

BURCH SEMINAR IN LONDON, UNITED KINGDOM
LONDON, SCIENCE, AND LITERATURE, 1600-2014

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In collaboration with
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I. INTRODUCTION

Undergraduate students in the natural sciences generally have a view of scientific discovery in which research proceeds independently of the society around them and the prevailing intellectual views of that society. Many students also believe that new discoveries depend only on the insight of a particular scientist and not on the existing knowledge and viewpoints of scientists prevailing at the time. Students also underestimate the importance of conveying scientific discoveries to other scientists and to the public.

We propose to offer two interrelated courses to try to broaden student views and understanding of scientific discoveries and the interactions of the relationships between the points of view of society as a whole and the views of scientists and the effects of these views on scientific discovery. Although each instructor will teach her own course, we will both attend both courses and try to help the students understand these relationships and the fundamental roles they play in science and in society.

One of the two courses which make up this program (Biology 490) will examine three major discoveries concerning the prevention and cure of infectious diseases made in and around London during the eighteenth to twentieth centuries (vaccination, transmission of cholera by contaminated water, and penicillin). The other course (Honors 355) will explore the assumptions of the society in which these discoveries were made as represented in imaginative literature. Resources in London such as museums, plays, and guided walks will contribute to both courses.

We will begin with sixteenth or seventeenth century England, before the experimental ideas of the enlightenment had begun to have much influence on medical science. Although plague was a fact of life for Shakespeare's playgoers and deaths frequently happen on his stage, none of the plays shows death by plague: We will read and see a performance of one of Shakespeare's plays (depending on the Globe's performance schedule) to experience the environment of the reconstructed Globe Theatre and consider the implied assumptions about disease. Focus on the plague of 1665 will bring out how devastating infectious disease epidemics were and the responses of the community to the disease: reading selections from John Donne's poetry and Daniel Defoe's fictionalized *Journal of the Plague Year* will add to this. Next we will look at the late eighteenth and early nineteenth century when the ideas of experimental intervention and testing and recording of

results had begun to influence medicine. We will examine Jenner's invention of vaccination and the popular response to the ensuing campaign to vaccinate as many people as possible. The importance of communicating scientific discoveries to other scientists and the public will be considered in the time of Jenner, Snow, Fleming, and the present day. Through consideration of poems by Swift, Blake, and Wordsworth, we will explore developing attitudes toward science.

By the mid-nineteenth century the industrial revolution had caused changes in living conditions, which along with new diseases brought in by increasing world-wide trade resulted in new epidemics and a new type of careful study of disease transmission. Reading Dickens's *Bleak House* will provide examples of these conditions and attitudes. By the early twentieth century bacteria had been identified as the causative agents of many diseases. A new approach directed at killing bacteria was used by Fleming and others. This approach reflected a new confidence in our ability to control living things, but the use of Fleming's work was limited by his failure to communicate it effectively. Reading Virginia Woolf's *Mrs. Dalloway*, besides reflecting the immediate London location of the program, offers examples of the inability of medical practitioners to see beyond their assumptions.

The combination of these two courses will offer students an unusual opportunity to combine advanced work in Biology with studies of the influence of society on science and the importance of communicating scientific findings to others.

II. PROGRAM GOALS

Goals for scientific understanding

Students will be able to

- a. discuss the basis and mechanics of the three major methods of preventing and treating infectious diseases: immunization, interruption of the transmission of the causative organism, and treatment with compounds which kill or inhibit the growth of the causative organism
- b. identify the strengths and weaknesses of each approach
- c. predict which strategy is most likely to be successful in a particular situation

Goals for understanding of literature

Students will be able to

- a. read literary texts with understanding, appreciation, and judgment
- b. discuss literature in its historical and social contexts

Goals for understanding the interaction of society and scientific research

Students will be able to understand, describe, and predict

- a. how scientific research is influenced the prevailing attitudes in society, particularly how do views of what kinds of things can be known and discovered, causality, attitudes toward change, beliefs as to whether change is possible and, if change is viewed as possible, views about what kinds of change are feasible and desirable influence research
- b. how what is valued by a society influences the types scientific research which are done and the use which is made of it
- c. how scientific views and knowledge at particular times influence what scientific questions are asked and how they are studied
- d. how scientific discoveries can be communicated to other scientists and to the public. How failure to communicate effectively influences responses to discoveries. You should be able to

compare the effectiveness of various methods of communication to different audiences under different circumstances.

e. how literature reflects, explores, and influences society's views of the world

f. how the assumptions we make may limit the possibilities we can change our world

III. ACADEMICS

General format

The classes will run for 6 weeks. The two classes will each meet for 75 minutes each weekday for a total of 26 days. Both of the faculty will attend most classes and field trips. One or two day(s) will be devoted to the final exams (one for each course). Most field trips will occur in the afternoon. Those that occur in the mornings will result in the cancellation of class that day. This will be true for the tour of the Globe Theater and the Fleming Museum which are only available in the mornings. Students will be expected to participate actively in class discussions each day. There will be a short paper and in class presentation by each student in each of the courses. There will also be a long paper which will be a joint paper for the two classes. The topics for both the short and long papers will be approved in advance. There will be separate final exams for each class but we plan to relate them to each other.

Course descriptions

1. Biology 490H: Special Topics in Biology -Discoveries in Prevention and Cure of Infectious Disease in London

Prerequisite Biology 202 This prerequisite is necessary so that students have the background to understand the concepts to be presented thoroughly enough that they can work with them creatively and not simply memorize material.

Course summary

In conjunction with Honors 355 this course will examine three major discoveries concerning the prevention and cure of infectious diseases made in and around London during the eighteenth to twentieth centuries (vaccination, transmission of cholera by contaminated water, and penicillin). Particular attention will be paid to how the thought patterns and assumptions of the society and the scientific community determine what questions a scientist is likely to ask and the kind of answers he will obtain. The role and importance of communicating scientific discoveries to other scientists and the public will also be explored.

There will be 5 sections to the course. The first will provide general background in microbiology for students who have taken molecular biology. If the students have a good background in molecular biology, this can be done in a little over a week. The remaining segments will deal with the plague of 1665, Jenner's invention of vaccination, Snow's discovery of the route of transmission of cholera, and Fleming's discovery of penicillin. In each of these segments we will begin by looking briefly at what is known about the topic today. Then we will examine common knowledge just prior to the discovery. We will read the original report of the discovery. Then we will examine what happened after the discovery. How was it communicated to society? What use was made of it? Were there negative reactions to the discovery? We will end each segment by looking at similar problems today.

London has an abundance of science museums which we will use to help us understand each of these topics. The physic garden and the Fleming museum are directly relevant to infectious disease.

Other museums have exhibits which illustrate society and its reactions to science and infectious disease at various periods (the Museum of London, the British Museum, the Grant Museum, and the Science Museum) and which attempt to communicate science to the public (the Science Museum and the Natural History Museum).

Class Meeting and Discussions

This class will be taught using an “inverted classroom” format. In each class there will be only short lectures to introduce you to difficult material and to clarify points with which you are having difficulty. Come prepared to ask for help with anything you found difficult in the reading. We will go over the material you have read and other work you have done in detail in discussion. The discussion will be followed by a brief presentation of any areas which you may find difficult in the reading assigned for the next class.

In-class discussions are an important part of the learning process. For each class you will have a set of questions to be discussed during the class. You should think about these questions in advance of the class and be prepared to discuss them. Each student will be called to respond to and lead at least one aspect of the discussion each class meeting (this means that you will have to be prepared for all aspects to be discussed as you cannot plan on which aspects we will be discussing when it is your turn to lead the discussion). If for some reason you are not prepared for that day’s class, please tell me before class. This should be a rare occurrence and will adversely affect your grade if it occurs more than twice during the course of the semester unless there is some unusual circumstance. Those students who come prepared for every discussion will be able to drop their bottom two discussion grades. So that you can get used to this form of teaching and grading, the first two in class discussions will be graded but the grades will not count towards your final grade.

Readings

1. General introduction
Slonczewski and Foster, Microbiology: An Evolving Science. Chapters 3, 4, 6, and 11.
2. Plague
Plague: past, present, and future. Stenseth NC, Atshabar BB, Begon M, Belmain SR, Bertherat E, Carniel E, Gage KL, Leirs H, Rahalison L. PLoS Med. 2008 Jan 15;5(1):e3
Plague: A Very Short introduction. Paul Slack 2012 Oxford University Press Book.
3. Smallpox
Angel of Death The Story of Smallpox. Gareth Williams 2010 Palgrave MacMillan Chapters 3, 7, 8, 9, 11, and 15.
Jenner’s papers (scanned, will be available on line)
A current review on small pox to be chosen
4. Cholera
Curr Opin Infect Dis. 2011;472-7. Cholera in the 21st century. Charles RC, Ryan ET.
John Snow’s book (excerpts)
The Ghost Map. Steven Johnson. 2006. Riverhead Books.
<http://www.ph.ucla.edu/epi/snow.html> the John Snow web site.
5. Penicillin
Fleming’s papers on lysozyme and on penicillin
A current review on resistance to antibiotics to be chosen

Topics

Short list

Unit 1: Background on microbiology

1. What is a bacterium?
2. What is a virus?
3. How do viruses grow and cause disease
4. How bacteria cause disease
5. How diseases are transmitted
6. How does the host respond

Unit 2: Plague

An example of an epidemic infectious disease before scientific experiments and intervention.

Visit to the Museum of London and to the Science Museum on your own. Visit to the Royal College of Physicians Physic Garden to be scheduled.

1. What we know today
2. The history of plague
3. The plague of 1665.
4. Plague today in the US, Western Europe, and the third world.

Unit 3: Smallpox

Visit to the Science Museum on your own..

1. What we know today
2. What was known in Jenner's day; Jenner's papers
3. Public response to Jenner's work
4. Eradication of smallpox

Unit 4: Cholera

Visit to the Museum of London, the British Museum, and the Grant Museum on your own. Broad Street walk.

1. What we know today
2. European 18th century epidemics, Snow's book
3. Snow's book
4. The response and modern public health measures: clean water and sewage treatment

Unit 5: Penicillin

Visit to the museum of natural history on your own. Visit to the Fleming Museum to be scheduled

1. The desire for antibacterials and Fleming's work on lysozyme
2. Fleming's papers on penicillin
3. Why the delay in follow-up? Communication matters. Flory et al and the development of penicillin as a useful drug
4. Antibiotics today: development of resistance, why are there no new antibiotics?

Unit 6: Conclusions

1. How do the assumptions of the society and scientific community determine what scientific questions we ask?

2. How does communication of science matter?
3. General discussion including presentation of seminar papers

Unit 7: Final exam

Detailed syllabus with discussion questions

Unit 1: Background on microbiology

1. What is a bacterium?
 - a. Define a bacterium. How would you determine if a particular organism was a bacterium?
 - b. How do bacteria differ from human cells?
 - c. How do bacteria grow?
 - d. What do bacteria need to be able to grow?
2. What is a virus?
 - a. Define a virus. How would you determine if a particular organism was a virus?
 - b. How do viruses differ from cells?
 - c. How do viruses grow? Note that there are different types of viruses and they grow differently in some respects. Describe these different types and how each type grows.
3. How viruses cause disease
 - a. Does growth of a virus always cause disease? What do viruses do that makes the host sick?
 - b. How do viruses persist without growth? Does this matter to the host?
 - c. Describe some different types of viral diseases and explain how the organism causes the symptoms observed.
 - d. How would you determine if a new disease was caused by a virus?
4. How bacteria cause disease
 - a. Do bacteria have to grow in the host to cause disease? Give examples and explain how they work.
 - b. Can bacterial growth alone cause damage to the host? Explain and give examples.
 - c. Most pathogenic bacteria cause disease via multiple mechanisms. Describe one or more examples of a bacterial disease where multiple virulence factors are involved? How do these factors interact with each other?
 - d. Do bacterial virulence factors act alone or is their action dependent on other bacterial processes? Give examples to support your answer.
 - e. Does it matter how the bacterium encounters the host in terms of the likelihood of disease resulting? Is this the same for all bacteria?
5. How diseases are transmitted
 - a. Are all diseases transmitted the same way? If not, what are the possible routes of disease transmission? Give examples of diseases transmitted by each route?
 - b. How would you determine how a disease was transmitted?

- c. Define the term reservoir. What are the reservoirs for some common diseases? Why does it matter what the reservoir for a disease is?
- d. How would you determine the reservoir for a disease?

6. How does the host respond

- a. There are two basic components to the response of an animal host to a potential pathogen: innate and adaptive immunity. What distinguishes these two systems?
- b. Describe the innate immune system. Could you enhance disease resistance by intervening to increase these responses?
- c. Describe the adaptive immune system. Could you enhance disease resistance by intervening to increase these responses?
- d. How would you go about developing an immunization for a new disease?

Unit 2: Plague

An example of an epidemic infectious disease before scientific experiments and intervention.

1. What we know today

- a. What is the causative agent of plague? How does it cause disease? What are the principal virulence factors involved?
- b. How is plague transmitted? What is the life cycle of the bacterium?
- c. What are the major reservoirs for plague?

2. The history of plague

- a. Plague is thought to be a very old disease. What is its history?
- b. Has plague changed over time? How can we tell if the bacterium which caused the out-break of 1665 is the same bacterium we see today? What is the answer?

3. The plague of 1665.

- a. How did people in general respond? How did the city officials respond? We might dramatize their response with a short role playing drama.
- b. There were several ideas circulating about how to reduce the likelihood that you would get plague. What were they? Why did no one explore them in a systematic manner? If you look at the ideas and views expressed in the literature of the period, does this help to explain their response to the epidemic? How were their views different from ours today?

4. Plague today in the US, Western Europe, and the third world.

- a. Plague continues to be a problem in the world today. Why? How is it different in different places? Why is there a difference depending on location?
- b. What actions do we take to reduce the incidence of plague? How do they differ from those taken in 1665? How do these differences reflect the differing views of 1665 and our time?

Unit 3: Smallpox

1. What we know today

- a. What is the causative agent of smallpox? How does it cause disease?
 - b. How is smallpox transmitted?
 - c. Describe the known relatives of smallpox and their reservoirs and transmission.
2. What was known in Jenner's day; Jenner's papers
 - a. What was known about smallpox in Jenner's day? Was anything known about the cause?
 - b. What measures were taken to reduce the likelihood of death from smallpox before Jenner's work? How well did they succeed?
 - b. What observations did Jenner make that led him to do his research?
 - c. What questions did he ask? What experiments did he do? How did Jenner report his research? Do you believe his conclusions? Would you have believed them at the time the research was reported?
 - d. Why was the response to smallpox so different than that to plague? What had changed in the intervening hundred years? Can you see examples of the changes in thought in the writings of each time?
3. Public response to Jenner's work
 - a. What did Jenner do with his research findings?
 - b. What was the public response to Jenner's work and the attempt to immunize the population? Why do you think so many people responded negatively? What attitudes and views were associated with different responses?
 - c. Smallpox stood alone as the only disease for which an immunization was available for many years. Why was this case?
4. Current problems with communicating immunization priorities
 - a. How do people respond to new immunizations today? What determines their response? What attitudes and views are associated with different responses?
 - b. Is it possible to change these attitudes?
5. Eradication of smallpox
 - a. Why was it possible to eradicate smallpox? How was this done?
 - b. Theoretically it would have been possible to eradicate smallpox much earlier than the late 20th century. Why was eradication not attempted earlier? What changes in attitudes and views of the world occurred between 1800 and the late 20th century that resulted in the attempt to eradicate diseases? Can you trace any of these changes in the literature you are reading?
 - c. Some researchers have argued that the eradication of smallpox may create problems in the future? Describe these arguments. Do you agree with them? Why or why not?

Unit 4: Cholera

1. What we know today
 - a. What is the causative agent of cholera? How does it cause disease? What are the principal virulence factors involved?

- b. How is cholera transmitted? What is the life cycle of the bacterium?
 - c. What are the major reservoirs for cholera?
2. European 18th century epidemics, Snow's book
 - a. What was known about cholera before Snow began his studies?
 - b. Describe 19th century cholera epidemics. What were the problems and changes that caused an increase in cholera in Europe and America?
 3. Snow's book
 - a. Snow's studies of the spread of cholera could have been undertaken at almost any time. Why did no one conduct these studies until the mid-19th century?
 - b. What changes in views of the world and in views of causation made the time favorable for this type of study?
 4. The response and modern public health measures: clean water and sewage treatment
 - a. What was the response to Snow's studies? What measures were taken? Why was the response relatively slow?
 - b. Was the response effective? What do we do today to prevent the spread of cholera? Why is there still cholera in the world today?

Unit 5: Penicillin

1. The desire for antibacterials and Fleming's work on lysozyme
 - a. Why didn't people begin to look for antibacterial compounds as soon as bacteria were discovered to be a cause of disease in the mid-19th century? Why did they begin to look for them just after the First World War? What changed about people's perception of the world to cause the change in scientific research? (Think about the change in attitudes as exemplified by characters in books written in the mid-19th century and those written in post-WWI era)
 - b. Discuss Fleming's work on lysozyme. Why did he undertake these studies? What was known before he began his research? What questions did he ask? How did he attempt to answer them? Do you believe the answers he found? Would you have believed them at the date the research was published? Do your answers differ? If so, why?
 - c. Did Fleming's work on lysozyme lead him to the desired results? What would you have tried next at that date? What did he try next?
2. Fleming's papers on penicillin
 - a. Discuss Fleming's work on penicillin. Why did he undertake these studies? What was known before he began his research? What questions did he ask? How did he attempt to answer them? Do you believe the answers he found? Would you have believed them at the date the research was published? Do your answers differ? If so, why?
 - b. Did Fleming's work on penicillin lead him to the desired results? What would you have tried next at that date? What did he try to do next?
3. Why the delay in follow-up? Flory et al and the development of penicillin as a useful drug

- a. Why was there such a long delay between Fleming's papers and the attempt to produce penicillin for clinical use? How could this delay have been avoided? How was penicillin finally developed as a clinical treatment?
 - b. Why does communication of results and ideas matter in science? Describe other examples where failure of communication has played a role in research?
 - c. Why does communication of science to the non-scientist public matter? What are effective and ineffective ways of doing this? Discuss the observations you made at the Museum of Natural History.
 - d. What was the response of the public to antibiotics when they were first introduced? Do you think the response would have been the same if they were introduced 100 years earlier or if they were just discovered and introduced today?
4. Antibiotics today: development of resistance, why are there no new antibiotics?
 - a. We continue to use antibiotics today. However, some problems with their use have arisen. What are they? What can be done about them?
 - b. How do most people view the use of antibiotics at the present time?
 - c. Why have there been no new antibiotics since the 1970s?

Unit 6: Conclusions

1. How do the assumptions of the society and scientific community determine what scientific questions we ask and what kind of answers we find acceptable?
2. How does communication of science matter?
3. How do views expressed in literature reflect the views of the society with regard to scientific research?
4. How does literature and mass communication influence scientific work and responses to situations?
5. General discussion includes presentation of seminar papers

Unit 7: Final Exam

Contact hours

26- 1¼ contact hours of seminar and lecture = 32.5 contact hours

3- 2 hour guided tours and 1 one hour tour = 7 hours of supervised field experience

3- 2 hour independent field experiences and 1 1 hour experience = 7 hours of independent field experience

1 final exam 3 hours

Assessment

Class participation 30% (1% for each discussion or required activity, students will receive weekly assessments. We use inverted classroom teachign methods.)

Journal 20% (to be graded twice during the class, this will be a joint journal for both classes and will contain a record of all of their out-of-class field work such as museum visits, walks, plays attended, etc.)

Long paper	20% (due at the beginning of the sixth week, topic to be approved in advance) This will be a joint paper covering the relationships between prevailing views of society and scientific discovery.
Short exam	10% to be given half-way through the class
Final exam	20%

Course instructor

Dr. Matthyse is a microbiologist. She has taught in the Biology Department at UNC since its establishment in 1980. Prior to that time she taught in the Botany Department at UNC. She teaches Biology 422 Microbiology, Biology 522 Bacterial Genetics, and Biology 891 Graduate Seminar in Biology. She is also Director of Undergraduate Studies for Biology. Her research concerns the interactions between bacteria and plant surfaces. Currently she is studying the interaction of *E. coli* O157 and *Salmonella cholersuis* with alfalfa sprouts, cut lettuce leaves, and tomato fruits, all of which have served as vehicles for the transmission of these human pathogens in recent years. The undergraduate students in her laboratory are studying the role of plant cell wall-degrading enzymes in the interaction of *Agrobacterium tumefaciens* with plants. This bacterium is used in genetic engineering of plants because its' pathogenesis involves the transfer of DNA from the bacterium to the plant. Although the mechanism by which the bacterial DNA which is to be transferred crosses the bacterial membranes and cell wall and the plant plasma membrane are understood, nothing is known about how DNA transfer across the plant cell wall occurs. The elucidation of this process is the focus of the students' research.

Dr. Matthyse has spent considerable time during the summer staying in the Bloomsbury district of London over the last 30 years. She is familiar with London and the London science museums. She has colleagues and friends at the University of London with whom she has interacted during this time. She and Dr. Wood generally stay at the same club in London (the Penn Club) and have discussed London, science, history, and London in literature many times over the last 30 years.

2. HNRS 355 - London in Literature: Disease and Science

Approach: Literary Arts (LA)

Major credit: English

Minor credit: Interdisciplinary Minor in Medicine, Literature, and Culture

Course summary

In conjunction with Biology 490, this course focuses on the role of imaginative literature in reflecting and shaping the assumptions of a changing urban society. Through reading of selected texts from Shakespeare's time through the 20th century, we will observe major shifts in attitudes toward disease and medicine and toward life and death as well. Though 21st century London has in some ways changed beyond recognition from the city of Shakespeare, Defoe, Wordsworth, Dickens, or even Woolf, enough traces remain to make the reading of their works here an enlightening experience, so that walking will join reading, writing, and discussion as a core course activity.

Readings

Blake, William. Poems ("Holy Thursday" in Songs of Innocence and Experience, "London")

Defoe, Daniel. Journal of the Plague Year (Good text at

<http://ebooks.adelaide.edu.au/d/defoe/daniel/d31j/index.html>) Read Parts 1, 2, and 5.

Dickens, Charles. Bleak House. (Students should begin reading this long novel early)
Donne, John. Poems (“Hymn to God my God in My Sickness,” “Hymn to God the Father,” “The First Anniversary”)
Shakespeare, William. Play to be determined, depending on the performance schedule at Shakespeare’s Globe.
Swift, Jonathan. “A Description of a City Shower.”
Woolf, Virginia. Mrs. Dalloway.
Wordsworth, William. The Prelude, book 7 (Text with line numbers and notes at gutenberg.org)
(and a more recent play, depending on what is being performed)

Topics

Unit 1: Early Modern London

Read, see, and discuss the Shakespeare play
Shakespeare’s Globe in context (tour of the complex).
Visit to the Museum of London

Unit 2: Plague

Read and discuss Donne poems
Read and discuss selections from Defoe

Unit 3 Living Conditions in the city

Shakespeare and Dickens walk with professional guide
Read and discuss Swift
Read and discuss Blake poems
Read and discuss Wordsworth selections

Unit 4: Dickens

Read and discuss Bleak House
Present and hand in short papers focusing on sections of the novel

Unit 5 Twentieth Century

Read and discuss Mrs. Dalloway
Walk one or more of the routes described in the novel (why so precisely described in both time and space? Can you still hear Big Ben’s “leaden circles”?)

Unit 6: Conclusions

Read and see a more recent play: how has drama changed as a way of expressing and commenting on social ideas?
General discussion (presentation of seminar papers)
Final Exam

Topics with discussion questions

Unit 1: Early Modern London (specific questions will depend on which play we read and see)
1. How might the conditions of playhouses have influenced Londoners’ beliefs about disease?

2. Are any of the characters in the play involved in treating disease symptoms? What kinds of symptoms? How are those characters portrayed?
3. To what extent do the characters think about what happens after death? How do those thoughts and beliefs influence their actions?

Unit 2: Plague

1. What attitudes toward disease and death are expressed in Donne's poems? How do those attitudes compare to those of Shakespeare's characters? How do you account for the similarities and differences?
2. Defoe's *Journal* was published in 1722 about 1665, when he was too young to have remembered the details. Who is the narrator? Is the text convincing as a journal? What details make it convincing, and what details make you suspect that it is really fiction? Do the fictional components make it more or less valuable as an account of the plague than an actual eyewitness account, and why?

Unit 3: Living Conditions in the City

1. How do the accumulated details in Swift's poem, published 1710, suggest causes of infectious disease? What is the speaker's attitude toward the details?
2. Do Blake's poems reflect any changes in living conditions from the beginning to the end of the 18th century? Who is the speaker in each of the poems (don't assume that it is Blake himself)? How does the imagery in "London" compare to Swift's in his "Description," and how do you account for the differences?
3. In lines 1-76 of Wordsworth's *Prelude* book 7, how does he set up the change of scene to London? Was he excited about going to the city, or fearful, or both, and how do you know? In lines 77-148, on what does he base his expectations about London? From 149-228, how does the actual city compare to his expectations? What details does he emphasize? You may skip 229-543, his account of museums, theatres, and the legal-political side of London, but note that he prefers Shakespeare on the page to the stage (484-85) and is impolite about lawyers (490) and clergymen (544-72). Resume line 594: from there to the end, how does he attempt to come to terms with the overwhelming confusion of the city?
4. How are the three poets' views of London similar and different? To what extent are they aware of disease and its consequences? How do you account for the differences?

Unit 4: Dickens

1. Pay particular attention to the descriptions of London in *Bleak House*. How do they express beliefs about both moral and physical causes of disease? Why are they important to the whole novel?
2. Also pay attention to the voices telling the story. What does Dickens gain by shifting perspective?
3. How is disease important to plot development of the novel? To the development of character?
4. How are medical professionals portrayed? What attitude toward science and medicine is implied? Note that Inspector Bucket is considered to be one of the first detectives in English literature - how do his methods compare to those of the scientists of the time?

Unit 5: Twentieth Century: Woolf

1. In *Mrs. Dalloway*, the descriptions of London are filtered through the consciousness of several different characters, some of whom are central while many are minor, referred to once and then forgotten. What view of the city is implied by this narrative technique?

2. While characters remember earlier times, the actual events of the novel take place on one June day in 1923. Why is that time setting important? How do the details reflect the effects of the Great War?
3. How are medical professionals portrayed in this novel, and what attitude toward science and medicine is implied?
4. Consider Lady Bruton's luncheon and Elizabeth Dalloway's bus journey along the Strand. What do these episodes imply about the position of women in the 1920s? How do they relate to Clarissa Dalloway's life?

Unit 6: Conclusions

1. How does the modern play show changes in society's attitudes toward disease and science since Shakespeare's time?
2. Considering the works we have read and others you know, to what extent is literature a valid source of knowledge about scientific topics? How does the search for those topics alter the process of reading imaginative fiction?

Contact hours

- 26 1/4 hour classes = 32.5 hours
- 2-hour guided walk = 1 hour
- 2-hour tour of Globe Exhibition and site = 1 hour
- 2+ hour Shakespeare play = 1 hour
- 2-hour more recent play = 1 hour
- 1-hour directed walk, Mrs. Dalloway routes = 1/2 hour
- 3-hour final examination

Course requirements and assessment

- Class participation 20% (students will receive weekly assessments)
- Journal (see Biology) 20%
- Focused paper on a section of Bleak House, presented in class and handed in 10%
- Seminar paper, topic to be approved in advance (see Biology) 25%
- Final Exam, comprehensive 25%

Course instructor

Dr. Andelys Wood, Professor of English, Union College, Kentucky

Dr. Wood has taught a variety of courses in literature and humanities during more than 35 years at Union College, including honors sections of freshman and sophomore core humanities courses. Her first trip to London in 1978 was as co-instructor of a January term history and literature class. Returning for a sabbatical term after participating in an Oxford summer course in literature and society in 1985, she has spent summers in London ever since. Some of the knowledge gained is reflected in published papers on Ruskin and museums (1988), performance at Shakespeare's Globe and other London theatres (1999, 2003, and 2008), the walks in Mrs. Dalloway (2003), and the London statues of Charlie Fletcher's Stoneheart trilogy (2011).

IV. PROGRAM LOGISTICS

- a. Local Affiliation

The UNC European Studies Center Winston House on 3 Bedford Square will serve as the program base. Students will have access to a range of libraries, including the University College London Science Library, the British Library, the Science Museum Library and Archives, and the Wellcome Library.

b. Student Housing

Students on the program will live in apartments managed by Acorn Group, a property management company based in Bloomsbury. Students share apartments with one or two other students on the program. All apartments are located in the Bloomsbury area of central London (no more than a 10 minute walk from Winston House) and are fully equipped with all cooking utensils, color television and telephone, and are cleaned weekly.

c. Classroom Space and Student Services

The program will use classroom space at Winston House. Program participants will have access to resources at Winston House, including internet access, copiers and printers, and a library and study area. Additional staff support is provided by the Winston House manager as needed.

d. Transportation and Communication

Students on this program will receive a weekly travel card for London's tube and buses. All program related travel will use public transportation.

e. Safety and Security

The U.S. State Department has no travel restrictions in place for the United Kingdom. The UK is a politically stable country with modern infrastructure and generally a safe place to visit. However, it shares with the rest of the world the risks of terrorist attacks. Students will receive a comprehensive safety orientation upon arrival and will be advised to stay vigilant as they would in any US city to street crime involving theft and pick-pocketing.

f. Medical Care

Hospitals and doctor's practices in London have very modern facilities and medical equipment. Students will carry international health insurance through HTH Worldwide and will receive information of doctors and clinics in proximity to Winston House upon arrival in London. Students will be advised to bring all prescription medicines with them for the duration of the program.

Ann G. Matthysse
CURRICULUM VITAE

Professor of Biology and Director of Undergraduate Studies in Biology, University of North Carolina, Chapel Hill

Degrees and Courses of Study:

A.B. magna cum laude, Biochemical Sciences, Radcliffe College, 1961.
Advisor: Prof. A.M. Pappenheimer, Jr.
Thesis: The Maltase of the Diphtheria Bacillus.
Graduate work, Life Sciences, Rockefeller University, 1961-1963.
Advisor: Prof. E.L. Tatum.
Ph.D. Biology, Harvard University, 1967.
Advisor: Prof. John G. Torrey.
Thesis: The Stimulation of Polyploid Mitosis in Pea Roots.
Postdoctoral Research Fellow with Prof. James Bonner, California Institute of Technology, 1966-1969. Molecular biology.
Postdoctoral Research Fellow with Prof. Bernard Davis, Harvard Medical School, 1969-1970. Bacterial physiology and protein synthesis.

Positions:

Lecturer in Biology (Microbiology), Harvard University, January 1970 to July 1971.
Assistant Professor of Microbiology, Indiana University School of Medicine, 1971-1975.
Assistant Professor of Botany, University of North Carolina, 1975- 1977.
Associate Professor of Botany, University of North Carolina, 1977- 1982.
Associate Professor of Biology, University of North Carolina, 1982- 1990.
Professor of Biology, University of North Carolina, 1990-present.

Special Achievements:

Phi Beta Kappa, 1960
Sigma Xi, 1961
Editorial Board, Journal of Bacteriology, 1980-86, 1995-2003.
Member, NSF Graduate Fellowship Program Panel in Biochemistry, Biophysics, and Molecular Biology, 1980-82. Chairman of panel, 1983.
O.N. Allen Lecture in Phytobacteriology, University of Wisconsin, 1982.
Member, NSF Genetics Panel, 1984-87
Member, ONR prokaryotic molecular biology panel, 1987.
Editorial Board, Journal of Microbiological Methods, 1984-2010
Reynolds leave, fall, 1988, spent in Dr. S. Gelvin's lab at Purdue
Member, Howard Hughes Undergraduate Biological Sciences Education Panel, 1992 & 1993.
Editorial Board, Applied and Environmental Microbiology, 1989-2004
Council member, AAAS, 1992-1995.
Kenan leave, Flinders University of South Australia, 1996

Distinguished visiting fellow, Institute for Advanced Study. La Trobe University, Melbourne, Australia 2005

Member, NSF Graduate Fellowship Program Panel in Microbiology, 2008 & 2009.

Member, USDA Grants Panel, 2009 & 2010

Recent Publications

Jeter, C. and A. G. Matthyse. 2005. Characterization of the binding of diarrheagenic strains of *E. coli* to plant surfaces and the role of curli in the interaction of the bacteria with alfalfa sprouts. *Mol Plant Microbe Interact.* 18:1235-42.

Torres AG, Jeter C, Langley W, and Matthyse AG. 2005. Differential binding of *Escherichia coli* O157:H7 to alfalfa, human epithelial cells, and plastic is mediated by a variety of surface structures. *Appl Environ Microbiol.* 71:8008-15.

Matthyse AG, Marry M, Krall L, Kaye M, Ramey BE, Fuqua C, and White AR. 2005. The effect of cellulose overproduction on binding and biofilm formation on roots by *Agrobacterium tumefaciens*. *Mol Plant Microbe Interact.* 18:1002-10.

Matthyse, A. G., Jaeckel, P., and Jeter, C. 2008. *AttG* and *attC* mutations of *Agrobacterium tumefaciens* are dominant negative mutations which block attachment and virulence. *Can. J. Microbiol.* 54:241-247.

Matthyse, A. G., R Deora, M Mishra, and A. G. Torres. 2008. The polysaccharides cellulose, poly- β -1, 6-*N*-acetyl-D-glucosamine, and colanic acid are required for optimal binding of *E. coli* O157:H7 strains to alfalfa sprouts and K12 strains to plastic but not for binding to epithelial cells. *Appl. Environ. Microbiol.* 74:2384-2390.

Mathews, S. L., Smith, R. B., and A. G. Matthyse. Characterization of the interaction of *E. coli* O157:H7 and K12 with lettuce plants and leaves and a comparison with the binding to alfalfa sprouts. Manuscript submitted for publication.

Aracic, S., A. G. Matthyse, B. A. Stone, V. A. Stanisich. The Biological Roles of Agrobacterial (1,3)- β -Glucan (Curdlan) and Cellulose. Manuscript in preparation.

ANDELYS WOOD

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Barbourville, Kentucky 40906
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EARNED DEGREES

A.B. Middlebury College, 1969 (major, English)
Ph.D. Indiana University, 1974 (major, English; minor, comparative literature)

FURTHER STUDY

International Graduate Summer School, Exeter College, Oxford, 1983 & 1985
(topics: modern poetry, social and economic history 1870-present)

DISTINCTIONS

Charles A. Dana Scholar 1966-69
A.B. cum laude, with high honors in English 1969
Phi Beta Kappa 1969
James Still Fellow, summer 1984
Vice President, Kentucky Philological Association 1989-90
President, Kentucky Philological Association 1990-91
Union College Excellence in Research Award 1994
Union College Excellence in Research Award 1996
United Methodist Exemplary Teacher Award 1997
Union College Excellence in Teaching Award 1998
Union College Excellence in Research Award 1999-2000
Union College Excellence in Research Award 2005
United Methodist Exemplary Teacher Award 2007-08
Union College Excellence in Research Award 2009
Union College Student Government Association Distinguished Professor 2010

TEACHING EXPERIENCE

Union College, Professor 1985-present (Department Head 1987-92, 1995-96,
1997-99; Department Chair, 1999-2002)
Union College, Associate Professor 1981-85
Union College, Assistant Professor 1977-81
St. Mary's College of Maryland, Instructor Spring 1977
University of Oklahoma, Visiting Assistant Professor 1975-76
Indiana University, Associate Instructor 1971-74

COURSES REGULARLY TAUGHT AT UNION

Critical Dialogues: Western Cultures in a World Context (Humanities Core)
Critical Study of Children's Literature
Literature for Adolescents and Young Adults
Shakespeare

ADDITIONAL COURSES RECENTLY TAUGHT

Introduction to Critical Studies
Texts in History before 1800: Medieval and Renaissance Literature
Texts and Themes: Other Childhoods
Literary Types: Lyric Poetry
Capstone Seminar: Paradise(s) Lost

RESEARCH AND PUBLICATION

"A Study in Purple: The Function of Poetic Prose in *Modern Painters*," unpublished dissertation, 1974.
"Shelley's Ironic Vision: *The Witch of Atlas*," *Keats-Shelley Journal* 29 (1980): 67-82.
"Elizabeth Barrett Browning's *Aurora Leigh*: A Question of Form," paper delivered at Kentucky Philological Association Annual Meeting, 1979.
"Dickens and Ruskin in Venice," paper delivered at KPA Annual Meeting, 1981.
"Landscape and Tradition: Auden and Ruskin," paper delivered at the Louisville Twentieth-Century Literature Conference, 1982.
"Yeats and Measurement," paper delivered at KPA Annual Meeting, 1982.
"Yeats and Measurement," *South Atlantic Review* 50.4 (1985): 65-79.
"Ruskin, the Museum, and the Labyrinth," paper delivered at KPA Annual Meeting, 1987.
"Fiction Meets History: The Strange Case of Boudicca," paper delivered at KPA Annual Meeting, 1988.
"Above Ruskin's Labyrinth," *Victorian Newsletter* 74 (1988): 33-37.
"Teaching Keats in Kentucky," paper delivered at KPA Annual Meeting, 1989.
"*The Conquered*," "*The Exeter Blitz*," and "*The Warden's Niece*" in *Masterplots II: Junior and Young Adult Fiction*. Ed. Frank N. Magill. 4 vols. Pasadena: Salem Press, 1991. 267-69, 394-96, 1579-81.
"The Body in the Library," KPA Presidential Address, 1991.
"1991 Presidential Address: The Body in the Library," *Kentucky Philological Review* 6 (1992): 1-3.
"Adam the Poet" (poem), *Kentucky Philological Review: Special Issue Twentieth Anniversary Chapbook* (March 1993), 22.
"Rosemary Sutcliff 1920-1992: Patterns of the Past," paper delivered at KPA Annual Meeting, 1993.
"The Walker's Paradox: Perceptions of Reality in *Mrs. Dalloway*," paper delivered at KPA Annual Meeting, 1994.
"The Big Bad Wolf and the Creation of the Politically Correct, Multicultural Child," paper delivered at the First Biennial Conference on Modern Critical Approaches to Children's Literature, 1995.
"Teaching Keats in Kentucky," *The Journal of Kentucky Studies* 12 (1995): 91-97.
"'My Thoughts Remain Below': Virginia Woolf and the Church," paper delivered at KPA Annual Meeting, 1996.
"One Saint in Two Books: *The Wind Eye* and *Cuddy*," paper delivered at KPA Annual Meeting, 1997.
"Treasure Trove: The Value of Art in Fiction for Children," paper delivered at Children's Literature Association Annual Conference (Paris), 1998.

- "Henry V at the Globe, 1599/1997," *Kentucky Philological Review* 13 (1999): 49-53.
- "London Bus Poem," *Kentucky Philological Review* 13 (1999): 58.
- "St. Cuthbert in Our Time: *The Wind Eye and Cuddy*," *Children's Literature Association Quarterly* 24 (1999): 40-46.
- "Cross-Gender Casting at the Globe, 1599/1999 (Or, Cleopatra and the Critics)," paper delivered at KPA Annual Meeting, 2000.
- "Crossing Time Boundaries: Connecting Pasts and Presents in the British Isles," paper delivered at Children's Literature Association Annual Conference, 2000.
- "To Split the Ears of the Groundlings'," *Kentucky Philological Review* 17 (2003): 40-44.
- "Walking the Web in the Lost London of *Mrs. Dalloway*," *Mosaic* 36/2 (June 2003): 19-32.
- "Regime Change on Stage, London 2003," paper delivered at KPA Annual Meeting, 2004.
- "Quidditch Rules: Sport in the Postmodern School Story," *The Journal of Kentucky Studies* 21 (2004): 155-60.
- "*Measure for Measure* for the 21st Century," paper delivered at KPA Annual Meeting, 2005.
- "Unwanted Laughter? *Titus Andronicus* at Shakespeare's Globe 2006," *Kentucky Philological Review* 22 (2008): 66-73.
- "The Summer of Bleak Endings: London Theatre 2008," paper delivered at KPA Annual Meeting, 2009.
- "Perspective Matters: Roman Britain in Three Children's Novels," paper delivered at Asterisks and Obelisks Conference, University of Wales at Lampeter, 2009.
- "In Search of the Heroic: Ancient Greeks on the London Stage 2009," paper delivered at KPA Annual Meeting, 2010.
- "The Stones of London: Public Art in Charlie Fletcher's Stoneheart Trilogy," paper delivered at Literary London Conference, University of London, July 2010.
- "Thomas Cromwell, Our Contemporary," paper delivered at KPA Annual Meeting, 2011.
- "Buying Flowers and the Ecology of London in *Mrs. Dalloway*," paper delivered at Literary London Conference, University of London, July 2011.
- "The Stones of London: Public Art in Charlie Fletcher's Stoneheart Trilogy," *Literary London Journal* 9.2 (Sept. 2011). Web.
- "Pastimes and Times Past: Children Visit the British Museum," paper delivered at Literary London Conference, University of London, July 2012.

REFERENCES

- Dr. Thomas J. McFarland, Vice President for Academic Affairs, Union College
 Dr. Vernon G. Miles, Provost and VP for Academic Affairs, Henderson State University (former Vice President for Academic Affairs, Union College)