and usually ends as suddenly as it began. Frequently it passes over into the "chronic anxiety state", or into the "state of anxiety preparedness". Sometimes it is over within 15 minutes, and gives place to a feeling of especial well-being, as after overcoming some serious danger. In this stage there may be a pleasant feeling of warmth, and sometimes diarrhœa and polyuria. It is said that the end of the attack may be indicated by the appearance of tears. The acute major attack can occur once only, or can be repeated at indefinite intervals with the same intensity and in the same manner. After a few attacks the subjective and the objective picture can alter as defence mechanisms enter into action, which will be referred to later.

This type of anxiety, which externally so resembles the anxiety of melancholia, is to be designated "*the major akinetic anxiety attack*", and is to be regarded as the prototype of the neurotic anxiety state, since it has been found in the course of the anamnesis in almost all our cases at the onset of the illness. In general it occurs only in persons previously free from anxiety, and only at the commencement of the anxiety neurosis in this pure form. Further progress of the disease alters the type of the anxiety in that, according to the resistance and activity of the personality, various defence mechanisms are brought into play. We then no longer see the pure picture of the anxiety attack, but rather a state in which the ever-threatening anxiety is kept down and modified by mechanisms originating in the sphere of the will and in ideas.

In a case-material of 50 cases of anxiety, such a major akinetic attack was only accurately observed with success in 3 cases, for the patient, on account of the motor inhibition during the attack, is as a rule unable to communicate with anybody, and even after the attack he is usually not in a position to relate the experience of anxiety, or else he is ashamed to confess to his symptoms. He may be afraid that a recollection will bring about a repetition of the attack, or that he may obtain from his doctor a confirmation of his fear of becoming insane or of having to die.

The defence mechanisms (*cf.* Meerloo (54)) set in because repeated attacks of akinetic anxiety, which may well be the most frightful of human experiences, are unbearable. They may consist of a breaking through of the akinesis before this has reached its highest point, so that a hypermotility arises which looks like an attempt at flight, or of a conscious suppression of the commencing attack by suitable distraction or the taking of medicine or alcohol; or in rationalization, that is, the reflection that the dawning feeling of unpleasantness is the beginning of an attack of anxiety which is unfounded. These defence mechanisms call into play a constant large expenditure of psychical energy, which is withdrawn from the total vitality, so that the capacity for work, enjoyment and relation to the outside world is considerably reduced. The following clinical pictures may result: the agitated anxiety attack, the

chronic state of anxiety with exacerbations, and the state of preparedness for anxiety with intermittent minor attacks of anxiety; and finally, the so-called anxiety equivalents (Freud).

The *agitated anxiety attack* consists of a compulsion for mobility. The patient finds no quiet; he seems as if in constant flight, running up and down the room, or about the streets. Features and gestures are restless, but all movements are vague, tremulous and inadequate. Here the strained, anxious expression, absent in the akinetic variety, is manifest. The colour and temperature of the skin are variable; on the otherwise pale skin of the face and neck red spots may appear; a cold sweat is not always present. The pulse-rate and blood-pressure likewise vary, and only rarely reach the same height as in akinetic anxiety. The patient usually knows that he is anxious. Agitated anxiety can occur as a single attack, or may last for days and weeks with remissions and exacerbations, the latter especially in the evening or at night. If interrupted there is present further a state of preparedness for and expectancy of anxiety, making itself felt again and again over months and years.

A further alteration of the primary anxiety attack consists of a simple diminution in severity and shortening of the attacks, so that there arises a state of affairs in which isolated minor attacks of anxiety with normal somatic and psychical findings are to be observed in the interval. Or there remains a state of *chronic preparedness for anxiety* with unrest, timidity and insomnia in the interval, and with minor exacerbations that can occur several times daily or at longer intervals.

Clinical pictures that can only be recognized with difficulty as fundamental anxiety states are Freud's so-called *anxiety equivalents*, i.e., attacks of palpitation and trembling, bouts of perspiration, weakness without actual feelings of anxiety. Such pictures are comparatively frequent, but only rarely recognized, for patients only come to the doctor, as a rule, with somatic complaints.

The various forms of anxiety described refer solely to the alteration of the anxiety attack itself, and can all appear in the same patient at various times in the course of a single illness. They do not by themselves as yet provide a basis for a judgment on the structure of the anxiety disease itself.

The following investigations were in the main concerned with anxiety neurosis and anxiety hysteria. The pure prototype of anxiety is found in Freud's *anxiety neurosis*, which was therefore made the basis of the investigations.

In this illness the main feature is that the anxiety suddenly occurs without recognizable cause, and sweeps over the patient like something completely foreign, somewhat similar to an infectious disease. During anxiety-free intervals the patient is in his usual psychical equilibrium. On the other hand, in *anxiety hysteria* the hysterical character of the patient, even when free from anxiety, is manifest either patently or at closer observation. For the

manifestation of the attacks of anxiety there is here always a psychical origin demonstrable, usually the repression of aggressions, more or less conscious to the patient. A distinct difference between the two diseases is given by the attitude of the patient towards his anxiety. The anxiety-neurotic regards the attack as completely foreign and utterly unintelligible to him, while the anxiety-hysteric is demonstrative over his anxiety. One can almost say that the attack of anxiety neurosis is related to that of anxiety hysteria as the epileptic is to the hysterical convulsive fit. The transition of pure anxiety neurosis to the hysterical anxiety state will be reported on below.

Anxiety and the Vegetative System.

Observations of the major anxiety attacks have shown that they are accompanied by somatic symptoms which not only are very similar in all cases, but also give a characteristic syndrome. In the foreground of this, appearing at the beginning of all the phenomena during an attack, is the widespread peripheral vaso-constriction, subjectively expressing itself in paræsthesias and a feeling of cold, objectively in a high-grade pallor. In the second place come heart symptoms, such as palpitation, a feeling of oppression, sometimes a tachycardia. To this are added disturbances in secretory activity of various glands, inhibition of salivary secretion and eruption of cold sweats. During the attack there is further found enlargement of the palpebral fissure and pupils, brightness of the eyes, arterial hypertonus up to 150 mm. Hg., and acceleration of the pulse up to 150 beats per minute, as well as a high-grade flaccidity of voluntary musculature and mimics.

This syndrome, designated the *somatic syndrome of anxiety*, denotes a stormy excitation of the vegetative system ; in its pure form an exclusive excitation of the sympathetic system, to which, especially towards the termination of the attack, parasympathetic phenomena are added which are to be regarded as compensatory phenomena. In *chronic anxiety* there is usually a mixture of sympathetico- and parasympathetico-tonic phenomena. Hypertonus and tachycardia are always demonstrable ; on the other hand, the pallor of the skin is often interchangeable with patchy or total flushing of the face and neck, and the akinesis is, as a rule, replaced by hypermotility ; further, mydriasis and hyperidrosis are usually absent.

In the literature of the last fifty years the somatic accompaniments of the anxiety state have often been described as an inherent constituent of anxiety itself. Especial significance was assigned to the vaso-motor disturbances and the heart symptoms.

Roller (62) was the first to point out that at the height of the anxiety affect we are dealing with excitation of the sympathetic system, and indeed with a vasomotor disturbance introduced from the medulla oblongata, giving constriction, or even closure of vessels. Hecker (35), who was the first to separate off the anxiety states from the picture of neurasthenia, and Freud (25), who marked off

anxiety state as a special syndrome, speak of an alteration of the function of the vasomotor apparatus. At the Neurological Congress of 1910, Oppenheim (56) communicated a great number of cases of anxiety attacks in which he could detect signs of a congenital weakness of the " vasomotor-visceral apparatus ", and pointed out that anxiety had a somatic, not only a psychical origin, which rested on an unusual reaction of the vegetative system to ideas and sense impressions. Hatschek (33) stressed that vasoconstriction stood in the foreground of the vegetative disturbance, which brought him to the assumption of an irritation of the sympathetic, with coincident vagus inhibition in an anxiety state.

An exceptional position is taken up by David (17), who, when contrasting the anxiety phenomena as described by Freud and the Graves' disease symptoms, draws the peculiar conclusion that in both diseases, while a few phenomena can be referred to increased sympathetic tone, most of them can be referred to increased parasympathetic tone.

Dattner (16) described anxiety attacks which occurred in the course of anaphylactic shocks, which he regarded as allergic states, and was able to ameliorate by changes in the diet (pure vegetarian diet). In lengthy duration they could lead to psychoneuroses. He compares them to the vaso-vagal attacks of Gowers (31), the vegetative attacks of Paul Loewy (51), and to certain pseudo-anginal states. They differ from the attacks described above mainly in the considerable fall in blood-pressure, are regarded as parasympatheticotonic, and can be influenced, like all anaphylactic phenomena, by adrenaline.

A careful analysis of the somatic anxiety syndrome of chronic anxiety and of the acute state was undertaken by Euzière and Margarot (22) :

> They refer the feeling of cerebral anæmia and pallor of the face to a vaso-constriction of the vessels of the head under the action of the cervical sympathetic. The parched throat feeling, the bitter mouth, the sudden lack of appetite, are explained by the inhibition of vaso-dilators of the tongue and salivary glands. The occurrence of tough saliva, rich in hard particles, is likewise explained by an inhibitory action on salivary secretion (sympathetic saliva). The shiver of cold and the goose-skin correspond to a peripheral vaso-constriction and contraction of arrectores pilorum, likewise dependent upon stimulation of the sympathetic. The cold sweats arise from increased secretory activity of the sweat-glands, with coincident strong vaso-constriction, while normal secretory activity is accompanied by parallel vaso-dilatation. There is here apparent a dissociation of this process, thus explaining the abnormal character of the sweat (sympathetic sweat). The heart palpitations, the rise in blood-pressure, the præcordial distress and the feeling of oppression are signs of a predominance of the cardiac sympathetic over the vagus. Aschner's reflex is either lacking or reversed (that is, pressure on the eyeball accelerates the pulse). Secretion of tears, polyuria and pollakiuria and diarrhœa are regarded as compensatory vagus phenomena, with the advent of which there is diminution and disappearance of anxiety. The motor inhibition and trembling are considered secondary*; like the movements for flight, they correspond more to the idea of anxiety than to the anxiety itself.

From a special consideration of the behaviour of the blood-pressure and the Aschner's phenomenon (oculocardiac reflex), which in an attack of anxiety

* The work of E. Franck, Nothmann and Hirsch-Kaufmann (24) (1922) has in the meantime shown that the tonus of skeletal muscle is increased by the vagus and diminished by the sympathetic ; thereby the akinesis in anxiety can likewise be explained as a sympatheticotonic phenomenon.

is absent or reversed, they reach the conclusion that both in chronic anxiety and to a larger extent in the acute anxiety attack there is a high-grade sympatheticotonia which, as a rule, is followed by an over-compensatory excitation of the parasympathetic, with the onset of which anxiety diminishes and disappears. This behaviour is contrasted with bronchial asthma, in which the vagotonic state during an attack of asthma is followed by over-compensatory sympatheticotonic reactions which are accompanied by anxiety. They assume that anxiety is mainly found associated with sympatheticotonia, and that it can be regarded as the subjective expression of a high-grade sympatheticotonic state. To a similar psychical influence the sympatheticotonic would react with anxiety, the vagotonic with asthma ; constantly a hyperfunction of the sympathetic, whether psychically or somatically conditioned, would precede the anxiety sensation.

Larrivé and Dancenis (50), too, found in the anxiety attack itself signs of a sympathetic hypertonia, while with quietening of the patient and diminution of the anxiety affect they observed vagotonic symptoms. This corresponds to the view of W. R. Hess (37), who regards affect and excitation as a consequence of a shift towards the sympathetic side, sleep and restfulness as one towards the parasympathetic side.

Other authors report a mixture of sympathetico- and parasympatheticotonic phenomena. We know already, from the observations of Knauer and Billigheimer (44) on the expression of fright and anxiety, that though in acute fright there is a pure excitation of the sympathetic, in fright neurosis the converse appearances set in in rapid succession. Laignel-Lavastine (48), who in a series of papers deals with the somatic phenomena of anxiety, reaches the conclusion that the major anxiety attacks are accompanied by sympatheticotonic, the minor by vagotonic events, but that mixed forms are also found. Tommasson (68), whose investigations will be more closely gone into later, found by means of the atropine test method (see below) that clinically identical events will take place with alteration both in the sympathetic and the parasympathetic system—that is, with absolute or relative sympathetic hypertonia ; that though sympatheticotonia was always in excess, the disturbance of the vegetative system would have its causation in one or the other system.

From the observations, it follows that in the major acute anxiety attack there is present a violent excitation of the sympathetic system, which with gradual cessation of the attack is covered over and relieved by parasympathetic phenomena ; but that in chronic anxiety signs of excitation of the sympathetic and the vagus can alternate and interfere one with the other. Besides, there appear to be vagotonic states in which anxiety can likewise appear, probably through sympatheticotonic over-compensation.

Somatic Therapy of the Anxiety Attack.

From observation of the anxiety attack and the descriptions of the patients, the impression has been gained that the neurotic anxiety attack represents an occurrence emanating from the somatic side. Specially in support of this view is the fact that exact analysis of the attack constantly shows that it begins with somatic complaints and symptoms, and that only when these have

reached a certain pitch does the anxiety experience itself put in an appearance. So much so is this the case that many patients achieve a certain routine in that, when they observe the premonitory somatic sensations, they prevent the onset of the anxiety by manifold measures (medicines, physical procedures, withdrawal of the attention elsewhere). We further have the fact, which Freud has pointed out, that the neurotic anxiety attack itself cannot be influenced psychotherapeutically; this is, in part, connected with the psychical separation of the patient from the external world.

On the other hand, J. H. Schultz (64) in anxiety states of organic heart cases has achieved excellent results with psychotherapeutic suggestion, and has thereby even been able to improve the organic basis of the disease for a considerable period. Such patients put their anxiety in the foreground of their complaints, in contrast to the patient with major anxiety attacks, in whom one can only obtain information of the anxiety on searching inquiry. Now, since secondary anxiety states arising on an organic basis can readily be influenced from the psychical side, the converse is suggested, namely, that primarily neurotic anxiety states which are isolated from external psychical influences should be treated in a somatic manner.

The treatment of acute anxiety states has hitherto been unsatisfactory. Oppenheim (57) and Hoche (38), for instance, repeatedly point to the ineffectiveness of all therapeutic attempts, which mainly consisted in pharmaco- and hydrotherapy. Opium derivatives were regarded sceptically, their effects being inconstant and only very transitory. The same disadvantages are shared by alcohol, which is taken by many patients suffering from anxiety states on account of its narcotic effect, and indeed really does possess a certain prophylactic and therapeutic action. It is well known that the large majority of chronic alcoholics, and especially of periodic alcoholics, are larval anxiety patients of different genesis. Bromides and other sedatives have proved themselves entirely ineffective.

Drugs acting on the cortex, then, are unsuitable, and this supports the conception that the origin of anxiety has to be sought in the lower centres.

We have attempted to treat the anxiety state primarily as a somatic disease. A drug was looked for with an action opposed to the somatic syndrome of anxiety—that is, one which dilates peripheral vessels, slows the heart-rate, lowers the blood-pressure, stimulates salivary secretion, dilates the pupil and increases muscular tone. Such a drug was found in the choline preparations.

First the experiment was tried of giving, in a major acute attack, 0·1 c.c. of acetyl choline intramuscularly. Within 5 to 10 minutes there was an ample flow of blood to the skin, a diminution of tachycardia practically to normal and a disappearance of subjective bodily phenomena—that is, that the somatic syndrome of anxiety practically disappeared. At the same time the psychical anxiety state, on which it had been impossible to exert any influence, disappeared completely, and made room for a feeling of entire well-being. Such

an effect would last, as a rule, 3 to 4 hours, and on that account administration of the drug by injection is only suitable for checking the major acute attacks.

For further treatment and for the treatment of the chronic forms of anxiety an oral method of choline medication was resorted to, and for this the preparation known as Pacyl, made by the Berlin firm of Wiernik (4–6 tablets per day), and the French preparation Hypotan (3–4 tablets per day), were employed. In the majority of cases, from a few hours up to two days after commencement of the oral treatment there was a gradual improvement, which in a short time led to a complete freedom from anxiety (*cf.* Table). Some

Case.	Age and sex.	Clinical diagnosis.	Form of anxiety.	Duration.	Choline effect.
1	21 ♀	Anxiety neurosis	4 major attacks	2 months	Prompt.
2	33 ♀	,, ,,	Minor akinetic attacks	8 years	,,
3	40 ♀	,, ,,	Chronic anxiety with exacerbations	1½ ,,	,,
4	48 ♀	,, ,,	Ditto	1 year	,,
5	38 ♂	,, ,,	Ditto, sometimes agitated	1½ years	,,
6	36 ♀	,, ,,	Major and minor attacks with free intervals	1½ ,,	,,
7	29 ♀	,, ,,	Major akinetic attacks	¾ year	,,
8	24 ♀	,, ,,	Minor attacks with intervals of freedom	2 months	,,
9	23 ♀	,, ,,	Chronic anxiety with exacerbations; some major attacks	3 years	,,
10	30 ♀	,, ,,	Chronic anxiety with medium attacks	½ year	,,
11	59 ♂	,, ,,	Minor attacks	4 months	Free of anxiety within a week.
12	25 ♂	,, ,,	Major akinetic attacks	2 ,,	Prompt.
13	33 ♀	,, ,,	Single major attacks; latterly almost daily	3 years	,,
14	36 ♀	,, ,, with hysterical colouring	Chronic anxiety	2 ,,	Considerable improvement.
15	49 ♀	Anxiety hysteria	Chronic anxiety state with major attacks	6 weeks	Improved.
16	29 ♀	,, ,,	Ditto	1½ years	,,
17	31 ♂	,, ,,	,,	½ year	,,
18	39 ♂	,, ,,	Chronic anxiety, partly agitated, with exacerbations	5–6 years	None.
19	26 ♂	,, ,,	Single, short, agitated attacks	1½ ,,	,,
20	41 ♀	Anxiety neurosis with depression	Chronic anxiety state with some major attacks	3 ,,	Free after 7 days.
21	38 ♀	Same	Chronic agitated anxiety with exacerbations	½ year	Free from anxiety.

cases, after choline medication for several weeks, remained permanently free from anxiety, but in others it was observed that a few days or weeks after cessation of the medication, anxiety reappeared in a lessened form, only to disappear again after renewed choline treatment. For such cases an intermittent choline therapy seems indicated, in so far as in the meantime the fundamental cause of the anxiety has not been eradicated, through special measures to be discussed later, e.g. removal of sexual maladjustments.

Fifty cases of anxiety states, of which about one-half could be thoroughly examined and observed, were treated with choline preparations. These were mostly cases which had had attacks of anxiety for months or years, and been treated continuously with narcotics and sedatives without result. In order to obtain controls for the pure choline action, any mental exploration which could have a suggestive influence was always avoided as soon as the spontaneous history given by the patient led to the diagnosis of anxiety state; any further psychical and more exact bodily examination was postponed, so that one could convince oneself that the patients, who were generally accustomed to tablets of various kinds, were benefited by the therapeutic action of the medicine alone.

In anxiety states occurring in the evening, Allonal (Roche) was occasionally given besides the choline preparations, it having been observed that it was the only effectively acting hypnotic in patients suffering from anxiety states. It is now believed that the efficacy of this preparation is to be referred not so much to its barbituric acid as to its amidopyrin content. For it had been previously observed by us that amidopyrin tended to reduce anxiety. From the nature of the anxiety syndrome this observation would be explained by the main accompanying symptom of anxiety, the peripheral vasoconstriction being counteracted in this way. Hot baths, we found, acted in the same way and probably also alcohol.

In the course of the investigations the result was obtained that choline medication in the different anxiety states was of variable efficacy. It was always effective in pure anxiety neurosis, especially in those forms of it which had not yet undergone strong psychical fixation. It was only conditionally effective in anxiety hysteria—that is, the anxiety was mostly ameliorated, but was often replaced by other disturbing hysterical symptoms. It was completely ineffective in the anxiety of compulsion neurosis, in psychotic anxiety states, as well as in anxiety caused by hypnosis and in post-hypnotic phobias.

An explanation may lie in the fact that the choline syndrome is exactly opposed to the sympathetic anxiety syndrome and removes the latter in all its individual symptoms, its chief action apparently lying in peripheral vasodilatation. Further, there is probably no clinical syndrome in which there is such a hurricane excitation of the sympathetic system as in the acute anxiety state. According to Wilder (71), the vegetative drugs obey the rule that their inhibiting antagonistic action is greater in the proportion in

which excitation of the vegetative system is present. Choline preparations can therefore exercise their maximal parasympathetic action in akinetic anxiety, which represents the purest sympatheticotonic anxiety syndrome, while in the remaining syndromes, already changed through defence mechanisms in which vagotonic over-compensation or psychical fixation play a rôle, it is not quite so certain or so rapid in action. The choline effect is thus the greater, the more elementary the anxiety form, and the less, the more the anxiety has been psychically elaborated.

More exact analyses of sympathetic and parasympathetic components in anxiety states have been undertaken by Tommasson (68) in the course of experiments with manic-depressive patients. On the one hand by measuring the blood electrolytes, on the other hand by determining the relation between sympathetic and vagus tone by the atropine test method* of Daniélopolu and Carniol (13), he found in severe depressive states associated with anxiety a diminution of parasympathetic with increased sympathetic excitability (absolute sympatheticotonia), in milder cases a pure diminution of parasympathetic excitability (relative sympatheticotonia). He was only able to ameliorate the latter cases with acetyl choline, while the former did not react at all to acetyl choline alone, but only when it was combined with ergotoxin. In neurotic anxiety he likewise found sympatheticotonia either absolute or relative, and believes that parasympathetic inhibition is here of greater import than sympathetic excitation. In such cases acetyl choline acted well, while in absolute sympatheticotonia the ergot preparation gynergen was more effective. He accordingly disputes the validity of Wilder's rule. Unfortunately no opportunity was presented to put this investigation to the test, but it can be assumed that in chronic anxiety states a combined acetylcholine and gynergen treatment might possibly give more rapid results.

Another series of therapeutic experiments seems to point in the same direction, although the various authors give other interpretations to the results of their experiments. Thus Dattner (15) treated neurotics of all kinds with doses of iodine and thyroid, and observed that anxiety disappeared in the first place. He considers the anxiety experience to be due to anoxæmia of the tissues, and explains the success of his therapy through the effect of the iodine-thyroid on the capillaries. It may be assumed that such a therapy will lead to reduction of sympathetic hypertonia via the thyroid gland, and act in the same sense as choline therapy. From similar consideration Edith Klemperer (43) treated anxiety attacks with sodium thiosulphate, and Januschke (41) with caffeine and digitalis, the latter with the distinct aim of achieving dilatation of peripheral vessels and diminution of diastolic blood-pressure. Cossa (12) reports on the treatment of anxiety cases

* This method consists in completely paralysing the parasympathetic by injecting atropine until there is no further rise of the pulse-rate. If, e.g., the initial pulse-rate was 72 per minute, ·5 mgrm. of atropine are injected intravenously and the pulse may rise up to 98. After 4 minutes another 1·0 mgrm. of atropine is injected; the pulse may go up to 128. If then another ·5 mgrm. is injected and the pulse does not rise further there is a complete paralysis of the parasympathetic, and we have the pure pulse-rate effect of the sympathetic without any inhibition of the parasympathetic. So the "absolute sympatheticotonia" is 128, and the inhibition power of the vagus is 128—72, i.e., 56. In this way it is possible to give measures of the sympathetic and the parasympathetic tone.

with the pancreas extract angioxyl, and recently Desruelles, Léculier and Gardien (18), as well as Claude, Dublineau and Dorolle (11), on the efficacy of the pancreas preparation vagotonine in *psychotic anxiety*. All these authors assume that the curative effect depends upon a vagotonization, and a removal of the peripheral vasoconstriction. Finally Schwartzmann (65), with his skeletal muscle extract myoston, which is said to remove angiospasm by acting on the vegetative centres, has obtained excellent results in anxiety states as well. The opportunity was presented to us in a few cases to perform experiments with the skeletal muscle preparation eutonon, and its efficacy can be confirmed, although it is never the equal of choline therapy.

A summary of these results leads to the belief that preparations which shift the altered vegetative equilibrium towards the parasympathetic side, and especially those which have a peripheral vasodilatation action, can ameliorate or remove anxiety states.

Anxiety and Hyperadrenalism.

In view of the fact that choline can be regarded as the physiological antagonist of adrenaline, it seemed desirable to investigate whether choline in anxiety compensates a hyperfunction of the adrenals.

Cannon (7) has shown experimentally that in fear (as also in pain, asphyxia and cold) adrenaline is poured out. Gakkebusch, quoted by Kroll (29), came independently to the same result with clinical and experimental observations.

A search in the literature for cases of hyperadrenalism with hyperfunction of the adrenal medulla revealed a case described in detail by Labbé, Pinel and Doumer (46) of a tumour of the adrenal medulla (paraganglioma), which was characterized clinically by attacks corresponding to the anxiety syndrome. Major and minor attacks were here reported. The former began with nausea, cold, numbness of the extremities, pallor of the face and extreme vaso-constriction of hands and feet; there followed epigastric crises with vomiting lasting a few hours, as well as palpitations and tachycardia; later there came vasodilatation of face and neck and cold sweats. With commencement of the attack there was regularly present a high-grade anxiety, which only towards the end changed into great fatigue. Besides, minor attacks without gastric disturbances were observed, which were characterized by an anxiety with peripheral vasoconstriction, followed by cold sweats and flushing of the face. During the attacks there was a tachycardia of 100 up to 130 per minute, a rise in blood-pressure up to 280 mm. Hg. maximum (as against 150 mm. in the interval), mydriasis, and a hyperthyroid-like tremor of the hands.

Marañon (52), who studied the psychic effect of adrenaline injections in a great number of normal and abnormal persons, obtained, apart from the somatic sensations, in isolated cases only indefinite affective states without real affect; the subjects had an impression of being frightened, excited or in a state of joyful anticipation; sometimes these sensations continued and resembled previous affects.

In a few of the anxiety cases in which cure had been achieved we made an attempt to induce anxiety states by adrenaline injections. In view of the difficulty of making such experiments with ambulant patients, adrenaline intravenously was not risked, but we tried Dresel's (20) subcutaneous adrenaline experiment. At the site of injection in every case there occurred a distinctly visible high-grade vaso-constriction (anæmic region of about an inch in size with contraction of the arrectores pilorum), so that the adrenaline was not absorbed, and neither changes in the circulatory system nor appearance of anxiety could be determined. Such a local adrenaline effect was described by Czepai in a type of patient not further characterized, and accepted as reason for the absence of the general adrenaline effect, and Dresel's experiment was discounted on that score. In our cases of anxiety we believe that there is present a special sensitivity of the skin vessels to adrenaline, and, as control, clinical patients of all sorts were given subcutaneous adrenaline injections. All anxiety cases but only a few of the other cases gave the local skin reaction. Clinical observation of the anxiety attacks had led to the view that vasoconstriction of the skin vessels is a prominent feature, and so the adrenaline experiments, which were unfortunately not brought to a conclusion, may give additional confirmation that the main anxiety predisposition lies in an increased excitability of the vasoconstrictors of the skin.

Both Cannon and the other authors who have dealt with this problem regard the pouring out of adrenaline in affective states as an accompanying symptom of these, which is co-ordinated with the other somatic appearances, and is, equally with them, a sequel of the excitation of the vegetative system. But, from the investigations of Cannon and Britton (8, 10), both with the "pseudo-affective preparation" (1925) and the "lasting preparation" of the denervated heart (1927), in which, after adrenal extirpation, the non-appearance of heart acceleration in the rage affect was demonstrated, it does not necessarily follow that the pouring out of adrenaline does not precede the sympathetic excitation and is the cause of it, as well as of the somatic appearances produced thereby. Evidently the appearance of anxiety in adrenal tumours permits of this interpretation, and the investigations of Tommasson (68) seem to point in that direction. This question is of importance as regards the pure somatic derivation of certain anxiety states, which will be referred to later.

Somatic Genesis of Anxiety.

The significance of the somatic processes in anxiety has been repeatedly discussed, on account of the prominence of somatic anxiety phenomena on the one hand and the lack of influence of psychotherapy on the other. The latter especially made Oppenheim (55) consider the abnormal excitability of the vasomotor and the visceral centres a main factor for the genesis of anxiety which, according to the procedure of Meynert and Kaan (42), he localizes in

the medulla oblongata (" Courage can sit gloriously in the cortex, whereas in the medella anxiety dominatingly reigns supreme "), and has emphatically maintained this point of view in a polemic against Dubois (21). Others have looked for an intoxication in anxiety states, such as Kowalewsky (45), who assumes an auto-intoxication with cerebral fatigue products, and Hecker (35), who reminded us of the observation, of Mariot (53), that the flavour of venison was connected with the fear of these animals while being hunted to death, and was to be referred to chemical substances arising in the cerebrum and causing the phenomenon of fear.

Hecker (35) was the first to describe " hidden anxiety states " in which anxiety is at first not experienced, and pointed out that the appearance of a single anxiety symptom could, by irradiating on to the remaining vasomotor apparatus, lead to a complete anxiety attack. On the basis of these observations, he regarded the somatic anxiety phenomena as primary and the anxiety affect itself as secondary, arising out of an appreciation of the bodily sensations.

Freud (25, 26), when describing the anxiety neurosis as a special syndrome, entered explicitly upon the question of the somatic genesis of the disease. In all cases he found sexual disturbances which had in common that the sexual excitation was unrelieved. He holds the view that the libido, dammed up by the insufficient relief, can translate itself directly into anxiety. This purely dynamic theory of Freud was broadened by Reich (60) in 1927 to a physiological theory. Reich is of the view that a direct change of libido into anxiety is improbable, and thinks that, in prolonged sexual excitation without relief, hormones and other metabolic processes, which in the normal course of the sexual act are katabolized, have a toxic effect upon the vegetative system, causing a constant excitation of this, of which the psychical correlate is anxiety. Reich, from the psychical side, has reached the same result as was obtained by us through study of the somatic phenomena.

Freud's sexual theory of anxiety has, as is well known, met with the most extreme opposition in the neurological and the psychiatrical literature, and is only confirmed by a single non-analytical work known to us, that of Strohmeyer (67), who supports with an extensive case-material the Freudian doctrine, which, though based on a wide experience, makes no use of case-material. In practically all cases of neurotic anxiety examined, sexual damage, as described by Freud, could be demonstrated. It was found that anxiety never appeared at the first disturbance, but only when the disturbances had been acting for a lengthy period. There seems to be necessary for the phenomenon of anxiety a summation of the excitation processes localized in the sympathetic system. Anxiety vanishes when the disturbances which bring about the manifold lack of sexual relief are removed—that is, in undisturbed sexual relief anxiety disappears just as it does in choline medication.

From Freud and others it is known that in the genesis of the anxiety syndrome both the amount of libido and also the volume of damming up of

the latter play a part. Apart from the individual differences in the amount of libido, it is increased at the critical periods of puberty and the menopause as well as in the periodic phases of sexual life (menstruation), and can further be increased by exciting events (engagement, etc.) and imagination so to speak exogenously. The causations for the damming up of the libido are likewise manifold: lack of opportunity for intercourse, inhibitions from moral and neurotic reasons, coitus interruptus and other more or less neurotic causes leading to disturbances of the orgasm (certain forms of impotence, frigidity). Only the simultaneous action of several of these factors over a longer period can lead to anxiety states. So, for every case there is a specific structure, which in the further course of the disease, through psychical fixation, to be referred to later, makes the clinical picture more complicated.

In illustration, a brief description of the constitution, sexual relations and treatment of 18 cases of anxiety will be given. Here it is remarkable that the greater number of anxiety neuroses occurred in women, while psychoneuroses were more common in men. In every case the somatic anxiety syndrome, as described above, was more or less present. Practically all patients had been previously treated by the most varied methods without success.

I. Cases 1 and 2 show development of anxiety on account of *lack of opportunity for sexual intercourse with increased libido*, in the first case from external, in the second from neurotic causes.

CASE 1.—Woman, æt. 40, 6 years divorced. For 1½ years almost daily minor akinetic attacks of anxiety. In the interval perfectly healthy. For some time increased libido, but no opportunity for satisfaction. Therapy: Pacyl treatment led to disappearance of the anxiety attacks within 2 days, and they did not reappear when pacyl was discontinued. At the end of the medical treatment the connection between anxiety and sexuality was discussed. Period under observation: 1 year.

CASE 2.—Woman, æt. 33, unmarried, housekeeper. Hysterical character. For 4 years constant anxiety-preparedness with minor attacks of anxiety, besides complaints of a constant feeling of cold, headache and disturbed sleep. Sexuality: Never had intercourse; severe sexual inhibition. Therapy: After 10 days of pacyl treatment, anxiety and cold disappeared completely, without the patient having any further subjective feeling of an amelioration of the general condition.

II. Cases 3 and 4 are examples of the appearance of anxiety as a consequence of *increased libido at the menopause*, with and without psychical elaboration.

CASE 3.—Woman, æt. 47, spinster. The previous night, without recognizable cause, severe anxiety state which gradually diminished during the next day. Sexuality: Menopause for 3 years, few climacteric disturbances. Therapy: After 3 days of pacyl, anxiety gradually receded; after a week also a resting state of anxiety-preparedness. After cessation of pacyl, anxiety set in once more.

CASE 4.—Woman, æt. 48, married. For 1 year, since the menopause, state of anxiety-preparedness with exacerbations; minor attacks from 3–5 minutes several times per day. Sexuality: During 26 years of marriage (5 births, 1 abortion) rarely attained satisfaction. Anxiety commenced in the month in which she did not see her menses for the first time. Psychically: Of hysterical character.

Therapy: After 8 days pacyl medication, free of anxiety; 2 months later renewed mild anxiety attack, which after another week's pacyl treatment did not recur. For 1 year free of anxiety; on the other hand headaches and giddiness set in, so that subjectively there has been no significant amelioration of the general condition.

III. In cases 5–7 anxiety was conditioned through *insufficient satisfaction as a consequence of coitus interruptus.*

CASE 5.—Married woman, æt. 29. Daily for 3 weeks, about 3 agitated anxiety attacks of about half-an-hour duration. Has had no orgasm for about 4 weeks, although previously always completely satisfied, and no more libido. For a year, coitus condomatus has been replaced by coitus interruptus. Hysterical character. After pacyl therapy: After 3 weeks no further major attacks; anxiety-preparedness still present. After 6 weeks anxiety-preparedness has likewise disappeared, libido is present, orgasm has been attained again several times. Patient feels quite well; occlusive pessary is prescribed.

CASE 6.—Married woman, æt. 33. For 8 years several times daily minor akinetic attacks of anxiety, setting in after a gynæcological operation. Apart from the attacks, completely healthy. Patient volunteers that the attacks are like the commencement of anæsthesia. Sexuality: Patient not herself frigid. On account of coitus interruptus does not attain orgasm. Therapy: After pacyl medication not a single further attack. After 1 week sexual relationships are discussed, coitus interruptus is forbidden, and occlusive pessary is prescribed. Since 1 year is free of anxiety.

CASE 7.—Married woman, æt. 23. For 3 years chronic anxiety state (continuous timidity), for 1 year when in bed in the morning major akinetic attack of 5–10 minutes duration, frequently 2–3 attacks at brief intervals, in the last 6 weeks daily. Sexuality: Has been married for 3 years; previously no sexual intercourse. During marriage, coitus interruptus; only rarely reaches orgasm, but is not frigid. Therapy: At once improved with pacyl; after a week, completely free from anxiety. After coitus interruptus had been forbidden, and an occlusive pessary been employed, anxiety ceased, though various hysterical complaints of headache, etc., remained. Period of observation: 1 year. In this case there had been a mobilization of hysterical mechanisms on account of the long duration of the anxiety.

IV. In Cases 8–10 of anxiety neurosis there was *damming up of the libido as a consequence of frustrated sexual excitation.*

CASE 8.—Married woman, æt. 33. For 3 years complains of severe attacks of anxiety, at first only rarely, about once a week at night, lately daily. Sexuality: Patient spontaneously voices belief that anxiety is somehow connected with sexuality, as anxiety had appeared at the same time as erotic dreams. She has been married for 13 years; was on excellent terms with her husband, but did not achieve sexual satisfaction. Therapy: Without entering into psychical factors, received pacyl, after which not a single nocturnal attack took place, but at first there remained an anxious feeling during the day. Later the connection between anxiety and sexuality was discussed, and in the first place the fear was removed that the erotic dreams and the nocturnal excitation were harmful. She received pacyl for about 14 days, during which the anxiety-preparedness likewise disappeared completely. After cessation of the medicament, no more anxiety. Period under observation about 6 months.

CASE 9.—Unmarried woman, æt. 36. Commencement of illness 1½ years ago without obvious external cause. At first 4 times daily major attacks lasting 2 hours with fear of death, later of lessened intensity. For 10 years has had friend with whom she lives. Achieves satisfaction with difficulty; recently orgasm has been rare. Since commencement of illness, without libido. Therapy: The day

following pacyl administration, free of anxiety; only some pain on the left side, which likewise disappeared after a fortnight. When the pacyl treatment was discontinued the same attacks reappeared, but disappeared after renewed pacyl medication. After 2 months the preparation was completely discontinued and the attacks did not reappear. Observed for a further 4 months: remained free from anxiety.

CASE 10.—Woman, æt. 38, married. For six months endogenous depression state at first with akinetic, later with agitated anxiety states of about 2 hours' duration, lately every 4–5 days. Sexuality: Married for 9 years; during intercourse attains excitation, but never orgasm. Therapy: After pacyl medication no further anxiety state, with the exception of the time of the next menstruations, during which the anxiety could not be influenced with pacyl. Observation restricted to 10 weeks.

V. In Cases 11 and 12 anxiety followed a *severe sexual neurotic disturbance*.

CASE 11.—Labourer, æt. 31. Since 4 months, at first severe akinetic anxiety attacks, then a state of chronic agitated anxiety. Sexuality: For about 5 months psychical impotence, brought about by a long period of ejaculatio præcox, the psychical causation of which has not been cleared up. The impotence was treated with a testicular extract (testifortan), whereby the disturbance was not ameliorated, but an anxiety state arose, which can be related to the increase of libido due to the testicular extract. Therapy: Pacyl treatment led to disappearence of the anxiety completely within a week. In its place arose severe hypochondriacal ideas. He was sent to a sanatorium and improved a little. Psychotherapy of the impotence, the only rational treatment in his case, was not possible for economic reasons.

CASE 12.—Married woman, æt. 39. For 14 days major anxiety states. In between, state of anxiety-preparedness. Sexuality: Up to 1 year ago completely healthy, not frigid. 1 year ago, uterus operation for prolapse. Since then has vaginismus, perversion of libido with sexual refusal and aversion from own husband, without thereby the human relationships with him being troubled. Therapy: After pacyl treatment for 1 week disappearance of anxiety, but bad sleep and nervousness persist. After the connection between sexual disturbance and anxiety had been talked over, these symptoms also improved, without disappearing completely. On cessation of pacyl, anxiety was renewed; sexual disturbances remained unchanged. Psychotherapy is indicated; so far has not been possible for economic reasons.

VI. In Cases 13–16 illness from commencement was manifested as *severe psychoneurosis*, but was always connected with *damming up of the libido*.

CASE 13.—Police-sergeant, æt. 26. Complains for 1½ years of anxiety states. The first and most severe attack (major akinetic anxiety attack of 1 hour duration) occurred when he heard on the radio of the collapse of a bridge, in which many persons lost their lives. The second attack occurred ½ year later on the way to his wedding. Thereafter, first at fortnightly intervals, then for ¾ year, almost every evening minor anxiety attacks; after these always a great feeling of fatigue. Psychical: Compulsion character. Only feels completely well when wearing his uniform; when in plain clothes always has feeling of insecurity. Sexuality: Married for 1 year; premarital intercourse for previous 3 years. For 2 years, after every coitus, feeling of oppression and insomnia. Therapy: Pacyl at first proved ineffective. After giving eutonon (a skeletal muscle preparation) anxiety disappeared at first, but then reappeared; after this anxiety could be suppressed as long as pacyl was taken.

CASE 14.—Business man, æt. 25, married. Anxiety commenced 1½ years ago: afraid that the tower of the church in which he was to be married would collapse;

some months later further attack without visible external cause. For ½ year (since his marriage) almost daily severe phobia states with anxiety. Sexuality: Previously had had many relationships. Since his marriage, without libido, often ejaculatio præcox. Psychical: While previously he had very early on been in an independent position, he had now, after a long period of unemployment, a very subordinate post, which depressed him greatly. Finally he hired a boarding-house room under an assumed name, ordered typists to this who were looking for a post under pretence of engaging them for some film enterprise, asked them for references, and then only said, "You will hear from me again". Was arrested on suspicion of white slave traffic. He says, "He only wanted to be boss once more". Therapy: During pacyl treatment the anxiety states ceased for several weeks, but the phobic disturbances became worse, so that finally he was unable to go over bridges or to stand at open windows. Was introduced to psychotherapy.

CASE 15.—Mason, æt. 52. For 1 year, following upon a fainting attack, probably psychical in origin, while he was engaged at his work, agitated anxiety states which alternate with states of extreme excitement. He is engaged in a bitter struggle with the authorities, over some money which is said to be his due: he could not, after all, live on the earnings of his wife. Sexuality: No intercourse for 1 year, because, he hints, he is now so ill. He refuses further questions on this subject. At a cautious reference to a possible sexual disturbance in the sense of an impotence which had preceded the general condition, he commences to grumble about his money affairs, and gets into a state of severe hysterical excitement. Pacyl completely ineffective.

CASE 16.—Manager, æt. 37. For six months once or twice weekly, short attacks of palpitation, giddiness and feeling of oppression, sometimes with and sometimes without anxiety. The attacks appear in connection with repressed rage towards his chief, and that because the patient possesses a relatively independent position which allows him to have matters out with the chief, who has already been over him for 7 years, and whom he regards as incapable. It turns out that previously he had always great fear of his father, who was very severe, though without thereby getting into anxiety states. Sexuality: Married for 7 years; for 1 year diminution of the libido; admits that his wife no longer excites him, but declines extramarital intercourse, although other women attract him. Therapy: Pacyl completely ineffective; introduced to major psychotherapy.

VII. In conclusion *two psychotic states with anxiety* are reported in which choline therapy was completely ineffective.

CASE 17.—Woman, æt. 38, married. For several years anxiety states in which she sees cats and mice. No alcoholism. Neurological findings nil. Complains of variable symptoms all over the body. Sexuality: Nothing known. Therapy: Pacyl completely ineffective.

CASE 18.—Seamstress, married, æt. 35. For 7 weeks constant anxiety as if someone were behind her; severe depression with suicidal ideas. 10 years ago similar state for 6 weeks. The present illness followed on influenza. There is great restlessness, insomnia, loss of weight, constant weeping; no neurological findings. Sexuality: nothing known. Therapy: Pacyl completely ineffective. Amelioration with hospital treatment.

It seems reasonable to assume that there is a somatic connection between the sexual disturbances and the somatic processes which lie at the basis of the anxiety neurosis; either we have to deal with hormonal-toxic processes (Reich), or relief processes from excitation in the vegetative system. In the exact analysis of the anxiety attacks it is noticeable that between the course of anxiety and sexual excitation there are certain resemblances and contrasts.

In the first stages of pleasure, as in anxiety, there is in the same manner a feeling of cold, oppression in the chest, palpitations and pallor as we know it in sympatheticotonic states. While in the anxiety state it is extremely unpleasurably toned and continually rises to the sympatheticotonic anxiety discharge, the same sensations in the preparatory stages of pleasure are felt as agreeable and are sometimes designated as " joyful anxiety " ; the further course of the normal sexual excitation up to the orgasm corresponds to a parasympathetic excitation (*cf.* Cannon). On the other hand, Walthard (69) pointed out that, for the individual muscles and glands of the feminine genital apparatus, impulses, along sympathetic fibres, arising from the somatic as well as the psychical, act inhibitingly on the genital functions, and Cannon (7) reports the same for the erection. Erection is a parasympathetic function (sacral-autonomic system) ; in the acme there occur sympathetic innervations which lead to the contraction of the seminal vesicles and the prostate, and to the subsidence of the engorged tissue—that is, the overwhelming of the sacral-autonomic system by sympathetic nervous discharges. In a number of cases it was observed that with slight or absent orgasm a special wakefulness and excitability is present after coitus instead of relaxation and fatigue, which points to the maintenance of a state of sympathetic excitation whose interfering action is the reason for the disturbance of normal relief of the excitation. So we can imagine that the somatic basis of anxiety can be found in the antagonistic sympathetic excitation during sexual excitation, and that their summation eventually leads to the anxiety state without hormonal influences playing a part therein.

Analysis of the individual anxiety attacks gave the result that the somatic sensations were present before the psychical, as Hecker (35) had already pointed out, and that only when the somatic disturbances had reached a certain climax did the anxiety phenomenon set in.* A few patients themselves related the commencement of the anxiety to the somatic sensations ; others, indeed, stressed the latter so much that the memory of the anxiety event practically completely receded behind them. Now it is probable that not all persons in whom the somatic anxiety syndrome appears experience anxiety. Max Herz (1909) (36) described a cardiac neurosis which he called phrenocardia, and this in its various symptoms, such as pallor, cold, tachycardia, dyspnœa and hypermotility, resembles closely the anxiety syndrome described above. Herz relates this illness to the same causes as Freud does the anxiety neurosis, namely unsatisfied sexuality. Phrenocardia differs from anxiety neurosis in that the chief symptom is severe stabbing pain in the region of the heart, which Herz thinks is a spasm of the diaphragm, and in that the anxiety experience is lacking, or at any rate is not expressed as such. Herz stresses that in the illness described by him there is a psychic component both for

* A patient described the attack with the words, " The blood flows away and then all is strange ".

the genesis and the working off of the bodily reactions; he therefore regards the unsatisfied sexuality solely as a psychical cause which leads to the somatic phenomenon described, without going into a dynamic derivation like Freud, or a functional somatic derivation like Reich.

So there is the probability that phrenocardia, both ætiologically and symptomatologically, so to speak represents anxiety neurosis without anxiety. We must conclude that the pathogenic agents, that is, the somatic phenomena, are here worked out psychically in a different way than in the anxiety neurosis, that for the genesis of the anxiety experience, besides the somatic syndrome, there must be given a certain psychical preparedness through the special structure of the personality. Schilder (63), who on the ground of Freud's theory of anxiety assumes genesis of anxiety from damming up of the libido, considers that anxiety appears when the ego, that is, the personality as a whole, cannot master the somatic sensations.

In all neurotic anxiety forms one has to deal therefore with interaction between soma and psyche, wherein the common somatic process is a state of vegetative excitation, the common psychical process is the anxiety experience. In the anxiety neurosis an agent resembling adrenaline seems to be effective, and by paralysing its action on the vegetative system the cause of anxiety itself can be removed. When in this manner the state of vegetative excitation is removed, the psyche is deprived of the somatic experience which it works out as anxiety. In this sense choline therapy can be considered a rational somatic therapy of anxiety neurosis, on condition, of course, that the predisposing causes of the anxiety neurosis, that is, the disturbance of the course of the sexual relief, is removed. Choline therapy interrupts a vicious circle from the somatic side, which cannot be broken, as described above, from the psychical side.

Different relations are at play in anxiety states originating from ideas, those aroused in psychoses and hypnosis, as also in secondarily fixated anxiety neurosis in which anxiety is brought into being likewise by ideas or to a certain extent as a conditioned reflex; also in primary anxiety hysteria, which in its structure resembles the latter very closely. As indicated above, such anxiety states cannot at all or only very incompletely be influenced by choline medication. What these anxiety states have in common is that here anxiety is sustained through continuous psychical impulses, while in anxiety neurosis there is a somatic disturbance of function which can also be removed from the somatic side.

The theory that all affects have their centre in the basal ganglia and that they reach consciousness in the cortex cannot be touched upon here. The well-known experiment of Sherrington (66), in which after transection of the spinal cord and of the vagus nerve, that is, of all connections between central and visceral organs, there were no evident alterations in emotional behaviour of the test animal, the observations of Cannon and Britton (8)

mentioned above with the decorticized cat (with the "pseudo-affective preparation"), and by Cannon, Lewis and Britton (10) with the fully sympathectomized animal, which led to an analogous result, as well as the experimental demonstration of the presence of an affect centre in the lower posterior thalamic region by Bard (2), do not permit conclusions about the affect experience itself.

Angell (1) describes in detail James's (39) affect theory in the following manner, in defence against the criticisms levelled on the basis of these experiments: "A sensory stimulus leads to a cortical or thalamic excitation with immediate reflex motor and glandular reaction, the kinæsthetic and organic sensations reaching consciousness in the cortex secondarily. This whole process represents the affect." In anxiety neurosis we must assume that the first part of this process is replaced by the purely somatic process which has been described.

On the Biological Significance of Anxiety.

Pure anxiety, seen in the major anxiety attack, is the feeling of displeasure itself, incomprehensible and a complete riddle to the victim himself. Just as unintelligible appear the phenomena of the somatic expression of the anxiety.

At the height of the attack we observe that the patient is almost completely shut off from the external world. There is a contraction of the function of the sense-organs, and a general motor inhibition which prevents the assumption of any relationships with the outside world. Blood flows away from the periphery, which Lange (49) designates as the cause, Weber (70), the constant accompaniment of displeasure affects. In the acetyl-choline experiments it could be observed repeatedly that together with the motor and vasomotor disturbances anxiety disappeared, while frequently part of the remaining bodily symptoms, palpitation, giddiness, feeling of oppression, was maintained further. It is to be concluded that the anxiety experience is closely bound up with the former.

In agreement with Weber one must assume that the displeasure syndrome, both biologically and in its psychical expression, signifies a turning aside from the external world, withdrawal into the interior of the body—that is, flight and shutting off from the threatening surroundings—with the purpose of offering the least possible surface of attack (Ribot (61)). It may be called the "barrier syndrome". Analogies from the animal kingdom are in the withdrawal of the pseudopodia in protozoa, certain reflexes of feigning death, the rolling up of the hedgehog when danger threatens (Reich). In all these cases we have to deal with affect reactions against threatening influences from the outside world, with somatic reactions, exogenously caused, which are experienced as affects.

In endogenous anxiety the mechanism is somewhat different. The somatic

anxiety sensation is identified by the consciousness with previously experienced sensations of fear. Darwin (14) and Preyer (58) observed fear as the earliest affect in the child, and Freud and Rank (59) regard the experiences of the child during birth already as the prototype of the anxiety. It represents the primitive reaction of the helpless to danger.

In the anxiety attack the psychical correlate of the isolation syndrome is experienced as a loss of relationship to the external world, as a loss of the objects, and that is the experience which lies at the bottom of the feeling of annihilation in the anxiety attack. K. Goldstein (30) interpreted the anxiety in patients with brain injury as actual anxiety through loss of part of the capacities of mastering the outside world. The patient with brain injury becomes calmer when with his remaining capacities he has built up a new kind of mastership over the surroundings; if he is put before a new problem to which he is not equal, anxiety appears in every case. In these cases the anxiety is the correlate of the partial object loss conditioned by the brain defect.

In the neurotic anxiety patients, anxiety arises as a correlate of a still further-reaching object loss on account of a physically conditioned withdrawal from the external world, just as dying is the psychological equivalent of a loss of the experience of the world. The fear of death experienced in the anxiety attack is the experience of the impending loss of the identification of the ego which realizes itself by means of objects. When there is no outside world, the subject ceases to exist; when the ego is separated by a barrier from the external world, then the world is lost to the ego; and this may be the significance of the feeling of annihilation which is the basis of the anxiety—a feeling of impending destruction of the whole being or his personality, fear of death or of insanity.

Summary.

As a state of neurotic anxiety is not to be influenced by the usual pharmaco- and psychotherapy, an attempt was made to find out the genesis of this state of anxiety. It was found that at the commencement of the illness it is always possible to find the "major anxiety attack" which is composed of a number of vasomotor sensations, tachycardia and intense paralysis of the motility and of the psychic apparatus, combined with acute fear. Such attacks are very seldom to be observed because the patient cannot move during the attack, and, besides that, does not speak about it. They rarely occur in the same patient again with the same violence, since, as the anxiety is unbearable, mechanisms of defence are mobilized at once. Owing to these latter there arise the modified syndromes of "agitated anxiety attacks", of the "chronic anxiety state" with exacerbations, and with incidental graver attacks, and the "anxiety equivalents" of Freud. Clinically, one has to differentiate

the anxiety neurosis, in which the anxiety overtakes the patient like an infectious disease, and in which neurotic symptoms are not to be observed in the intervals, and the anxiety hysteria, in which the hysterical disposition can be demonstrated, and the attacks are determined by psychical processes (e.g., are caused by suppressed aggressions).

The investigations started with the anxiety neurosis, and especially the major anxiety attack. In the latter case the somatic anxiety syndrome is most clearly developed, and is composed of intense vasoconstriction of the skin (paræsthesias, sensation of cold, pallor), tachycardia up to 150, inhibition of salivation, cold sweating, mydriasis, arterial hypertony up to 150 mm. (of mercury), and an intense relaxation of the voluntary muscle system. This syndrome indicates a stormy excitation of the sympathetic system, which may be combined at the end of the attack with parasympathetic phenomena. It was found that this syndrome could be removed by choline preparations, which by their stimulating effect on the parasympathetic nerve produced an effect exactly the opposite to the anxiety syndrome: by an intramuscular injection of 0·1 c.c. acetyl-choline the anxiety attack can be stopped also in its psychical effects, and even chronic anxiety attacks can disappear after a few days by oral administration of the choline preparations pacyl or hypotan. It appeared that the effect of choline is greater if the anxiety experience is more elementary, and smaller if the anxiety is worked through in a psychical manner.

The removal of anxiety by a drug with only a peripheral action led to the supposition that the fear of an anxiety neurosis arises primarily in a somatic way. Various clinical and experimental observations led to the hypothesis that the vaso-constriction of the skin plays an important part here (vaso-neurotic anxiety), and that the character of the anxiety syndrome, corresponding to the adrenaline effect, may be traced back to a primary action of the adrenal glands. Since in all cases observed there was found some sexual damage, such as the inhibition of normal relief, and since the anxiety could be removed both by the prevention of this and by choline medication, this confirms Freud's theory of the damming up of libido, and Reich's theory of the origin of anxiety being due to a sympathetic-toxic action of the sexual hormone.

The fact of peripheral somatic removal of anxiety seems to have great theoretic importance for the question of the relation between psychic and somatic events in anxiety. Clinical observations showed that in an anxiety neurosis the vaso-constriction of the skin is of primary significance—a phenomenon which is understood as the " barrier syndrome ". The psychic correlation to this is experienced in the anxiety attack as a loss of connection with surroundings, and this experience is the origin of the feeling of annihilation in the anxiety attack, as K. Goldstein has proved in the anxiety in cases of brain injury. The fear of death which is experienced in the anxiety attack

is understood to be the experience of threatened loss of identification by the ego which becomes realized by means of the objects.

The heart neurosis described by Max Herz as phrenocardia, which not only shows the same somatic syndrome as the anxiety neurosis, but at the same time is traced to unsatisfied sexuality, allows the supposition that this disease is a kind of " anxiety neurosis without anxiety ", and that therefore the pathogenic agent is here worked through psychically in a different way to that of the anxiety neurosis. In order that anxiety should arise there must then be, apart from the somatic events, also a psychic readiness through the individual structure of the personality. In neurotic anxiety conditions there is a reciprocity between soma and psyche, the common somatic condition being a state of sympathetic excitation, the common psychic condition being the anxiety experience. Choline treatment removes the somatic experience from the psyche where it was worked through as anxiety, and in this way a vicious circle which usually cannot be interrupted by action on the psychic factor is interrupted by action on the somatic factors.

The somatic genesis of neurotic anxiety can be designed in the following way: There is always a disturbance of the course of sexual irritation to be found. This disturbance results either from sexual abstinence caused by external or neurotic reasons, or from neurotic sexual hypo-æsthesia while relatively great libido is present, and leads, with a certain sympatheticotonic disposition, to a strong excitation of the sympathetic system. At this point the mechanism can be interrupted by choline medication. According to the working through of the state of sympathetic excitation there results either the syndrome phrenocardia, or, with corresponding psychic preparedness, the anxiety neurosis. If this continues for some time it can become fixated and psychically worked through so that anxiety can then also be issued by the psyche.

It was possible to ascertain in nearly all cases that the ailment had started with an actual anxiety neurosis, and that by drug treatment or abolition of the sexual disturbances, one can prevent the manifestation of the psychoneurosis. The somatic neurosis only lasts for a certain time, some weeks or months, and then becomes built over in a psychoneurotic manner so that then it may only be treated by a long-continued psycho-therapy. In the cases of anxiety hysteria this psychoneurotic projection is existent from the beginning and is to be treated by psychotherapy. Psychotherapy, then, has to treat the neurotic sexual abstinence and hypo-æsthesia as sources of anxiety neurosis, and its secondary fixation.

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