Einstein's light quanta and the understanding of scotopic vision

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In 1905, Einstein put forward his concept of light quanta. Light quanta are particle-like bundles of energy which are of relevance if the mechanism of emission and absorption of light is to be understood. Scientists working in the field of scotopic vision, i.e., vision under dark-adapted conditions, soon realized that a relatively small number of quanta were required to yield a visual sensation. The physical fluctuation of such a weak stimulus could not be neglected and, in addition to the inevitable biological variability, another factor of uncertainty had to be considered when human scotopic sensitivity was investigated. Although different weights were given to these factors, there was agreement that the number of quanta absorbed at the absolute threshold was 20 or less. As these few quanta are distributed over a retinal area of several hundred rods, it was reasonable to assume that one quantum excites a rod. This was confirmed by modern electrophysiological studies which clearly showed that retinal rods respond to single light quanta.

Session 1. Scientists and Methodology
Wednesday, 17 June 2009, 9:00 – 10:30 am

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
Charleston, South Carolina, USA, 16-20 June 2009

Is there an evolutionary continuity between language, its function and its biology?

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Much has been made of a "continuity thesis," claiming that speech production errors in health and disease exist on a scale of degree rather than kind. Whether or not functional continuities adumbrate biological continuities is not known; many argue that they do not. Naturally, the outcome of "kind" vs. "degree" claims will have repercussions for evolutionary theory.

The structural constraints of slips-of-the-tongue in normalcy and their analogs in paraphasia have intrigued scientists from Hughlings-Jackson, Freud, James, and Pick up to the recent connectionist models of Gary Dell and others. They have traced this continuity in health and disease, and have ruled out strict demarcations between them. Accordingly, one might expect continuities to have existed within early Homo sapiens's language. Numerous scientists have claimed that evolutionary continuities in the mammalian brain commit us to mere differences of degree within their communication systems. Few, however, exclude the possibility of sudden shift at punctuation points within otherwise gradient evolution. This, in turn, could easily forge a difference in "kind" between the internal organ of human language and the language of non-human primates. These possibilities engender a web of evolutionary enigmas. My paper will discuss some of the puzzling dichotomies of "degree" vs. "kind" within the overall picture of human language and how it came to be structured in the metaphor we refer to as "the human mind."

I will argue for a strict distinction between physical and mental continuities and will suggest that their evolution was neither a monistic voyage, nor a parallel evolution of the psychic and the physical. I will suggest that the body and its mind have different ontologies. Spencer developed the notion that the mind and the body have a history, and no physiological psychology yokes both. Finally, I will suggest that an internal biological organ of language is not to be conflated with its exterior performance in society. If this is the case, we can forge a meaningful view of linguistic biological organs as having principles and structures that are complex, but with no necessarily ties to communication. External language becomes interlaced with constraints, alterations and changes, which are social, cultural, geographical and perceptual. The so-called "universal" grammar rests within the biological organ, sculpted by some recondite force that belongs to the inner world of the mind. How *that* sprung forth appears beyond the reach of Darwin.

Session 4. A Celebration in Honor of Charles Darwin
Wednesday, 17 June 2009, 3:00 – 5:30 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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Making patients perform: imitative practices and textbook knowledge of modern neurological patients

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Making, describing, eliciting, imitating, performing, experiencing – all words that might be used to describe the ways neurological symptoms manifest. Ever since neurology became a specialty of medicine, the task of discovering and then making neurological symptoms comprehensible to patients, caregivers, and medical students alike has fallen on the shoulders of neurologists. That task has been a challenging one. Since the rise of Paris medical school, the notion of the normal and pathological has been deeply rooted in the conception that the body in the morgue could provide a window into the hidden function and dysfunction of the living body. Yet, due to their often epistemological and performative ambiguities, neurological diseases have historically been some of the most challenging to explain and demonstrate in living patients, especially in the absence of modern technologies of revealing. Using textbooks and early papers as its chief source to the era before significant radiological tools had been invented; this paper claims that neurologists grounded their diagnostic acumen in the nomenclature of positive and negative signs, which ranged over rational analyses of reflex patterns to hermeneutic observation of patients' everyday habits. Students, accordingly, learned neurological diagnostics as a tacit set of practices, for which there were only a few rational justifications. By being excessively modern in their practices, neurologists turned the patient's body into the machine of its own revealing, and yet strangely, elements of that most 'modern' of medical specialties came also to enjoy similarities with the constitutional medicine that predominated before modern medicine.

Session 6. The Neurology Patient
Thursday, 18 June 2009, 11:00 am – 12:30 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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History of efforts to create definitive taxonomies of communication disabilities

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There have been a number of attempts over the years to create a rational taxonomy for classifying communication disabilities. Various reasons have been given by the taxonomists for the need for such classification systems. In the 1930s when the profession was just beginning in the US, American academics and clinicians hoped to use the taxonomies to lay claim to a client base for the newly minted professionals. These first professionals also used the taxonomies to carve out a body of knowledge around which to organize their specialty training. Speech-language professionals spent the next few decades streamlining those early taxonomies, reducing the overlap, and making the category systems more accessible to the general public. They also began to use various elements of the classification systems as diagnostic categories for assigning etiology and determining treatment. Most recently, taxonomists of communication disorders have argued for a common, accessible, and more consistent set of categories so that speech-language pathologists from different settings and cultures can communicate better with one another. This paper aims to identify and compare these earliest taxonomies and trace their evolution to current times. Included will be a review and critique of the conceptual models that underpin the different taxonomic systems as well as an explication and evaluation of how they were used.

Session 2. Cognitive Science
Wednesday, 17 June 2009, 11:00 am – 12:00 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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The neurological patient as an experimental subject

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Elsewhere I argue that, beginning in the 1920s, neurologists interested in seizure disorders began to move out of institutional settings into research hospitals and universities. This shift is easy to see in a 185-page synthetic essay titled "Epilepsy," written by William J. Lennox and Stanley Cobb for *Medicine* in 1928. Lennox and Cobb discuss the neurological mechanisms of convulsions, the pathology of the nervous tissue, and abnormalities outside of the nervous system, including circulatory problems, glandular abnormalities, and carbohydrate and fat metabolism. For their predecessors, the path to understanding seizure disorders had wound through the experiences of individuals and epilepsy; such individuals appear nowhere in Lennox and Cobb's more than one-hundred-page piece. Their interest, they proclaim, is in "the cause of the seizure…what pulled the trigger rather than what happened after the trigger was pulled."

The question for this paper grew out of my reading of Lennox and Cobb's essay. How did the elite neurologists of the late 1920s and 1930s, in their zeal to test a wide range of hypotheses, change their views of neurological patients (in this case, those suffering from epilepsy)? To answer this question, I have turned to the lengthy published report of a research project run by the Department of Nervous and Mental Diseases at Northwestern University in 1935. Driven by frustration with the faulty supervision of the Department's patients, as well as by patients' frequent failure to take their prescribed medications, Loyal Davis and Lewis J. Pollack created a special clinic for indigent epileptics. At this clinic, Davis, Pollack, and their colleagues systematically explored multiple explanations of epilepsy. They induced ketosis, and hyperventilation, tested the therapeutic usefulness of snake venom and bromides, over- and under-hydrated their patients, and ran studies in prolonged anoxia. Although a number of published papers emerged, the project produced no new insights into convulsive disorders. Further, despite the generous free medical care offered by Northwestern, many clinic patients simply failed to return for subsequent phases of the project or follow-up work. Even in the depths of the Great Depression, these neurological patients proved more recalcitrant than the Northwestern doctors had anticipated, especially those involved in the anoxia experiments. Despite their initial frank impatience with patients, the doctors did not reflect (at least in print) on this outcome. Nonetheless, making neurological patients into compliant experimental subjects, even before the era of human subjects committees, proved a difficult project.

It is important to acknowledge the importance of the systematic testing of common explanations of and therapies for epilepsy, especially when carried out in a carefully controlled research setting. Yet, the Northwestern study also supports the complaint of a contemporary British neurologist, Alan McDougall, that those with epilepsy often suffered more from the treatments than from the disease. McDougall compared neurologists to rat catchers who, in their zeal to dislodge the rats (epilepsy), sometimes destroyed the house (the patient) in which the rats resided.

WITHDRAWN

Session 6. The Neurology Patient
Thursday, 18 June 2009, 11:00 am – 12:30 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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The contributions of W.W. Keen, Jr., MD to diagnosis and treatment of peripheral nerve injuries from the War between the States through WW I

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William Williams Keen, Jr, MD (1837-1932) [WWK] the only medical officer to serve in the War between the States [Wvs.S] and WW I, had a unique opportunity to advance the care and treatment of peripheral nerve wounds. Keen (WWK) was born In Philadelphia on January 19, 1837. He graduated from Brown University in Liberal Arts as valedictorian of his class. At Jefferson Medical College WWK attended surgical clinics of Samuel Gross and Joseph Pancoast; S. Weir Mitchell (SWM) taught him physiology. After graduation, while serving as a US Army surgeon WWK was wounded at the second Battle of Bull Run. Subsequently, SWM had WWK assigned as house surgeon to Turner's Lane Hospital in Philadelphia. WWK assisted SWM and George Morehouse (GM).collected case histories and performed examinations that were published in 1864 as *Gunshot Wounds and Other Injuries of Nerves*.

During the Wvs.S, no systematic attempts were made to suture interrupted nerves or remove intracranial wounds due to fear of sepsis. Superficial limb wounds were debrided, irrigated with clean cold water and healed by secondary intent. More severely injured limbs were amputated. Chronic peripheral nerve pain was treated with perineural injections of atropine and morphine. Keen and Mitchell described the burning characteristic of neuropathic pain that they termed causalgia. Keen described ptosis, meiosis following a gunshot wound that involved the sympathetic nerve, years before Horner.

Upon hearing Lister's lectures in 1876, WWK followed anti-septic techniques. He developed the successful technique of loosely suturing severed sheaths of nerves, then freeing proximal and distal portions from scar, before approximating nerves. At Harvey Cushing's request WWK assisted Cushing in establishing battle field neurosurgical hospital units during WW I where penetrating head injuries and nerve injuries were treated. Keen made significant and enduring contributions to treatment of peripheral nerve lesions.

Session 14. The "War " on Nerves
Saturday, 20 June 2009, 10:30 – 11:30 am

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
Charleston, South Carolina, USA, 16-20 June 2009

Alexander Garden of Charles-Town: 1774 and the arrival of "The wonderful electrical FISHES"

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During the summer of 1774, five electric eels survived the voyage from Surinam, South America to Charles-Town, South Carolina. The arrival of "The wonderful Electrical FISHES" was announced in a local newspaper, which proclaimed they are "a remarkable Cure for the Palsy or Weakness of the Nerves." Among the people who paid one dollar to see them before they were shipped on to England, was Alexander Garden, a physician who had emigrated from Scotland and was himself ill at the time. Garden corresponded with Franklin, Linnaeus (who named the gardenia after him), and other leading scientists, and he was active in numerous scientific societies.

His letter about the eels was published in the 1775 *Philosophical Transactions* as "An Account of the Gymnotus Electricus, or Electric Eel." He devoted the first part of his report to its physical features, before turning to its shocks. He pointed out that known conductors of electricity, including human bodies, communicate the "stroke," whereas non-conductors block it. "The shock which our Surinam fish gives, seems to be wholly electrical; and all the phaenomena or properties of it exactly resemble those of the electric aura of our atmosphere when collected."

Garden letter appeared in the same year and same place as Hugh Williamson's report from Philadelphia on electric eels. These two papers were the first to describe systematic electrical experiments on these fish outside of South America. These experiments, conducted by men of science under better conditions in North America, would generate excitement at the Royal Society of London, where Walsh, Hunter, and Cavendish would now further study the possibility of fish electricity -- a concept destined to revolutionize physiology.

Session 8. "Electrifying" Charleston
Thursday, 18 June 2009, 2:15 – 3:30 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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Where the ways of nature test every nerve: Hysteria and the brainstem

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Standard histories convey the impression that it is possible to trace a continuous account of "hysteria" from ancient times to the present (in the form of conversion disorder and psychosomatic disease), and convey the impression that after the publication of Breuer and Freud's *Studien über Hysterie* (1895) scientific interest in the purportedly functional brain disorder was largely restricted to the psychological direction of psychiatry. This neglects the often heated debate regarding the nature of hysteria during the 1920s and 1930s, particularly amongst French-speaking neurologists and psychiatrists. Significant impetus to the debate was provided by the complex neuropsychiatric phenomena of encephalitis lethargica, and evidence mounted that the omnibus diagnosis of "hysteria" encompassed a broad range of distinct neurological and psychiatric disorders, including focal injury to the brainstem.

Session 11. Brain Disorders
Friday, 19 June 2009, 2:00 – 3:30 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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Precedents for "animal spirits" in Hippocratic treatises

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Descartes' hesitant characterization of the "animal spirits" as a "very subtle wind, or rather as a very pure and lively flame" is the best known definition of the virtue carrying nervous signals, according to the classic theory up to the end of the 18th century. The basic idea can be traced back at least to late pre-Socratic times, when Diogenes of Apollonia concluded that "in all animals the Soul is the same thing, [namely] Air, warmer than that outside in which we are, but much colder than that nearer the sun." Yet, whereas for Diogenes this warm air or "pneuma" was an intelligence-endowed agent equivalent to the soul itself, for Descartes it is a fluid capable of inflating muscles. This latter notion comes from antiquity as well, for already in Aristotle we find the "pneuma" as "capable of pulling and pushing" in the production of animal motion. So the question arises of when and why the "pneuma" or spirit acquired the capacity of performing mechanical work. As it will be shown in this paper, a cross-referenced survey of some early Hippocratic treatises indicates that their theory about "pneuma" went far beyond the well-known attribution of epilepsy and other diseases to disorders in the flow of pneuma within the vessels. Particular attention will be given to paradigms of regular automatism and coordinated collaboration between the elements, and to how those mechanisms were in turn conceived to account for ongoing inhalation and exhalation, as well as for embryonic growth through morphogenic differentiation. Viewed in historical context, these features suggest that Hippocratic speculation about pneuma may be representative of a stage intermediate between pre-Socratic thought and the more mature Aristotelian and Hellenistic theories.

Session 5. Analyzing Our Philosophical, Historical and Cultural Roots
Thursday, 18 June 2009, 8:30 – 10:30 am

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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Dr. Sakel's way: the use of insulin to treat schizophrenia

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Historically, "talk therapies" have never been that effective for psychotic disorders. As a result, the medical community discounted psychology, instead turning to somatic or biological approaches to mental illness. During World War I, Vienna became the center for these new procedures, which included fever therapy for syphilis, induced seizures for psychoses, and coma treatments for schizophrenia. In the 1930s, physician Manfred Sakel, a Viennese from a distinguished family, discovered that by manipulating glucose levels in psychotic patients, he could reduce their symptoms. He eventually began to induce insulin comas, with some success. This treatment became one of the leading ways of approaching schizophrenia for two decades. Incredibly, Sakel did not have a developed hypothesis prior to beginning his experiments. Only after his therapy became the treatment standard did he offer a number of theories for schizophrenia. Debates emerged toward the end of Sakel's life, when psychiatrists began using the first generation of antipsychotic drugs. By the 1950s, it became apparent that the neurotransmitter dopamine impacted the symptoms of schizophrenia, but no one was certain about the relationship. As late as the 1990s, physicians and pharmaceutical developers relied on his "after the fact" logic.

Session 9. International Approaches to Therapeutic Techniques
Friday, 19 June 2009, 8:30 – 10:30 am

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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About Faces and Expressions: From Darwin to WALL-E

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Darwin's 1872 examination of *The Expression of the Emotions in Man and Animals* was enormously popular when first published. In this book Darwin proposed that facial expressions were universal and had evolved according to the same laws as any other trait, that is, by processes of natural selection. This book, however, was largely forgotten for many years. There were a variety of reasons for this neglect: Social scientists considered facial expressions to be culturally determined; many scientists did not consider that facial expressions reflected a specific corresponding emotion; Darwin believed that non-human animals displayed expressions analogous to those of humans; he briefly mentioned the use of facial expressions as a means of communication, but did not elaborate.

An interest in faces, facial expressions, and emotions and how these correlate with one another has resurfaced in recent years. One reason is that we can now use neuroimaging techniques to examine cortical activity in subjects experiencing a variety of emotions, instead of having to rely upon self-report data. In addition, case studies of patients who are incapable of facial movement, such as those with Möbius syndrome, demonstrate the importance of the face for emotional and psychological self-awareness as well as for social intercourse. In addition, two surgically successful face transplants have demonstrated the psychological effects in recipients who must learn to live with a face that is not "them."

Darwin was criticized for the sources he used in his examination of emotional expression, using examples from art, clinical case studies, correspondence with a people around the globe to whom he directed questions about their experiences with indigenous peoples, domestic and wild animals, and his own children. In keeping with Darwin's methodology this paper will also examine the ways in which faces and emotions have been expressed in a variety of sources, from clinical case studies through art, literature, and film.

Presidential Lecture
Wednesday, 17 June 2009, 5:30 – 6:30 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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Phineas Gage had a brain abscess, so precise anatomical localization is impossible

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Phineas Gage (the American crowbar case) died in 1861. His skull was exhumed in 1866. Since then, many investigators have tried to determine the exact extent of Gage's brain damage, using the maxillary-subfrontal and frontal-vertex skull defects as the geometric bases for their estimates. Although some authors recognized that Gage had a brain abscess, no one has taken that fact into account.

Gage's attending physician, John Martyn Harlow, published two reports of his patient's findings and treatment. Both show that Gage had an abscess in the tract of the tamping iron. It was intermittently drained by two routes: (1) Harlow opened the exit wound at the vertex on several occasions, and he observed extruding pieces of brain; (2) he also observed that Gage had a tear in the lateral wall of his left pharynx, and he observed pus escaping from there. Since bacterial abscesses are well known to destroy brain tissue, and this was observed in Gage, the final extent of his brain damage went far beyond the tissue that was initially destroyed in the path of the tamping iron.

Conclusions:

1. Without the brain, we can not know exactly which parts of Gage's brain were destroyed;
2. Efforts to reconstruct the path of the tamping iron from the skull defects cannot alone provide reliable neuroanatomical data for detailed correlation with his later behavior
3. It is probable that tissue damage from Gage's abscess extended significantly into the right frontal lobe, which would be expected if he truly did exhibit any permanent "lobotomy effect."

Session 11. Brain Disorders
Friday, 19 June 2009, 2:00 – 3:30 pm

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Darwin's contribution to the study of child development and language acquisition

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In 1877, Charles Darwin responded to an article by Taine in the journal *Mind* (1877) on early language acquisition by "look[ing] over a diary" he'd kept 37 years before on his own son's development. The result, 'A Biological Sketch of an Infant' (1877), was one of the first English infant psychology studies. It was methodologically innovative being based on regular recordings of observations over a period of years. Darwin's article motivated others in England to carry out research on child development, an area which had previously received little attention in that country.

The diary and related article reveal Darwin's considerations on child language acquisition as a key to understanding of the mental development of the child, as well as the development of language in mankind, which was of vital importance to evolutionary theory. In *The Descent of Man* (1871), Darwin argued that language is not an "impossible barrier" between animals and man. Infants between the ages of 10 to 12 months were at the same stage of language development as dogs with their well-attested ability to understand certain words. The difference, he insisted, lie in man's "infinitely larger power" of associating sounds and concepts; the result of the co-evolution of language and mind. Darwin's expressed hope that others would follow his lead in the study of child development was swiftly realised in the works of Pollock (1878), Sully (1880) and Champneys (1881).

This paper takes the notebook of observations on Darwin's children (1839-1856) and later article (1877) as the focal point for a 3-fold discussion: the relevance of theories of child language acquisition to evolutionary theory in the 19th century, Darwin's ideas on these issues as reflected in his early writings in the diary and later developed in the Mind article, and others' research that followed publication of his influential paper.

Session 4. A Celebration in Honor of Charles Darwin
Wednesday, 17 June 2009, 3:00 – 5:30 pm

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Exemplary patients: the history of the 'special' neurological case

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The paper deals with an important subset of the population of neurological patients in history. Namely those whose case is seen either as so remarkable, or conversely, so "typical," that they assume a special importance in the history of neurology. The history of such special patients can be explored through an examination of case histories, research reports and medical monographs. But it is also inscribed in more intimate sources such as letters, biographies, and journals.

The names of some of these individuals—of whom Phineas Gage was perhaps the prototype—are well known. Others remain anonymous, known only by such initials as "H.M.", or referred to chiefly by some nickname like "Tan." These patients may acquire their status because their condition exemplifies in a particularly "pure" way a particular disease or syndrome. In some cases, an exemplary patient may through the symptoms he or she presents even bring to light some fundamental scientific truth about the workings of the nervous system.

The paper will consider the careers of such exemplary patients in the nineteenth and twentieth centuries. It will, in particular, deal with the way in which the status of exemplary patient provides these individuals with a new identity that can modify or even transform the experience of illness as well as other aspects of their existence. This identity can encompass a new set of relationships including prolonged and multifaceted interactions with clinicians and researchers. Sometimes, the patient takes on the role of an active collaborator rather than the passive object of a clinical gaze. In such cases, the nature of the "patient-doctor" relationship can undergo profound transformation.

Session 6. The Neurology Patient
Thursday, 18 June 2009, 11:00 am – 12:30 pm

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The terror of forgetting: Alzheimer's disease in contemporary motion pictures (1985-2007)

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Background: With one exception (Segers 2007), fictional portrayals of Alzheimer's in film have remained unexamined to date. Therefore, this presentation takes comprehensive inventory of and analyzes all available theatre and television films which include Alzheimer's.

Methods: The author has identified relevant productions by means of international film databases and by hand search. Each film was carefully evaluated along neurological and cinematic lines.

Results: Between 1985 and 2007 Alzheimer's appeared in more than 20 feature films produced in various countries, namely the US, the UK, and Germany. Because screenplay writers and directors often made use of medical knowledge, from a neurological perspective many films present a largely accurate picture of the disease's course and symptoms. The effects of dramatic composition and the predominantly visual character of the medium result in the prominence of certain phenomena, f.e. behavioural disturbances. While diagnostic procedures hold a relatively prominent position in the storylines, therapeutic options and the role of caring institutions only play a minimal role. In addition, most of these films thematize "the drama of proxy", which usually follows the psychological scheme "denial, resistance, affirmation, integration". From a historical perspective, there is a transition from "disaster stories" in early films to "coping stories" in later ones. This tendency may correlate with slight improvements in pharmacological treatment and changed social attitudes towards patients with dementia.

Conclusion: Movies attract millions of viewers and thus shape the image of a disease. A solid knowledge of how symptoms as well as diagnostic and therapeutic options are presented in mass media is therefore indispensable for all professionals who deal with Alzheimer patients, relatives, and caregivers.

Session 10. Neuroscience on/in Film
Friday, 19 June 2009, 11:00 am – 12:00 pm

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A.V. Hill, war and British biophysics: Glimpses into the interrelated contributions of a scientist and a statesman

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Archibald Vivian Hill was a renowned British physiologist, who shared the Nobel Prize with Otto Meyerhof in 1922 for his contributions to muscle energetics. Hill, or "A.V." as his students called him, had a long and distinguished career which spanned both world wars, and which included exemplary service as a soldier and statesman. As part of an ongoing project focusing on Hill's life and achievements within the larger historical problems concerning the development of neuroenergetics and neurophysiology (see Khan, 2007; 2008; 2009), this paper will focus on the life of A.V. Hill as a soldier, statesman and scientist. Four separate periods of Hill's life will be touched upon: (1) his entry as a soldier during World War I and his contributions to anti-aircraft defense technology; (2) his contributions to scientific exchange between Great Britain and the United States as part of the "Tizard Committee" during World War II; and (3) his public stance against anti-Semitism and the Nazi-sponsored expulsion of Jewish academics in Europe; and (4) his post-war efforts to rehabilitate his laboratory at war-damaged University College London and recruit Bernard Katz to be deputy director (and later, Director) of the new Biophysics Unit there (which was perhaps Hill's greatest indirect contribution to nerve physiology). In particular, drawing from Hill's personal letters and correspondence, I present details about the challenges Hill faced in obtaining funding after the war for key personnel, and how he used his political and scientific clout to call for the demobilization of scientists from military service so that they may join his laboratory. Hill's own work on nerve and muscle energetics is his direct scientific legacy, but his tenacity and vision for the future of biophysics and physiology deserves more consideration as an outstanding indirect contribution to this field.

Session 1. Scientists and Methodology
Wednesday, 17 June 2009, 9:00 – 10:30 am

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Eduard Hitzig's experiences in the Franco-Prussian war (1870-1): the case of Joseph Masseau

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It is well-known that Fritsch and Hitzig published the results of their experiments on cortical stimulation in 1870, the year in which the Franco-Prussian war (FPW) broke out. It is less well-known that the reason why Hitzig performed these experiments is coincidental and could be called serendipitous. Furthermore, several stories are found about his role in the FPW, stories that have not been well documented.

In this paper, I will first discuss the way how Hitzig came to the idea to perform animal experiments, using secondary German literature. During the FPW he worked at the military hospital in Nancy, where he was allowed to admit to his ward soldiers with head wounds. He made a close observation of the 20-year old French soldier Joseph Masseau, who suffered from a right-sided cerebral abscess following a gunshot wound sustained during the Loire campaign on December 10th 1870, and was looked after in the military hospital of Nancy in January and February 1871. Hitzig related the clinical and autopsy observations to his experimental findings. A translation into English of part of the case report is provided.

Session 13. The European Experience
Saturday, 20 June 2009, 10:30 – 11:30 am

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Nerve injury and repair

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Regarding injuries of the spinal cord, Roman and Greek medicine knew about paraplegia and hemiplegia, however, very little was known about peripheral nerve lesions. A reason for this ignorance could be that Greek physicians before Galen did not know the difference between tendons, ligaments and nerves. The first physician to put forward the idea of stitching together damaged nerves was Paul of Aegina (Paulus Aegineta), a Byzantine of the 7th century AD. In Arabian medicine, Avicenna recommended repairing damaged nerves by stitching together the nerve sheets. This method was later used by the north Italian medicine schools in the early Renaissance. Important progress, but also problems, occurred in the 14th century with the discovery of gun-powder and new weapons. Guy de Chauliac (1300 – 1368) wrote his "*Chirurgia magna"* the guiding authority of the time. He saw shot wounds for the first time and recommended stitching the perineurium and adjacent tissue. It seems that he also observed for the first time some functional recovery. It took 500 more years to finally discover experimentally the regeneration of the vagus nerve and a recovery of function. William Cumberland Cruikshank (1745 – 1800), prosector in John Hunter's institution in Scotland, deserves the credit for this breakthrough. Following this proof of evidence, nerve suturing soon became common practice. As in the 14th century, research in the field of peripheral nerves flourished during wartime in many countries and has led to remarkable progress, which will be briefly reported.

Session 14. The "War " on Nerves
Saturday, 20 June 2009, 10:30 – 11:30 am

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
Charleston, South Carolina, USA, 16-20 June 2009

Academic historians of neuroscience confront the history of neuroscience

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Neuroscientists tend to view history as producing lessons and models for emulation through an examination of great scientists and key discoveries. Theirs is a story of medical progress and their histories tend to be internalist, that is, they examine discoveries from the perspective of science, but insulated from wider cultural influences. In contrast, academic historians view history as a contextual enterprise in which the past and the present are incommensurate. They are not simply engaged in telling a chronological story; nor, since the late 19th century have they assumed they can uncover "facts" that recreate the past as it was. Rather, academic historians insist that historical sources do not speak for themselves, but are subjects of contested interpretations framed by current and past cultural and political contexts. From this perspective, there can never be a final "factual" reading of the past; today's landmark interpretation is regularly subjected to tomorrow's reinterpretation because, odd as it may sound to the non-academic historian, the past is always subject to change as historians redefine the contexts in which events occur. Thus, academic historians of science study institutions, classification systems, and the social and cultural values which scientists bring to the scientific enterprise. The notion that the history of neuroscience could be accessed through current encounters and contemporary practices is an anathema to most academic historians. Although both neuroscientists and academic historians use the term "history" to describe what they do, they are not engaged in the same enterprise and generally aim at different audiences. Perhaps it would be best to accept this division and to proceed with parallel and complementary contributions. Nevertheless, this presentation suggests that the benefits of integration are worth considering. Academic historians of can learn a great deal from observing the scientific and medical encounter. Neuroscience informed history would be enhanced, rather than diminished, if it considered the impact of culture on practice and research and the context in which they take place. Because it is impractical for everyone interested in the history of neuroscience or its application become fully trained in both disciplines, collaboration between academic historians and neuroscientists can be productive.

WITHDRAWN

Session 5. Analyzing Our Philosophical, Historical and Cultural Roots
Thursday, 18 June 2009, 8:30 – 10:30 am

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
Charleston, South Carolina, USA, 16-20 June 2009

Angelo Mosso's legacy and his laboratory: From physiology to psychophysiology

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Between the 19th and 20th centuries, the Institute of Physiology at the University of Turin was considered one of the major research centres in Europe. The Institute emphasized a multidisciplinary approach to research; this approach included both a positivistic and an experimental dimension. Angelo Mosso (1846-1910), Director of the Institute, advanced the use of instruments such as the plethysmograph, the ergograph, and the sphygmomanometer in experimental research. Mosso's reputation and the Institute's approach to research attracted scientists from various European countries, who in turn shaped the direction of experimental psychological research in Italy throughout the 20th century.

For example, Friedrich Kiesow (1858-1940) moved to Turin in 1894 to join Mosso in the field of experimental psychology. Kiesow was a pupil of Wilhelm Wundt (1832-1920), who had established what many consider to be the first experimental psychology laboratory in Leipzig in 1879. Kiesow's primary projects examined sensations, reaction time and visual perception, making use of many of the original instruments available in Turin and championed by Mosso. Kiesow continued his research at the Institute following Mosso's death. He was succeeded by Alessandro Gatti (1901-1938). Gatti's research interests were eclectic. A scientist as well as a humanist, Gatti had a great influence upon schools of psychological thought and research in Turin and Milan. Psychology was promoted in Milan by Agostino Gemelli (1878-1959) who studied in Pavia with Camillo Golgi (1843-1926). Gemelli founded the Catholic University in Milano as well as a laboratory for the study of experimental psychology after the First World War. Another important scientist of this era was Mario Ponzo (1882-1960), who developed psychotechnics, particularly the study of breath associated with psychic processes. In addition Ponzo conducted research on perceptiveness, an important aspect of Italian Psychology of the 20th century, influenced by *Gestalttheorie*.

Other experimental psychologists of the Italian school included Vittorio Benussi (1878-1927) in Padua, and Gaetano Kanizsa (1913-1993) who, along with Ponzo, studied optical illusions. Their research, influenced by Mosso's legacy and Kiesow's work, contributed to the development of Italian Experimental Psychology.

Session 1. Scientists and Methodology
Wednesday, 17 June 2009, 9:00 – 10:30 am
14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
Charleston, South Carolina, USA, 16-20 June 2009

Neuropsychiatry: between fiction and medicine in early silent cinema

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From its earliest conception cinema provided an opportunity to explore the human condition, and this communication medium was used quite often in the silent era to study neuropsychiatric movement.

In 1899 in France, Alice Guy-Blaché (1873–1968), the first female director in the motion picture industry, directed the short film "La Bonne Absinthe," which examined the dangerous effects of alcohol. Films such as "The Escaped Lunatic" (1904) and "Dr. Dippy's Sanitarium" (1906) depicted the role of psychiatric hospitals. "The Criminal Hypnotist" (1909), "Saint, Devil and Woman" (1916), and "Abuse of Hypnosis" (1918) explored hypnosis. The German expressionist film "Das Kabinett des Dr. Caligari" (1919), as well as the American films "Girl at Bay" (1919) and "When the Cloud Rolls By" (1919), examined the credibility of psychology. Over a twenty year period films explored the relationship between the psychology and society, presenting the first interpretation of the psychoanalysis and its limitations. Examples of these films include: "Il Sole e i Pazzi" (1920), "The Case of Becky" (1921), "The Man Who Saw Tomorrow" (1922), "The Boomerang" (1925), "Geheimnisse einer Seele (1926) and "Plastered in Paris" (1928). Other films of the silent era examined the controversial figure of psychiatrist and the different neuropsychiatric schools. Some titles include: "Free Love" (1930), "The Front Page" (1931), "Tomorrow and Tomorrow" (1932), "Das Testament des Dr. Mabuse" (1933), "The Black Cat" and "The Return of the Terror" (1934), "The Flame Within" (1935), "Mr. Deeds Goes to Town" (1936), "Death in the Air" (1937).

The relationship between fiction and neuropsychiatry in the silent history of the cinema had an important role about the understanding of the development of the "neuropsychiatric image in movements."

Session 10. Neuroscience on/in Film
Friday, 19 June 2009, 11:00 am – 12:00 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
Charleston, South Carolina, USA, 16-20 June 2009

The life and times of William Charles Wells (1757–1817): recognition is more than dew

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Most of what we know about Wells comes from his *A Memoir of His Life* (1818) and from his scientific publications (approximately 35). He was born on May 24, 1757, in Charleston, South Carolina, just a few years before the outbreak of the American Revolution. He was educated predominantly in Scotland and spent most of his adult life in London. He did, however, spend about four years, towards the end of the Revolution, in Charleston and St. Augustine, Florida tending to his father's newspaper business. Although he was trained as a physician and made a meagre living practicing medicine, his passion was experimentation. His *An Essay on Dew* (1814) was his most highly recognized work and earned him the Rumford medal from the Royal Society of London. His observations and experiments in other areas of natural science, although just as astute as those in his essay on dew, never received their due recognition. For example, his work on how the visible directions of objects as seen from the two eyes are integrated into a single sense of visual direction was very similar to the work later conducted by German physiologist Ewald Hering (1834-1918). Yet, these so-called laws of visual direction are traditionally credited to Hering, not Wells. Likewise, Wells's work on vertigo that laid the groundwork for what we now know of vestibular function was overlooked and credit was given instead to Czech physiologist Jan Evangelista Purkinje (1787-1869). Also, in the field of medicine, Richard Bright (1789-1858), an English physician, is historically dubbed the "father of nephrology", even though Wells's work in this field yielded the same conclusions. Why so much of Wells's work has been ignored is puzzling. Hopefully, this symposium will aid in giving Wells due recognition for more than just dew.

Session 7. Wells of Charleston
Thursday, 18 June 2009, 12:45 – 2:15 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
Charleston, South Carolina, USA, 16-20 June 2009

The multidisciplinary history of neuroendovascular procedures

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Although the neurosurgeon Edgar Moniz is credited with pioneering cerebral angiography, endovascular procedures evolved into a multidisplinary specialty after he first introduced a catheter into the cerebral circulation. Reports of the use of embolizing agents did not appear until the 1960's. Neurosurgeons, Luessenhop and Spense, used silastic spheres made of methyl methacrylate to occlude arteriovenous malformations (AVM). In the late 1960's Dotter, a radiologist, proposed the use of transluminal angioplasty and stent placement for stroke. In the 1970's, Djindjian, a neurologist, pioneered endovascular spinal AVM treatments. Also in the early 1970's, Fyodor Serbinenko, a neurosurgeon, pioneered the use inflatable balloon techniques to occlude carotid-cavernous fistulas and to guide angiographic catheterization. Advances in the type of materials used in manufacturing the balloons and agents to occlude vessels, including latex, by Debrun, a neurologist, and polymerizing agents by Sano as well as Kerber, a radiologist, occurred in the mid-1970's. Zubkov and his neurosurgical colleagues suggested the use endovascular techniques to dilate vessels after subarachnoid hemorrhage for the treatment of vasospasm in the 1970's. In the 1990's, increased "comfort" with the endovascular techniques and procedures led to its use in pediatrics; including treatment of vein of Galen aneurysms in children by Lasjaunias, who was a neurologist. Guidelines were established for the use of intra-arterial thrombolysis in 1999 with the publication of the Prolyse in Acute Cerebral Thrombo-embolism study, which demonstrated that administration of thrombolytics via an intra-arterial catheter within 6 hours of the stroke significantly improved patient outcome. Detachable metallic coils were first introduced for the treatment of aneurysms by Guglielmi and his radiologist colleagues in the early 1990's. Today, current technologies are "going after the clot" itself. Angiojet, Penumbra and MERCI devices are now used to disrupt and remove obstructions of the vessels of the central nervous system. Although controversy exists as to who "should be" performing endovascular procedures, it is clear that one could not have gotten this far without the multidisplinary efforts that occurred over the last few decades.

Session 3. Neurosurgery
Wednesday, 17 June 2009, 2:00 – 3:00 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
Charleston, South Carolina, USA, 16-20 June 2009

The neglected vision of William Charles Wells

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When Wells (1792) published his *Essay upon Single Vision with Two Eyes*, the prevalent belief was that an object seen with one eye is always seen where it is. This belief can be traced back to Kepler who in 1604 described correctly the image forming properties of the eye; Porterfield (1737) was so confident of its validity that he formally stated it as an axiom. Wells showed experimentally that this idea holds only for the intersection of the two visual axes and that an object located in front of or behind the intersection is mislocalized. He summarized his findings with three propositions, but his observations and the summary were neither understood nor appreciated. Wheatstone (1838) dismissed Wells's propositions as "erroneous" and that his theory "was framed to account for an anomalous individual fact". Brewster (1844) offered a law of visible direction that restated Porterfield's axiom, although one of Wells's observations was acknowledged without noticing the contradiction. Wells's observations and the propositions were confirmed later but he never received the credit he deserved.

Session 7. Wells of Charleston
Thursday, 18 June 2009, 12:45 – 2:15 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
Charleston, South Carolina, USA, 16-20 June 2009

Ibn Ṭufayl's Ḥayy ibn Yaqzān *and Locke's* Essay on human understanding*: further evidence*

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Since proposing the Latin translation of Ibn Ṭufayl's (d. 1185), Ḥayy ibn Yaqzān, as a formative influence on the early drafts (1671) of Locke's Essay on Human Understanding (1687) (Russell, Brill, 1994), additional evidence has steadily been unfolding through my ongoing research. Published (Oxford, 1671) in a bilingual edition of Arabic and Latin, entitled the *Philosophus autodidactus,* Ḥayy ibn Yaqzān, became widely known. In depicting the emergence of the mind of an infant alone on a desert island, initially by sensory experience and association of experiences, without innateness, it struck a resonant chord in the latter part of 17th c. The central question is how Locke could have become acquainted with the work. In addition to the unusual content, the evidence was brought to bear from Locke's close acquaintance with the two translators at his College, Christ Church, Oxford: Dr. Pococke (the Laudian Professor of Arabic, the Regius Professor of Hebrew and Canon of Christ Church), who was Locke's teacher; and Pococke's son, Edward, whose tutor was Locke. It will be shown that the knowledge of and interest in the work appeared long before its publication and review in the *Philosophical Transactions of the Royal Society* in 1671, and not only at Oxford but also at Cambridge. The evidence will be explored and evaluated through the correspondence during the period between 1659 and 1663 of Samuel Hartlib, John Worthington and Robert Boyle, including Boyle's unfinished fragment of an imaginary work. Locke's initial acquaintance with the work can now be dated back to 1660/61, upon his arrival at Christ Church from Westminster School where he had been exposed to both Arabic and Hebrew studies under Dr. Busby. When Locke's relationship with Dr. Pococke was changing from student to that of close friendship, the news of Dr. Pococke working on the translation of 'an ingenious Arabic fiction' was already in circulation.

In conclusion, it will be argued based on further new evidence, that the *Philosophus autodidactus* provides a uniquely comprehensive answer to the previously puzzling question of how Locke came to consider the empirical 'nature of human understanding' and the concept of the mind as a 'tabula rasa' in the face of Cartesian rationalism and innate ideas If we consider the early drafts of the Essay as the result of a process of gradual evolution rather than a dramatic shift or change in Locke's intellectual orientation (i.e. at a single meeting at the Exeter House], then the text acquires even greater significance. The publication of the *Philosophus autodidactus* would have served as the final stimulus for Locke to focus and record in 1671, thoughts which had been incubating for nearly a decade since 1660/61.

Session 5. Analyzing Our Philosophical, Historical and Cultural Roots
Thursday, 18 June 2009, 8:30 – 10:30 am

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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Darwin's problem: the place of consciousness in an evolutionary world

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'How does consciousness commence?' When Darwin set about developing his evolution theory on his return from the Beagle circumnavigation in 1836 he quickly realised that one major problem was, precisely, the existence of 'mind' in a material world. This paper reviews his early struggles with this problem and pursues it into his later writings, especially the 1872 *Expression of Emotions* and in the work of his disciple G.J.Romanes. In the 1871 *Descent of Man* (p.100) Darwin admits defeat writing that 'In what manner the mental powers were first developed in the lowest organisms is as hopeless an enquiry as how life itself first originated. These are problems for the distant future'. That 'distant future' has now arrived and plausible answers to Darwin's second question have been developed. The bicentennial celebrations provide an opportunity to ask again whether we are any closer to a solution of the first.

Session 4. A Celebration in Honor of Charles Darwin
Wednesday, 17 June 2009, 3:00 – 5:30 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
Charleston, South Carolina, USA, 16-20 June 2009

Charles Darwin's place in the history of human experimental psychology

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In the late 1860's and early 1870's, Darwin had corresponded with the French physician and physiologist, G. B. A. Duchenne, regarding Duchenne's experimental manipulation of human facial expression of emotion, by applying Galvanic electrical stimulation directly to facial muscles. Duchenne had produced a set of 65 photographic plates to illustrate his view that there are different muscles in the human face that are separately responsible for each individual's emotion, and Darwin studied this material very carefully – and he received permission from Duchenne in 1871 to reproduce several of these images in *The Expression of the Emotions in Man and Animals* (1872). Darwin had doubted Duchenne's view that there were individual muscle groups that mediate the expression of dozens of separable emotions, and he wondered whether there might instead be a fewer set of core emotions that are expressed with great stability worldwide and across cultures. Prompted by his doubts regarding the veracity of Duchenne's model, Darwin conducted what may have been the first-ever single-blind study of the recognition of human facial expression of emotion. This single experiment was a little-known forerunner for an entire modern field of study with contemporary clinical relevance. Moreover, his specific question about cross-cultural recognition of the cardinal emotions in faces is a topic that is being actively studied (in the 21st century) with the hope of developing novel biomarkers to aid the discovery of new therapies for the treatment of schizophrenia, autism, and other neuropsychiatric diseases.

Session 4. A Celebration in Honor of Charles Darwin
Wednesday, 17 June 2009, 3:00 – 5:30 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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Image and logic: considerations regarding the material culture of neuroscience

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In the historiography of neuroscience, the programmes of scientific investigation of the brain have often become subdivided as the morphological and the physiological tradition. The morphological tradition, according to this perspective, is seen as describing and mapping the form and structure of the external and interior parts of the brain and the spinal cord. The physiological tradition is regarded as a compilation of all those approaches which pursue and investigate cerebral actions and functions in their dynamic interplay. It can be seen as an open question, whether the distinction between the morphological and functional tradition in clinical and basic neuroscience approaches has not become obsolete with the development of recent neuroimaging techniques (fMRI, PET scans, SPECT etc.). Taken at face value, the new neuroimaging techniques seem to "relate", "overlap", and even "identify" the morphological with the functional substrate, when mapping out individual activation patterns across the delineated morphological structures. Public and scientific discussions over "neuromythology" and "neophrenology" – over the past decades – thus invite a reconsideration and re-conceptualization of landmark methodologies in the history of modern neuroscience.

While pursuing these philosophical and historical reflections on the material culture of neuroscience, this paper draws on earlier observations made by Hilary Putnam in *Language and Reality* (1975) and Peter Galison, *Image and Logic: A Material Culture of Microphysics* (1997). The particular focus will be on the modern morphological tradition, as beginning with the Mainz neuroanatomist Samuel Thomas Soemmerring (1755–1830) and leading to recent approaches, for example in the neurohistological work of Fred Gage and the morpho-physiological neuroimaging research of Bruce Pike. Following some landmark research steps in neuroanatomy, it shall be analyzed how the changing developments towards an integrative theory of the brain have put the emphasis on either side of the morphological and the functional distinction. As will be argued in this paper, what seems to be obvious in the case of the neurophysiological tradition (the "logic") likewise holds for the morphological tradition ("image"): Looking at the relation between form and function within the material culture of neuroscience hence reveals an astonishingly heterogeneous and complex conceptual terrain.

Session 5. Analyzing Our Philosophical, Historical and Cultural Roots
Thursday, 18 June 2009, 8:30 – 10:30 am

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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The Tenerife Primate Research Station and the origins of cognitive neuroscience

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The paper will trace the origins of the founding of Primate Research Station by the Prussian Academy of Sciences in Tenerife, Spain. Its first Director was Eugen Teuber, who was a graduate student at the University of Berlin studying linguistics with Professor Stumpf. He was succeeded a year later by Wolfgang Koehler who had studied physics with Plank and psychoacoustics with Stumpf. An astonishing amount of original research was achieved by both research directors in a remarkably brief period of time. Both Teuber and Koehler can be said to have established the foundations of cognitive neuroscience and left a major contributions to this new scientific discipline.

With the advent of the Great War in 1914 the work on cognitive capacities of the great apes fell into abeyance as Koehler became more involved with maritime espionage for the German navy. Both British and Spanish authorities were well aware of the fact that the Tenerife research station was a ruse de guerre for German Naval Intelligence. Its real purpose was to coordinate the German U-boat interception of British shipping of men and materials from South Africa, India and Australia to the Western Front. Evidence will be presented to show that both the espionage and scientific programmes were outstandingly successful. The former was a consequence of imaginative and detailed planning; whereas the latter owed a considerable debt to serendipity.

Session 2. Cognitive Science
Wednesday, 17 June 2009, 11:00 am – 12:00 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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Kirkbride: an American influence on lunacy in a "land down-under"

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In 1854, Dr Thomas Story Kirkbride, of Pennsylvania, a member of the Association of Medical Superintendents of American Institutions for the Insane (AMSAII), published *On the Construction, Organization and General Arrangements of Hospitals for the Insane.* Greatly influenced by the poor state of insane asylums and the emerging philosophy of moral treatment, Kirkbride proposed that the buildings and surrounds of asylums were integral to the treatment of the insane and should provide a therapeutic environment in which to affect a cure. The building plan that Kirkbride (or Linear plan) delineated, dominated asylum architecture in the United States for the remainder of the nineteenth century, and resulted in the construction of scores of large imposing buildings. These grand publicly funded structures were considered the state of the art, the cutting edge of treatment for the insane. By the end of the century, these grand buildings gave way to newer concepts of care and many have since declined to a ruinous state, many have disappeared completely. Few have been maintained, but rarely used according to the original purpose.

It is surprising therefore, to find at the heart of the largest psychiatric hospital, Callan Park, in Sydney, a group of splendid buildings completed in 1885, and named the "Kirkbride Complex". The largest public works project of the nineteenth century, the cutting edge of asylum architecture of its time, was designed according to the enlightened views of Kirkbride. These carefully planned buildings set in extensive parklands, on the shores of Iron Cove fulfilled the criteria "to bless, soothe, and restore the wandering intellects".

These Kirkbride inspired buildings remain, restored to their former glory and although now occupied by the Sydney College of the Arts, stand as a testament to a previous era of treating the insane, which is worthy of discussion.

Session 9. International Approaches to Therapeutic Techniques
Friday, 19 June 2009, 8:30 – 10:30 am

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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Encephalitis lethargica and postencephalitic Parkinsonism: not a simple relationship

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The most prevalent and devastating sequel of encephalitis lethargica (EL) is postencephalitic parkinsonism (PEP), which was popularized in the Oliver Sack's book, *Awakenings*, and the subsequent film of the same name. The virus that presumably caused EL is also generally believed to have directly or indirectly caused PEP after the acute illness. Casals et al. (1998), however, found that virtually no other neurotrophic virus results in parkinsonism. We have analyzed year-by-year reports on EL and PEP from 1917 until approximately 1930, and the analysis reveals an uncertain relationship between EL and PEP. Although many PEP patients described in the literature had a well-documented history of EL (e.g., reports by Hall, Ziegler, Parsons), in the vast majority of patients the diagnosis of EL was made *post hoc*. Careful reading of the articles reveals that many investigators made a new diagnosis of EL for virtually any catarrh-like illness described in the patient's history. The logic underlying these newly created diagnoses is circular: the patient has PEP, a disease of unknown etiology; however, PEP may be caused by EL, therefore it is legitimate to assume that any EL-like illness in the patient's history was EL. These retrospective diagnoses have questionable reliability because of recall bias. Additionally, oculogyric crises, considered virtually a pathognomonic sign of PEP, were not seen until about 1920 and were fully described in 1924, well after other chronic sequelae had been identified. Signs of parkinsonism were first associated with acute EL in about 1920, approximately 3 years after von Economo's initial characterization of the syndrome. Based on these findings, we suggest that, similar to other parkinsonian syndromes, the etiology of PEP is complex and not necessarily the consequence of a prolonged direct or indirect EL infection.

We acknowledge the Sophie Cameron Trust for support of this project.

Session 11. Brain Disorders
Friday, 19 June 2009, 2:00 – 3:30 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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From revolution to evolution: the scientific journey of William Charles Wells

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William Charles Wells was born in America, educated in Scotland and practiced medicine in London. His first scientific publication (in 1792) was concerned with binocular single vision and he retained an interest in visual phenomena throughout his life. His monograph was concerned with more than single vision with two eyes, and among the 'other topics in vision' he addressed were eye movements, accommodation, acuity, and giddiness. Wells was a revolutionary but his revolution was not concerned with the body politic rather with the body anatomic. He investigated the consequences of body rotation and the visual vertigo that follows it when the body is still. In so doing, he showed how the eyes moved in phases of slow drifts and ballistic returns (nystagmus). These were the first experimental studies of eye movements, and his technique of comparing the motion of an afterimage (which was fixed to the retina) with a real image (which was not) constituted a novel approach to an age old issue. His interpretations of vertigo were at variance with those of Erasmus Darwin. Wells's ideas on evolution were expressed late in his life – in a paper delivered to the Royal Society (in 1813) but not published in its Transactions. Commenting on the case of a white woman, part of whose skin was black he proposed a process of change that was akin to natural selection: "those who attend to the improvement of domestic animals, when they find individuals possessing, in a greater degree than common, the qualities they desire, couple a male and a female of these together, then take the best of their offspring as a new stock, and in this way proceed, till they approach as near the point in view, as the nature of things will permit. But, what is here done by art, seems to be done, with equal efficacy, though more slowly, by nature, in the formation of varieties of mankind, fitted for the country which they inhabit". His ideas were acknowledged by Charles Darwin in the fourth edition of the *Origin of Species*.

Session 7. Wells of Charleston
Thursday, 18 June 2009, 12:45 – 2:15 pm

14th Annual Meeting of the International Society for the History of the Neurosciences (ISHN)
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Electricity in neurorehabilitation: Wilhelm Erb's contributions to electrotherapy

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Wilhelm Heinrich Erb (1840-1921), a prominent German neurologist and pioneer in the field of electrotherapeutics, taught medicine at the Universities of Heidelberg and Leipzig. Although Erb is well known to historians of medicine (Erb's sign, Erb's point, Erb's dystrophy), his contributions in electrotherapy are not as often discussed. In Leipzig Erb wrote *Handbuch der Elektrotherapie* in 1882. Continuing traditions that had started in the 18th century, Erb synthesized his late 19th century understanding of electricity with his knowledge of the human nervous system and applied these to clinical practice, most notably in the area of paralysis. For example, he described the case of a young soldier who suffered from paresthesia, paralysis, and severe pain after receiving a wound that extended from the anterior portion of the left deltoid to below the angle of the left scapula. After the fourteenth visit, Erb reported that administration of galvanic treatment to the supraclavicular region improved sensation in the fingers and yielded improved mobility (Erb, 211). Some practitioners of current therapeutic electrical stimulation seem unaware that Erb's contributions still influence modern clinical science. Theodosiadis et al. (*Neuromodulation* 11.1, 2008), in discussing the effectiveness of subcutaneous targeted neuromodulation in treating a case of severe shoulder pain associated with scapular injury which is remniscent of Erb's case, refer to the "introduction in 1967... (of) stimulation of spinal and peripheral nervous systems"(62). Although technology clearly has enabled advancements in neuromodulation, the basic therapeutic principles advocated by Erb can be seen in modern clinical approaches to treating a wide range of medical problems.

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