

## POST-CHOREIC PERSONALITY AND NEUROSIS.

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### CONTENTS.

- I. The importance of the psychopathology of post-infectious states.
- II. The investigation of the first series of post-choreics, which lead to the definition of a "post-choreic syndrome."
- III. Hereditary predisposition reconciled with phenomenal change in personality.
- IV. Investigation of a second series: post-choreics who developed neurosis.
- V. Case-histories, including a post-choreic with a neurotic and a schizophrenic phase.
- VI. Conclusions on the inclination of post-choreic persons towards neurosis.
- VII. Proposals for preventive measures in rheumatic and otherwise predisposed children.
- VIII. Summary.

### I.

IN the relatively short period which has elapsed since the important findings about personality changes after encephalitis epidemica became known, those findings have been mainly responsible for the enormous advance in our knowledge of the sub-cortical direction of man's emotional and volitional life. This advance in psychopathology subsequently gave rise to the question whether similar sequelae could be found in the personality structure of those who had suffered from other forms of post-infectious encephalopathies. Chorea, which had already offered the puzzling problem of why the rheumatic virus becomes "neurotropic" in certain cases, was amongst the first to be considered, whereas 25 years ago no psychiatrist would have seen a special problem in the personality structure after choreic illness. The first investigations which dealt with entirely new problems in chorea minor were those of E. Straus, (1927), who found that *hyperkinetic symptoms* are frequently found, either in a generalized form, or as localized tics as sequelae of chorea minor, and of E. Guttmann (1927) and Schulz (1928), who both showed that *hereditary predisposition* of the brain plays an important role in persons who fall ill with chorea minor. A *follow-up study* of chorea cases with regard to personality development had not been undertaken until the present author's first publication on chorea (1934).

## II.

Not only chronological procedure, but also the explanation of heuristic principles, which guided the author in his recent investigation, make it necessary to refer first to the findings of the previous investigation, which was carried out in 1933.

The material consisted of 24 cases of postchoreics (in addition to which one case of "chorea-psychosis," viz., of chorea with direct transition into psychosis in a youth, aged 21, was dealt with in detail). Of 50 cases which had been found on the registers of the University Hospital for Children's Diseases in Basle, Switzerland, as treated for chorea minor between 1910 and 1930, the whereabouts of the majority was found out, and they were invited to undergo a re-examination. 24 persons declared their willingness to have it done, and were seen, either in the Psychiatric Out-patients' Clinic (under the direction of Prof. J. Staehelin, who had suggested this follow-up study), or at their homes. 13 cases were female and 11 male, an accidental and atypical distribution, as it is statistically proved that out of 100 cases of chorea, somewhat about 65 belong to the female sex. As to the period which had elapsed since the illness in our cases, 4 cases have had chorea more than 20 years ago; 5, 16-20 years ago; 4, 11-15 years ago; and 6, 6-10 years ago. The oldest patient was 35 at the time of the follow-up, so that in every case at least one of the parents was still alive and able to give an account of the patient's childhood.

As to the methods adopted for personality assessment, in the first instance the usual psychiatric exploration was used, supported by statements of the parents, while out of the numerous auxiliary methods which would have been possible, the author restricted himself to two: the first one was the Rorschach Test, and the second a Characterological Item Sheet, i.e., a sheet containing 45 pairs of characterological opposites, like confiding or seclusive, amenable or strong-headed, shy or cheeky, and so on, which had to be filled in by one of the parents. Besides the examination of the postchoreic personality, special attention was paid to heredity, to social environment, and to physical constitution.

The findings allowed of a subdivision under five headings:

1. Hyperkinetic symptoms.
2. Neurasthenic symptoms.
3. Psychasthenic symptoms.
4. Peculiarities of character development.
5. Peculiarities of temperament.

Hyperkinesis is the symptom most obvious to the eye, and is found, to a higher or lesser degree, in every postchoreic. The hyperkinesis is either generalized and constant, in the form of fidgetiness, restlessness, inability to sit still or kneading the fingers; or else localized and episodic. The latter becomes apparent mainly in form of *tics*, which are usually facial, but sometimes appear as shrugging of the shoulders or head-nodding. Blinking of the eyes is a frequent symptom, and sometimes stammering is found in form of mild defects

of co-ordination in speech. Creak and Guttman (1935) have described compulsive utterances in postchoreics, which apparently are equivalents of tics, and Straus (1927) has described a case of "coprolalia," i.e., the uttering of dirty expressions. In one of my cases a troublesome singultus was found, which can be regarded as a tic localized in the diaphragm, and has been frequently observed in encephalitic states. Before the sequelae of encephalitis epidemica were known, every tic used to be regarded as hysterical, but since then we have learned that a tic can be a residual symptom of a focal lesion in the striatum, and the same applies to genuine hyperkinesis as a whole. Frequent symptoms of hyperkinesis are also shakiness during writing, or spilling while water is poured out into a glass. There is also a marked tendency in postchoreics to show an increased amount of associated movements, which can easily be tested by letting the patient squeeze the doctor's hand or turn a coin round which lies on the palm with the fingers of the same hand, or use a dynamometer.

Neurasthenic symptoms which are very frequent in postchoreics are headaches, sometimes resembling migraine, and vertigo, attacks of which can spread over many years; less frequent symptoms in this group are insomnia, vomiting and enuresis. Psychasthenic symptoms have been put into a special group, not as if the author would not follow the doctrine of psychosomatic unity—which in fact he does—but because certain symptoms as phenomena reveal insufficiencies in the dynamics of psychic functions. These symptoms which postchoreics frequently complain of are forgetfulness, difficulties in concentration, difficulty in learning new things, diminished perseverance, and being quickly overwhelmed by fatigue. Postchoreics frequently complain of getting frightened by a sudden noise or at the appearance of an unexpected person. The most characteristic symptom, however, in this group is the fact that postchoreics show less vitality than the average person of their age; they are quiet. Their families people soon come to notice that the postchoreics show definitely less vitality than before their illness. Postchoreics make the impression, sometimes at once, of colourless, lame or faint personalities without much drive in life. One can hardly meet a postchoreic who has distinguished himself in his (or her) career, or has done anything outstanding in any respect. The author proposes to call this dynamic weakness of psychic functions a *psychic hypokinesis*. We shall meet this phenomenon again in the discussion of the Rorschach results. Similar features have been observed in other states following a subcortical lesion (e.g., even more grossly after carbon monoxide poisoning).

There are striking characterological peculiarities in postchoreics. What members of their families tell us about postchoreics always goes in the same direction, and postchoreics are very much aware of their peculiarities themselves: they are sensitive, seclusive, taking everything very seriously, querulous and suspicious. They are inclined to brood over things and to grumble a lot. As a whole it can be said that they resemble *schizoid psychopaths*.

While attitudes, sentiments and tendencies form the *substance* of character in its stricter sense, there are, on the other hand, some *formal* qualities characteristic of a person or of personal dynamics, such as appear in features of

experience type, affectivity and temperament. It is just this group that the Rorschach Test deals with centrally, and it is with respect to this group that the Rorschach Test—as the author concluded (1934)—shows a characteristic result. It is not difficult to diagnose a person as predominantly introvert, extratensive or balanced, but the Rorschach Test is very helpful in finding out some essential formal qualities of intellectual and affective life in the respective person in the short time of an experiment. According to Rorschach results, intelligence itself is unimpaired in postchoreics, which is evident from the number of whole answers and good form answers. Most striking, however, is a lack of productivity revealed by the sum total of responses, which often falls below 20. This lack of ability to become impressed and to evoke associations under the influence of new impressions is mainly due to the mental hypokinesia mentioned before, and partly also to the meticulousness of those persons who cannot recognize an object as such if it is actually a mere inkblot. Stereotype responses are also frequent. If we consider the ratio between the kinaesthetic and the colour responses in the results, we find that the postchoreic usually proves, by means of the Rorschach Test, predominantly and distinctly *introvert*. There is, however, another important fact which emerges from the Rorschach results, and which probably could not have been expressed so accurately without the help of this test. We find that the number of both kinaesthetic and colour responses is very small in postchoreics, which shows that they are neither *good* introverts nor, of course, good extraverts. They represent an experience type which Rorschach himself called the “coartated” (*i.e.*, restricted or narrowed-down) type, which indicates that the subject is not equipped with a wide or deep range of feelings either in his inward or in his outward life. From the material available it even appears that this “coartation” shows a progressive tendency with age. The usually small number of colour responses, taken absolutely, indicates that postchoreics show a limited adaptability to their environment. This, together with introversion, shows them again as schizoid characters. As another feature, they see rather frequently “intermediate” forms, that is, the white gaps between the forms, which according to Rorschach reveals a tendency towards opposition. They also frequently notice slight differences in shade and brightness, which according to Binder (1932) reveals “dysphoria” or disgruntledness. This feature sometimes goes together with another one known as a neurotic symptom, *viz.*, the “colour shock” (affective rejection of the colours displayed in the test).

In summarizing these findings it clearly appears that these five groups of symptoms, *viz.*, hyperkinesia, neurasthenic and psychasthenic symptoms, characterological and temperamental peculiarities, form a closely-knit and sharply defined complex of symptoms typical of the postchoreic person. One group of symptoms may be more prominent in one postchoreic and another group in another, but the complete symptom-complex is always found to be present. It would, however, be a fallacy, after all the deviations we have found in the postchoreic, to think of him as grossly abnormal. This is not at all the case: to the layman the postchoreic will frequently appear quite normal. The postchoreic is, within certain limits, able to adapt himself

to life and to make a success of his job ; he is fond of his home and his family like other people. It is merely due to a necessarily thorough psychiatric analysis that the psychopathological personality structure of the postchoreic does now appear distinct and defined. There may be mild and severe cases amongst postchoreics, but never is the picture as severe as in a postencephalitic state. The fact that moral deterioration goes with subcortical impulsivity and hypokinesia in a typical postencephalitic case, whereas moral over-conscientiousness goes with subcortical lack of drive and hyperkinesia in the postchoreic state, inevitably suggests a distinct cerebral representation of these psychopathological structures.

### III.

Having dealt with the psychopathological structure of the postchoreic, we have still the question of *heredity* to discuss. It is a crucial question, because it is decisive for our whole view of the problem. The findings are quite clear: given optimal conditions, a hereditary disposition of the brain can be found in every case of genuine chorea. The only case out of 24 (in the first series) where there was no proof of a hereditary factor had already originally been diagnosed as hysterical chorea. Very good conditions for genealogical investigations were existent in Switzerland, with her stationary population: looking up a certain name in the registers of a mental hospital sometimes revealed facts about ancestors which were unknown to the family itself. The highest number of hereditary factors in the ancestry of 24 cases was represented by *psychopathy*, particularly of the irritable and excitable type, the second highest number by *schizophrenia*. In the family trees of 24 cases there were 8 certain and 3 probable cases of schizophrenia, and in most cases the psychosis was of a catatonic type. This corresponds with the findings of Guttman and Schulz, the latter stating that the schizophrenia index in choreics is twice as high as in the normal population. Chorea itself is also frequently found in the family trees of postchoreics, though seldom dominant. Epilepsy, migraine and alcoholism also appear amongst the hereditary factors, though not as conspicuously as schizophrenia. Kehrer (1928) has once pointed out that a principle might be working in nature favouring the "alternation" of heredodegenerative manifestations. An interesting fact concerning the affinity between chorea and schizophrenia has been found by Guttman (1936). He took those in-patients of Maudsley Hospital who have had chorea in their history, and found that amongst 24 cases the most frequent diagnosis later (*viz.*, in 7 cases) was schizophrenia. Furthermore, he found that when he investigated the pre-morbid personality of those psychotic cases, it had to be described in exactly the same terms in which the present author has described the postchoreic. It may be mentioned that the rare cases of chorea-psychosis often show a marked similarity to schizophrenia, which has been stressed by A. Lewis and Minski (1935).

It has been suggested that in the same way as there is a constitutional *schizopathy* in certain families, a constitutional *choreopathy* could be thought of in other families. As a matter of fact, Kehrer has coined the term "*choreo-*

*pathic families.*" There is, indeed, one fact at least which supports this view, namely, the occurrence of chorea in a series of brothers and sisters. In the Basle series reported here there was a group of 5 children out of 6 in a family who had chorea, and in the Mill Hill series there were quite a number of groups of choreatic sibilings. The onset of chorea, of course, must have taken place in different years in order to exclude the possibility of hysterical chorea (which can even lead to school epidemics, e.g., Basle, 1852). One child in the Basle series of 5 postchoreic sibilings died of heart failure. Another point which speaks in favour of familial choreopathy is a recent finding in *electroencephalography*. In 1941 Jasper and Usher published results which showed that the E.E.Gs. of sibilings of choreic families not having had chorea themselves showed abnormalities resembling those seen in the E.E.Gs. of choreics or postchoreics.

We now have to reconcile the fact of a *hereditary predisposition* with our statement about a *change in personality*. On the basis of the fact that there is a constitutional predisposition of the brain in all cases of chorea (apart from the hysterical type), an attempt might be made to refute the author's conclusion that a change in personality takes place after chorea. The argument would run as follows: if chorea is constitutionally predisposed, the state after chorea does not constitute a real change in personality. Sometimes in early childhood, that is in the pre-morbid history, traits are found which, though being less outspoken, resemble the postchoreic personality traits. Besides, the onset of chorea usually occurs so early that we cannot reach a conclusion as to the premorbid personality of a certain child (Gamper, 1935). These are the arguments contra, and now we have to reply to them: let us take the minor ones first. The weight of evidence that children were showing certain traits before chorea is not a considerable one in the light of the innumerable children who show those same little neurotic traits and yet do not develop nervous trouble in later life. More important is the frequent remark heard from parents of postchoreics that the children *have* changed after chorea, that they have become quieter, show less vitality and are more listless and irritable. Guttmann (1936) found in the record of one of the rare cases with a late onset of chorea the following description: "Before 13 normal, gets on fairly well with people. Between 13 and 16 energetic and sociable, fond of parties, lots of friends. First attack of chorea at 14, recurrence at 16½. Since then has become more difficult and quarrelsome. Criticizes people and is afraid people may criticize her." Given good observation there should be no doubt that a comparison can be drawn between the early and the later stage of development in the first few years. Child psychology has shown that already at the age of 3 a characteristic nucleus of personality is formed in a child. In future, it can be expected, objective records will be available about every child's development through the work of educational psychologists putting down observations and test results at certain intervals.

Turning now to the relationship between constitutional disposition and manifestation of symptoms, we may be allowed to take the following view: psychopathology, in the first line, records the *phenomenal* structure of personality (not the *genetic* structure). The child of a psychopath is not called

a psychopath unless it *shows* psychopathic traits, though constitutionally it might have predispositions for developing psychopathic traits. The conclusion is as follows: a phenomenal change in personality, even if it was constitutionally preceded by a state of potential change and thus implied within the framework of personality, is a real change of personality in the light of psychopathology only at the time of its actual appearance. It cannot be found practicable to separate the hyperkinetic symptoms and to recognize them as choreic sequelæ without recognizing the characterological symptoms in the same way. We have tried to demonstrate that the picture of the post-choreic personality represents a unity. Neither is it consistent to recognize the personality change after encephalitis epidemica and to deny it in the case of chorea, for the sole reason that the picture is not such a gross one. Surely the same argument ought to be applied to two groups of phenomena which are very much akin owing to the nature of their respective cerebral substrate. Besides, it cannot be denied that the actual bloodborne attack of the streptococci or virus on the brain-cells means a serious change to them, and from what we gather from the facts it appears that the results of this attack are not entirely reversible. It is significant that out of 24 cases in the Basle series only one failed to show the characteristic complex of postchoreic symptoms, and this was a case diagnosed as hysterical chorea already at the time of illness. Practically speaking, the postchoreic syndrome enables us to make, even after many years, a *differential diagnosis* between what *has* been a genuine or a hysterical chorea. The author was recently able to exclude, on such a basis as has been pointed out, the possibility of a genuine choreic attack from the doubtful history of a patient in the Mill Hill series. (NOTE.—The name "St. Vitus' dance" reminds us of the time when all cases of chorea were regarded as hysterical before the infectious origin was known.)

#### IV.

A second series of cases was collected at Mill Hill Emergency Hospital (Neurosis Centre) in 1943 (last quarter) and 1944 (first quarter). This series comprises 28 cases (including one which had passed through Mill Hill as a case of neurosis and was later admitted to the Holloway Sanatorium, Virginia Water, in a psychotic state). There were 23 Service cases in this series (including two ex-Service patients who had been discharged for neurosis, but were in need of further treatment), and 5 civilian neurotics. Amongst the latter has been included an exceptional case, viz., the postchoreic mother of a postchoreic girl, the mother having had a breakdown with depressive anxiety symptoms in earlier life similar to that which her daughter showed now. A few "ordinary" postchoreics who were found in the families of our cases but were free from neurosis were omitted from this series, though one was particularly interesting, being the daughter of a schizophrenic mother and the sister of a soldier treated by the author for severe neurosis together with schizoid symptoms. Apart from the soldier, who later became psychotic, and the above-mentioned postchoreic mother of a patient, all (26) cases were seen in the acute state of neurosis. The aim of this second investigation was

to throw light on the relationship which apparently exists between postchoreic personality and inclination towards neurosis.

The procedure was the usual psychiatric exploration, taking the whole life-history (including questions about heredity) and particulars about the civilian work record or/and military record, together with the circumstances of the development of the neurotic symptoms. The complex of symptoms established in the first investigation (1933-4) served as a guide for possible questions, and this procedure helped, without being in any way suggestive, to unroll the complete picture of the postchoreic personality in each case. Physical examination helped to assess constitution and to detect possible heart trouble. In addition, the Rorschach Test was done by the author in each case, and some motor tests were given to each patient for the purpose of examining the co-ordination of the hands and the tendency towards associated movements. For E.E.Gs. the patients were sent to Hill End Hospital (by E.M.S. arrangement). It is to be regretted that interviews with parents could be arranged only in a few cases, so that objective information about childhood is missing in most of them. Information about heredity was scanty, but even so a great number of hereditary facts has emerged. Intelligence was tested (in most of the cases) at Mill Hill Psychological Laboratory with Raven's Progressive Matrices (plus Vocabulary Test).

The catamnesic period (i.e., the time elapsed between the attack of chorea and the investigation) was—

1-5	years in	0	cases.
6-10	„	4	„
11-15	„	6	„
16-20	„	11	„
21-25	„	3	„
26-30	„	3	„
50	„	1	case.

The distribution of 6 female cases against 22 males is accidental and quite atypical, as there must be more female postchoreics than male ones, but conscription affected the male population more.

The frequency and variation of symptoms either observed in these postchoreics or reported by them is illustrated by Table I.

NOTE.—“Emotional” has been included in the temperamental group (including the formal features of affectivity), though the “near reflex” character of crying implied by being “emotional” as seen in post-choreics also reflects on their psychasthenic side. It is of interest to note that choreic children start being “emotional” and “irritable” during the attack itself.

It will be of interest to record some *gross symptoms* reported by the patients.

*Group 1.*—When I have to write in front of other people I get shaky (the same happens when I pour out a cup of tea or light a cigarette), or I feel the anxiety I might get shaky (Case 16). I sometimes spit numerous times (Case 4; has been teased because of that and his fidgetiness). My hand runs away when I am writing, and generally I feel the desire to rush everything (Case 27). I became shaky while



TABLE I.—Symptoms in Neurotic Postchoreics.

<i>Group 1: Hyperkinetic.</i>		<i>Group 2: Neurasthenic.</i>	
Fidgety, shaky, jumpy . . . . .	17	Dizziness, giddiness . . . . .	19
Cannot sit (or stand) still . . . . .	10	Headaches . . . . .	14
Bad co-ordination . . . . .	10	Insomnia . . . . .	13
Tendency towards associated movements	9	Easily tired . . . . .	11
Tics . . . . .	8	Nail-biting . . . . .	7
Eye blinking . . . . .	7	Enuresis (or dribbling)	6
Stammering . . . . .	5	Sick feeling (or vomiting)	6
Shaky writing . . . . .	5	Blushing . . . . .	4
Picking fingers . . . . .	4	Easily breathless . . . . .	4
Tremor (head, lips or tongue)	3	Perspiration . . . . .	3
Urged to rush . . . . .	3	Palpitation . . . . .	2
Impulsive writing . . . . .	2	Nightmares . . . . .	2
Impulsive movements . . . . .	1	Burning feeling over body . . . . .	1
Explosive speech . . . . .	1	Head feels numb . . . . .	1
Clumsy . . . . .	1	Much yawning . . . . .	1
Loses control when observed . . . . .	1	Observes his breath . . . . .	1
Can't aim in throwing . . . . .	1	Pseudo-hallucinations . . . . .	1
		Claustrophobia . . . . .	1
<i>Group 3: Psychasthenic.</i>		<i>Group 4: Characterological.</i>	
Bad memory . . . . .	8	Shy (bad mixers). . . . .	19
Bad concentration . . . . .	7	Self-conscious . . . . .	7
Fear of dark . . . . .	7	Touchy, sensitive . . . . .	6
Difficulty in grasping . . . . .	6	Inclined to worry . . . . .	6
Lack of endurance . . . . .	6	Seclusive . . . . .	5
Easily frightened . . . . .	6	Over-conscientious . . . . .	3
Lack of drive or energy . . . . .	4	Very religious . . . . .	3
Absentminded . . . . .	3	Meticulous . . . . .	3
Irritated by noise . . . . .	3	Prudish . . . . .	2
Mind goes blank . . . . .	2	Hypochondriacal . . . . .	2
Easily muddled . . . . .	1	Feels inferior . . . . .	2
Daydreaming . . . . .	1	Timid . . . . .	2
Listless . . . . .	1	Overdependent . . . . .	2
Loses interest . . . . .	1	Feels bullied . . . . .	1
Cannot shout . . . . .	1	Self-centred . . . . .	1
Hesitant speech . . . . .	1	Obstinate . . . . .	1
Cannot find words . . . . .	1	Drinker . . . . .	1
Difficulty in spelling . . . . .	1		
<i>Group 5: Temperamental.</i>			
Irritable, excitable . . . . .	17	Apathetic . . . . .	2
Emotional . . . . .	9	Brooding . . . . .	1
Moody . . . . .	8	Bad-tempered . . . . .	1
Inhibited . . . . .	7	Impulsive . . . . .	1
Less lively than before . . . . .	5	Likes change . . . . .	1
Inert . . . . .	2		

standing before a superior (Case 1). I sometimes put things down with extraordinary force, and recently the force of my movements pulled my stitches away. I have been reprimanded in cinemas for swinging my legs (Case 12). I was a nuisance on training because I threw the hand grenades in the wrong direction (Case 20).

*Group 3.*—I have never been able to shout (Case 21). I can't worry (Case 22).

*Group 4.*—When I come out of cinema I have to take a taxi because I cannot stand the glances of the people in the queue. When the lights go on I have to go to the cloakroom (Case 2). I had the impulse to give my clothes away (Case 2). I don't go to a dance because I am afraid of being touched. I am afraid of having a person behind me in the door (Case 12).

It will be noticed that in the symptoms they display neurotic and non-neurotic postchoreics are very similar. There is no difference in essence, but in degree, apart of course from conversion symptoms.

The *Rorschach Test* was done in all cases but one (27). Only 10 out of 27 produced more than 20 answers, which is indicative of the diminished mental agility found in postchoreics. The main ratio in the Rorschach result (M : C, kinaesthetic to colour responses) indicated in all cases a tendency towards "coartation" (restriction on both introversive and extratensive side). In 13 of our cases the figure is not higher than 3, and in 24 not higher than 5 on either side. A plus in favour of introversion was more frequent, but the contrary also occurred. We found the latter in 4 out of 6 female cases, and in 3 male patients in whom body build was nearer to the pyknic type. Enke (1927) found relationships between Rorschach result and body build. Generally speaking we found an extratensive plus (which is actually a plus in social adaptability) to be an indication of good prognosis in postchoreics. It is of interest to note that in two postchoreic brothers there was similar coartation (0 : 1, 1 : 2), and the same was the case in mother and daughter (2 : 4, 3 : 5). Responses referring to the white space between the blots (indicating a tendency towards opposition) and responses recording differences of shade (indicating dysphoria or disgruntledness) were also frequently found (the latter 12 times). "Colour shock," which is a neurotic reaction, was found in 8 cases.

The *Intelligence* was tested in 20 cases by the Progressive Matrices method. In 7 cases the intelligence was above average, in 3 average, in 10 below average. Only one conclusion can be drawn from this : chorea does not impair intelligence, though it does impair vitality and consequently mental output and productivity.

The *Electro-encephalogram* was secured in 21 cases. 14 E.E.Gs. showed abnormal features in form of slow waves and low voltage waves ; 7 were within normal limits. According to expert opinion the abnormalities were of a nature usually found in constitutional alterations of the brain. In one case only the result resembled an epileptic E.E.G. (outbursts, in patient 21, whose paternal uncle was epileptic). The E.E.G. was also recorded in three siblings of choreics : in two it was abnormal, in one normal. It will be of interest to collect more material in this line.

*Motor tests* were performed in most of the cases : drawing of patterns (simultaneously with both hands), finger-to-nose test, diadochokinesis, closing one eye at a time, standing on one leg. Tremulous drawing, defective co-ordination and a strong tendency to perform associated movements were frequently found. In Fig. 1 three examples are given of drawings by postchoreics. The pattern demands a co-ordination of both hands.

Though the inquiry into *heredity* in this series was not as successful as in the previous one, owing to the nature of the present material, quite a number of hereditary facts have been established. In the family trees of our cases 3 people were in mental hospitals (1 certain schizophrenic), 2 had chorea, 4 were epileptics, 7 were excitable, 1 was unstable (psychopath), 1 was neurotic, 4 had rheumatic fever, 1 had migraine, 3 had a nervous breakdown or nervous trouble (vaguely described). There was, furthermore, a remarkable number of *choreic sibilings* : Cases 14 and 19 are brothers, and have a third postchoreic brother ; Case 9 is a nephew of 14 and 19 and has, therefore, 3 postchoreic uncles ; Case 8 has a postchoreic brother and sister ; Case 18 has a postchoreic

sister; Case 27 has two postchoreic sisters. Finally, Cases 28 and 3 were *mother and daughter*. It may be noted that four of our cases belonged to Jewish families, and three non-neurotic postchoreics were amongst their siblings.

As regards *constitution*, no measurements were taken of body build, but an eye was kept on it during the physical examination. Seven of our cases appeared to be definitely on the leptosome (asthenic) sides, where 3 appeared mesosome (in the terminology of W. L. Rees, 1945), and only 3

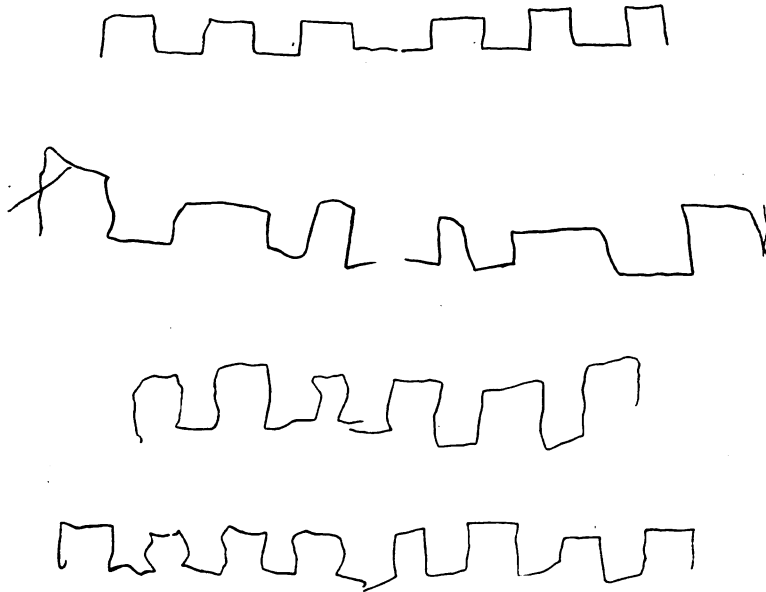


FIG. 1.

eurysome (nearly pyknic). The rest (15 cases) would, on mere inspection, be placed between leptosome and mesosome build, so that a preponderance of the near-asthenic type results. As already remarked, mesosome and eurysome body build go together with a good Rorschach result and hold out a good prognosis for the postchoreic.

Objective information about *childhood* was missing in most of the cases, owing to the nature of the present material, which is regrettable with regard to the theoretical importance this question has. In 14 cases mild "neurotic traits" before chorea were reported (such as fear of the dark, prolonged enuresis, stammering, nailbiting, extreme shyness). In all these cases there were known hereditary factors, too. In a number of cases, however, it was said that the patient had been a "happy child without any nervous signs." Twice a "broken home" was reported.

As regards *previous health*, one patient reported convulsions he had as a baby and two reported head accidents (without fracture). Case 3 had

encephalitis after vaccination at the age of 3, and Case 9 meningitis at the age of 7. Two patients had rheumatic fever before chorea (one together with jaundice), 3 had it after chorea. One patient got chorea after scarlet fever and one after diphtheria. Only 3 Service cases had nervous trouble in civilian life. Case 7 had a lorry accident 4 years before admission with amnesia and later short "black-outs" (E.E.G. abnormal, but father had epileptic fits). Case 10 was 5 months off his job during air raids, and Case 26 had two nervous breakdowns at the age of 21 and 29 (once 14 months out of work). Patient 12 had been thrown down by blast. While 4 patients reported previous heart trouble, the author found a mild systolic murmur in one case and tachycardia in Case 11 diagnosed as effort syndrome. Amenorrhoea and acne rosacea were present in the depressive young girl (Case 3).

In their *civilian work* only a few reached a somewhat higher standard: we found an engineer, a journalist, a technician, a Cook's tours organizer, a nurse and a probationer nurse. There were 3 clerical workers, and the rest were skilled and unskilled workmen and shop assistants. Postchoreics generally lack ambition and drive. Patient 20, who fancied himself as an artist, produced carpet designs with a meticulous repetition of small details.

In their *military record*, likewise, our Service cases did not show particular achievements. It is first of all noteworthy that out of 20 male soldiers in our series not a single one has seen fighting or has been retained in a combatant unit. Only two became lance-corporals, and one was a sergeant who, owing to his usability as an interpreter, was offered a commission but refused. Two have been out with Expeditionary Forces (on non-combatant duties). The time between enlistment and admission to a Neurosis Centre varied widely: while 5 cases out of 23 served less than a year, 6 other cases had served in a simple capacity more than 3 years. The young hyperkinetic and impulsive postchoreics were found out or broke down earlier; the older ones, with predominantly characterological peculiarities, were able to hold out longer, this being a sign of their conscientiousness. Many cases improved under the therapeutic measures (direct and indirect) of the Neurosis Centre (sedation and reassurance, P.T., occupational therapy, participation in a less authoritative community life and help in family affairs by the Social Worker). The usual disposal was regrading (to Category C) and recommending for more suitable posting and work (sometimes using the "Annexure Scheme" of the War Office). The cases with gross postchoreic symptoms (hyperkinetic, neurasthenic or schizoid) and showing an anxiety state were regarded as unfit for any form of service, and recommended for discharge in Category E. In this way the gross postchoreic state has been recognized as a disability.

The *diagnosis* which was affixed to the cases by various psychiatrists varied a good deal: the most frequent one was Chronic Anxiety State, sometimes with the addition of "depressive" or "somatic" or "hysterical" features. Effort Syndrome on the one hand, Hysteria and Hysterical Amnesia on the other hand also occurred. While the purely postchoreic state could be labelled as "Schizoid Psychopathy with motor and behaviour anomalies," there were, as a rule, anxiety or hysterical symptoms superimposed on top of the postchoreic traits.

## V.

Three *case-records* are given below in order to present a more *dynamic* view of how neurosis develops on the basis of a postchoreic personality structure.

CASE 5.—Pte. A. B—, R.A.O.C., aged 19.

*Complaints.*—Facial twitchings, restlessness, depression.

*Family history.*—Father suffers from rheumatism; master tailor. Mother very excitable; bad tempers; 1 sister.

*Personal history.*

Childhood: There was much friction between parents about him. He would not eat and cried a lot. Bedwetting till 8; terribly scared by darkness. Was extremely shy, did not mix; mother kept him at home.

School: Kindergarten, elementary till 14; good scholar in spite of interruptions.

Work: Junior clerk 2 years. On outbreak of war 6 months' course in instrument making; then helped father as cutter and keeping books. Had friction with mother, but liked to work with father.

Previous health: Had chorea aged 8. It started with twitchings in the face and later the arms became shaky. Some minor attacks until 14. Facial twitchings and fidgetiness remained. Double pneumonia, aged 11.

Service: Call-up April, 1943, Category B 1. Storesman's course passed. Posted as storesman, but employed on odd jobs.

Present illness: Within 3 weeks after call-up he got into a very bad state. Could not keep his face still for a moment; walked restlessly around in camp, even at night sometimes; felt bullied and teased, slept badly, became depressed. Sometimes when lying on bed he had vivid "visions" of a firing gun or of mother's face. Got worried about these visions.

Sex: Girl friend, aged 17, killed in blitz; since then no interest; very shy.

Interests: Cycling, reading travel books; wants to stay in tailoring.

*On admission.*—Short, puerile lad. Sullen expression, depressed. Blinking. Many facial tics; very fidgety. Talks a lot and in extraordinarily quick tempo; speech has explosive character. Feels resentment about his treatment in the Army.

*Physical examination.*—C.N.S.: nil abnormal apart from tics. Heart, lungs, N.A.D.

*Mental.*—Intelligence Grade 2. Rorschach: Highly introvert, neurotic.

*E.E.G.*—Abnormal.

*Progress.*—Depression eased; restlessness diminished on luminal. Occupation: went to clerical course with good result.

*Diagnosis.*—Anxiety state in schizoid psychopath with speech and behaviour abnormalities due to chorea in childhood.

*Recommended.*—In view of the fact that speech and behaviour of this soldier appear abnormal and would be the subject of constant remarks, besides the fact that his attitude is schizoid and unsuitable for any unit, he is recommended for Category E.

CASE 17.—Gnr. C. D—, R.A., aged 24.

*Complaints.*—Shakiness, headaches, anxiety dreams.

*Family history.*—Father died of stroke. One brother in Army. No nervous trouble in family.

*Personal history.*

Childhood: Normal child as far as he remembers.

School: Elementary 5-14; was backward; afraid of teachers.

Work: Messenger boy 6 months; various jobs; last ones, in brass foundry 18 months, newspaper packer 14 months.

Sex: Single; was engaged; gave up out of fear of being given up. Feels inferior towards girls.

Interests: No hobbies; not fond of company.

Previous health: Chorea, aged 5-6. Chronic otorrhoea since 9.

Service: Volunteered July, 1939, for Territorial Army, R.A.; not employed on guns, only carrying ammunition. 1940 to Middle East; short time on guard on pipe line in Palestine. Later in Libya, accidentally blown up by booby trap (while working as postman); got shrapnel into calves, all removed in hospital. Top phalanx of left big toe had to be amputated. Developed insomnia, anxiety dreams, became restless and showed lack of concentration. Has not been on duty for 12 months; medical board, recommended him for evacuation in Category D.

*On admission.*—Tense, apprehensive, tremulous.

*Physical examination.*—Coarse tremor of outstretched fingers. Heart, lungs, *nil* abnormal. B.P. 130/90. W.R. negative. Scars on lower limbs.

*Mental.*—Intelligence, Grade 3. Rorschach: "restricted" type. E.E.G. normal.

*Diagnosis.*—Chronic anxiety state, moderately severe, with neurasthenic symptoms in post-choreic person.

*Recommended.*—In view of his poor prospect of giving further satisfactory service he is recommended for Category E.

CASE 18.—L/Bdr. E. F.—, R.A. (L.A.A.), aged 31.

*Complaints.*—Breathless on exertion; feels jumpy, depressed and worried.

*Family history.*—Father died of heart trouble, aged 48, when patient was 3. He was unstable. Mother excitable. Father's brother died of bad heart after rheumatic fever. Three sisters, two brothers. One sister has heart trouble, another sister had chorea and is still fidgety.

*Personal history.*

Childhood: Brought up by mother, who married a second time. Was frequently ill. Prolonged bed-wetting and nail-biting; afraid of the dark.

School: Elementary till 13; 1 year open-air school after chorea. Passed scholarship, but could not take it up, owing to ill-health.

Work: Junior clerk 5 years, and colour matcher 7 years, in the same firm. Over-conscientious and meticulous in his work, irritable.

Marital: Married, aged 27, a nurse 3 years older. She used to go to the same chapel; knew her many years. No child. They want to adopt one.

Service: Called up September, 1940, Category A 1. Did not tell about chorea. Posted to searchlight battery, but worked as a storesman. January, 1943, promoted L/Bdr. When unit went into battle course, patient was seen by specialist and boarded C for chronic bronchitis.

Previous health: Aged 8, hit head on table. Had a "fit" same day, no repetition. Aged 12, chorea. Aged 16-19, slight depressive phase, with stomach trouble. Aged 20, appendicectomy, with following pneumonia. After that lost hair. Was in bed 6 months with weak heart. Seven years ago second depressive phase, having seen stepfather dying. Second time pneumonia, and since then chronic bronchitis.

Personality: Shy before chorea. Afterwards developed into somewhat weak, sensitive personality. Became very religious in adolescence, and strict Methodist (like a "conversion," as he experienced it). Wanted to go abroad as a missionary, but not accepted because of health. Still wants to go as missionary after the war. No smoking, no drinking.

Present illness: Six weeks ago, when he reported sick with bronchitis, it was noticed that he was also jumpy and depressed. Was too fidgety to sit still as a storesman, and got worse by worrying about his wife's health and his own.

*On admission.*—Shows marked emotional lability, quickly changing from tearfulness into laughter. His behaviour seems to be somewhat immature, and he seems to be dependent on his wife.

*Physical examination.*—Rather pyknic physique. Reflexes lively, no tremor. Chest: numerous rhonchi; slight degree of emphysema. Effort tolerance test: 88, 140, 100.

*Mental.*—Intelligence, Grade 2. Rorschach: good social adaptability.

*E.E.G.*—Abnormal (slow waves, but no focus).

*Progress.*—Has recovered quickly from depressive phase; emotional lability and fidgetiness less marked now. Very reliable and amiable; made friends in the ward.

*Diagnosis.*—Anxiety state with depressive features in post-choreic person.

*Recommended.*—Annexure Scheme, Pay Corps, near home (recommendation has been implemented).

These three cases show how one or the other group of postchoreic traits (hyperkinetic, neurasthenic, characterological) enters as leading feature into the neurosis. A further case is added, which later became *psychotic*.

CASE 15.—Pte. G. H—, aged 22 (April, 1941).

*Complaints.*—Shortness of breath, pain in ankles and calves.

*Family history.*—Mother has heart trouble, has to rest in the afternoons. Father in good health. Two siblings are well.

*Personal history.*

Childhood: No neurotic traits.

School: 5–18, away many times with minor ailments. Was very nervous in examinations.

Occupation: Clerk.

Service: He volunteered for Territorial Army in April, 1939; was classified A 1 and put into infantry. Later, in May, 1940, following his attack of influenza, he was graded C and sent to a Home Defence unit.

Habits: Teetotal. No sports. Reads a lot, particularly history.

Sex: Single.

Previous health: Pneumonia in first year; ailing child. Aged 5, mild attack of chorea. Aged 16, rheumatic fever. After his illness he was seen at the National Heart Hospital and told to go easy for the rest of his life.

Previous personality: Schizoid, hypochondriacal, seclusive.

Present illness: When he was examined for the Army he was told that his heart was all right, and graded A 1. As soon as training began he became tired out very easily and breathless on exertion. He was eventually graded C, and became an Army clerk. In February, 1941, he had headache, sore throat and fever, which was diagnosed as influenza, and a few days later he had dull aching pain in the chest and shortness of breath on effort. He had a persistent fluctuating temperature for 6 weeks, and all investigations during this time were negative. His symptoms continued after his recovery, and he also began to get pain in the legs and ankles upon walking. Transferred to Mill Hill.

*On admission.*—Thin, asthenic. Effort tolerance test: 92, 110, 100. He is hypochondriacal, self-centred, and very suggestible. Intelligence is average. He sleeps poorly, and is awake feeling breathless. He does not like the Army, and suggests that Army life has precipitated his trouble. There is a hysterical element in his symptoms.

*Diagnosis.*—Effort syndrome.

*Recommended.*—This man will never make a useful soldier, and his discharge from the Army is therefore recommended.

This record was found in the Mill Hill registry. The author saw this patient first on his admission to the *Holloway Sanatorium*, Virginia Water, on June 9, 1944, in an acute *psychotic state*.

The certifying doctor wrote: Patient states that he has venereal disease, which is killing him. His father, mother, brother and sister have all committed suicide.

The father stated: Patient's mother's brother had a psychotic phase like this. Patient's mother had rheumatic fever and her two other children had it too. Patient was in very poor health after his discharge from the Army, and was for a

period in a Rehabilitation Centre. He has been unable to keep a job since then, and was afraid of mixing with people. His delusions started gradually: he said he had syphilis and passed red urine. Blood test was done and proved negative. On May 23 he spoke of a suicide pact with his father. On May 30 he was admitted to Brookwood Hospital, Woking, in a state of extreme excitement and full of delusions. He spent some days in a padded room.

When examined on the day after admission the patient showed no physical defect. His body build was typically asthenic. In the face he had a bad acne. His nutritional state was unsatisfactory. Blood test again negative. Mentally he was full of abstruse delusions, but orientated. His talk was not flowing freely; he uttered short remarks with a sharp voice and an air of superiority.

Soon after admission he made an attempt to escape through the window. Now kept in bed, he is very restless and jumps in and out of bed. He implores the doctor to get him out from here: "You save your soul. You save the world from annihilation." He feels a successor of Jesus Christ; wants to be buried and to rise again. Besides these religious delusions he has a lot of paranoid ideas: the Gestapo rules the country; spies are everywhere; everybody is out to torture him. He accuses himself of having V.D. He doubts the reality of his parents; keeps talking of a "fake father." He does not admit being ill. Thinks the food is poisoned.

22.6: Extremely paranoid. When spoken to he hesitates to answer: "It could be used against me." Tries all doors to escape. Sweets and strawberries seen on his locker came from his "non-real parents."

29.6: Insulin treatment (modified) started. Up for the rest of the day. Broke a pane of glass with his foot.

30.6: Still thinks his food is poisoned and that everything he says will be used against him.

2.7: Sits about quietly, talking to nobody, with an expression of misery on his face. He now admits that the food is all right.

7.7: Keeps his shoulders hunched. Says he feels very strong. Asks repeatedly: "Is this a trick? Do you feed me to kill me afterwards?"

20.7: Has already reached a high dose of insulin, but shows no reaction. Is restless the whole morning and tries to get out of bed. He demands in a stereotyped manner "roast-beef," whenever the doctor passes by. "Himmler has ordered me to be fed on the fat of the land." He talks of visitors, "who said they were my parents." Sometimes dirty at night. E.C.T. started 3 times a week, together with insulin.

26.7: First time expresses the wish to be occupied.

29.7: After 4 E.C.T. a sudden turn towards improvement took place. He is free of delusions, smiles, starts a conversation, reads newspapers and books.

7.8: Has not maintained improvement when E.C.T. was left out. Again on regular E.C.T. Comes in for treatment smiling and talking incessantly.

30.8: Relapse into delusional state. Accompanies everything he does with a flood of stereotyped phrases: Is it beneficial to me? Is it beneficial to you?

Insulin treatment stopped. Has gained weight considerably.

31.8: Became very excited and had to spend a night in the strong room. Banged on the door and shouted at the top of his voice: "I want to play billiards to-night." To persons approaching him he said with a wild expression in his face: "I love you. Kiss me!"

1.9: Needs E.C.T. maintenance doses.

3.9: Again friendly, but manic, with flight of ideas. Shouts, "The war is over," and goes around shaking hands with everybody. Wants to be received at Buckingham Palace and to broadcast on the B.B.C. Wants to meet a girl.

8.9: Much quieter after 3 E.C.T.

10.9: Has become rational again, though still talkative. Desires to do some work in the ward.

15.9: After a visit home (near the hospital) he deteriorated considerably. Talks incessantly and interferes with other patients.

22.9: His excitement has taken a paranoid turn again. Talks of "sadism," and has taken two attendants by their throats.

8.10: E.C.T. resumed as he shows a more manic state again. Also second course of insulin started. Gets now vaccine injections for his acne, which has deteriorated so much that the pustules reach the size of little boils.



27.10: Had 8 E.C.T., and has improved considerably. Somewhat quieter, and more rational.

6.11: In a manic state again, with flight of ideas; talking incessantly. Says "the war is over," and goes round and round to shake hands with everybody within reach.

10.11: Slight improvement. Has finished E.C.T. (had 31 altogether) and insulin course. Acne much improved by injections. He still talks a lot and interferes with other patients.

18.11: Somewhat quieter. More rational.

21.11: His father wants to take him home now. Discharged.

Rorschach results: The first test was done some days before his discharge. Responses, 13 (very distracted). Main ratio 1:7, colour shock. Nine *symbolic* interpretations, like "lot of black paint; means fifth column in Great Britain or defeat of Germany." "Bird is flying away; I should not remain here." "The blue skies are around the corner." A second test was done some months after his discharge. Responses, 24. M:C ratio, 2:3, colour shock. No symbolism, but associations like chest, decay, weeping, mournful, fright, Dante's Inferno.

20.7.45: *Catamnestic* remarks: Patient has remained rational all the time (8 months). His behaviour at home, where he works on his father's land, has been satisfactory throughout. His face shows very little acne now. He takes a lively interest in current affairs, and goes to a club. Sometimes he goes taciturn for a few minutes, and appears deep in thought, but otherwise he converses freely and smilingly. Physical state now more satisfactory.

## VI.

Compared with peace-time findings the incidence of neurosis in postchoreic persons has undoubtedly increased during the war years. In the Swiss series of postchoreics no acute state of neurosis had been found, and not a single person had been in need of psychiatric treatment during a long catamnestic period. Guttman (1936) found only 12 non-psychotic postchoreics amongst 3 years' admissions to Maudsley Hospital. They consisted of 4 cases of anxiety state, 4 cases of hysteria, 3 of moral abnormality and 1 of neurasthenia (in addition, there were 7 cases of schizophrenia and 4 of depression). These are small numbers if one takes into account that the Annual Health Report of the L.C.C. mentions 1,094 cases of chorea for the year 1934 alone, and that the Report of the School Medical Officer, L.C.C., for 1938, mentions 2,026 new cases of children who were admitted to rheumatism supervision centres. While 12 non-psychotic postchoreics had been admitted to Maudsley Hospital in 3 years, 12 neurotic postchoreics were *present* on a certain *day* during this investigation at the Mill Hill Neurosis Centre, thus forming 2½ per cent. of its total population. Even if one takes into account that such a centre serves a very large area and naturally accumulates cases, and that military conditions demand a quick hospitalization and disposal of such cases, the incidence of neurosis in postchoreics during war-time appears remarkably increased, and we have now to investigate the causes of it.

In peace time a postchoreic person will seldom find himself in a situation which would not be in accordance with his mental agility and his vitality, both of which have suffered, as we have found, through the cerebral affection. He will always be, more or less, in a situation of his own choice and be able to "go easy." War time, however, intensifies and multiplies the *stresses* brought upon him: there is conscription or direction of labour, there is separation, there are air raids and lack of commodities. In military service

the postchoreic is put under the stress of strict discipline and rigid training. The adaptation to these conditions demands from the postchoreics an output of energy to an amount which they are frequently unable to muster with their impaired vitality. The result is "maladaptation" with all its emotional consequences. Masserman (1943) deals in his book *Behavior and Neurosis* with maladaptation as the central factor in the etiology of neurosis. The answer to a maladaptive situation is an emotional conflict, which postchoreics cannot master so easily owing to their defects in psychosomatic constitution. Unable to master their conflicts, they break down, they develop anxiety or other forms of neurosis with all the variety of somatic and psychic symptoms. Thus it appears that the central factor in the neurosis of the postchoreic is the same one as in any neurosis, viz., the emotional *conflict* between *two levels*. We can call these levels the level of "demand" on the one hand and the level of "readiness to respond" on the other hand. It should not be overlooked how powerful a formative factor in human existence conflict can be, both as regards integration as well as disintegration of personality (this dual aspect of conflict is referred to in the author's publication, 1933). Even in effort syndrome emotional conflict has been regarded as the underlying principle (Dunn, 1942). Recent investigation by A. Lewis (1941) and others has shown that psychobiologically there is no difference in principle between anxiety state and effort syndrome. Postchoreics are prone to develop effort syndrome owing to the attention they pay to their heart.

In the postchoreic the emotional conflict meets with special conditions, viz., the presence of a *pathoplastic factor* which facilitates a development towards neurosis. This factor is the *neurasthenia* which we have found to be always present as a part of the postchoreic syndrome. Considering the amount of stress to which a postchoreic might be subjected, and his peculiar affective structure, he has indeed not a far way to go from neurasthenia to neurosis. The peculiar motility of the postchoreic on the one hand and his peculiar characterological-affective structure on the other hand constitute additional pathoplastic factors in the process of neurosis formation. The question of pathogenesis within the postchoreic structure, to which Guttmann (1936) has given some consideration, now finds its solution by looking at the postchoreic syndrome as a unity. This does not exclude that in the final phenomenal picture of the neurosis one or the other feature may take the lead.

As this investigation comes to the conclusion that the postchoreic state implies a minor or major disability with some more potential dangers in the background, one is entitled to draw a practical conclusion, viz., that every postchoreic deserves a thorough psychiatric examination already on enlistment, and that according to the result a *suitable employment* must be chosen unless the person is found unfit altogether. The same care should be exercised by Industrial Medical Officers or their equivalents in civilian employment.

The theoretical side to which this investigation points is the relationship between the various post-infectious personality changes or sequels. The post-encephalitic and the post-choreic state are so different from each other and so well defined that they seem to have a localisatory implication, both of them pointing to subcortical regions. Recently changes in personality after

meningitis have been described by M. N. Pai (1945). The picture is a more diffuse and variant one; it may include deterioration both on the intellectual side and on the behaviour side together with neurasthenic symptoms. In meningitis the cortex is the nearest part to become the victim of irreversible affection, and this might be the reason for the variation. Kinnier Wilson (1940) sums up the histopathological findings in chorea by stating that the lesions are predominantly of the toxic-degenerative type and that they are diffuse, involving both cortical and infracortical regions. Most of the authors agree on the selective tendency to befall the neostriatum; some include the thalamus as well. Kinnier Wilson's statement that in chorea "no residua are to be dreaded" (apart from tics) cannot be maintained any longer in the light of the facts which have now accumulated.

## VII.

The detrimental and life-long after-effects inflicted upon people by their chorea in childhood suggest the question whether anything could be done in the way of *prophylaxis* or *more effective treatment* in order to prevent their appearance or to lessen their danger. The first idea which presents itself is to shorten the duration of the attack or to mitigate its severity. This idea has actually been pursued by clinicians in the last decade or so, even without having any knowledge of the postchoreic sequelae. Now that we know those sequelae it is the more urgent to achieve this aim.

The therapy of chorea is still in a rather chaotic state. The old proverb, "Medicus curat, natura sanat," seems to guide those who think that whatever medicine is given, the chorea will fade away in "its time." But just what is its time? Kinnier Wilson (1940) states that the average duration is from 6 to 8 weeks. Surely this is a long time to allow the toxins to have their effect on the brain-cells, though only the first period of attack might count. Apart from the traditional medicines like calcium-aspirin, liquor arsenicalis Fowleri and luminal, many others have been tried out. The first drug which proved effective in the sense of cutting down the duration was *Nirvanol* (phenylethylhydantoin, used since 1930), but many dread its dangers. It has, however, been shown that if one is careful in the prescription of the drug (small doses for a short period, regular blood-count), its dangers (haemorrhagic nephritis, dermatitis exfoliativa, agranulocytosis) can be easily avoided. There appears as a rule a morbilliform rash and pyrexia between the 8th and 10th day of the cure, which are indications that the allergic reaction of the body has reached its maximum. In 1936 the author had the opportunity to work with the paediatrician Gruenfelder on the *Nirvanol* treatment of chorea. A blood-count was done daily, and if the eosinophiles showed a rapid increase the drug was stopped. With a careful prescription, viz., 0.15 gm. *b.d.* for 4½ days, there was no accident in our series and the duration in 18 cases averaged 16 days. In 1933 Sutton and Dodge in America had cut down the duration to an average of 8.5 days by intravenous typhoid vaccine treatment. Diathermy of the brain has been applied in Russia.

A new prospect has been opened by the sulphonamides. Up to 1943 only

one investigation on the use of sulphonamide in chorea has been reported (in Russian, not available to the author). There have been, however, extensive trials in prophylaxis with sulphadiazine in American training camps (Coburn (1944), Holbrook (1944)). The intention was to prevent by prescription of short courses of the drug in small doses rheumatic relapses in the winter months, and the method proved successful. This success encourages a similar use in choreic children (until now the only preventive measure has been tonsillectomy), as recurrences seem to aggravate the sequelae. As penicillin comes to over-shadow the sulphonamides, this too might be considered. Though the use of penicillin has been discouraged in rheumatoid arthritis, no trial in chorea has as yet been reported.

There is, however, a regrettable gap in our knowledge: we do not know for certain whether choreics treated with more efficient drugs show less marked sequelae than the controls. It is to be hoped that this gap in medical science will be filled very soon.

In the *prophylactic line* the following procedure is proposed: after chorea periodical courses of sulphonamide and luminal should be given in order to avoid detrimental recurrences. Children who have had rheumatic fever or in whose families there is marked rheumatism or distinct neuropathy should be given prophylactic treatment in order to prevent chorea altogether. There would always be an experimental and a control group, and later on a follow-up would have to be done. Similar ideas, as far as the rheumatic child is concerned, were recently expressed by Hubble (1944) in a general survey on the rheumatic child. On October 30, 1944, the *B.M.J.* reported that "in view of favourable American reports the Education Committee of the L.C.C. have arranged that prophylactic treatment with sulphonamide shall be given to 100 selected rheumatic children attending supervisory centres." If all these tasks which are still left in the research line are fulfilled, something might be achieved which could save a great number of children from an undesirable development, physical and mental. Here lies a task for psychiatry through which it can make a further contribution in the field of social and preventive medicine.

## VIII.

1. A series of 28 postchoreic persons who developed neurosis (23 Service, 5 civilian cases) were examined with regard to their symptoms and the causes underlying their neurotic state.

2. Five distinct groups of abnormalities (hyperkinetic, neurasthenic, psychasthenic, characterological, temperamental) were found, which regularly form a characteristic "postchoreic syndrome." These symptoms are present both in non-neurotic and in neurotic postchoreics, but they tend to develop more grossly in the latter.

3. These postchoreic abnormalities facilitate the development of neurosis. Brought under unusual stress postchoreics are unable to adapt themselves to the situation, and get overwhelmed by their somatic and environmental difficulties and emotional conflicts.

4. Hereditary factors predisposing the brain are found running in the families of children who acquire chorea, so that they start with a constitutional nervous deficiency from the beginning and are left with an even increased deficiency after their illness.

5. Prophylactic measures are proposed to protect as far as possible rheumatic children or children of rheumatic or neuropathic families against chorea and its sequels.

My thanks are due to the Medical Superintendent of Mill Hill Emergency Hospital for permission to use material of this hospital, and to the staff for their co-operation. I also thank the Medical Superintendent of the Holloway Sanatorium, Virginia Water, for permission to publish a case treated in the Sanatorium.

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