

the nursing staff to administer. For these reasons it is probably wiser to reserve sulphonamides for therapeutic purposes.

### Summary

The results are recorded of two investigations made among measles patients admitted to the North-Western Hospital during the epidemic of 1942-3.

1. In Investigation A an intensive study of the bacteriological and clinical conditions in one ward for a period of 12 weeks showed that: (a) 72% of the 65 patients at risk became cross-infected with Type 6 haemolytic streptococci; (b) as a result of Type 6 streptococcal cross-infection 12 patients (18.5%) developed middle-ear suppuration—of these 12, 4 underwent mastoid operations; (c) 26% of the patients developed skin infections, mainly impetigo; (d) allowing 14 days as the normal stay for an uncomplicated measles case, excess stay in hospital amounted to two and a half years.

2. In Investigation B an analysis was made, in accordance with a set scheme, of the middle-ear-suppurative cases among all the measles patients admitted to the hospital from Dec., 1942, to May, 1943, inclusive. This showed that: (a) Among the 496 patients 3.6% suffered from "early" (i.e., on or before the 5th hospital day) middle-ear suppuration, and 13.3% from "late" (i.e., on or after the 6th hospital day). In view of the findings in Investigation A, it could be assumed that the great majority of the late middle-ear complications were due to cross-infection. (b) Among children under the age of 9 years the percentage incidence of late middle-ear suppuration did not vary greatly in the three age groups. Under 3 years of age the incidence was 14.3%, in the 3-to-5-year group 13.9%, and in the 6-to-8-year group 18.6%. Among patients of 9 years or over the rate was much lower, being 3.2%. (c) The late middle-ear-suppurative rate was considerably lower among patients admitted in April and May than among those admitted in the winter months. (d) The incidence of late middle-ear suppuration did not vary greatly in the three "open" wards of the hospital, being in Ward A 18.8%, in Ward B 17.2%, and in Ward C 17.9% (corrected figure). (e) The percentage incidence of ear complications was not higher among children under 3 years of age, but the seriously damaging effects of cross-infection fell most heavily upon them. Of the 238 children in this group, 11 (4.6%) underwent mastoidectomy, and one of these died. Infants under 1 year of age suffered particularly severely; 6 of the 45 infants admitted to the hospital developed late middle-ear suppuration, and in 4 cases this was followed by further complications—namely, in one by retropharyngeal abscess, in one by extradural abscess and mastoidectomy, in one by bilateral mastoidectomy, and in the last by orbital cellulitis, bronchopneumonia, and mastoidectomy.

3. In view of the high complication rate due to cross-infection, treatment at home rather than in hospital is advocated for patients with uncomplicated measles.

4. For the protection of measles patients who must be admitted to hospital, recommendations are made for the control of cross-infection and for improvements in administrative and nursing procedures.

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### REFERENCES

- Allison, V. D., and Brown, W. A. (1936). *Ann. Rep. C.M.O. of Ministry of Health, Appendix A*. London.  
 Banks, H. S. (1944). *British Medical Journal*, **1**, 124.  
 Harwood, F. C., Powney, J., and Edwards, C. W. (1944). *Ibid.*, **1**, 615.  
 Kerridge, P. M. T. (1936). *Med. Res. Cncl. Sp. Rep. Ser. No. 221*, London.  
 Linford, H. (1936). *L.C.C. Report on the Measles Epidemic, 1933-4*, London.  
 L.C.C. Report (1933) on the Measles Epidemic, 1931-2, London.  
 M.R.C. War Memorandum No. 6, 2nd reprint (1943), London.  
 M.R.C. War Memorandum No. 11, reprint (1944), London.  
 Wright, J., Cruickshank, R., and Gunn, W. (1944). *British Medical Journal*, **1**, 611.

Dorothy M. Horstmann, Robert Ward, and Joseph L. Melnick (*J. Amer. med. Ass.*, Dec. 23, 1944, p. 1061) report a study undertaken at the New Haven Hospital, Connecticut, to determine the average duration of excretion of poliomyelitis virus in stools of patients who had had acute infection. The stools were examined of 61 patients in whom a clinical diagnosis of poliomyelitis had been established. It was found that 61% excreted virus during the first two weeks after onset of the disease; 50% during the third and fourth weeks; 27% at the fifth and sixth weeks; 12.5% at the seventh and eight weeks. Between the ninth and twenty-fourth weeks virus was detected in only one of 52 specimens tested; this was excreted by a boy in the twelfth week of paralytic disease. Not one of the 61 patients followed up was demonstrated to become a persistent carrier of poliomyelitis virus.

## CHANGES IN PERSONALITY AFTER CEREBROSPINAL FEVER

BY

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Literature on the neuro-psychiatric residuals and changes in personality after cerebrospinal fever (C.S.F.) is very meagre, and most of the papers on this subject record observations made chiefly on children. Among the papers dealing with adults are 12 English, 4 American, 6 French, 1 Russian, 1 Spanish, and 7 German. There is, however, no unanimity in their findings. Some writers—notably Rolleston and Ronaldson (1940), Rundle (1929), and others—say that a few patients with predisposition to neuroses may during convalescence suffer from neurasthenia and occasionally from mental deterioration (Brain, 1940). Others, including Netter and Debré (1911) and Foster and Gaskell, are emphatic that after recovery from the acute illness and in the absence of internal hydrocephalus no mental changes occur. In 1918 Rosanoff described a uniform syndrome as a result of observations made on 26 adults at the U.S. Army Hospital for War Neurosis at Plattsburg Barracks. The symptoms in order of frequency were limitation of flexion of the spine; undue fatigue; pains in the back, legs, and head; tendency towards dizziness and faintness; muscular weakness; tendency towards blurring of vision associated with photophobia; and, lastly, impairment of appetite and sleep associated with a state of undernutrition. These findings have not been confirmed by subsequent writers.

From a study of patients who gave a history of C.S.F. in adult years one finds that some who have apparently recovered from the acute stage may continue to complain of symptoms which incapacitate them for work for prolonged periods. Some of them wander from hospital to hospital, and on account of negative findings are finally labelled "neurotics," which only adds to their hardship by depriving them of the sympathetic consideration of their employers. Anxiety state resulting from prolonged unemployment and financial insecurity may obscure the picture before a psychiatrist is consulted. It is therefore essential that symptoms due to external stress should be clearly differentiated from those due to the meningococcal infection. The criteria to be used in these cases have already been discussed elsewhere (Pai, 1944).

Independent and extensive inquiries were made to obtain reliable information on patients' personality, previous illness, disposition to neurotic or psychotic illness, intellectual level, and capacity for work before and since meningitis. Letters from relatives, reports of psychiatric social workers, and, in Service patients, personality and efficiency reports by the officers commanding units were available in most cases. On the basis of this information the patients were considered in three groups according to whether their previous personality was (1) good (i.e., well organized and stable), (2) fairly good, or (3) poor (i.e., neurotic or psychopathic).

### Symptomatology

When the symptoms were studied in the light of information obtained from various sources it was found that some symptoms appeared to be purely functional in origin and to be precipitated by psychological factors such as domestic and financial stress or unsuitable employment in their units. Among such symptoms were stutter, amblyopia, and hysterical paraplegia (Hurst, 1918) and disorders of gait, and these began after varying intervals of complete freedom from symptoms. As was only to be expected, such symptoms were predominant in patients of the second and third groups, indicating that functional symptoms were more common where disposition to neurosis existed before the meningococcal infection. Some of these patients had actually suffered from somewhat similar symptoms before the onset of cerebrospinal fever, and their present psychiatric disorders more or less conformed to their previous pattern of behaviour to stress.

But functional symptoms were also present in a few patients with previous good personality who had not suffered from any neurotic illness prior to the C.S.F. For instance, three months after recovery from an attack of fever one patient was torpedoed off the west coast of Ireland, and ten days after his return to England the house next to his billet was hit by a bomb. He then developed fainting attacks. Investigation revealed that before his C.S.F. he had been torpedoed twice and had withstood the London "blitz" without showing symptoms of neurosis. In another patient, who complained of pains in the spine and chest, the symptoms had obviously been precipitated by the serious illness and subsequent death of his mother from cancer of the breast with metastasis in the vertebral column. In the case of another patient, who complained of sudden amblyopia about six months after recovery from C.S.F., psychiatric investigation revealed that he was a capable signaller who since his recovery from C.S.F. had developed a fear of oversea service (though prior to the C.S.F. he had twice volunteered to go over-seas), and his hysterical blindness began while home on embarkation leave. The symptoms in these patients were obviously functional, but as they had no history of inherited or personal disposition to neurotic illness previous to the C.S.F. the tendency for neurotic breakdown seems to have been acquired as a result of the infection.

It was, however, difficult to assess whether such symptoms as headaches, blackouts, fits, and temporary loss of memory were predominantly physiogenic or entirely psychogenic in origin. But slowly developing changes in personality, habits, and interests, mild but prolonged depression, intellectual deterioration, and in some patients of hitherto unblemished character moral deterioration as well, involving trouble with the civil authorities, were more suggestive of encephalopathy than of functional disorder. Such changes were striking in patients with previous good personality (though they were also found in other patients), and were confined to those who had had a severe attack of C.S.F. with delirium. These changes more or less began during the initial illness (C.S.F.), and even after extensive inquiries no obvious psychological factors were discovered to account for such symptoms. The evidence for regarding these patients as suffering from an encephalopathy appears, therefore, to be fairly convincing.

Table showing Changes in Personality after C.S.F.

Previous Personality	No.	Details of C.S.F. (D = Delirium)	Ex- ternal Stress	Symptoms Con- tinuous	Psychiatric Disorder		
					Neuro- sis	Probably Organic	
Good	27	Mild	6	4	3	6	—
		Severe, with D	14	3	12	5	9
		Severe, without D	7	2	6	7	—
Fairly good	19	Mild	3	2	1	3	—
		Severe, with D	5	2	5	2	3
		Severe, without D	2	—	—	2	—
Poor	14	Mild	6	5	6	6	—
		Severe, with D	5	3	3	1	4
		Severe, without D	3	1	2	3	—

It would seem that some patients who have apparently recovered from a severe attack of C.S.F. with impairment of cerebral function during the illness may continue to complain of symptoms, some of which appear to be predominantly psychogenic and others most probably physiogenic.

### Symptoms of Meningococcal Encephalopathy

#### Changes in Personality

More or less profound changes in the total personality in children have been mentioned by several writers—chiefly Pette, Pfeiffer, and Redlich, in their handbooks on psychiatry. Moroseness in children previously of a placid and cheerful disposition and in persons with a hereditary or personal history of nervous instability, irritability, and outbursts of passion have been mentioned by Rolleston and Ronaldson (1940).

Various changes in personality were predominant features in most of our patients, especially those (in Group 1) who before the C.S.F. were known to be well-organized and stable persons with plenty of initiative and drive. In general they appeared to have lost the *joie de vivre* and become diffident, and were

inclined to spend more time in the comparative security of their homes, moping about and doing practically no useful work. Those who had resumed their work were inefficient, and even the lightest task seemed to be an effort. Employers reported that some of these patients were constantly grumbling, and yet others were frequently asking for concessions from superiors or help from work-mates and relatives.

#### Intellectual Deterioration

In children, mental enfeeblement, difficulties in learning, and even dementia (Brain, 1940) have been mentioned by several writers. Goeppert points out that in an epidemic in Norway 3.7% of 539 patients showed severe mental deterioration, and after an epidemic in Upper Silesia most of the survivors who could be followed up over a considerable period were reported to have become more irritable and poorer in their scholastic achievements.

The majority of our patients showed some degree of intellectual deterioration. They complained of forgetfulness, and of difficulty in calling up old associations and in recalling names, dates, and figures *quickly*. While speaking to their friends they sometimes could not then recall their names, though they could do so after some time. This was probably due to impairment of visual recognition and recall. Forming new associations was an effort, and there was considerable difficulty in planning ahead quickly.

When given a battery of psychological tests (Halstead, 1943) visual memory, as tested with pictures, stories, and reproduction of designs from memory, was faulty, and there was evidence of displacement of major details or confusion. Auditory memory (repeating words, sentences, and stories) seemed fairly good. Retention was short, and there was a substantial drop in the amount recalled after 10 minutes. In some patients there was no improvement even after repeated readings of the same material.

Making mistakes, confusion of details, and bringing in inventions were quite common. Disturbed attention, poverty of associations, and slowness of thinking and planning were also apparent during occupational therapy in the workshops attached to the hospital when the patients had no reason to suspect they were being tested.

*Case 1.*—A male aged 23 was admitted on April 13, 1943, for investigation—? schizophrenia. He came from a well-to-do family, had a normal childhood, and had been very popular at school, where he was captain of the cricket and football teams. After getting his school certificate with seven credits he became a teacher in a preparatory school, and in 1938 was commissioned in the Forces, where he got on well until an attack of C.S.F. in 1941. During convalescence he could not recognize his father for several weeks, and later complained that his memory was bad. When allowed up he used to get lost. At first he could not remember what he had read, and although in this respect he improved after a few weeks he still had difficulty in recalling temporary or unfixed events. Eventually he was invalidated out with a 100% pension. After his discharge from the Service he went to a preparatory school as house master and tried to teach mathematics and science, but had memory difficulties: he could remember things he knew long before the illness—e.g., elementary mathematics—but had difficulty in learning new things; he forgot engagements, and others had to help him. He tried hard to do new problems in his mathematical work, but owing to loss of memory, headaches, and tiredness, he finally had to give up teaching about the middle of 1942. Next he tried an easier job as progress chaser at an aircraft factory, but was incompetent, and on medical advice was discharged in six weeks. He then remained at home for about eight months, when he used to stay in bed until 11 a.m. and showed no desire to do anything. He did not know whether he required work or rest. Finally he left home and went to stay with his uncle (a retired Army officer), who took him to a psychiatrist. The latter raised the question of schizophrenia, and referred him to this hospital. On admission he complained that his memory difficulty had caused him to be incompetent at teaching and factory or any other work. He described his difficulty as a feeling of blankness when he had to deal with a new situation quickly. The harder he tried the greater was the blank, and he felt as if he was in a maze. He also had difficulty in planning ahead quickly, though he could do it *very slowly*. When given a battery of special tests devised by Halstead (1943) his impairment seemed to be mainly intellectual—i.e., in the higher processes. His learning ability was poor, his retention was short, and his recall after a second reading of the same material showed no improvement. His vocabulary score was equivalent to an I.Q. of about

130. He had no financial or other obvious stress to account for his symptoms. Wassermann and electro-encephalogram—N.A.D. During his stay his attitude improved, and he was discharged with advice to do work at a lower intellectual level.

*Case 2.*—A male aged 21 was admitted on March 16, 1942, for investigation of headaches, loss of memory, depression, and behaviour disorders. There was nothing significant in his family and early history. He was happy and contented, and got on well with his friends and work-mates, who all liked him. "One could not have wished for a better boy." After a severe attack of C.S.F. in 1937 his personality seemed to have undergone a complete change. He had moods quite often, when he was really hateful—he snapped at everybody, the dog seemed to be continuously under his feet, and everything was wrong. As soon as he came in from his work his mother could tell whether he was in a bad mood or not. These moods seemed to last for the rest of the day on which they started. Since his illness he had also complained of severe headaches and intolerance of noise. He could not even bear the clatter of the china when the table was being laid. His memory had been very bad since the C.S.F.; sometimes when he went to work in the morning he would ask his mother to mind something for him during the day, but he would have entirely forgotten this by the evening, and would be asking her what she had done with it. He could even forget where he had put something a few minutes before, and be looking for it in the wrong room. On several occasions he failed to get out of the bus on the way home from work and passed the end of his own road. On one such occasion he found himself in a locality he did not know at all, so that he was forced to ask a policeman where he was. He had also suffered from attacks of amnesia. The first attack occurred about 4 to 5 months after recovery from C.S.F. While on his way home from his factory he suddenly lost his memory and wandered about aimlessly until the next day, when he was recognized by one of his friends, who took him home. About a year later, while sitting with his brother in a picture theatre, he suddenly got up and walked out. After about 15 minutes he "came to" and realized what he was doing. There have also been disturbances of sleep. He used to sleep in a large room with his two brothers, each in a single bed. On one occasion he got up in the night and, going downstairs, opened the front door and went out. The noise made by the banging of the door wakened one of his brothers, who followed him and persuaded him to return to his bed. When his brother pointed out that it was too early and too cold to go out he said it was time to get up. On another occasion he got out of his bed and into that of his brother. The latter did not wish to disturb him and so let him remain, and they both spent the night in one bed.

He had also complained of mild depression, and had been spending more time at home, seldom going out in the evenings. On account of his forgetfulness his work deteriorated and he had frequent changes of jobs. On Feb. 8, 1942, he had another fugue, and was found wandering with loss of memory. A psychiatrist who examined him found his memory defective and his powers of attention, retention, and recall all impaired. During his stay here he was depressed and retarded. After discharge from this hospital on April 9 he stayed at home for a month, then took up a labouring job, but found that the jar of using a pickaxe brought on headaches and in a few days gave this up. After some unemployment he was persuaded to go into a war factory where his two sisters were working. He travelled to and from work with his sisters and worked in the same room, but after about five or six weeks was discharged as inefficient. His subsequent work record continued to be unsatisfactory.

#### Moral Deterioration

Disorders of conduct similar to those following encephalitis have been reported by Voisin and Paiseau (Kinnier Wilson, 1940) in children who survived the Paris epidemic of C.S.F. in 1910. Mendaciousness and deterioration of character similar to those described in a boy by Kinnier Wilson (1940) were striking features in some of the patients.

*Case 3.*—A male aged 29 was admitted on Feb. 19, 1943, on account of deterioration of personality. He came of a good family and was popular at school, where he captained the football team. After leaving school he was a cinema operator for 14 years. At 16 he had a severe attack of diphtheria, and since then he appears to have had occasional moody attacks, when he would prefer to be alone. Otherwise he is reported to have been sociable and happy-go-lucky. At the outbreak of war he volunteered for the Army, and after 18 months' service became a L/Sgt. One of his brothers was killed at Dunkirk, another at Coventry during an air raid, and a third in an explosion at a munition factory. In spite of this he seems to have done fairly well until he had an attack of C.S.F. in Oct., 1942, since when his personality has undergone a complete change. He was found guilty of several breaches of discipline, and never returned from leave at the correct time, and in, most cases on his return said that he had been suffering from amnesia. His

officer stated that it was impossible to place any reliance on him, that it was found necessary to keep him with another N.C.O., and that as he required to be under constant supervision he was therefore not fit to carry out normal duties, which included solitary sentry duty on the gun. His O.C. also remarked that he seemed on the whole to be a man of good type and intelligence, and if cured of his present trouble would probably prove to be a useful and efficient soldier. On account of his steady deterioration he was warned on many occasions and given an opportunity to relinquish his stripes, which he refused to do. However, in Dec., 1942, he broke into a shop and stole about a pound of sweets, which he immediately distributed among his friends. He says he did it on a sudden impulse without realizing what he was doing, as the sentry on duty was not far from the shop. He was subsequently convicted of stealing and sent to a civil prison for 21 days. On the expiry of his sentence he was again A.W.O.L. and was found wandering in the fields. He was then examined by an Army psychiatrist, who referred him to this hospital.

On admission he complained of attacks of confusion, absent-mindedness, forgetfulness, headaches, fear of accepting responsibility, lack of control over sudden impulses, loss of libido, and depression. He appeared lacrimose, despondent, and full of apprehension. He complained bitterly that since the illness a change had come over him. Because of this and his complete impotence while home on leave his wife had threatened to leave him. He pointed out that during the periods A.W.O.L. he did not go home, but wandered aimlessly and slept in the fields (this was confirmed by independent report), as he felt a desire to avoid all human beings. During his stay he slightly improved, and was given a posting under the War Office Annexure Scheme, but within about three months he had relapsed and was admitted to another hospital.

*Case 4.*—A male aged 25, a quiet, cheerful, and well-adjusted professional violin-player, had a severe attack of C.S.F. with delirium in Jan., 1941. During convalescence he began to complain of constant heaviness in the head, with frequent frontal headaches, impairment of memory, disturbances of sleep, undue tiredness, fainting attacks, and persistent depression. His relatives and friends noticed gradual changes in his character and habits. Whereas before the illness he used to spend about five hours daily playing the violin, he now seldom spent more than 10 minutes. Before the illness he used to read two or three books a week, but now he could read short stories only. Acquaintances stated that he had short lapses of memory, and while talking to them could not remember their names. It was reported that he had become mendacious and was inclined to say nasty things in a sarcastic way about his friends, which surprised them, as they had always known him to be a quiet likeable chap who never offended anyone before. He seems also to have done several odd things. For instance, one night he woke up at 2 a.m. and got out of bed to go down for breakfast. On two or three occasions he "collapsed" and was apparently unconscious.

In a slightly unstable individual a severe attack could be followed by deterioration of character and temper, disorders of conduct, and antisocial behaviour.

*Case 5.*—A male aged 24, admitted on July 28, 1942. Though inclined to be highly strung, he was fairly well adjusted in civil life. Since a severe attack of C.S.F., for which he was three months in hospital, he had been continuously depressed and irritable. He had been unmanageable in his home and also in his unit, where he had been punished for frequent breaches of discipline. He was in trouble also with the civil authorities for disorderly conduct and antisocial behaviour. During his stay here he was dejected, fidgety, and difficult to handle on account of his destructive tendencies. He was untidy, faulty in habits, and inclined to use obscene language, and spat all over the place.

Some of the patients also complained of blackouts, fits, and attacks of confusion, which were at first thought to be hysterical in nature, but which from the evidence of the E.E.G. appeared to be attacks of petit mal or grand mal. Convulsions may have been due to involvement of the cortex, as pointed out by Grinker (1937), or to internal hydrocephalus (Baker, 1934). Jacksonian attacks may be due, as suggested by Dopter, to areas of meningitis which act as irritants to the cortex (Rolleston and Ronaldson, 1940).

*Case 6.*—A male aged 31 had an attack of C.S.F. in 1940. During convalescence he complained of continuous pressure in the head with frequent headaches on the left side and depression. After three months he tried to resume his previous work but could not, and changed to a lighter job. About nine months later he had a blackout, then twitching and involuntary movements of the right arm and hand, followed by temporary paralysis and recovery. Though some of his symptoms persisted in April, 1941, he enlisted in the Forces (as a volunteer), hoping to shake off some of his depression, but during training had another blackout followed by

brief paralysis of the right arm and hand, which caused him to drop the rifle which he was holding. Soon after this he went to sea and seems to have tried his best for several months, but on account of symptoms he reported sick and was returned to shore, where he was given light duties. As he found even these too strenuous, on the advice of the M.O. he was given a light job as a runner, but complained bitterly that he could not do it unless he had a bicycle. When a bicycle was obtained he grumbled that the work was too much for him. For nearly four months he was on sick parade almost every morning. His O.C. stated that at one time he was "well behaved, well disciplined, well turned out, and conscientious," and that he was steadily deteriorating. His relatives also complained about the change that had come over him.

On admission he said that during some of his blackouts he felt dazed, and vague and indistinct figures moved rapidly in front of him ("dreamy state" of Hughlings Jackson). An E.E.G. showed abnormal waves from the left temporal and occipital lobes.

#### Sexual Anomalies

It has been pointed out that temporary impotence and inhibition of spermatogenesis may occur after administration of sulphonamides and that these disabilities seldom last longer than a few days (Cohen, 1941). Several of our patients complained of loss of sexual desire and impotence lasting several months, and this condition is apparently not the result of chemotherapy, as similar changes were present in some of the patients who had their illness in childhood and who had not been treated with sulphonamides (Pai, 1944).

*Case 7.*—A male aged 31, happily married, with two children. Following C.S.F. in March, 1941, he lost all heterosexual desire, became impotent with his wife, and gradually began to be bothered with homosexual (passive) fantasies and impulses, with increasing difficulty in self-control. He got worried over his impotence, and the stress of close association with other men resulted in anxiety symptoms regarding fears of giving way to his unhealthy cravings and of the consequences. Finally he sought refuge in alcohol, which made his condition worse and aggravated his depression.

#### Depression

Nearly every one of our patients complained of mild but prolonged depression without feelings of guilt or self-reproach. They avoided their fellow-beings; lost interest in favourite hobbies, and were disinclined for any form of employment, whether gainful or not. They could not be bothered even to talk to people, and had no patience for any form of recreation or entertainment. The depression was not intense enough to cause fits of crying, and none admitted having ever entertained thoughts of committing suicide—a useful point in distinguishing this condition from neuroses, in which patients often burst out crying and sometimes threaten to commit suicide.

#### Headache

The great majority of these patients complained of constant heaviness in the head, with frequent attacks of headache. It is difficult to say whether this headache is due to organic changes in the meningeal vessels, to a minor degree of internal hydrocephalus (Baker, 1934), or to the process of disintegration of the personality pattern. Possibly alterations in personality may lower the threshold for pain or cause external stimuli (which ordinarily do not cause pain) to be interpreted as potential threats to the personality, giving rise to the sensation of pain. Hence their frequent remark, "Any noise gives me headache."

*Case 8.*—A male aged 28, with no previous history of neurotic traits or ill-health, had a severe attack of C.S.F. in April, 1939. It was reported that before this illness he was a very easy man to live with and tried hard to make his wife happy. Since his illness his wife felt she was living with a different man. He was full of complaints about his headaches and used to spend his nights sleeping in a chair in the sitting-room. One day, being unable to bear the pain, he deliberately knocked his head against a wall, and next day had a swelling on his forehead. When questioned by his wife he confessed what he had done.

A few of the patients complained of vague phobias, but in four of these cases specific obsessional trends emerged for the first time since the C.S.F. These features were merely different aspects of the personality changes.

While convalescing from C.S.F. a barber with 11 years' experience developed a phobia for razors, and was obsessed with the idea that if he handled one he might not be responsible for the consequences.

Another patient was afraid to sleep in his bed (lest he should not wake up in the morning), and in consequence spent the nights dozing in a chair.

Irritability, aggression, suspicion, and paranoid reactions met with in post-confusional states were either absent or insignificant in our patients, who, generally speaking, appeared to be mildly apathetic. Nevertheless, when faced with tasks which they could not tackle a few showed symptoms of mild anxiety and irritability, due no doubt to frustration.

#### Discussion

Consciousness is necessary for the full functioning of one's responses to the demands of society. This pattern of behaviour constitutes to a great extent one's personality. When consciousness is disturbed, as in confusional or delirious states, the cognitive, emotional, and volitional functions are impaired, resulting in temporary disintegration of the personality pattern—hence such symptoms as incoherent speech, disturbances of bladder function, and disorders of conduct. When, therefore, changes in the personality pattern persist for some time it would not be unreasonable to assume that some damage remains to those parts of the brain which govern, among other things, the cognitive, emotional, and volitional faculties, or that restoration of these functions has been delayed.

It is becoming increasingly clear that some patients who apparently recover from C.S.F. show a more or less definite syndrome, though individual symptoms may vary in intensity and degree in different patients. These symptoms would appear to progress up to 10 to 14 months and then remain more or less stationary. Whether these changes are the result of damage by the meningococcus or the result of slow vascular changes it is difficult to say. Possibly other factors, such as chemotherapy, biochemical changes, or vitamin deficiencies during the course of the illness, may be at work, either singly or in combination.

#### Conclusion

In the absence of definite knowledge of the causative factors prophylactic measures cannot be suggested, but certain lines of procedure may be adopted while dealing with patients who during C.S.F. suffer from disturbances of consciousness. As soon as possible (and before the patient leaves the fever hospital) the patient's psychiatric and socio-economic problems should be reviewed, if necessary with the help of a psychiatrist and a psychiatric social worker. By this means a good deal may be done in the way of preventing purely neurotic superstructures. Where evidence of neuro-psychiatric disorder has emerged, although it may be unprofitable to try to label an individual symptom as predominantly psychogenic or predominantly physiogenic, it is clearly essential to decide whether the total picture is suggestive of a functional disorder or of an organic process. In the case of the former, appropriate treatment may restore a patient to his previous functioning level. When there are reasons to suspect an organic process the psychiatrist should assess the patient's efficiency, placing emphasis on his residual capacities rather than on his disabilities, and he should be advised and encouraged to work at levels at which he is likely to achieve success. In the early stages this should be done under supervision. "Vague advice to "do light work and take plenty of rest" is worse than useless, and has been responsible not only for much unemployment but also for the development of avoidable secondary neurotic reactions.

#### Summary

Studies were made of 51 patients who complained of neuro-psychiatric symptoms after apparent recovery from cerebrospinal fever in adult life.

In the majority of these patients the psychiatric disorder was predominantly psychogenic and the symptoms were similar to those seen in other patients suffering from neurosis.

Of 24 patients who had had a severe illness, with delirium, 16 showed a definite syndrome which was suggestive of an organic process, with perhaps slight functional overlay in a few instances. Case histories have been given illustrating the changes in personality, intellectual or character deterioration, and tendencies to invalidism, which were prominent features in these patients.

Persons with no hereditary or personal tendencies to neurotic breakdown may after an attack of C.S.F. acquire a disposition to neurotic illness.

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BIBLIOGRAPHY

Baker, C. G. (1934). *Guy's Hosp. Rep.*, **84**, 115.  
 Brain, W. R. (1940). *Diseases of the Nervous System*, 2nd ed., p. 361, London.  
 Cohen, H. (1941). *Practitioner*, **147**, 609.  
 Grinker, R. R. (1937). *Neurology*, p. 668, Springfield, Ill.  
 Halstead, H. (1943). *J. ment. Sci.*, **89**, 363.  
 Hurst, A. (1918). *Medical Diseases of War*, 2nd ed., p. 79.  
 Joe, A. (1942). *Edinb. med. J.*, **49**, 628.  
 Netter, A., and Debré, R. (1911). *La Méningite Cérébrospinale*, Paris.  
 Pai, M. N. (1944). *Proc. roy. Soc. Med.*, **37**, 205.  
 Rolleston, J. D., and Ronaldson, G. W. (1940). *Acute Infectious Diseases*, 3rd ed., p. 99, London.  
 Rosenoff, A. J. (1918). *J. Amer. med. Ass.*, **71**, 1476.  
 Rundle, C. (1929). *Ker's Infectious Diseases*, p. 546, London.  
 Slesinger, H. A. (1933). *Penn. med. J.*, **36**, p. 327.  
 Wilson, S. A. Kinnier. (1940). *Neurology*, **1**, 32, London.

PSYCHIATRIC CASUALTIES IN A WOMEN'S SERVICE

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Little has been written of the war neuroses as they affect the women's Services. From a joint personal experience of nearly 1,000 such cases, we believe that some features of interest arise, and that a brief analysis of our material and of the factors leading to breakdown in this minority of the W.A.A.F. population may have some importance, not only because of the economic and social issues involved but also in relation to the general theory of the war neuroses.

We are unable to give figures showing the respective incidence of psychiatric disability among men and women in the Service, and it seems unlikely that such figures will become available during the war. Many medical officers of mixed units state that there is an appreciably higher incidence in women. The accompanying Table shows the diagnoses in two groups of consecutive psychiatric cases seen.

Diagnosis	Cases among 250 Consecutive Airmen Referred	Cases among 250 Consecutive Airwomen Referred
Anxiety states . . . .	100	65
Hysteria . . . . .	56	105
Psychopathy . . . . .	70	53
Mental defect . . . .	8	18
Psychosis . . . . .	12	7
Other psychiatric conditions	4	2

Mental Defect

These cases represent about 7% of the airwomen in our series invalidated on psychiatric grounds, and 44% of the group were referred because of executive difficulties. We would stress that, at all levels, usefulness in the Service depends more on emotional stability than on intelligence quotients. Two-thirds of these defectives were emotionally unstable, and over three-quarters had very poor civil employment records. Nevertheless some of them do useful work under Service conditions, and in this they are materially assisted by the existence of work suited to their intellectual level: they are less likely to be pushed into the technical training which so often leads to rapid breakdown in male defectives.

The few psychotic airwomen seen were not invalidated direct, but were admitted to hospital, and, defectives and psychotics excepted, the remainder of cases invalidated are classified as anxiety states (16%), hysteria (50%), and psychopathic states (34%). It is with these groups, comprising about 90% of our psychiatric invalidings, that this paper is chiefly concerned.

Psychoneurosis

A striking feature is the preponderance of hysterical reactions in the female cases, seen in the table of cases referred and even more marked in the invalidated group.

In general, the clinical features of the psychoneuroses are similar to those found in men, but an important symptomatological difference was noted in that the somatic expressions of emotional disturbance were less common among females, who tended to show an overt emotional upset rather than one masked by physical symptoms. Thus nervous dyspepsia, a common psychosomatic illness in men, is rarely seen in women. When psychosomatic symptoms do occur in the latter they tend to be of a vague type and frequently take the form of headaches, ill-determined emotional faints, "rheumatic pains," backaches, or gynaecological complaints especially related to menstruation. Similarly, major conversion symptoms, fugues, and amnesias are rare among W.A.A.F. personnel suffering from hysteria. It would appear that the socially acknowledged and permitted emotionalism of women allows of a more direct expression of adaptive and emotional difficulties, and that this renders prolonged and inconvenient physical symptoms superfluous. Men, on the other hand, submit to a sterner social and emotional code. They have, therefore, a greater need to preserve their self-esteem by the development of a more complex disguise or escape mechanism.

At the extreme end of the scale a small number of highly unstable young women showed an acute and usually transient breakdown, often hysterical but sometimes schizoid in type. This usually occurred shortly after joining the Service, and represented a complete failure of adaptation. Similar cases were seen in men, who were invariably, however, of low intelligence bordering on the level of high-grade feeble-mindedness.

In aetiology domestic factors were important, and were found in a third of all anxiety states in both sexes. A fairly common finding, also in both groups, consisted of feelings of frustration, amounting in some cases to paranoid reactions, which cleared up when an obvious environmental difficulty could be overcome.

Psychopathy and Temperamental Instability

The classification of "psychopathy" covers two distinct groups of cases. First there are the true "constitutional" psychopaths of the predominantly inadequate or predominantly aggressive types. These usually give a psychopathic family history, and have a past record of gross personality difficulties and maladaptation dating from early life. The inadequate and feckless is the commoner type, personified by the shy, over-protected, and often socially "superior" female with interests and activities limited to the immediate family circle. Typically the only or the youngest child of elderly parents, and with a history of minor neurosis, she often stated that she joined the Service on medical advice. Such women are apt to make much of minor ailments and to fail in adapting to communal life, routine work, and the absence of special consideration.

Examples of the aggressive group, who show irresponsibility, unscrupulousness, and rebellious antisocial activity, are not rare. These patients are frequently vivacious, attractive, and intelligent products of parental overspoiling, whose egocentricity is often expressed in conduct disorder or hysterical symptoms in the face of unpalatable regimentation. They are, however, a menace to unit morale and discipline, and, in women at any rate, the Service usefulness of either group is slight.

We have arbitrarily separated from the classical psychopathies a group of temperamentally unstable individuals which is numerically as great, and clinically as important from the Service standpoint, as the psychopaths. While it is obvious that if seen in civil practice these would be classified as psychopathic personalities, their pre-Service social history shows little evidence of maladaptation although their personality structure shows clear indications of psychopathic instability. In civil life, living at their own level, such individuals have been able to compensate their predisposition, and a breakdown with neurosis or conduct disorder of an aggressive or rebellious type occurs only on exposure to the unusual demands of Service life.

Members of the classical psychopathic groups are usually invalidated at an early stage, and it is from the temperamentally unstable group that the "problem cases" of the W.A.A.F. are principally drawn. They are problems from the executive and medical points of view, for while they show gross conduct disorder and ruthless determination in pursuit of their own