

Honors/History 399: Science and War: An interdisciplinary approach to the history of modern warfare

Spring 2014

Tu/Thurs. 9:30-10:45 a.m.

Honors College

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Contact Information:

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Course description and objectives:

In this class, students will investigate the connection between advances in modern science and the rise of modern, total warfare. Collectively, we look at some of the transformations in both science and warfare (from chemical weapons to rocketry to medical and surgical innovations including antibiotics and blood transfusions) and the cultural, political, and social contexts in which these developments occurred. By using primary texts and secondary scholarship on science, technology, and twentieth-century intra and interstate conflict, students will have opportunities to develop their skills in critical reading and analysis, oral and verbal argument and communication. One of the course goals is to promote your exploration of possible honors thesis projects related to the course themes by cutting across disciplinary boundaries.

Course requirements and grading:

Class Participation (10%)

Active attendance and participation is a vital component of this class. Students will do the assigned reading during that week and be prepared to discuss it in class. In addition, students will be asked over the course of the semester to prepare to share orally with the class (either individually or in a group format) material about the issues, concepts, figures, technologies or historical sources of class content. Instructions about such oral presentations will be distributed and discussed in class.

Two exams (40%)

At the end of each substantive thematic block, students will take an exam that consists of in-class short answer portion and a take-home essay covering the material presented in lectures, discussions, and most especially in course readings.

Each exam will be worth 20% of the final grade.

One **research project** consisting of three parts: (50%)

Prospectus (10%)

On March 20 (the week after Spring Break), students will submit a 3-5-page prospectus and bibliography. The prospectus must include a clear statement of the proposed thesis question(s) driving the research project and a discussion of the sources that will enable such a question to be addressed.

Oral Presentation (10%)

During the final week of the semester, students will deliver a 10-minute oral presentation that delivers the thesis question, evidence and highlights of their research project.

Final paper (30%)

On Monday May 5 at noon, students will turn in an approximately 15 page (3750 word) research paper on a topic relevant to the issues, themes or concepts investigated in this class. Further instructions about all aspects of the research project will be delivered and discussed in class.

Required Readings (listed below) will be found available on Blackboard and/or placed on reserve in the J.D. Williams Library.

Required background text:

Parker, *Cambridge Illustrated History of Warfare* (CIHW). Essential for students as background in the political and military history of the modern warfare not otherwise covered in class.

I: Introduction

Thurs. Jan. 23 What is War?

Reading: Definitions of Warfare (IR, Sociology) distributed in class

Week Two: Approaches

Tues. Jan. 28
Thurs. Jan. 30

Approaches to and History of Modern Intra/Inter State Violence
The Role of Science & Technology in War: Overview Part I

Readings:

CIHW Introduction;
Simons, "War: Back to the Future;"
Gleditsch "Revised list of Wars Between States,"

Part I: Weaponry and Technology

Week Three: Introduction/Overview of Role of Technology in Warfare from Ancient to Modern Times

Tues. Feb. 4 The role of Science & Technology in War: Overview Part II

Readings:

Hacker, "The Machines of War;" CIHW: Ch 6 (106-117);
P.J. Bray & A.M. Pollard "A new interpretative approach to the chemistry of copper-alloy objects: source, recycling and technology"
Hough (1916) Man and Metals (MetalsPNAS-1916-Hough-123-9)
Basalla, George "The Evolution of Technology" (1988)
Technology References: Technology and Society- Industrial Revolution, Engineers and the steam engine See: <http://www.fordham.edu/Halsall/mod/modsbook14.asp>
McCrone, John "Fired up" New Scientist, 05/20/2000, Vol. 166 Issue 2239, p. 30
Hsu, Y.-K. "Tracing the flows of copper and copper alloys in the Early Iron Age societies of the eastern Eurasian steppe" (2016)
Leonard, Jennifer A. (2002) "Ancient DNA Evidence for Old World Origin of New World Dogs" Science
Ambrose, Stanley H. "Paleolithic Technology and Human Evolution" 2 MARCH 2001 VOL 291 SCIENCE (2001)
Internal Combustion engine- History <http://www.imperialclub.com/Repair/Engine/history.htm>

Thurs. Feb. 6 How do Explosives Work? Gunpowder to Modern Artillery

Readings

Bosch, "Nobel Prize Lecture;"
Haber, "Nobel Prize Lecture;"
Paull, essay from *Elementals*.
Berl, E. (1937) "FRITZ HABER" (obituary in Journal of Chemical Education"
8-STEPS TO MAKING GUNPOWDER <http://www.wikihow.com/Make-Gunpowder>
Smil, Vaclav "Detonator of the population explosion" NATURE | VOL 400 | 29 JULY 1999
Kelly, Jack "GunPowder: Alchemy, Bombards & Pyrotechnics: The History of the Explosive that Changed the World" (2004)

Feldman, Martin R. and Tarver, Monica L. (1983) "Fritz Haber" *Journal of Chemical Education*
Volume 60 Number 6 June 1983
Hager, Thomas "The Alchemy of Air"

Week Four: Air Power and Rocketry

Tues. Feb. 11: War in the Air: From Origins to Strategic Bombing

Readings:

CIHW on WWI and WWII,
Douhet, *Command of the Air*;
Langdon-Davies, *Air-Raid*;

Thurs. Feb. 13 The Physics of Flight and Bombing

Readings:

Tanaka, Schaffer and Sherry in *Bombing Civilians*;
Kennedy, G. P., *Germany's V-2 rocket*, Schiffer Military History, Atglen, PA (2006)
"Report on Operation Backfire", The War Office, London. 1946
Dungan, T. D., *V-2 : a combat history of the first ballistic missile*, Westholme ; Windsor, Yardley,
Penn.; Garsington (2005)
Longmate, N., *Hitler's rockets : the story of the V-2s*, Hutchinson, London (1985)
Sellier, A., Wright, S., and Taponier, S., *A history of the Dora Camp*, I.R. Dee, Chicago (2003)

Week Five: Chemical Warfare

Tues. Feb. 18 Origins, Experiences and Reactions to Poison Gas in War

Readings:

CIHW on WWI;
Haldane, *Callinicus* (1925);
Sneath, "Present Status of Gas in Modern Warfare" (1933);
Parker on WW1

Thurs. Feb. 20 The Chemistry of Chemical Weapons

Readings:

Faith, Thomas "Behind the Gas Mask: The US Chemical Warfare Service in War and Peace"
Vilensky, Joel A. "Dew of Death: The Story of Lewisite, America's World War I Weapon of Mass
Destruction"
Warren, Christopher A. "GAS, GAS, GAS! The Debate Over Chemical Warfare Between the
World Wars" *Federal History* 2012
Spear, ELLWOOD B. SOME PROBLEMS OF GAS WARFARE (1919) *The Scientific Monthly*, Vol. 8,
No. 3 (Mar., 1919), pp. 275-283

Jones, R., Wills, B. and Kang, C. "Chlorine Gas: An Evolving Hazardous Material Threat and Unconventional Weapon" *Western Journal of Emergency Medicine* Volume XI, no. 2 : May 2010

Excerpt: 'War of Nerves' May 08, 2006 1:51 PM The Chemistry of War NPR
Patent # US1457493- Phosgene

Week Six: Radio and Communication

Tues. Feb. 25 The Science behind Radio

Readings:

Spradley, Joseph L. "Hertz and the Discovery of Radio Waves and the Photoelectric Effect" *The Physics Teacher* 1988

Stellmann, Louis J. "War as a Modern Science" (1911) *Sunset Magazine*, November, 1911, pages 570-572

WORTS, GEO. F. "DIRECTING THE WAR BY WIRELESS" *Popular Mechanics*, May, 1915, pages 647-650:

Thurs. Feb. 27 Communications Technology, War and Society

Readings:

Reed-Winkler, "Information Warfare WWI;" Juniper, "First World War and Radio Development,"

Syrett on Communications Infrastructure in WW2;

Cronin, "Global Communications and War;

Part II: Medicine and War

Week Seven: Infection, Germ Theory and Antibiotics and Sulfa Drugs

Tues. Mar. 4 Why do soldiers die in war? Germ Theory, Disease and Infection

Readings:

Swann, "Search for Synthetic Penicillin during WW2;"

Bud, Robert "Penicillin: Triumph and Tragedy" (2008)

WEEK EIGHT SPRING BREAK

Week Nine: Battlefield Medicine and After

Tues. Mar. 18 Medicine into Battle

Readings:

Marble, Sanders "Forward Surgery and Combat Hospitals: The Origins of the MASH" *Journal of the History of Medicine and Allied Sciences*, Volume 69, Number 1, January 2014, pp. 68-100.

Mabry, Robert L. and DeLorenzo, Robert "Challenges to Improving Combat Casualty Survival on the Battlefield" *MILITARY MEDICINE*, 179, 5:477, 2014.

Hall, H. P. "War and Surgery" Presidential Address, Ulster Medical Society, 1945

Ogilvie W. H. "Some APPLICATIONS OF THE SURGICAL LESSONS OF WAR TO CIVIL PRACTICE" *BRITISH MEDICAL JOURNAL*, LONDON SATURDAY MAY 5 1945

Thurs. Mar. 20 **Medical Techniques and the Wounded Soldier** (Anesthesia, Blood transfusion, Prostheses)

Readings:

Lille, Ralph, S. "The Theory of Anæsthesia" *Biological Bulletin*, Vol. 30, No. 5 (May, 1916), pp. 311-366.

Desai, M.S. and Desai, S. P. "Discovery of Modern Anesthesia: A Counterfactual Narrative about Crawford W. Long, Horace Wells, Charles T. Jackson, and William T. G. Morton" *AANA Journal* ☐ December 2015 ☐ Vol. 83, No. 6.

Baskerville, Charles "The Chemistry of Anesthetics" *Science*, Vol. 34, No. 867 (Aug. 11, 1911), pp. 161-176.

Metcalf, N. H. (2007) "The Effect of the First World War (1914-1918) on the development of British Anesthesia" *European Journal of Anesthesia* 24(8):649-657.

Schneider, William H. "Blood Transfusion in Peace and War, 1900-1918" 1997 *The Society for the Social History of Medicine*

Harrison, "Control of Malaria in WW2"

Scudder, J., Drew, C. R., Corcoran, D.R. and Bull, D.C. "Studies in Blood Preservation *JAMA* (1939) 112(22):2263-2271

US Army Medical Department website (amedd) BLOOD TRANSFUSION IN WORLD WAR I <http://history.amedd.army.mil/booksdocs/wwii/blood/chapter1.htm> (The British Experience)

Fire Arm Injury Research- 3 references – WORD doc

Robertson, Oswald H. (1918) Transfusion with Preserved Red Blood Cells. *The Battle Medical Journal* June 22 1918, p. 691-695.

Week Ten: Medicine and Non-Combatant Dangers to Combatants

Tues. Mar. 25 **Dangers Within: Controlling Threats to the Military**

Thurs. Mar. 27 **Science of disease and military fitness**

Readings:

Rhoades, "Renegotiating French Masculinity: Medicine and Venereal Disease during the Great War"

Roberts, Mary Louise "The Price of Discretion: Prostitution, Venereal Disease, and the American Military in France, 1944–1946" AHR Forum

Harrison, Mark "Medicine and the Culture of Command: the Case of Malaria Control in the British Army during the two World Wars" *Medical History*, 1996, 40: 437-452.

Sauerteig, Lutz D. H. "Sex, Medicine and Mortality During the First World War" Ch 9 ???

Week Eleven: The Veteran and Modern Medicine: Prosthetics and Rehabilitation,

Tues. Apr. 1 Treating Veterans and the Invention of Modern Medicine

Thurs. Apr. 3 Medical Science treats the Injured Body

Readings:

Biernoff, "The Rhetoric of Disfigurement in First World War Britain;" *Social History of Medicine* Vol. 24, No. 3 pp. 666–685.

Panchasi, "Reconstructions: Prosthetics and the Rehabilitation of the Male Body in World War I France" *Differences: A Journal of Feminist Cultural Studies* 7.5 (1995) 109-140.

Serlin, David "Engineering Masculinity: Veterans and Prosthetics after World War Two" p. 45-74

Perry, Heather R. "Re-arming the Disabled Veteran: Artificially Rebuilding State and Society in World War One Germany" p. 75-101

Feo, Katherine "Invisibility: Memory, Masks and Masculinities in the Great War" *Journal of Design History* Vol. 20 No. 1 (2007) p. 17-27.

TransplantsProstheses- References in reinnervation of muscles.

Protocol for Composite Facial Allograft Transplantation

Kuiken, Todd A. "Targeted Muscle Reinnervation for Real-time Myoelectric Control of Multifunction Artificial Arms" *JAMA*, February 11, 2009—Vol 301, No. 6 619-628.

Week Twelve:

Tues. Apr. 8 Medical Science and the Warrior's Mind: from Shell Shock to PTSD

Readings:

Tracey Loughran "Shell Shock, Trauma, and the First World War: The Making of a Diagnosis and Its Histories" *Journal of the History of Medicine and Allied Sciences*, Volume 67, Number 1, January 2012, pp. 94-119

Jonathan E. Sherin, MD, PhD; Charles B. Nemeroff, MD, PhD "Post-traumatic stress disorder: the neurobiological impact of psychological trauma" *Dialogues in Clinical Neuroscience* - Vol 13 . No. 3 . 2011

Phillips, E. Lakin "WAR NEUROSIS: II. A SECOND STUDY OF CLINICAL AND CONTROL GROUPS" *Journal of Clinical Psychology* (1947)

Dayan, J. and Olliac, B. "From hysteria and shell shock to posttraumatic stress disorder: Comments on psychoanalytic and neuropsychological approaches" *Journal of Physiology - Paris* 104 (2010) 296–302.

G. Elliot Smith and T. H. Pear (1917) "Shell Shock and Its Lessons" from Living through the First World War. Ch 38 p. 121-125.

Part III: War Crimes and Ethics

Week Thirteen: Nazi Medicine

Tues. Apr. 15 The Doctor's Trials and the Limits of Medical Knowledge

Readings:

Indictment: Doctor's Trials transcripts

Opening Statement: Doctor's Trials transcripts

Nuremburg Code

Weindling "The Origins of Informed Consent: The International Scientific Commission on Medical War Crimes, and the Nuremberg Code" Bulletin of the History of Medicine, Volume 75, Number 1, Spring 2001, pp. 37-71.

Marrus, Michael R. "The Nuremberg Doctors' Trial in Historical Context" Bulletin of the History of Medicine 73.1 (1999) 106-123

Thurs. Apr. 17 Discussion of limits on human experimentation

Readings:

TUSKEGEE STUDY <http://www.cdc.gov/tuskegee/timeline.htm> U.S. Public Health Service Syphilis Study at Tuskegee

Week Fourteen: Ethics, Science and Nuclear War

Tues. Apr. 22 The Science of Nuclear War

Readings:

Wikipedia: Nuclear Fission Doc

Daugherty, W. Levi, B. and Von Hippel, F. "Casualties Due to the Blast, Heat, and Radioactive Fallout from Various Hypothetical Nuclear Attacks on the United States" 207-231 (Paper presented at a seminar. A technical report is available from Princeton University's Center for Energy and Environmental Studies as Report #PU/CEES198.

Thurs. Apr. 24 The Atomic bomb and the Legacy of Nuclear Proliferation [Discussion]

Readings:

Fiske, Susan T. "Adult Beliefs, Feelings, and Actions Regarding Nuclear War: Evidence from Surveys and Experiments" The Medical Implications of Nuclear War. Institute of Medicine