

OCCASIONAL PAPER

**Shell shock at Queen Square: Lewis Yealland
100 years on**Stefanie C. Linden,¹ Edgar Jones¹ and Andrew J. Lees²

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This article reviews the treatment of functional neurological symptoms during World War I by Lewis Yealland at the National Hospital for the Paralysed and Epileptic in London. Yealland was among the first doctors in Britain to incorporate electricity in the systematic treatment of shell shock. Our analysis is based on the original case records of his treatment of 196 soldiers with functional motor and sensory symptoms, functional seizures and somatoform disorders. Yealland's treatment approach integrated peripheral and central electrical stimulation with a variety of other—psychological and physical—interventions. A combination of electrical stimulation of affected muscles with suggestion of imminent improvement was the hallmark of his approach. Although his reported success rates were high, Yealland conducted no formal follow-up. Many of the principles of his treatment, including the emphasis on suggestion, demonstration of preserved function and the communication of a physiological illness model, are encountered in current therapeutic approaches to functional motor and sensory symptoms. Yealland has been attacked for his use of electrical stimulation and harsh disciplinary procedures in popular and scientific literature during and after World War I. This criticism reflects changing views on patient autonomy and the social role of doctors and directly impacts on current debates on ethical justification of suggestive therapies. We argue that knowledge of the historical approaches to diagnosis and management of functional neurological syndromes can inform both aetiological models and treatment concepts for these challenging conditions.

Keywords: war; electrotherapy; history; psychogenic; movement disorders

Introduction

Innovation in medicine has often been produced by major crises. The epidemic of shell shock that started soon after the outbreak of World War I posed a major threat to the war effort and challenged the prevailing models of hysteria and functional nervous disease. Some military casualties were transferred to the National

Hospital for the Paralysed and Epileptic, the present National Hospital for Neurology and Neurosurgery in Queen Square, London. The hospital, which had gained an early reputation for its expertise in electrotherapy, became a centre for the development and implementation of new treatments for functional neurological disorders. One of its most active therapists, Lewis Ralph Yealland (1884–1954), rose to prominence through the

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publication of a monograph *Hysterical disorders of warfare* in 1918. Yealland and his colleagues, who included the Nobel laureate to be, Edgar Adrian (1889–1977), eagerly embraced the opportunities afforded by psychological and physiological treatment methods. Yealland's interventionist approach led to controversy, both amongst his contemporaries and in later literary adaptations. His work remains of contemporary interest as neurologists and psychiatrists continue to seek clinically effective models for functional neurological syndromes (Hallett, 2012). We review Yealland's work at Queen Square based on the original case records, including the 196 cases that he treated personally and that provided the basis for his book.

'The temple of British neurology': the treatment of traumatized soldiers before Yealland's arrival

By the time that Yealland (Figs 1 and 2) came to London in November 1915, Queen Square had gained an international reputation for the treatment of neurological disorders and had pioneered neurosurgery in England. Contemporaries referred to Queen Square as 'the temple of British neurology' and compared its staff with 'a priesthood for the spread of the neurological faith of Britain' (Maloney, 1919) (Fig. 3). In his monograph on the National Hospital, Gordon Holmes (1876–1965), whose life and work has been reviewed by McDonald in a recent issue of *Brain* (McDonald, 2007), described how the war affected hospital logistics, patient

treatment, teaching and research. Eventually, four wards, a third of the hospital, were allotted to military casualties. In addition, two adjoining houses in Queen Square were adapted to accommodate between 30 and 40 men (Holmes, 1954, pp. 55, 58). On 6 February 1915, Lord Beauchamp, the president of the National Hospital, announced that the war office was 'arranging to send soldiers suffering from shock to be treated at the Hospital in wards specially set apart for the purpose' (*The Times*, 6 February 1915). War-related cases continued to be treated at Queen Square until 1926 (Holmes, 1954, p. 59). At the request of the Ministry of Pensions, physicians at Queen Square investigated invalid ex-servicemen in special sessions of the outpatient department.

In January 1916, Frederick Eustace Batten (1865–1918), neurologist at Queen Square from 1900 and the first Dean of its Medical School, published an article on soldiers with functional disorders and their treatment at Queen Square between January and November 1915 (Batten, 1916). For his resident medical officer, Francis M. R. Walshe, Batten had obtained funding from the Medical Research Committee for 'the proper study of neurological cases arising from the war' (letter to Batten from the Medical Research Committee, 25 February 1915, Queen Square Archive). Batten's concept of 'functional nervous disorder' was broader than Yealland's definition of 'hysterical disorder' and included loss of memory and psychotic syndromes arising in response to the trauma of military combat. For treatment, he used walking exercises, re-education, suggestion, strong faradic currents, complete rest, isolation, encouragement and a change of surroundings. All of these therapies had been in use for many years to treat chronic neurological handicap, albeit with limited success. They also constituted the standard programme for 'hysteria' (Linden and Jones, 2012) and were readily adopted for the treatment of functional disorders in soldiers. Batten's eclectic approach was typical of the neurologists of his time (Linden and Jones, 2012).

'In skilful and determined hands'—the development of Yealland's treatment protocol

Although Batten occasionally used electrical therapy for his patients with shell shock, with his first recorded use in March 1915, Yealland was among the first in Britain to incorporate it into a systematic treatment programme. Electrical treatment had its heyday in the 19th century, fuelled by advances in both electromagnetism and neurophysiology (Rowbottom and Susskind, 1984). Departments of electrotherapy were opened in leading teaching hospitals, such as the Radcliffe Infirmary in Oxford and Guy's Hospital in London where Golding Bird applied faradic currents for the treatment of hysterical paralysis in the 1840s. The main advocate of electrotherapy in France was Guillaume-Benjamin-Amand Duchenne (1806–75), who applied it for the treatment of disorders of peripheral nerve and muscle. His 1855 work, *De l'électrisation localisée*, was translated into English in 1871 by Herbert Tibbits (1838–91), the medical superintendent of the West End Hospital for Diseases of the Nervous System in Welbeck Street, London. Electrotherapy was also popular with



Figure 1 Graduation photograph of Lewis Yealland, 1912. With kind permission of Dr. Susan Yealland.

Physician <i>D. Buzzard</i>		Ward <i>Morgan</i>
House Physician <i>D. Yealland</i>		Clinical Clerk _____
Name <i>L. C. [REDACTED]</i>		Married or Single _____ Age <i>17</i>
Occupation <i>9534 Pte. S/S. Staffs.</i>		Address <i>Potters Lane Wednesbury Staffordshire</i>
Admitted <i>8. 12. 15</i>	Disease.	
Discharged <i>21-8-16</i>	<i>Shell Shock</i>	
	<i>+ Venous Thrombosis L. Leg.</i>	
	Ill <i>2 months</i>	
	Result <i>improved</i>	
<i>Insillectum</i>		

Figure 2 (A and B) Case record of the first soldier with 'shell shock' treated by Yealland at Queen Square; cover page and first page of Yealland's handwritten account of the patient's history. This 17-year-old soldier, the youngest soldier to be admitted to Queen Square during World War I had developed catatonia. The patient was ordered bed rest, received a milk diet and massages. Yealland prescribed bromide salts, mixtures of strychnine and belladonna, as well as the analgesics acetylsalicylic acid and phenacetin. On discharge, the patient's condition was stated as 'improved', and he was recommended for discharge from the army. For extracts of the transcribed records, see the online Supplementary material.

asylum psychiatrists in the late 19th century, applied not only to the limbs but also to the head, and there were occasional reports of inadvertent seizures, in effect precursors of electroconvulsive treatment. However, because of the generally disappointing results for mental illness, this treatment had largely vanished from the UK by the beginning of the 20th century (Beveridge and Renvoize,

1988). In Germany, by contrast, electrotherapy had remained fashionable in the decade before World War I as a treatment for a wide range of neurological and psychiatric problems (Killen, 2006; Linden and Jones, 2012).

The first patient treated by Yealland with faradism was Solomon ('Solly') W., a 35-year-old private from the 9th Oxfordshire and

<u>Complaint.</u>	"Hystero Epileptois Seizures" according to cards.
<u>General note</u>	<p>This youth with brown hair and brown eyes and a well-nourished physique and pleasant features is almost inaccessible. He will only answer questions asked him monosyllables or making a motion with his hands. He lies in a rather stuporous condition and frequently makes grimaces as though he had great fear of something. He is restless in his habits, tossing himself from one place to another on his bed and if he is moved he falls back as though he were lifeless. When aroused he jumps with a start, looks at one confused, looks the opposite way frowning and grimacing as though he were in great agony. He sometimes attempts to say something but cannot be understood in view of the fact that he gasps for breath all the time. He is exceedingly depressed and worried and when asked if he had been at the war replied, "war?" and started suddenly making a characteristic grimace before describing. Sometimes he puts his hand to his head and says "pain". It is quite impossible to get any history from him subjectively.</p>

Figure 2 Continued.

Buckinghamshire Light Infantry who had mainly worked as a waiter in an officers' mess in France and was admitted to Queen Square on 14 December 1915. The patient complained of 'shooting pains in the right shoulder and running up to the neck' (with no objective sensory loss). On examination, Yealland found weakness of the right arm, particularly in the shoulder. Muscular power in other muscle groups was normal, and there was no muscular wasting or flaccidity. Yealland applied faradism to the right arm and leg combined with massage, radiant heat to

the right shoulder and analgesia. According to his case notes, the patient was discharged 'improved' after 2.5 months of inpatient treatment (Dr Taylor, Queen Square Records, 1916).

Yealland's book *Hysterical disorders of warfare*, published in 1918, contains details of 44 cases and therefore provides only partial insight into his clinical practice. The aforementioned case, for example, was not included, perhaps because of the limited treatment success. As most scholarly opinion is based on evidence from Yealland's monograph, we conducted a full survey of the



NATIONAL HOSPITAL, QUEEN SQUARE, FRONTAGE.

Figure 3 The National Hospital for the Paralyzed and Epileptic at around 1914; Queen Square Archive.

patient files for the period August 1914 to December 1919, analysing all cases diagnosed with functional disorders ($n = 462$). Author S.L., a board-certified psychiatrist, classified the cases by their contemporary diagnosis, as in our previous work on German World War I records (Linden *et al.*, 2012) and, in addition, derived retrospective diagnoses according to International Classification of Diseases—10th Revision criteria.

Of the 323 soldier cases with functional disorders treated at Queen Square between 8 December 1915 and 7 March 1919 (Yealland's time at Queen Square), Yealland treated at least 196, although there were at least two other resident doctors at Queen Square at any one time. Most cases reported by Yealland in his *Hysterical disorders of warfare* were identified in the original case records. The treatment descriptions in the book were detailed and consistent with the documentation in the hospital notes. During his time at Queen Square, Yealland worked for most of the staff physicians of the hospital (Fig. 4) and gained a reputation for his 'skilful and determined' approach [quoted from the preface to *Hysterical Disorders of Warfare* by E. Farquhar Buzzard (Yealland, 1918, p. vi)].

Although Yealland believed in a psychogenic origin for the symptoms of war neurosis, he communicated a physiological illness model to his patients (Supplementary material). This approach

was harshly criticized by Charles Samuel Myers (1873–1946), consultant psychologist to the British Expeditionary Force in France and editor of the *British Journal of Psychology*, in a letter published in the *Lancet* in December 1919 (Myers, 1919). In Myers's view the communication of a somatic illness model to the patient was unnecessary and dangerous. By contrast, Yealland feared that by communicating a psychological interpretation, the doctor would give the patient the impression that he was suspected of malingering. Simulation of symptoms would bring society's wrath on the soldier and his family and be a strong disincentive to rehabilitation. In Yealland's view, patients were more amenable to the suggestion that they suffered from a physiological disturbance that could be potentially remedied by a physical treatment such as faradism (Yealland and Adrian, 1917). For the same reason, Yealland avoided the term 'hysteria' in clinical notes (Yealland and Adrian, 1917) and instead preferred the term 'functional disorder'. However, by acknowledging the important contribution of suggestion and other psychological techniques, Yealland recognized the interaction of psychological and physiological processes both in the aetiology and in the treatment of functional neurological syndromes. He came close to the modern model in which physiological changes can induce functional impairment even in the absence of gross 'organic' lesions (Vuilleumier, 2005).

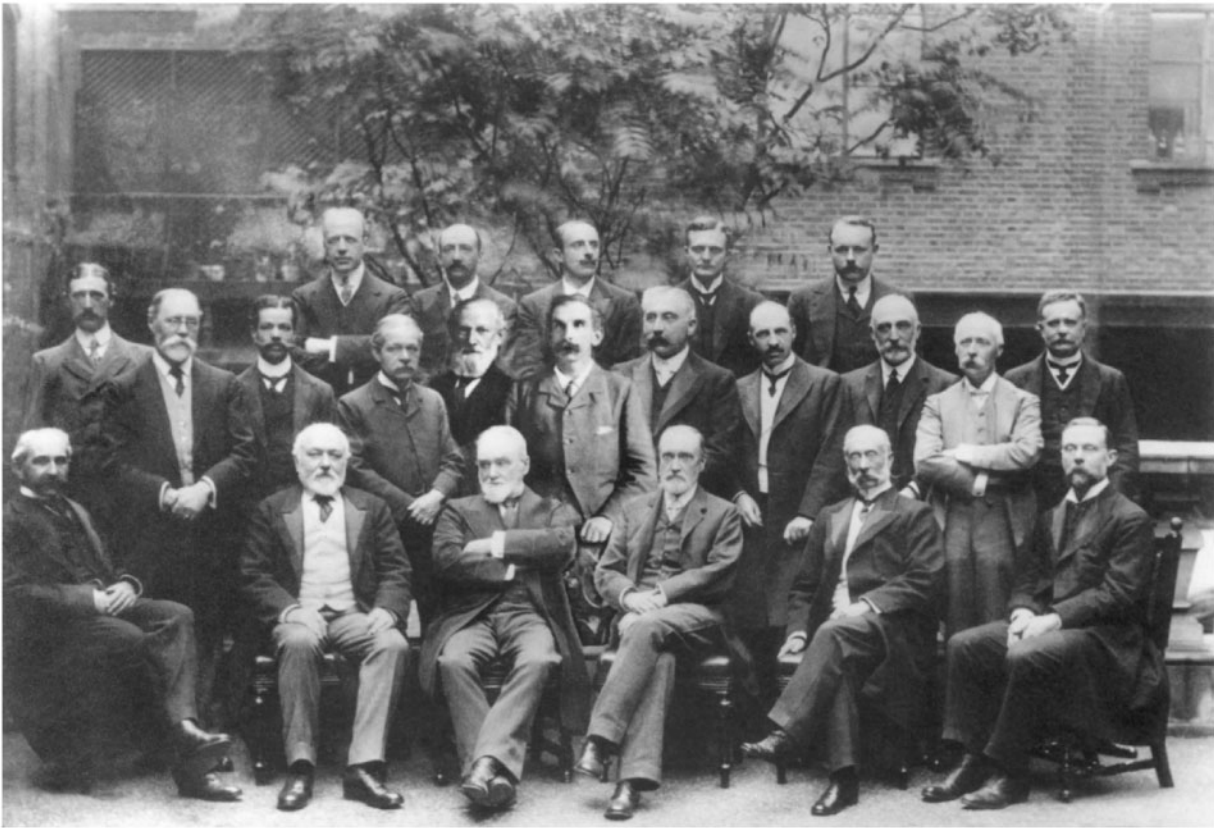


Figure 4 Consultants at Queen Square, 1906. *Back row, left to right:* Armour, Batten, Collier, Sargent, E.F. Buzzard. *Middle row, left to right:* Tate, Beevor, Risien Russell, Cumberbatch, Gowers, Horsley, Ballance, Aldren Turner, Taylor, Marcus Gunn, Tooth. *Front row, left to right:* Semon, T. Buzzard, Hughlings Jackson, Bastian, Ferrier, Ormerod; Queen Square Archive. Yealland treated 94% (17/18) of Dr S.A. Kinnier Wilson's (appointed Consultant in 1912), 90% (62/69) of Dr J. S. Collier's, 86% (24/28) of Dr E. Farquhar Buzzard's, 83% (43/52) of Dr James Taylor's and 78% (32/41) of Dr W. Aldren Turner's patients with functional disorders admitted between 8 December 1915 and 7 March 1919 (Yealland's time at Queen Square).

'Establishing a diagnosis is obviously not enough': Yealland and Adrian's treatment rationale

In their article on 'Some common war neuroses' published in the *Lancet* on 9 June 1917, Yealland and Adrian lamented the neglect of the treatment of 'hysterical disorders' in the recent English medical literature '...and we are left with the impression that our task is at an end when we have succeeded in establishing the diagnosis. In war-time this is obviously not enough: adequate treatment is essential, and it will make all the difference between a useless burden to the State and a useful civilian or even a useful soldier' (Yealland and Adrian, 1917). They devised an intensive treatment programme (Yealland and Adrian, 1917), which was in many respects similar to the 'surprise attack' practised by Fritz Kaufmann in Germany (Linden and Jones, 2012) and the 'rééducation intensive' proposed by Clovis Vincent in France (Roudebush, 2001). Yealland and Adrian advocated a combination of suggestive treatment and re-education that was supposed to make the patient believe that he would be cured or had already been cured. Vincent, too, used the suggestive powers of electrical

stimulation and employed faradism to demonstrate preserved function of paralysed limbs (Roudebush, 2001).

Verbal suggestion was usually combined with electric stimuli producing feeling and movement in an anaesthetic and paralysed limb. Yealland and Adrian (1917) also reported a case in which they applied weak electrical stimulation directly to the scalp overlying the motor cortex. The patient, an officer who had some knowledge of brain topography and had been told that he would be able to move his arm after stimulation of the respective cortical area, responded immediately. Today's treatment protocols with transcranial magnetic stimulation, discussed later in the text, use more sophisticated neurophysiological tools but are based on the same principles. Yealland also described early applications of cross-modal sensory integration. For treatment of functional deafness, he applied tuning forks of different frequencies to the mastoid, beginning with those in which the vibrations were slow enough to be felt rather than heard and reducing the size gradually until the fork could be heard. Yealland and Adrian (1917) reported clinical success particularly for functional disorders that were characterized by the 'absence or diminished activity of a normal function' (such as functional deafness, mutism, blindness and paralysis of limbs). Conversely, in disorders with 'excessive

and disordered activity' (such as tremors, fits and jerks), they considered isolation therapy more successful because it made 'the patient's illness a dreary and unprofitable business instead of a source of pride and satisfaction' (Yealland and Adrian, 1917).

'The cloak of negativism': Yealland the clinician and systematic observer

Yealland examined the majority of soldier patients with functional disorders admitted to Queen Square during the war years. He was particularly interested in cases 'in which the patient suffers from some somatic disorder such as paralysis, loss of speech, &c., without showing any signs of organic change in the central nervous system' (which were labelled as 'war neuroses') (Yealland and Adrian, 1917), but less so in patients with purely psychological symptoms (which were labelled as 'neurasthenia' or 'psychasthenia'). Yealland believed that patients with war neuroses had three major characteristics in common: weakness of the will, negativism and hyper-suggestibility. Yealland defined negativism as 'an active but not necessarily a conscious, resistance to the idea of recovery' (Yealland and Adrian, 1917) and saw it as the most important sign that distinguished functional disorders both from organic disorders and malingering. The patients typically did the opposite of what was asked of them, down to the level of innervation of antagonistic muscle groups (Yealland and Adrian, 1918). The overactivity of antagonistic muscles in functional motor disorders had already been described by Charles Edward Beevor (1854–1908): 'The condition of the antagonists acting before the principal movers begin, I have never seen in any other condition besides those of so-called hysterical or functional paralysis. I therefore venture to think that it is a diagnostic symptom of this condition' (Beevor, 1903). Yealland considered negativism to be an obstacle to therapeutic success, whereas the patient's suggestibility could be exploited for suggestive treatments.

Yealland's descriptions of the phenomenology of functional deficit syndromes suggest that they were of a higher order and closer to agnosia and to dyspraxia than to cases of complete sensory or motor loss. For example, he documented a patient's description of his paralysis, which resembled an alien limb syndrome: 'the defect does not lie in the power of my arm, but in the power to use my arm. It appears to me that I have forgotten how to use it, and the disorder has existed so long that the limb does not seem to be part of me' (Yealland, 1918, p. 93). Similarly, in the process of recovery from functional deafness, the patients first started to hear a sound, but could not give any meaning to it, and in functional blindness, the patients were able to see something, but did not know what it was. These descriptions broadly conform to Janet's (1920) model of narrowing of attention or 'contraction of the field of consciousness', although Yealland did not make this link explicitly. Janet's (1920) model has formed the basis for many recent theories of functional motor and sensory symptoms until the recent challenge from a Bayesian perspective by Edwards *et al.* (2012).

Yealland wanted to create a 'permanent neurological record' of some of his cases of war neurosis and document the treatment 'process from the beginning to the end'. Like Arthur Hurst (Jones, 2012), he managed to secure a grant from the Medical Research

Committee to record cases on film, and in July and August 1917, Yealland's treatment of at least two soldiers with functional disorders was filmed by a Pathé cameraman on the roof of the hospital (patients Mark Edward M., 44-year-old private from the Northampton Regiment and 33-year-old private James C. from the 12th Royal Sussex Regiment; Dr Wilson, Queen Square Records, 1917). To our knowledge, no copy of this film has survived.

Table 1 shows the sociodemographic data and clinical characteristics (including all modern International Classification of Diseases—10th Revision diagnoses) of all soldiers with functional disorders that Yealland treated during his time at Queen Square. Most of his patients were regulars and had a relatively long illness history (on average ~40 weeks). In 104 of 196 cases, functional motor and somatosensory symptoms were combined. Motor disorders most commonly involved paralyse of both the arms and legs. The anaesthesia of a paralysed limb was commonly limited to a line drawn round the limb and did not correspond to any dermatomal or root distribution. Only 6% of patients presented with functional seizures, which is a low proportion of cases compared with our German sample of soldiers admitted to the Charité during World War I [28% of soldiers were diagnosed with functional seizures (Linden *et al.*, 2012)]. The category 'Result of treatment' in Table 1 refers to the patient's discharge state and is based on a handwritten judgement in the clinical notes, possibly by Yealland himself.

'The attack comes on with some excitement': Yealland's interest in functional seizures

In addition to his study of functional motor and sensory deficits, Yealland developed a special interest in functional seizures and the clinical differentiation between epilepsy and pseudo-epileptic seizures (Yealland, 1918, 1923). During the war years, he treated 12 soldiers with functional seizures at Queen Square (Table 1). Clonic fits, Yealland emphasized, 'were in my experience the only type of hysterical seizure that occurred in soldiers in the recent war... the attack comes on with some excitement or sudden shock' (Yealland, 1923). Based on his observations, Yealland concluded that predominantly tonic fits, such as the classic 'arc de cercle' (opisthotonus) described by Charcot, never occurred in men. Contrary to his opinion, there are descriptions of opisthotonus in soldier patients both in Hurst's book (1918, p. 98) and in German case records of the time (Linden *et al.*, 2012).

Yealland's treatment rationale for 'hysterical fits' based on the clinical observation that patients reacted to external stimuli during a functional seizure, that they could be persuaded consciously to reproduce a seizure and that one individual always presented with the same type of fit (Yealland, 1923). Yealland frequently told patients with a history of functional seizures to reproduce a typical fit. During the seizure, the patient was made to realize that his consciousness was retained during the fit; he was asked to focus his attention on his fit and describe the nature of it. In a final step of treatment, the patient learned to inhibit seizures through re-education. 'Some, on realising that they are conscious during

Table 1 Demographic and clinical details of Yealland's 196 soldier patients with functional disorders treated at Queen Square between 8 December 1915 and 7 March 1919

Military rank	Regulars: <i>n</i> = 165 Non-commissioned officers: <i>n</i> = 30 Officers: <i>n</i> = 1		
Average age (years)	28.6 ± 8.0		
Duration of symptoms (weeks)	40.1 ± 70.1		
Length of stay at Queen Square (days)	70.1 ± 58.3		
Nationality	British: <i>n</i> = 173 Irish: <i>n</i> = 6 Belgian: <i>n</i> = 6 Canadian: <i>n</i> = 6 Australian: <i>n</i> = 4 South African: <i>n</i> = 1		
Year of admission	1915: <i>n</i> = 4 1916: <i>n</i> = 69 1917: <i>n</i> = 65 1918: <i>n</i> = 55 1919: <i>n</i> = 3		
Marital status	Married: <i>n</i> = 81 Single: <i>n</i> = 115		
Referred from	Other British hospital: <i>n</i> = 118 Hospital at frontline: <i>n</i> = 20		
Wounded in battle	<i>n</i> = 52		
Exposed to frontline service	<i>n</i> = 182		
Past history of mental problems	<i>n</i> = 9		
Family history of mental illness	<i>n</i> = 12		
Contemporaneous diagnosis	Functional disorder: <i>n</i> = 101 Neurasthenia: <i>n</i> = 28 Hysteria: <i>n</i> = 26 Neurosis: <i>n</i> = 17 Shell shock: <i>n</i> = 11		
International Classification of Diseases—10th Revision diagnosis	Psychotic	F23	<i>n</i> = 4
	Affective	F32	<i>n</i> = 1
	Adjustment disorder	F43.2	<i>n</i> = 16
	Motor conversion	F44.4	<i>n</i> = 148
	Sensory conversion	F44.6	<i>n</i> = 108
	Dissociative seizures	F44.5	<i>n</i> = 12
	Other dissociative symptoms (other than F.44.4/5/6)	F44.2, F44.88	<i>n</i> = 11
	Somatiform disorders	F45, F48	<i>n</i> = 28
Symptoms ^a	Involuntary movements (shaking, tremor, choreatic movements etc.)		<i>n</i> = 31
	Visual disturbance (blindness, diplopia etc.)		<i>n</i> = 5
	Deafness		<i>n</i> = 7
	Motor disturbances other than involuntary movements		<i>n</i> = 111
	Somatosensory disturbance		<i>n</i> = 103
	Speech disturbances (aphonia, stutter etc.)		<i>n</i> = 37
	Pseudo-seizures		<i>n</i> = 12
	Anxiety and depression		<i>n</i> = 23
	Dissociative states		<i>n</i> = 9
	Catatonic symptoms		<i>n</i> = 3
	Pain and autonomic dysfunction		<i>n</i> = 38
	Psychotic		<i>n</i> = 4
Result of treatment (as indicated in notes)	Cured: <i>n</i> = 88 Improved: <i>n</i> = 84 In <i>status quo</i> : <i>n</i> = 24		

(continued)

Table 1 Continued

Recommendation for 'Fitness for military service'	Home service: <i>n</i> = 22 Garrison service: <i>n</i> = 1 Discharge, 'no further use': <i>n</i> = 32 Furlough and duty: <i>n</i> = 7 Furlough and light duty: <i>n</i> = 16 Already discharged from military service: <i>n</i> = 21
Treatment	Faradism: <i>n</i> = 108 (combined with re-education and suggestion) Isolation: <i>n</i> = 12 Physical treatment (massage, baths, heat etc.): <i>n</i> = 59 Exercises: <i>n</i> = 35 Persuasion: <i>n</i> = 2

A functional disorder was defined as any condition without a demonstrable organic basis (including the contemporaneous diagnoses of neurasthenia, psychasthenia, and war neuroses).

a One patient can have several diagnoses and symptoms from several symptom groups.

a seizure, and that they have formed a clear idea of the nature of the attack from beginning to end, have no further seizures' (Yealland, 1923). According to Yealland, the therapist had to induce fits in a patient with a higher frequency than occurred without prompting to achieve the desired treatment response. This seems to be one of the first instances where re-experience of symptoms and learning of control, which are standard elements of modern psychological interventions, were used in the treatment of psychological trauma.

'Yards and yards of cable'—patients' views and literary afterlife

'...a fair sized room painted white. In the centre of the room was a white enamelled table, and nearby two dressing trolleys. On the floor were yards and yards of cable, which was strewn all over the place, and connected to a telegraph instrument placed upon an ordinary deal table. The room was crowded with nurses who were in white dresses and white aprons, they were all talking excitedly. A Doctor now enters in a white coat, he walks round the room, stepping over the coils of wire and is also excited and in a great hurry. He has a knife in his hand....The doctor was an exact representation of Dr. Yealland' (Dr Wilson, Queen Square Records, 1918).

This is a handwritten account of the dream that Frederick O. had on 16 March 1918 at Queen Square. The 35-year-old private in the Army Service Corps had developed a paralysis of his lower limbs after a shell explosion at Ypres in June 1917. This dream documents the anxiety of many patients about being treated by Yealland. Several patients decided, after having been admitted to Queen Square for treatment, to discharge themselves against medical advice. One patient, 19-year-old private James T. who had been wounded and gassed in France, had to sign a form (handwritten by Yealland) saying that he 'decided to discharge [himself] from the National Hospital because [he was] afraid to undergo treatment, which proved beneficial to [him] on a previous occasion', and that he took full responsibility for what might happen to him after he left the hospital (Dr Taylor, Queen Square Records, 1917) (Fig. 5). Other patients appear to have

recovered (after a long illness history) shortly before Yealland was about to initiate treatment.

Unfortunately, documents like Frederick O.'s account of his dream are scarce. It is therefore difficult to know how patients—as opposed to the medical profession—perceived Yealland's treatment approaches. During the war years, Yealland became well-known for his successful faradic treatment of war neurosis. Patients from all over the UK, and Belgian, Canadian, Irish, Australian, American and South African soldiers were referred to Queen Square. Even colleagues like Sir Frederick Walker Mott (1853–1926), consultant neurologist and neuropathologist to the London County Council and an acknowledged specialist on shell shock, referred patients he had failed to cure to Yealland. In his Chadwick Lecture, held on 26 April 1917, on 'Mental Hygiene in Shell-shock, during and after the War' (Mott, 1917), Mott reported on one of his patients who had been deaf and mute for nearly a year. Mott had tried 'strong electric shocks, tuning-forks to the head, and sudden noises and hypnotism, without any result'. He then referred the soldier to Yealland who managed to cure him. Mott concluded:

'I think the imposing array of electrical machines, coloured lights, and other strong suggestive influences, were partly instrumental in accomplishing what I had failed to do, but also I think the knowledge of success in other difficult cases attending Dr. Yealland's efforts, played a very important part in curing by strong suggestion this apparently hopeless case'.

The importance of suggestion as a leading mechanism behind the clinical success of electrotherapy was stated even more succinctly by Grafton Elliot Smith (1871–1937), one of the fathers of brain mapping, and Tom Hatherley Pear (1886–1972) in their 1917 book 'Shell Shock and its Lessons' in relation to the case of a German naval seaman with hysterical aphonia: 'This application of the faradic current was suggestion pure and simple' (Smith and Pear, 1917, p. 44).

The Queen Square case records and Yealland's book provide incontrovertible evidence of his harsh treatment methods and the asymmetrical relation between doctor and patient. Yealland played on the soldier's greatest fear of being accused of

January 29/17

This is to certify that I James
 [redacted] have decided to discharge
 myself from the National Hospital
 for Paralyzed and Epileptic because
 I am afraid to undergo
 treatment which proved beneficial
 to me on a previous occasion.
 I take full responsibility for
 what may happen to me
 after I leave the National
 Hospital Queen Square

Signed -
 James [redacted]

Figure 5 Handwritten form by Yealland, signed by one of his patients who decided to discharge himself against medical advice (Dr Taylor, Queen Square Records, 1917).

malingering, by explaining to the patient: 'If you recover quickly, then it is due to a disease, if you recover slowly, ... then I shall decide that your condition is due to malingering' (Yealland, 1918, p. 59). He also appealed to the soldier's sense of honour, responsibility towards his family, pride and self-respect. The way he addressed the patient was schoolmasterly, authoritative, sometimes patronizing, denying the patient compassion and moral support.

Treatment could be extremely painful, when strong electrical currents were used or supra-orbital pressure was applied for long periods (in patients with hysterical fits and hysterical blindness; Yealland and Adrian, 1917). However, Yealland's approach was generally in line with medical practice of the time (Linden and Jones, 2012), and the tradition of aversion shock therapies lasted long into the second half of the 20th century (King and

Bartlett, 1999). Even some of the physicians who stressed the importance of empathy and a trusting relationship between doctor and patient had recourse to painful shock treatment. For example, Mott (1917) not only referred non-respondent patients to Yealland but also frequently used electrotherapy for soldiers with functional disorders at the newly founded Maudsley Hospital. Nevertheless, Yealland was singled out in later scholarly and literary tradition and vilified as a proponent of inhumane treatment methods.

In his article on 'The Strange Second Death of Lewis Yealland', Dennis Duffy describes how 'beginning in 1985, Yealland's reputation began its posthumous disintegration' (Duffy, 2011). Most scholars writing about shell shock and the reaction of the medical profession to this epidemic of war trauma seemed to have a clear opinion on Yealland's 'barbarous' treatment practices. Elaine Showalter found Yealland's 'Orwellian scenes of mind control [...] painfully embarrassing to contemporary readers' (Showalter, 1987, p. 178). She contrasted his therapeutic approach with that of W.H.R. Rivers at Craiglockhart and concluded: 'If Yealland was the worst of the military psychiatrists, Sassoon's therapist, Rivers, was unquestionably the best' (Showalter, 1987, p. 181). The 'convenient dramatic contrast' (Duffy, 2011) between Yealland and Rivers was also adopted by Pat Barker in her 1991 novel 'Regeneration', and its later film adaptation (Regeneration, 1997). Barker chose two case histories of Yealland's book to illustrate his treatment methods. Patient 'G9' (Yealland, 1918, pp. 208–11; Barker, 2008, pp. 223–26), whom we identified as 22-year-old private George H. from the Argyll and Sutherland Highlanders (Dr Collier, Queen Square Records, 1917), was admitted to Queen Square on 20 October 1916 (Barker's book stated that he was admitted in November 1917) and discharged 'improved' but 'of no further use' after 4 months of treatment. The second case, which Barker literally cited, was the first ('A1') of Yealland's book (Yealland, 1918, pp. 7–15; Barker, 2008, pp. 226–33) and certainly the most dramatic where the patient's 'mouth was kept open by means of a tongue depressor; a strong faradic current was applied to the posterior wall of the pharynx, and with this stimulus (the patient) jumped backwards, detaching the wires from the battery....' (Yealland, 1918). Interestingly, most modern scholars cite this first 'didactic illustration' of Yealland's *Hysterical disorders of warfare* (Leed, 1979, pp. 174–75; Showalter, 1987, pp. 176–77; Binneveld, 1997, p. 111; Shephard, 2001, p. 77; Scull, 2009, p. 171).

'The worst of military psychiatrists'—myths and misconceptions about Yealland's treatment methods

Several misconceptions about Yealland's work with traumatized soldiers have survived, despite the dearth of primary resources: (i) Yealland only used disciplinary treatment with strong electric currents (Showalter, 1987 pp. 176–78); (ii) Yealland claimed 100% success rates (Binneveld, 1997, p. 111); and (iii) Yealland was isolated from the rest of the neurological community (Leese, 2002 pp. 7, 74).

Strikingly, Yealland is almost exclusively cited for his treatment with strong faradic currents and has been depicted as the leading exponent of disciplinary therapy in Britain (Leed, 1979; Leese, 2002). Yealland's treatment undoubtedly had a punitive component, but this was only part of a more comprehensive treatment concept. Contrary to its literary depiction, faradism for Yealland was not primarily a punishment but part of a form of suggestive treatment. Furthermore, according to the case records and also Yealland's and Adrian's (1917) joint paper, Yealland mainly used weak currents and only resorted to painful strong currents if the patient did not respond to first-line treatment (Yealland and Adrian, 1917). For example, in patients with functional mutism, tickling the back of the patient's mouth with a mirror or tongue depressor could trigger a 'reflex phonation' making the application of painful currents through a pharyngeal electrode unnecessary (Yealland and Adrian, 1917).

Contrary to prevalent belief, Yealland's duration of inpatient treatment, treatment outcomes and judgements of military fitness did not differ from those of his colleagues at Queen Square. The average length of stay for Yealland's soldier patients with functional disorders was >2 months (Table 1). The statement of Binneveld (1997, p. 111) that 'Yealland also claimed never to fail. His patients were always cured' is not consistent with our data either. As documented in the case records, 88 (45%) of Yealland's patients were classified as 'cured', 84 (43%) as 'improved' and in 24 cases (13%), his treatment had failed. It is true that Yealland claimed higher success rates for patients treated with faradism, which only included those with classical functional motor and sensory symptoms. From July 1917 onwards, all of his patients with functional sensory-motor symptoms treated with faradism were eventually discharged as 'cured'. Furthermore, cases where he claimed success are over-represented in his book, which contributed to his public image as the leading expert on electrotherapy for traumatized soldiers. However, the basis for the discharge categories 'cured' and 'improved' does not become entirely clear from the records. We are not aware of any formal follow-up studies of treatment outcomes at Queen Square. An important long-term outcome study, not confined to electrotherapy cases, was conducted by the Ministry of Pensions in the 1920s and concluded that the outcome for war veterans with chronic functional disorders was poor (Grant, 1925; Jones and Wessely, 2005, p. 155).

Thus, Yealland's public image was based on selected reporting of cases with successful outcomes in his book and success rates that were derived from internal staff judgements rather than long-term outcome studies. Yealland and Adrian (1917) openly admitted that they could not provide a permanent cure ('give the patient a new mind') but only relieve functional symptoms, and Yealland was not alone in this eclectic and subjective approach. Outcome studies such as the questionnaire-based long-term follow-ups conducted by the German neurologist Max Nonne (Nonne, 1917; Linden and Jones, 2012) were certainly the exception in World War I.

Yealland and the other neurologists at Queen Square sent only a small percentage of patients back to the front. In those cases treated by Yealland, where such outcome data were reported, only 7% were assessed as fit for active duty (Table 1).

In summer 1916, Yealland had realized that ‘it is quite important that [cases of functional disorders] be not sent back to the front. It is almost certain that a similar attack would occur should [a traumatised soldier] be sent back again. ... he would be quite useful in civil life or home service preferably the former’ (handwritten note by Yealland in one of the patient files—George C.; Dr Collier, Queen Square Records, 1916). His colleagues at Queen Square took a similar view. Although Jones (1919) reported a relapse rate of 4% at 2 months from discharge from a forward psychiatric unit, he believed that the longer-term rate was far higher. Plausibly relapse rates from UK hospitals were higher because they treated chronic or more severe cases than those retained in France.

On analysing Yealland’s treatment approaches Leese (2002) came to the conclusion that ‘Yealland seems to have been isolated not only within the treatment regime of Queen Square, but on the national stage’ (Leese, 2002, p. 74). Yet, during the war years, all physicians at the National Hospital used the same treatment methods [although Yealland resorted more to faradism (in 55% of his patients versus 32% for other Resident Medical Officers), less to isolation (6 versus 12%) and physical therapies (30 versus 48%)]. Moreover, the treatment of war neuroses with faradism was practiced at Queen Square and indeed internationally (Roudebush, 2001; Linden and Jones, 2012) before Yealland arrived on the scene.

The power of suggestion: the lessons of Yealland for today

When assessing Yealland’s treatment methods, we have to consider their historical context, the pressure on doctors to return invalid soldiers to active duty and the other treatment options available (Jones, 2004). When appointed to Queen Square, Yealland was comparatively young and inexperienced. As an ambitious doctor keen to establish his clinical credentials, he may have been blinded by the apparent success of electrical treatment to broader questions about its long-term effectiveness and ethical considerations. Indeed, his subsequent clinical practice was more measured, and he earned a reputation for empathy and concern for his patients (Obituary, 1954). Furthermore, Yealland’s treatment methods were not only influenced by the emerging field of neurophysiology but also by cognitive (persuasion) and behavioural theories (operant conditioning). As emphasized by Farquhar Buzzard in the foreword to the *Hysterical disorders of warfare*, the epidemic of war trauma paved the way for a more psychologically based treatment approach (Yealland, 1918, p. viii).

World War I marked a turning point in the history of neurological treatment because clinicians were provided with the opportunity and resources to treat and evaluate large numbers of patients with similar symptoms (Linden and Jones, 2012). Although many of the specific treatments were forgotten after the Armistice (Jones and Wessely, 2005) or superseded by the increasing influence of psychoanalysis (Shorter, 1997 pp. 145–89), they experienced a revival in the 1970s and 1980s when small case series of isolation treatment and faradic stimulation were published in leading psychiatric journals (Dickes, 1974; Hafeiz, 1980; Khalil *et al.*, 1988). Furthermore, the psychological

and physiological approaches to functional disorders established by Yealland and his contemporaries were conceptually similar to some recent treatments, although they are rarely acknowledged as precursors. The biofeedback procedure with electromyographic signals developed by Fishbain *et al.* (1988) incorporated the communication of a somatic illness model, demonstration of intact function, exercises and operant conditioning, and was thus conceptually close to Yealland’s treatment protocols. Modern versions of electrotherapy include transcranial magnetic stimulation and transcranial direct current stimulation (Wassermann and Zimmermann, 2012). For example, Chastan and Parain (2010) treated 70 patients with functional paralysis with repetitive transcranial magnetic stimulation to the contralateral primary motor cortex, with high success rates. This stimulation evoked a contraction of the muscles of the paralysed limb that was visible to the patient, and the authors argued that this demonstration of function was an essential part of their treatment. Similarly, Yealland had argued that the patient’s experience of preserved motor function was crucial for the recovery of movement. The nature of these treatment approaches—past and present—makes controlled studies extremely difficult to design, and thus the contribution of suggestion may have been substantial, as foreseen by Yealland.

Unlike some of his colleagues involved in the treatment of shell shock (Rows, 1916; Smith and Pear, 1917; Myers, 2011), Yealland did not interpret the meaning of his patients’ symptoms; to him they were deficits that required a physical intervention rather than clues to the patients’ hidden fears and conflicts. Myers, in contrast, advocated an individualized treatment approach that not only targeted symptoms but also aimed at tracing disorders ‘to their emotional origin’ (Myers, 2011, p. 60). He also debated the justification of particular treatments and explored the adverse consequences of failed interventions (Myers, 1919), arguing that coercive treatment with no psychological insight could reinforce functional symptoms. By contrast, Yealland’s attitude to the ethics of coercive treatments was one-dimensional: ‘the only merits that can be assigned to such methods of treatment are to be found in the result’ (Yealland, 1918, p. 57). His neurological deficit model and paternalistic attitude—justification by results and disregard for patient autonomy—was later challenged by present patient-centred approaches. However, faced with the challenge of treating functional movement disorders, some authors have advocated a revival of suggestive methods and the associated ethical concept of ‘asymmetric paternalism’ (Shamy, 2012, p. 298). This approach aims at guiding patients towards a particular outcome (when it is judged that they might act against their best interests) without subverting the principle of autonomy. This current ethical debate was foreshadowed in the letter on ‘the justifiability of therapeutic lying’ that Charles Myers sent to the *Lancet* shortly after the publication of *Hysterical disorders of warfare* (Myers, 1919). It is striking and not widely known that the essential questions of the current debate on the treatment of functional neurological disorders, regarding the importance of suggestion, the demonstration of preserved function and the ethics of partially unexplained treatment methods, already divided the medical profession in the years of World War I.

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Supplementary material

Supplementary material is available at *Brain* online.

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