

The Proceedings  
of the 22nd Annual  
History of Medicine  
Days Conference 2013

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# The Proceedings of the 22nd Annual History of Medicine Days Conference 2013

Edited by

Aleksandra Loewenau, William J. Pratt  
and Frank W. Stahnisch

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The Proceedings of the 22<sup>nd</sup> Annual History of Medicine Days  
Conference 2013

Edited by Aleksandra Loewenau, William J. Pratt  
and Frank W. Stahnisch

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Kevin J. Zuo.....	University of Alberta

## PREFACE AND ACKNOWLEDGEMENTS

The 22<sup>nd</sup> History of Medicine Days (HMDs) conference took place on Friday March 8, 2013 and Saturday March 9, 2013 in the Libin Theatre of the University of Calgary's Faculty of Medicine in Alberta, Canada.<sup>1</sup> Here, undergraduate and early graduate students from across Canada, the United States, United Kingdom, and Europe gave paper and poster presentations on a wide variety of topics from the history of medicine and healthcare. In this preface, the editors would like to express their particular and sincere thanks again to all of the presenters and event participants of the 22<sup>nd</sup> HMDs student conference in 2013. The event was graciously introduced by the Vice Dean of the University of Calgary's Faculty of Medicine, Dr. Glenda MacQueen, and the Senior Associate Dean of the newly amalgamated Faculty of Arts, Dr. David Stewart. Both gave their warm welcoming addresses to all delegates and participating students.

The resulting chapter contributions in the first part of this volume provide many historical insights, gained from the 2013 conference event in Calgary. They are assembled here for the readers of the current HMDs proceedings volume. As for this year's HMDs conference, the selected papers, which are included in the current volume, particularly comprise contributions on Historical Medical Classics as well as Physicianship and the Doctor's Role. Further content areas include History of Public Health; History of Medicine in Lower Canada and Ontario; along with Military Medicine which closes this volume. All in all thirty-five oral presentations and eighteen posters were presented at the 2013 conference. Furthermore, both an exhibit of objects from the Alberta Health Services (AHS) historical archive collection (Chief Curator: Mr. Dennis Slater) and from the Mackie Family Collection in the History of the Neurosciences at the Health Sciences Library of the University of Calgary Faculty of Medicine (Library Director: Mrs. Susan Powelson) were made available for viewing

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<sup>1</sup> The new specialized series of the History of Medicine Days conference with Cambridge Scholars Publishing began in the year 2012. See also Lisa Petermann, Kerry Sheng-Sun and Frank W. Stahnisch (eds.), *Proceedings of the 18<sup>th</sup> History of Medicine Days Conferences at the University of Calgary, AB* (Newcastle upon Tyne: Cambridge Scholars Publishing, 2012) as an example for the previous volumes.

at the entrance to the Libin Theatre in the Health Sciences Centre of the Faculty of Medicine in Calgary.



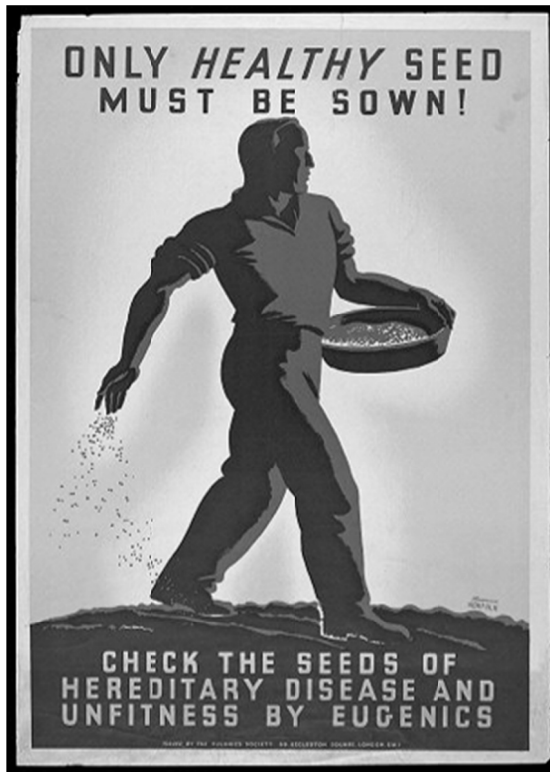
**1-1** Photograph of Dr. Frank Hamilton Mewburn (1858–1929), one of the foremost Alberta pioneer doctors, who was also an assistant surgeon to the Northwest Mounted Police and physician for the Galt Mines near Lethbridge, Alberta. Courtesy of the Alberta Health Services Archives and Historical Collections, Calgary, Alberta, Canada.

Altogether, students from the University of Calgary delivered about one quarter of the presentations at the 22<sup>nd</sup> History of Medicine Days conference. Many local students also actively volunteered on various organizing committees for the conference as well, which included hosting and billeting external student presenters in Calgary, as well as aiding with the organization of the program, and many other preparatory roles. Without their most valuable and gracious help, the organization of the conference would not have been as smooth and successful as it was. About one hundred and fifty students and faculty colleagues attended the

individual sessions from the University of Calgary campuses. Additionally, many faculty from both the Faculty of Medicine and the Faculty of Arts supported the HMDs by reviewing conference abstracts that were submitted.

They also contributed significantly to the chairing and judging of the numerous paper and poster presentations that were delivered at the conference. As well, one faculty colleague from the University of Calgary's medical school, Dr. Manuel Hulliger, presented a featured lecture from the Bachelor of Neuroscience program, entitled "The Edwin Smith Papyrus, 5,000 Years Ago. The First Reported Case of Aphasia After Fronto-Temporal Brain Injury?" We were also fortunate to have a special lecture from well-known Canadian historian Dr. Jack I. Little from Simon Fraser University in Vancouver, British Columbia, on "Private Enterprise versus Catholic Charity in Montreal: The Sisters of Providence Spruce Gum Syrup Case, 1876-78."

The conference's keynote lecture, entitled "Eugenics – A Blueprint for the Future?," was given by the renowned medical historian, Professor Guel Russell from Texas A&M University in College Station, Texas, who presented on a very relevant and timely topic. Professor Russell kindly adjusted her presentation as a chapter submission for our 22<sup>nd</sup> History of Medicine Days proceedings volume. She has also made instructive visual materials accessible for this volume from her foregoing historical research. In 2013, Dr. Russell's invited keynote lecture was again delivered as a co-sponsored event by the O'Brien Institute for Public Health (OIPH), the Calgary History of Medicine Society (CHOMS) and the Science, Technology, Environment and Medicine Studies (STEMS) colloquium at the University of Calgary, for which the organizers of this event were all very grateful.



**1-2** British eugenics poster from the 1930s. Courtesy of the Galton Institute, Northfields, London, England. The Galton Institute: “Eugenic Past,” in *Exploring Human Heredity*, ed. by The Galton Institute (London, England: The Galton Institute, 2016); URL: <http://www.galtoninstitute.org.uk/sir-francis-galton/eugenics-and-final-years/>; <accessed on October 30, 2016>.

As Professor Russell demonstrates in her keynote lecture, contemporary genetic research raises complex questions and ethical dilemmas with striking parallels with the early decades of the 20th century that gave rise to the ‘eugenics’ movement. Founded by Francis Galton (1822-1911), the English polymath, eugenics gained support by the rediscovery of Gregory Mendel (1822-1884) and the subsequent development of ‘genetics as a ‘science of inheritance’ initially through agricultural research. In the USA, the eugenics movement was widely endorsed during the first half of the 20th century. Under Charles Davenport (1866-1944), the first director



of the Eugenics Record Office at Cold Spring Harbor, NY, it became a “triumph of the pedigree chart.” Its violation, however, of individual rights had consequences and paved the way for bioethics.<sup>2</sup>

How the genetic knowledge was applied and misapplied for a seemingly ‘utopian ideal’ of improvement of humankind, manipulated by society to resolve its perceived problems, sanctioned by medicine and the law, provide cautionary lessons and insight into a powerful legacy. Russell shows that history does not predict, but that we can nevertheless learn from the deep experiences of the past. Professor Russell’s chapter in this volume delves particularly into the health systems implications of the growing eugenics movement in the United States of America and intriguingly explores the implications for consecutive research in experimental biology and public health.

Unfortunately, we did not receive Professors Hulliger’s and Little’s papers for publication in this proceedings volume, yet they both delved into important historical issues related to the objectives of our conference. Manuel Hulliger showed that the Edwin Smith papyrus, which was written as an incomplete 1700 BCE copy of an earlier ancient Egyptian document from 3000 BCE, was a treatment manual describing various injuries and ailments of 48 patients. The papyrus’s claim to fame in much of the modern literature is that it is the first, among extant ancient documents, to mention the brain. This, on its own, had not merited much neurological interest and it was largely accidental, yet it offers us more insight into the development of writing than any early understanding of brain function. What made the document exceptional, as Hulliger showed, were the remarkable objectivity of the clinical descriptions, the strict separation of observation and interpretation, and the absence of dogma invoking divine powers or untested theories. The case of its special patient 20, has not received much attention in the modern literature. According to Egyptologist James Henry Breasted’s (1865-1935) 1930 translation, the papyrus describes, “a wound in the temple ... perforating the bone”, which left the patient speechless, while he was still able to wipe his eyes with the arm. Notably, the writer, being aware that the term ‘temple’ might be ambiguous, proceeded (in case 18, also dealing with an injury in the temple region) to define ‘temple’ as the region between “the corner of his eye and the orifice of his ear.”<sup>3</sup>

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<sup>2</sup> Garland Allen, “‘Culling the Herd’: Eugenics and the Conservation Movement in the United States, 1900-1940,” *Journal of the History of Biology* 46 (2013), pp. 31-72.

<sup>3</sup> Francis Clifford Rose, “Cerebral Localization in Antiquity,” *Journal of the History of the Neurosciences* 18 (2009), pp. 239-247.

Jack I. Little, in his conference paper entitled, “Private Enterprise versus Catholic Charity in Montreal: The Sisters of Providence Spruce Gum Syrup Case, 1876-1878” examined the controversy surrounding the attempt by a patent medicine producer in Montreal to have the courts rule against the Sisters of Providence on the grounds that their popular spruce gum syrup represented an infringement of patent. This case led to the application by the Sisters in 1876 for an amendment to their charter that would officially recognize their right as a charitable organization to produce and market their products. The ultramontane supporters of the Sisters argued that their services to the poor and their mental asylum represented a major tax-saving to the city’s rate-payers, thereby illustrating historian Jean-Marie Fecteau’s (1949-2012) argument that the Catholic Church’s social role in Quebec had not been antithetical to a liberal ideology that opposed state expansionism. Yet the fact remained that the Liberal opposition and most of the English-speaking Conservatives in the Legislative Assembly opposed this bill on the liberal grounds that religious orders and charitable societies had an unfair competitive advantage as tax-free corporations. In the final analysis, then, the enactment of the bill represented a victory of conservative rights in an era of rising liberalism.<sup>4</sup>

Looking at the current HMDs proceedings volume, the editorial team is very grateful that eleven manuscript contributions could be included in this edited collection.<sup>5</sup> Moreover, this volume includes the abstracts of all 2013 conference presentations in a separate appendix. This volume has been illustrated with images and diagrams pertaining to the various topics from the history of medicine as they are assembled here. Throughout the 22<sup>nd</sup> conference of the History of Medicine Days in 2013 at the University of Calgary, research enthusiasm, oratory, and audio-visual competence of the speakers were again of a very high quality. The conference audience was not only greatly entertained, but the local and national delegates contributed further to a highly stimulating and engaging discussion throughout the whole event. The proceedings editors are grateful to all participants for their active contributions and support, which helped to

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<sup>4</sup> Jack I. Little, “Charities, Manufactures, and Taxes: The Montreal Sisters of Providence Spruce Gum Syrup Case, 1876-78,” *Canadian Historical Review* 95 (2014), pp. 54-77.

<sup>5</sup> All of the contributions in these proceedings, for which the volume editors have received explicit *Copyright Transfer Forms* and *Author Consent Forms*, will also be made available online through the University of Calgary Internet Repository *Prism*: History of Medicine Days Community Homepage: <http://dspace.ualgary.ca/handle/1880/47439>.

make this academic conference a great success. Since the sad passing of the previous Associated Medical Services (AMS) Chief Executive Officer, Bill Shragge last year, fortunately a new and very energetic CEO has taken over the leadership.

Gail Paech had been an Assistant Professor in the University of Toronto's Faculties of Nursing and Medicine. Holding a Bachelor of Science degree in nursing from the University of Ottawa and a Master of Science degree in nursing from the University of Toronto, she was recently the President and CEO of Toronto East General Hospital. Gail Paech has over twenty-five years of experience in the non-profit, public, and private health care sectors, and held several senior administrative roles in nursing and in the consulting industry. Furthermore, she has also served as Associate Deputy Minister of Economic Development and Trade and Assistant Deputy Minister of Health and Long-Term Care in Ontario and is very committed to spur the leadership role of AMS in history of medicine and healthcare support for Canada in the coming years.<sup>6</sup> We are very grateful for her enthusiastic interest and personal support of this year's History of Medicine Days conference, but would also like to thank AMS tremendously for a five-year grant that has secured the future funding for this nation-wide conference and its international partners and participants. Both the publication of the proceedings volumes and the organization of the 22<sup>nd</sup> History of Medicine Days at the University of Calgary would not have been possible without the continued and sustained financial support through AMS in Toronto, along with the Alberta Medical Foundation in Edmonton, for which we continue to be very grateful. The content is solely the responsibility of the authors and does not necessarily represent the official views of AMS.

We would also like to thank the O'Brien Institute for Public Health in Calgary and the Faculty of Medicine at the University of Calgary for their continued and important support. We likewise extend our warm thanks to Beth Cusitar for the important additional editorial help she provided in finalizing this manuscript, as well as her tireless efforts in organizing the conference and contributing greatly to its success for yet another year. In addition, we express our gratitude to the staff members at Cambridge Scholars Publishing, who have been instrumental in the *Proceedings of the History of Medicine Days Conference Volumes* as a full History Series

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<sup>6</sup> Dorothy Pringle, "AMS Appoints New Chief Executive Officer," in: *Canadian Society for the History of Medicine*, ed. by Stephen E. Mausdley (<https://cshmschm.ca/ams-appoints-new-chief-executive-officer/>); <Accessed on October 30, 2016>.

with their press in Newcastle upon Tyne.

Aleksandra Loewenau,  
William J. Pratt,  
Frank W. Stahnisch

(University of Calgary, October 29, 2016)

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# **HISTORICAL MEDICAL CLASSICS**

# ASSESSING ALEXANDER THE GREAT FOR POST TRAUMATIC STRESS DISORDER

ALISON BUMSTEAD

**SUMMARY:** In the study of military history, Alexander III of Macedon (356-323 BCE), also known as Alexander the Great, is considered one of the greatest generals of all time. In just sixteen years, Alexander built an empire that encompassed most of the known world. As a result, Alexander's life and accomplishments have justifiably fascinated scholars for centuries. The military exploits of this renowned general are well known, as are the aetiology of not only his untimely death, but also of other illnesses he suffered over the course of campaigning. Not extensively studied, however, is the possibility that Alexander suffered from Post Traumatic Stress Disorder (PTSD). While definitive diagnosis of PTSD is rendered impossible due to the limitations of the sources on Alexander, it is possible to reasonably conclude that the likelihood of Alexander suffering from this disorder was high. This chapter will demonstrate the application of current theory and diagnostic criteria, regarding PTSD, including that of the American Psychiatric Association, to the life, campaigns, and actions of Alexander. An assessment of Alexander's exposure to formidable combat stressors indicates that this general would certainly have been vulnerable to development of the combat and operational stress injuries that are precursors of combat-related PTSD. Further, examination of behaviour exhibited by Alexander reveals actions consistent with those considered indicative of PTSD. It is also evident that these behaviours escalated as Alexander's campaign progressed and adversely affected his leadership abilities. Limitations to the Alexander sources must temper any conclusions, however, and as such will be considered.

**KEYWORDS:** Alexander the Great, History of Psychiatry, PTSD

**PRECEPTOR:** Dr. Waldemar Heckel

**INSTITUTION:** University of Calgary



## Introduction

In recent years, the neuropsychiatric syndrome known as Post Traumatic Stress Disorder (PTSD) has garnered considerable public interest. Although adverse psychological reactions to the rigours of warfare were noted in Ancient Greece, and identified periodically throughout history, the phenomenon did not reach generalized public awareness in the modern era until the First World War when the affliction became known as “Shell Shock.” Currently, the aetiology of combat related PTSD is widely considered to be the combat and operational stressors inherent in all military deployments.

Alexander III of Macedon, known popularly as Alexander the Great, is considered one of history’s greatest military leaders. Upon ascending the Macedonian throne in 336 BCE at the age of only twenty years, he proceeded to gain control of a vast amount of territory in just thirteen years before his untimely death in 323 BCE. The military exploits of this renowned general are well studied, as are the aetiology of not only his untimely death, but also the illnesses he suffered over the course of his campaigning. Not extensively considered is the possibility that Alexander suffered from PTSD.

This research project applies contemporary diagnostic criteria for PTSD to the life, campaigns, and actions of Alexander the Great. By examining Alexander’s exposure to combat and operational stressors, as well as evidence of behaviours indicative of the development of PTSD, it is possible to conclude that the great general conceivably suffered from this pernicious psychiatric disorder. Limitations to the Alexander sources temper any conclusions, however, and as such will also be considered.

Awareness of the psychological costs associated with combat has existed since antiquity. Warriors experiencing combat-related psychiatric distress are noted in the heroic tradition of poet Homer (between the 12<sup>th</sup> and 8<sup>th</sup> centuries BCE), in Greek mythology, and in accounts of the Peloponnesian War.<sup>1</sup> For the Ancient Greeks, the defining characteristics of the combat veteran could be understood within the framework of stories surrounding Ares, the God of War, and Hercules, and early attempts to develop mechanisms for coping with the extreme stressors of combat are

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<sup>1</sup> Michael B. Cosmopoulos, ed., *Experiencing War: Trauma and Society in Ancient Greece and Today* (Chicago: Ares Publishers, Inc., 2007), 5-6; Lawrence Tritle, *From Melos to My Lai: War and Survival* (New York: Routledge Taylor & Francis Group, 2000).

seen within these myths.<sup>2</sup> In the modern era, psychiatric combat casualties were deemed purely somatic when they occurred *en masse* during the First World War.<sup>3</sup> Increasingly, however, the military viewed the affliction as a weakness of character revealed by the hardships of war.<sup>4</sup> Psychiatric casualties continued to plague the Anglo-American armies during the Second World War and were especially problematic for American military personnel serving in the Vietnam Conflict.<sup>5</sup> Historically, in United States military operations, approximately one-half of all battlefield casualties have been psychiatric in nature.<sup>6</sup> In 1980, lobbying efforts by afflicted Vietnam Veterans resulted in the American Psychiatric Association (APA) introducing PTSD into the Diagnostic and Statistical Manual (DSM) as an identifiable psychiatric disorder characterized by anxiety and depression with neurophysiological implications.<sup>7</sup> Although subsequent progress in understanding PTSD has occurred, prevention and treatment of the disorder remain challenging.<sup>8</sup>

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<sup>2</sup> Aphrodite Matsakis, "Three Faces of Post-Traumatic Stress: Ares, Hercules, and Hephaestus," in *Experiencing War: Trauma and Society in Ancient Greece and Today*, ed. Michael B. Cosmopoulos (Chicago: Ares Publishers, Inc., 2007), 195-224.

<sup>3</sup> Daryl S. Paulson and Stanley Krippner, *Haunted by Combat: Understanding PTSD in War Veterans* (Toronto: Rowman & Littlefield Publishers, Inc., 2007), xvi.

<sup>4</sup> United States Marine Corps, *Combat and Operational Stress Control* (Washington, D.C.: United States Marine Corps Publications, 2010), accessed 13 October 2012, <http://www.med.navy.mil/sites/nmcscd/nccosc/coscConference/Documents/COSC%20MRCP%20NTP%20Doctrine.pdf>/ chpt. 1 and 4.

<sup>5</sup> Anonymous, "Deployment: Combat and Operational Stress," in *Leaders Guide for Managing Marines in Distress*, ed. US Marines Forces (Washington, D.C.: US Marines Forces, 2012), accessed 13 October 2012, <http://www.usmc-mccs.org/leadersguide/Deployments/CombatOpsStress/index.htm>.

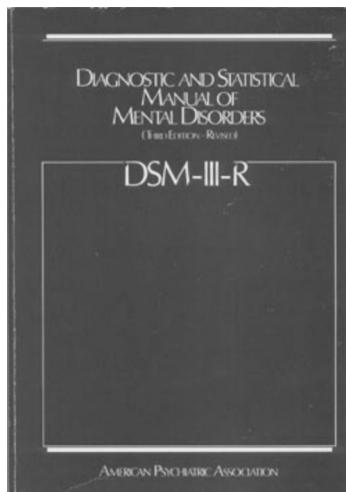
<sup>6</sup> Headquarters, Department of the Army, *Combat and Operational Stress Control Manual for Leaders and Soldiers: FM 6-22.5* (Washington, D.C.: Army Knowledge Online, 2009), accessed 13 October 2012, [http://armypubs.army.mil/doctrine/DR\\_pubs/dr\\_a/pdf/fm6\\_22x5.pdf](http://armypubs.army.mil/doctrine/DR_pubs/dr_a/pdf/fm6_22x5.pdf), chpt. 1.

<sup>7</sup> Paulson and Krippner, *Haunted by Combat*, 70; J. Gayle Beck and Denise M. Sloan, *The Oxford Handbook of Traumatic Stress Disorders* (Toronto: Oxford University Press, Inc., 2010), 3-6.

<sup>8</sup> Regarding progress made: Beck and Sloan, *The Oxford Book of Traumatic Stress Disorders*, 537-531.

## **The Aetiology of Combat-Related Post Traumatic Stress Syndrome: Combat and Operational Stressors and Injuries Transmissible**

Since the initial introduction of PTSD into the DSM (fig. 2-1), the definition of the disorder has broadened considerably to include symptoms caused by a large number of fear-inducing life events.<sup>9</sup> As a result, the APA's diagnostic criteria have become less useful in working with the specific stressors and psychological difficulties encountered by military service veterans. To address this problem, military psychiatry has developed its own nomenclature and diagnostic guidelines for use in assessment of its patients.



**2-1** Front cover of the Diagnostic Statistical Manual III, in which the diagnosis of PTSD was first introduced; courtesy of the Health Sciences Library, University of Calgary, Alberta, Canada.

Currently, the challenges experienced by military personnel are classified as combat and operational stressors (COSs), and these are acknowledged as occurring in all military operations.<sup>10</sup> As the name

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<sup>9</sup> Beck and Sloan, *The Oxford Handbook of Traumatic Stress Disorders*, 3; for a complete discussion of PTSD epidemiology and assessment, see 3-223.

<sup>10</sup> Headquarters, Department of the Army, *Combat and Operational Stress Control*, chpts. 1 and 2.

implies, combat stressors are those that occur during combat itself and involve exposure to horror or terror.<sup>11</sup> These stressors include: participation in killing; inflicting bodily harm; observing killing and the inflicting of bodily harm; seeing dead or dismembered bodies; handling dead bodies and body parts; seeing, or participating in, mutilations and other atrocities; the noise of battle; fear for one's life and safety; fear for the lives and safety of comrades; sustaining a physical injury; losing an important friend or comrade in battle; and killing, or witnessing the death of, non-combatants.<sup>12</sup> In considering Alexander's exposure to such stressors it is important to remember that he was no "chateau general" who led his troops from afar. Alexander led assaults repeatedly, and once engaged in battle he was often found at the epicentre of the action, dramatically increasing his exposure to these traumatizing combat stressors.

Operational stressors are those relating to all other aspects of military deployment, excluding actual combat. These include factors such as: poor army organization, training, and leadership; environmental hazards including extreme temperatures; inadequate rest or nourishment; illness and non-combat injury; poor health or fitness; boredom; failure of strategic, operational, or tactical goals; poor relations with comrades; poor unit cohesion and morale; lengthy deployments, particularly when they are of indeterminate length and there is no appreciable end in sight; and excessive use of alcohol or other drugs.<sup>13</sup>

Given the scope of Alexander's campaign, operational stressors would not have been minor. He and his men travelled a minimum of 20,000 miles as they conquered an area greater than two million square miles extending from Egypt and Greece in the West to India and Pakistan in the East (fig. 2-2).<sup>14</sup> Among Alexander's more damaging operational stresses were the fatigue and exhaustion resulting from the prolonged length of time he maintained the campaign, and the unrelenting pace at which he proceeded. While most ancient armies ceased campaigning for the harvest and winter,

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<sup>11</sup> Michael B. First and Harold Alan Pincus, *DSM-IV-TR Guidebook* (Washington, D.C.: American Psychiatric Publishing, 2004), 926.

<sup>12</sup> Headquarters, Department of the Army, *Combat and Operational Stress Control*; chpts. 1, 1-6 and chpts. 2, 1-6; Anonymous, "Combat and Operational Stress: General Information," in *Leaders Guide for Managing Marines in Distress*, ed. US Marines Forces (Washington, D.C.: US Marines Forces, 2012), accessed 13 October 2012, <http://www.usmc-mccs.org/leadersguide/Deployments/CombatOpsStress/generalinfo.cfm>.

<sup>13</sup> Ibid.

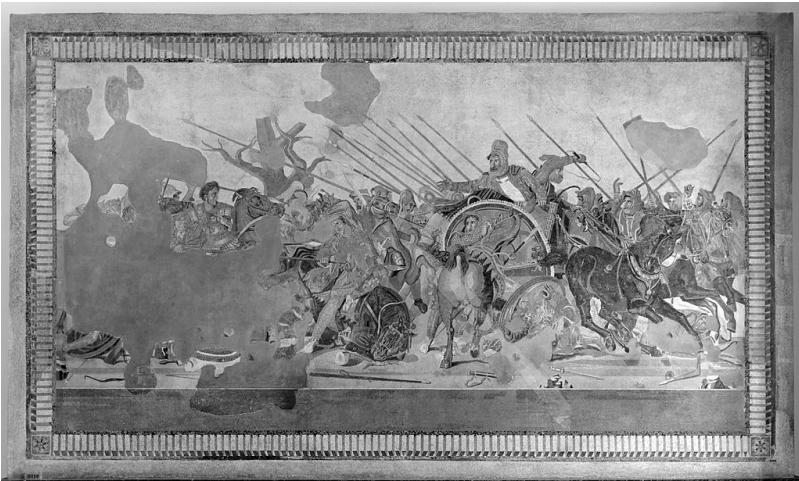
<sup>14</sup> Barry S. Strauss, "Alexander: The Military Campaign," in *Brill's Companion to Alexander the Great*, ed. Joseph Roisman (Boston: Brill, 2003), 134.

Alexander generally campaigned year-round and it has been repeatedly observed that prolonged and multiple deployments are a major source of operational stress.<sup>15</sup> In addition, the intensity of his campaigning seldom decreased over the winter months. While Alexander was keen to overcome any obstacle that lay in his path, the price paid in terms of exposure to environmental hazards was high. Extreme weather of all types was encountered as he crossed mountains, deserts, and bodies of water; in the fourth century BCE, men on campaign rarely had proper protection against harsh environmental elements. Unlike most modern military leaders, Alexander was also the supreme authority in his empire and faced additional operational stressors regarding matters of finance, administration, and governance. Financial concerns were particularly plaguing as the army Alexander inherited from his father, while in suitable fighting form, was very nearly bankrupt. Lack of funds and supplies was an ongoing problem.<sup>16</sup>

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<sup>15</sup> Harold Lamb, *Alexander of Macedon: The Journey to World's End* (Garden City, New York: Doubleday & Company, Inc., 1946), 378; Anonymous, "Combat and Operational Stress: Fatigue Stress Injury," in *Leader's Guide for Managing Marines in Distress*, ed. US Marines Forces (Washington, D.C.: US Marines Forces, 2012), accessed 13 October 2012, <http://www.usmc-mccs.org/leadersguide/Deployments/CombatOpsStress/operationalstress.htm>.

<sup>16</sup> Winthrop Lindsay Adams, *Alexander the Great: Legacy of a Conqueror* (Toronto: Pearson Longman, 2005), 75.



**2-2** Alexander Mosaic in Athens, Greece. Photograph by Berthold Werner. Source: [https://commons.wikimedia.org/wiki/File:Battle\\_of\\_Issus\\_mosaic\\_-\\_Museo\\_Archeologico\\_Nazionale\\_-\\_Naples\\_BW.jpg](https://commons.wikimedia.org/wiki/File:Battle_of_Issus_mosaic_-_Museo_Archeologico_Nazionale_-_Naples_BW.jpg)

Following an indeterminate number of exposures to COSs, combat and operational stress injuries (COSIs) occur. COSIs are literal wounds to the body, mind, and spirit that develop when stressors “exceed in intensity or duration, the individual’s ability to adapt.”<sup>17</sup> While combat stress injuries usually occur abruptly in response to the horrors experienced in battle, those related to operational stressors result from an accumulation of stress “from many sources over the duration of very long or repeated deployments.”<sup>18</sup> Fatigue stress injuries, a subset of operational stress injuries, are particularly damaging and occur over a period of months, or in Alexander’s case over years, as internal biological and psychological resources are depleted due to lack of adequate rest and respite from combat and operational stressors.<sup>19</sup> Fatigue injuries are particularly

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<sup>17</sup> Anonymous, “Combat and Operational Stress: Traumatic Stress Injury,” in *Leaders Guide for Managing Marines in Distress*, ed. US Marines Forces (Washington, D.C.: US Marines Forces, 2012), accessed 13 October 2012, <http://www.usmc-mccs.org/LeadersGuide/Deployments/CombatOpsStress/combatstress.htm>.

<sup>18</sup> Ibid.

<sup>19</sup> Anonymous, “Combat and Operational Stress: Fatigue Stress Injury,” in *Leaders Guide for Managing Marines in Distress*, ed. US Marines Forces (Washington, D.C.: US Marines Forces, 2012), accessed 13 October 2012, <http://www.usmc->