
In the twenty-first century, pathogenic bacteria species and their threat to human health are common knowledge. In urbanised and economically developed areas especially, this awareness is reflected in the wide array of commercial products designed to eliminate harmful bacteria and protect the user’s hygienic interests. These goods couple with an extensive understanding of how to prevent and treat illness and infection in the field of medical science, which has developed significantly since the Gilded Age.

Modern measures for countering outbreaks of disease have deep origins within the Gilded Age period of the late nineteenth and early twentieth century. It was during this time in American history when advances in microscope technology and bacteria cultures helped medical scientists discover revolutionary methods of countering infectious outbreaks. Most notably, the introduction of the antitoxin, an innovation that would advance treatment and slash mortality rates in humans and animals, would define this transition towards more complex and progressive forms of treatment. Much like in the present day, where scientists seek new ways to tackle mutated superbacteria - infective microorganisms that have become resistant to existing treatments including antibiotics – the medical science of the Gilded Age sought to identify and classify more common strains of bacterial infection in the hope of neutralising them.

Elaborating on advances in the sphere of bacterial infection during the Gilded Age, “The Art of Healing: Marvelous Progress Made in the Science of Medicine,” written by Cyrus Edson M.D. in the Los Angeles Sunday Times, references advances in surgery, microscope development, bacterial research and inoculation. Using “The Art of Healing: Marvelous Progress Made in the Science of Medicine,” I argue that medical science was an integral part of the progressive movement that defined the Gilded
Age period. To sustain this hypothesis, the historical context of the period, the writer’s background, ideological clashes pertaining to progressivism and key terminology will be addressed.

Edson’s intention is to convey the success professionals encounter when they work to provide surplus value, advancing their own profession and improving humanity’s existence. This enthusiasm, referring to medical researchers and physicians as “men of unselfish purpose ready to devote their energy, their health, and even their lives to...[elevating] the whole plane of professional thought,” can be attributed to Edson’s own career in medicine. Tenures as President of the Board of Pharmacy of New York City and Commissioner of Health of New York State, as well time in medical research capped by his formulation of Aseptolin - a "cure" for consumption (tuberculosis), reveal Edson’s own contribution to progressive medicine. A graduate from the College of Physicians and Surgeons in 1881, Edson entered the field of medicine as it became integrated with education through the establishment of research laboratories in universities. Combining their own studies with the education of younger groups, professors of the late nineteenth century imparted their initiative to younger generations. This trend is acknowledged in unique fashion through the literary mocking parodies of H.P. Lovecraft, who exploited the popularity of progressive science as writing material by twisting man’s loyalty to science and new discoveries into tales of horror such as in The Colour Out of Space.

An understanding of what prompted the rapid progress made in medicine is essential to explaining the key issues raised within Edson’s article. In the period’s historical and social context, two instrumental developments catalysed the progression of medical research; the violent nature of the American Civil War and the new demands and effects brought about by the United States’ accelerated industrialization and urbanization towards the end of the nineteenth century.

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American industrial society’s intensity in the late 1900s demanded a certain standard of physical health from some workers. Physicians became a part of the hiring process, using diagnostic methods to assess whether potential workers were in suitable condition for obligations of a job. The nation’s transition from agricultural means of economic circulation to a focus on industrial manufacturing also benefitted medicine through the production of beneficial instruments that enhanced the ability to treat those in poor health. Hardware including enhanced microscopes, antiseptics and the petridish, enhanced American medicine’s reputation as an effectual vocation, a facet of the Progressive Movement that encompassed a wealth of new manufacturing, scientific and medical technology. Present at both ends of the manufacturing spectrum, in the hiring process and amongst the products assembled, medical science established itself as a component of the industrialisation process that progressivism, as a reform ideology, was attempting to control. This relationship between medicine and progressivism was indicative of the wider ideological shift taking place in American society in response to the rapid growth of manufacturing, affluence and a higher national population.

The ravaging impact of the American Civil War, which took the lives of thousands of soldiers prior to the Gilded Age, highlighted the substandard condition of medical science and the need to amend these flaws. Soldiers representing the Union and the Confederacy fell victim to the improved killing power of weapons – through developments such as the Minie bullet ball - and the squalid state of the camps they resided in. Both factors combined with lacklustre medical treatment to create a fatal lifestyle. This came in spite of the Federal and Confederate governments’ efforts to provide adequate healthcare through the Federal Health Care for Freedmen policy and other examples.5 With a projection of between 618,000 and 700,000 Americans having died in the Civil War, the majority of

these losses came off the battlefield as 250,152 Union soldiers and 164,000 Confederate troops fell to the likes of disease and poor treatment of wounds, according to journalist Burke Davis⁶.

A shortage in medical supplies, drugs and surgical equipment during the Civil War was compensated by more antiquated methods of treatment. 1861 Confederate surgeon general Samuel Preston Moore resorted to “procuring and distributing widely a book on native herbs and other plants that grew wild in the South and were believed to possess curative qualities.”⁷ Treatments of questionable effectiveness, like herbal medicines, combined with failures to maintain hygienic camp facilities. Authorities asserted that military companies should have a sink and dig an 8 feet deep trench to preserve a sanitary environment. George W. Adams claims that soldiers failed to meet these requirements, prompting the spread of disease and bacterial infection to troops and their food supplies via fly infestation⁸. These scenarios communicate the lack of knowledge pertaining to bacteria and its risks that existed during the civil war period.

Outbreaks of bowel problems and internal discomfort reported by diseased soldiers were met with rushed and uninformed diagnoses of diarrhoea and dysentery attributed to the poor maintenance of food. In reality, these outbreaks of amoebic and bacillary dysentery were symptoms of tuberculosis or malaria, different ailments⁹. Often, regardless of the diagnosis, surgical procedures were unsanitary and prone to infection. Recycled clothing and the washing of instruments using only water left wounds unsterilized for an extended period of time. By the time disinfectants such as carbolic acid, sodium hypochloride and mercury bichloride were applied, the patient was often septic and beyond saving.¹⁰ It was not until 1865 that Joseph Lister, Professor of Surgery at Glasgow University, deduced that the

⁹ Ibid.
¹⁰ Ibid.
immediate treatment of wounds with carbolic acid prevented the threat of gangrene and disease.\textsuperscript{11} The discovery formed the foundation of sanitary medicine and was indicative of the battle to neutralize bacterial infection that forms the basis of Edson’s article. The number of deaths and the condition of medical science in the Civil War period that predated the Gilded Age were condemning enough to prompt a new experimental and clinical attitude to medical research. This approach coincided with the introduction and ascension of progressivism, as well as a favourability towards artificial methods over natural ones and a belief in humanity’s capability to improve conditions of life. This faith is shared by Edson who claims the “…vast mass of regular practitioners…look upon their calling…as a means by which they may aid in the divine task of bettering the conditions of the human race.”\textsuperscript{12}

With some measure of context established, key terminology from the Cyrus Edson article can be explained within a historical and ideological framework. Edson identifies the artificial cultivation of bacteria as one of the most significant developments of ‘modern’ medicine in the Gilded Age, “[bacteria] could be cultivated artificially...immerse a needle in any substance containing bacteria and then thrust it into some culture medium ... the world was indebted for the placing of bacteriology upon a solid scientific basis”. The process is integral to a medical innovation that defines experimental clinical medicine in the Gilded Age, the antitoxin.

In spite of the antitoxin’s eventual success beyond the period defined as the Gilded Age, the treatment was criticised by a number of contemporary medical personnel in the late nineteenth/early twentieth century. Dr. Campbell Black, Professor of Physiology at Anderson's College, Glasgow in the 1890s, was an example of traditionalist criticism opposing the developmental nature of new medical science. He argued that "to invent an antitoxin from some animal abomination, and get it boomed as a cure for some new and grievous malady..." was a declaration of the disgusting nature of these

unorthodox measures\textsuperscript{13}. The introduction of the antitoxin, as evidenced by the criticism above, caused an ideological conflict in medicine between those who remained loyal to pursuing natural remedies and others, such as Professor Robert Koch, who were willing to experiment with manufactured treatment remedies. This clash of philosophies in medicine was a strain of the wider struggle between progressivism and conventionalism in the latter half of the nineteenth century, with arguments such as Black’s conveying this parallel to correspond with this paper’s thesis.

Edson cites the work of Professor Robert Koch in his article on revolutionary medicine. A scientist at the forefront of disease management in the Gilded Age period, Koch revealed the pioneering therapeutic vaccine of tuberculin in 1890\textsuperscript{14}. Creating serums with trace amounts of tuberculosis mycobacteria, Koch would administer the vaccine to patients already infected with the disease. The basis of Koch’s research was founded on his 1890 proposition of the germ theory of disease which, using microscopic lenses for validation, attributed microorganisms to the causes of many diseases. Koch’s germ theory, from the forefront of scientific medicine in the nineteenth century, is now a foundation component of modern medicine and microbiology.

Conducting his research out of Berlin, Germany, Koch’s efforts are a testament to the unified intercontinental nature of medical research, especially between Europe and the United States. This cooperation is recognized and revered by Edson in his article, which labels medical science as “so widespread, [yet] so single-hearted.”\textsuperscript{15} However, Edson’s positive appraisal of Koch for the “placing of bacteriology upon a solid scientific basis”\textsuperscript{16} fails to accurately convey the negative consequences that came out of such a highly experimental approach to vaccination discovery. Koch’s branding of tuberculin as a cure was heavily undermined by counter-productive evidence published in the early twentieth century publication \textit{Zoophilist}, which reported the death of 123 case subjects between

\textsuperscript{13} J.T. Biggs, \textit{Leicester; Sanitation versus Vaccination}: Its Vital Statistics Compared with Those of Other Towns, the Army, Navy, Japan, and England and Wales, London: The National Anti-Vaccination League, 1912: 110
\textsuperscript{14} Biggs, \textit{Leicester; Sanitation versus Vaccination}, London: The National Anti-Vaccination League, 1912: 95
\textsuperscript{16} Ibid.
November 1890 and February 1891. Koch was unable to identify and calibrate his serums to the correct dosage on an individual basis and would induce “excessively violent reactions” amongst his patients. Despite his shortcomings, Koch’s deviation from what traditionalist medicine perceived as rational and natural – the intentional administering of disease serums – mirrors the radical qualities of the Progressive Era and inclined other physicians to do the same; serving as a pioneer of antitoxin medicine and broader reform movements of the time in Western society.

The reputation of the antitoxin in its introductory stage was also damaged by the number of people misdiagnosed with conditions that allegedly benefitted from this treatment. These individuals were as much a victim of the popularity of antitoxins as they were victims of their respective ailments. The Metropolitan Asylums Board reported that between 1895 and 1897, an estimated number of 3,542 people had the diphtheritic virus inserted into their bloodstream as a result of misdiagnosis. Those who did not die directly from the serum treatment developed crippling disabilities including “a certain train of symptoms suggestive of paralysis of the vagus nerve,” cyanosis, exudative tonsilitis, abscesses, cutaneous eruptions, erythema, urticaria, pyrexia, lockjaw, and other complications.

With Koch’s reputation tarnished, his participation in the development of vaccination medication is often forgotten or only remembered as detrimental to the cause; with only a few media sources including Edson crediting Koch for marrying marketing and science in a union which remains strong in the present day. Tuberculin’s application as allopathic medicine would resurface in the early twentieth century once dosage levels were amended. The drawbacks of introducing new methods of medicine

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20 Washbourne, Dr., ”Speaking at the Medical Society of London”, *British Medical Journal,* London: BMJ Group, 1899.
also correlate with the reform movement of progressivism. In the same way that progressivism ensconces power into the ranks of an intellectual ruling elite and isolates knowledge from the majority underclass that make up the population, Koch’s radical methods and their move away from the status quo made it hard for them to be accepted as new regulations. The antitoxin’s lack of immediate success also intensified any discrepancy and lent credibility to the medical traditionalist argument opposing progressive medicine in the short-term.

By the turn of the twentieth century, clinical medical science and the development of related technology had become the standard by which the progress of Western medicine was determined, in spite of the questionable outcomes of early experimental studies such as the use of antitoxin serum treatment\textsuperscript{23}. As the social and economic structures of late nineteenth-century America became more business and industry orientated, the progress of medical technology grew with increased investment that helped improve devices including the microscope referenced in Edson’s article. Diagnostic tools, in addition to fronting medical progress, conformed to the industrialization process the nation was undergoing with the assistance of machinery and tools. The significance of medical progression, including microscope technology, to the rapid economic growth of the nation in the aftermath of Civil War and Reconstruction periods is affirmed by Professor Mary Sykes Wylie. Arguing that the two are equally practical in the evolution of Western society, Wylie claims “...the clinic was to the medical world something like the factory system to the business world: a method of rationalization serving ends noble, useful and necessary to the transformation of medical logic...simulate[-ing] the style of the industrial order...clinical research was indeed ‘practical work.’\textsuperscript{24}” With city, state and federal legislation incorporating medical practice into so many facets of American living during the Gilded Age ranging from education, to gaining employment, serving in the nation’s military and purchasing insurance coverage, medicine’s importance to the Gilded Age systems of progressivism and capitalism is established. Like the other driving forces of the period - industrial output, politics and migration -


medicine was productive, experimental and constantly developing, with Cyrus Edson’s article supporting this notion.


“In all the history of mankind, there has been no movement…so single hearted, so fraught with importance to humanity, as the advance in scientific discovery made by the doctors of medicine…there have been men of unselfish purpose ready to devote their energy, their health and even their lives to the advancement of their profession…by which they may aid in the divine task of bettering the human race…Perhaps the most potent factor in the advancement of medicine has been the microscope…Bacteria were found everywhere—in the earth, the air, the water…if bacteria could be excluded from wounds, the latter would heal without suppuration…From the mere discovery of bacteria to the identification and classification was comparatively but a step. It was found that they could be cultivated artificially…immerse a needle in any substance containing bacteria and then thrust it into some culture medium…It was in Prof. Koch’s book on the “Etiology of Anthrax,” published in 1878, that the world was indebted for the placing of bacteriology upon a solid scientific basis…they multiplied with extraordinary rapidity, consuming the oxygen in the blood faster than the lungs could supply it…The study of this disease, and of others which were traced to bacterial sources, led to the discovery that germ diseases in general were self-limiting…germs form and excrete some poison which is fatal to themselves…at the same time it was noticed that the action of the germs upon the culture media transformed the latter into new substances. The yeast germ, for instance, produced alcohol and carbonic acid.”
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