

BIEB 166 Syllabus Winter 2017

Animal Behavior & Communication

Please note: information in this syllabus is subject to change. **Any schedule changes will be posted on the course website.** Make sure to frequently check the website to keep updated.

Overall Learning Goals

I am excited that you will be learning about the fascinating field of Animal Behavior and Communication. The course is somewhat unusual in that it is a synthesis of traditional topics in Animal Behavior with a strong emphasis on mechanism and biophysics. I have the following learning goals for you.

- 1) Understand some of the amazing ways in which animal behavior and communication has evolved.
- 2) Learn how to analyze questions on multiple levels, on both the proximate (here and now) and ultimate (evolutionary) levels.
- 3) Be able to look at an animal behavior that you encounter, not necessarily one that we discuss in this course, but any animal behavior and form hypotheses and experiments as a scientist would. Why is the animal doing this? How can I answer my question? What are the appropriate control experiments?
- 4) Understand the constraints the shape animal communication in the acoustic, visual, and olfactory domains.
- 5) Years from now, I hope that you will retain an appreciation of the excitement and concepts that have arisen in the quest to understand the amazing behavior of animals. Above all, I hope that this course will expand your own horizons, giving you a sense of what it is like to live in different sensory worlds, and an admiration of the solutions that evolution has tailored.

Grading

Grading is on a fixed percentage scale, not on a curve. Grading on a curve forces you to compete with your classmates. I believe you should be rewarded for your own achievements, not upon how many people have lower or higher grades. In addition, grading with a fixed percentage allows you to have performance criteria that are specific, explicit, and clear. Each percentage shown is the **lowest** percentage corresponding to a letter grade. Please note that I use two significant digits.

F	<60.00% is an F
D	<70.00% is a D (there is no D+ or D-)
C-	70.00%
C	73.33%
C+	76.66%
B-	80.00%
B	83.33%
B+	86.66%
A-	90.00%
A	93.33%
A+	≥96.66%

Your final grade is based upon the following:

- 1) First midterm exam = 20%
- 2) Second midterm exam = 30%
- 3) Final exam = 40%
- 4) Section quizzes = 5%
- 5) Clicker questions in lecture = 5%

To determine your overall grade to date, please use the following formula:

Total percentage = [(% from Midterm 1) x 0.20] + [(% from Midterm 2) x 0.30] + [(% from Final) x 0.45] + (% from section quizzes) x 0.05 + (% from clicker questions) x 0.05]

What does this formula mean? It weighs each exam by the percentage of your total grade that the exam is worth. Midterm 1 is worth 20%, Midterm 2 is worth 30%, and the Final is worth 40% of your grade. The sections quizzes count for 5% of your grade and are based upon your highest seven section quiz grades (out of nine quizzes). The lecture clicker questions count for 5% of your grade and are based upon your attending and answering questions in at least 73% of the lectures (19 of the 26 lectures).

How does my improvement affect my grade?

The weighting system that I use gives each successive exam more weight. Thus, you are automatically rewarded if you do better in each successive exam. Sometimes, students are initially not familiar with how to best study for the course. Therefore, they may not do well on the first exam. However, they can compensate for this by improving their performance on successive exams.

Lecture clicker questions

Each lecture, we will ask clicker questions. You will be graded upon participation, not the percentage of questions that you answer correctly because we want to reward your participation. If you participate by answering questions in at least 19 of the 26 lectures, you will receive full credit for the lecture clicker questions. We understand that sometimes you may be ill or there could be an issue with your clicker. However, you only need to participate in 73% of the lectures to receive full credit. Also, credit is given per lecture, not per question. Some lectures may have more clicker questions than other lectures.

Accommodations

Students requesting accommodations and services due to a disability for this course need to provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD), prior to eligibility for requests. Receipt of AFAs in advance is necessary for appropriate planning for the provision of reasonable accommodations. For more information, contact the OSD at (858) 534-4382 (voice), osd@ucsd.edu, or visit osd.ucsd.edu.

Exams

All exams are given in class. All exams are closed book. You are not allowed to use notes or any electronic aids. You will have 50 min for each Midterm and 3 hrs for the Final. If possible, you must seat yourself one chair apart from the next individual. Exams can only be written in non-erasable pen. Exams written in pencil or with an erasable pen will not be regraded. When you submit your exam, you must bring a **valid photo ID** and show it to an IA, who will then take your exam for grading. If you do not bring a valid photo ID, *then the IA will take a photograph of you with your exam for verification purposes*. You must also sign your name on the sign out

sheet to verify that you were present at the exam. There are multiple sign out sheets. You only need to sign your name on *one sign out sheet per exam*.

Exam Regrades

Having your exam accurately and correctly graded **is important to us**. Thus, you may submit your exam for a regrade **within one week** after the exam is made available to pick up. The regrade due date will be posted on the course software. **You must follow the following rules to submit a regrade**. These rules apply to **all exams**, including the final exam.

- 1) For **incorrect points addition**, please state in writing which pages and questions were incorrectly added up. Make sure you double-check this against the online key. In the past, students have actually lost points because they were incorrectly given too many points originally. **We therefore encourage you to double check the points addition on your exams**.
- 2) Regrades can only be submitted on exams **written in non-erasable ink**. Exams written in pencil or erasable ink will not be regraded.
- 3) You must state in **writing** exactly which questions you want regraded and why. **We usually will only regrade questions that you ask to be regraded (but see below)**. Stating “the question was not graded correctly” **is not sufficient**. You must explain **in writing** why you feel you **deserve** more points. Please note that writing down a vague or general answer or writing down a series of correct and incorrect answers does not mean that the question was answered correctly. Just because there is a hint of a correct answer embedded among incorrect answers does not mean that you correctly understood the concept being tested.
- 4) Your regrade request must be stapled to your exam. **Do not write your request on your exam. Regrades should be submitted to the instructor or to an IA.**
- 5) **YOU CAN LOSE POINTS ON A REGRADE**. We do not want to penalize you for submitting a regrade, but the logic of a regrade is to make sure that the regraded questions are **accurately** and **correctly** regraded. We will only regrade questions that you submit to be regraded, but these questions will be correctly regraded. Students have lost points in the past. To guard against this, please check the key carefully and make sure that you have a clear understanding of the correct answer
- 6) If it appears to the instructor that a student is submitting an exam for a **frivolous regrade** (defined as more than 66% of the questions to be regraded not deserving additional points), then the instructor may have the entire exam regraded.

Where can I pick up my exams?

All exams will be available at the Division of Biological Sciences Exam Depot. This is located at **Pacific Hall Room 1227** (1st floor across from the vending machines outside the north entrance). It is open M-F from 11 am to 3 pm. It is **closed** on weekends, holidays, and all other official UCSD closures.

Missed exams

There are no make-up exams. If you must miss an exam, you will be required to provide official **WRITTEN** documentation of an unavoidable emergency (e.g. serious illness). Without such documentation, you will receive a failing grade for that exam. With valid documentation, the proportion of your grade **that is based upon your final exam** will be increased to cover the

midterm that was missed. You must submit this documentation to the instructor within one week of your returning to health and resuming the course. **You cannot take the final exam if you missed both midterms, even if you have written excuses. A missed final exam cannot be taken at a later date.** If you are able to provide official documentation of an unavoidable emergency, you will receive an incomplete for the course. You will then need to make arrangements to complete the course in the following quarter.

Incomplete policy

UCSD has a strict policy on incompletes. We adhere to this policy. For example, if you miss both midterms and the final exam, even for valid medical reasons, you may not take an incomplete. If you receive an incomplete, you must schedule your make up final exam before the end of the following quarter. *Once you and the instructor have agreed upon a final exam make-up date, you must show up for the make-up final. If you do not, you will have no further opportunities to take the make-up exam.*

Excused absences

If you cannot be present in the classroom for an exam and can present a valid excuse (such as a note from your coach for a sporting event), then a sealed copy of the exam will be given to the coach, musical director, etc. who will administer the exam **at the same time as the class exam. You must present the documentation at least one week in advance of the exam.** If no UCSD official can be found to administer the exam, then it will count as a missed exam. If the exam cannot be taken on the class exam day, then it will count as a missed exam. **No exam can be taken before or after the scheduled exam date.**

Course Time Conflicts

You **may not** enroll in this course and course(s) that meet at the same day and time. If you do so, you will have a final exam time and date conflict. You are only able to take the final exam for BIEB 166 at the date and time determined by the registrar. If a conflict arises, you will not be able to take the exam for BIEB 166. In addition, if you schedule multiple courses that meet on the same day but at **different** times, **you will not be able to take your BIEB 166 exam on a different date.**

If you have multiple final exams on the same day as the final exam for this course, you will not be able to take your final exam at a different day or time. There is an **incorrect belief** that an instructor **must** provide an alternative exam time if a student has three or more final exams on the same day. **This is not true.** Please be responsible in scheduling your courses to ensure that such situations do not arise.

What you need to buy

You do not need to buy any books or course readers for this course! All of the assigned readings, lecture notes, and lecture slides are available online for you to read and download on the course website. Note that we have included *additional* readings that are **not required**, but are for your own enrichment. All lecture notes, lectures slides, and lecture movies can be accessed from home, if you have the correct software and setup a **VPN client**. Please check the campus website for current instructions. If you cannot access these materials, please use a campus computer.

Sourcebook

The course sourcebook is available as a pdf file online (download from TritonEd) or, if you prefer, you can purchase a printed copy from the bookstore. Please note that the printed copy,

for copyright reasons, does not contain the three additional weekly readings (see below) that you will read and then discuss in section.

Please note that there is no need to buy old exams. *All exams that have ever been given in this course*, and the corresponding answer keys, are on the course website.

Additional weekly readings

These readings are papers published in scientific journals and are designed to expose you to scientific literature and the scientific method. The readings are also assigned to give you a deeper example of a particular topic. **Required readings will be discussed in section and tested on the exam and are listed on the lecture schedule (see end of this document).**

You will be tested on the readings! Sections will go over the weekly readings. Please attend the sections or office hours if you have any questions about the readings.

SECTIONS

Sections are MANDATORY. Section attendance will be measured by your taking section quizzes (see below) Sections will review material presented in the lecture and any additional weekly readings that have been assigned.

- 1) **Each section will have a brief section quiz THAT CAN ONLY BE TAKEN DURING SECTION TIME IN THE SECTION.** Repeating a quiz in any given week to obtain a higher quiz grade is not allowed. The quiz will be different for each section but will cover the topics from that week in the course. **Your highest 7 out of 9 section quiz scores will be used to calculate your section quiz grade. How does this work?** Let's say you attend all 9 sections (there is no section during the first week of the course) and your grades are 10%, 20%, 25%, 30%, 32%, 40%, 50%, 55%, and 65%. We will throw out your lowest two quizzes (10% and 20%) and calculate your section quiz score based upon the remaining quizzes.
- 2) **What if I cannot attend any of the sections?** Section times are posted on the course registration site. ***If you cannot make any of these section times, then you cannot take the course.*** I advise you to drop the course before the drop deadline for a W.
- 3) **What if I add the course later on and miss a section?** Once you have added the course, go to a section right away, any section. Even if you miss a section, this will not matter much for your section quiz grade because the lowest two quizzes are dropped.
- 4) **What if I need to change my section?** Please inform your old section leader and your new section leader. Your section quiz grades are recorded on the course software, so your old and new section quiz grades will be recorded.
- 5) **What if I am sick and need to miss a section?** You can always go to another section taught that week by another IA. In this case, you will need to tell that IA that you will be attending his or her section and take their quiz. All quiz grades will be recorded on the course software. You can check this to see if your quiz grade has been recorded. You do not need to present an excuse if you are ill. Your missed quiz will be one of the low score quizzes that is thrown out.
- 6) **What if I am sick and miss the entire week?** Remember, your lowest two section quiz grades are thrown out.

- 7) **What if I am sick and miss two weeks of section?** Remember, your lowest two section quiz grades are thrown out.
- 8) **What if I am sick and miss more three or more weeks of section?** If you miss three or more weeks of the course, you are missing more than 30% of the course. This means that you will have difficulty doing well in the course. If this happens, please make sure you contact the instructor who can advise you on whether it would be good to continue in the course. Also, remember that even if you miss three quizzes, this really counts as just missing one quiz because your lowest two quiz scores are thrown out. The quizzes are only worth 5% of your grade, so there will still be a low impact of missing three section quizzes if you decide to remain in the course. The main issue will be how you can do well on the exams after missing so much of the course.
- 9) **What if I have a section on Monday that is also a holiday?** You should then attend the section rescheduled by your IA and, if you cannot attend this new time, you should go to another IA's section (see above).

The instructional assistants will also have office hours (one hour per section taught) with extra office hours before the exams. **There will be no sections during the first week of the course. To sign up for a section, please use the UCSD online section tool. We prefer that you attend the section you signed up for** but, if necessary, you can switch sections or attend a different one if you are unable to attend your regularly scheduled section.

Academic Misconduct Policy

Students are expected to do their own work, as outlined in the UCSD Policy on Academic Integrity. **Academic misconduct** is broadly defined as any prohibited and dishonest means to receive course credit, a higher grade, or avoid a lower grade. Academic misconduct misrepresents your knowledge and abilities, which undermines the instructor's ability to determine how well you're doing in the course. **Such cheating will not be tolerated, and I will fail any student caught engaging in academic dishonesty and report the case to the UCSD Academic Integrity Review Board. Punishment for cheating is severe, including possible suspension.** Please do not risk your future by cheating. All exams will be closed book and closed-notes, so all personal materials must be stowed under your seat. **No electronic devices are allowed. In addition, during exams, if you need to rest your eyes, you may only look straight up or directly in front of you. You may not look to your left or your right because you would then see other student exams.**

The course website

The course will be using web-learning software called "TritonEd". Your USERID and Password for your UCSD email account should work. However, if you are a recent transfer student or do not yet have a UCSD email account, please contact Academic Computer Support. **PLEASE CHECK THE COURSE WEBSITE FREQUENTLY!** All of the **READINGS** are available through this site and can be downloaded as PDF files or viewed directly on the web. **Exam keys and grades** are also on the website.

Podcasting

All lectures are audio podcast. In addition, all lectures are video podcast, when possible (this depends upon the lecture room having video podcast equipment). When possible, the review sections led by the instructor will also be audio and video podcast, *if the review lecture hall is audio or video podcasting enabled*. Please access these podcasts at <http://podcast.ucsd.edu>.

You can listen and view them using your Internet browser or download them for later access. Note that the instructor-led reviews are always on the weekend when there is no UCSD staff to set up the podcasting. Sometimes, the podcasting does not work. Therefore, it is best to attend the review lectures.

Movies (online video)

All movies shown in the course, with the exception of some short visual examples illustrating sound effects, are available online as Quicktime video files that you can download. **Not all videos may be shown, please check lectures to see what was actually presented. If our lecture room is video podcast enabled, it is easiest to view the videos through the video podcast.** Please note that viewing movies online is not a substitute for attending class because you are able to ask questions and benefit from the classroom setting.

Diversity and equity statement

It is important for us to make sure that how we teach this course and how we accommodate different student needs reflects the differences of race, ability, sexual orientation, age, and gender identity that enrich our classroom experience and campus. If you have any concerns related to diversity and equity in the course, please contact the instructor.

BIEB 166 syllabus

Animal Behavior & Communication

Please note: information in this syllabus is **SUBJECT TO CHANGE**. Any schedule changes will be posted on the course website and announced in lecture. Make sure to frequently check the website to keep updated.

READINGS

ALL READINGS ARE **REQUIRED**, UNLESS THEY ARE LABELED “**OPTIONAL**,” PLEASE CHECK WHAT IS LISTED FOR EACH LECTURE. We provide optional readings so that you can enrich your own understanding of these topics, if you choose.

- 1 Lecture readings:** These readings are available in the course book or you can download them from the course website.
- 2 PAC:** Bradbury J, and S.L. Vehrencamp (2011) Principles of Animal Communication, 2nd Edition, Sinauer Assoc., Inc., Sunderland, Mass. ***Please note that this 2nd edition is completely different from the 1st edition. YOU DO NOT NEED TO BUY THIS BOOK. THE CHAPTERS ARE AVAILABLE AS PDF FILES ON THE COURSE WEBSITE.***
- 3 PAB:** Dugatkin, L.A. (2009) Principles of Animal Behavior, 2nd Edition, W.W. Norton & Company, Inc., New York, NY. ***Please note that the readings from this book are suggested, not mandatory. Material that is ONLY found in this book and not in the required readings or discussed in lecture will not be tested. I have suggested readings because they supplement topics that we discuss in lecture and that are discussed in the readings that I have written. YOU DO NOT NEED TO BUY THIS BOOK. THE CHAPTERS ARE AVAILABLE AS PDF FILES ON THE COURSE WEBSITE.***
- 4 SELECTED RESEARCH PAPERS** (see weekly schedule).

CONTACT INFORMATION & OFFICE HOURS

Instructor: James C. Nieh

Muir Biology Building Room 1268 (office hours are held in a different location)

Office: 858 822-5010

Email: jnieh@ucsd.edu

Office Hours: Please see the course website site for details

IA section times and Office Hours

Please see the course website site for details

Review sections

The instructor, James Nieh, will give a review section on the weekend (usually on Saturday) before a midterm exam. The midterm exams are scheduled on Mondays to give you the preceding weekend to study. His review sections are usually scheduled on Saturday to give you one additional day after the review section to study. Review sections are always **Question and Answer sessions** to which you should bring questions. The instructor will cover topics that students had difficulty with, but cannot cover everything. If you cannot attend a review section,

please try to listen to or view (if available) the podcasts. Sometimes, because of weekend computer issues, the podcasts may not record. Therefore, it is best to not rely upon the podcasts but come to the review sections directly.

NOTE: ALL READINGS ARE **REQUIRED**, UNLESS THEY ARE LABELED “**OPTIONAL**”

WEEK 1

- Jan 8 Lecture 1: Course Overview & History of Ethology
Lecture 1 REQUIRED reading (see sourcebook or course website for these readings)
- Jan 10 Lecture 2: The four questions of Tinbergen: Classical Ethology part I
Lecture 2 REQUIRED reading
- Jan 12 Lecture 3: Classical Ethology part II
Lecture 3 REQUIRED reading

No section this week. We understand that you may need to change sections at some point, so please come and see the head IA about this and other section issues.

WEEK 2

- Jan 15 **NO LECTURE, MARTIN LUTHER KING HOLIDAY**
- Jan 17 Lecture 4: Foundations of Behavioral Neurobiology.
Lecture 4 REQUIRED reading
Optional reading (NOT required, you will not be tested on it): PAB p90-98
PAB = Principles of Animal Behavior, available online
- Jan 19 Lecture 5: Behavioral Endocrinology.
Lecture 5 REQUIRED reading
Optional: PAB p81-90

REQUIRED Section reading:

Adkins-Regan (1998) Hormonal mechanisms of mate choice. American Zoologist, 38: 166-178.
This reading may be tested on the midterm. (If not, it will be tested on the final.) **Note: if you cannot attend the section for which you signed up, please attend whatever section you can make (see the course website for times and locations).**

WEEK 3

- Jan 22 Lecture 6: Genetics & Learning (Part I)
Lecture 6 REQUIRED reading
Optional: PAB p146
- Jan 24 Lecture 7: Genetics & Learning (Part II)
Lecture 7 REQUIRED reading
Optional: PAB p146
- Jan 26 Lecture 8: Learning Part II
Lecture 8 REQUIRED reading
Optional: PAB p118-145

Sections:

Review for Midterm 1.

WEEK 4

Jan 29 **FIRST MIDTERM in class (covering lectures 1-8)**

Jan 31 Lecture 9: Imprinting & Kin Recognition

Lecture 9 REQUIRED reading

Optional: PAB p208-210

Feb 2 Lecture 10: Orientation: Kinesis & Taxis

Lecture 10 REQUIRED reading

Today is the deadline to drop without receiving a W

Section Reading:

Capaldi, E.A., Robinson, G.E., and Fahrbach, S.E. (1999) Neuroethology of spatial learning: the birds and the bees. Annual Review of Psychology. 50:651-682. The reading is available online.

Please note that some of the topics covered in this paper are relevant to week 4 lectures.

Review:

The instructor will also hold an additional review section over the weekend before the exam.

Please see the course website for the time and place. Please bring questions!

WEEK 5

Feb 5 Lecture 11: Orientation: Migration orientation mechanisms

Lecture 11 REQUIRED reading

Optional: PAB p443-448

Feb 7 Lecture 12: Representational communication

Lecture 12 REQUIRED reading

Feb 9 Lecture 13: Signal origin & evolution

Lecture 13 REQUIRED reading

Optional: PAB p400-405

REQUIRED Section Reading:

Cheney, D.L. and Seyfarth, R.M. (1985) Vervet monkey alarm calls: manipulation through shared information? 94: 150-166. The reading is available online. This reading may be tested on the midterm. (If not, it will be tested on the final.). **In addition, you will review results of the first midterm and review problem areas.**

WEEK 6

Feb 12 Lecture 14: Properties of Sound

Beginning with this lecture, with the exception of lectures 19 and 25, readings are only in the book chapters. There are no more lecturer-written readings.

OPTIONAL PAC (2nd edition, available online): p19-33.

PAC = Principles of Animal Communication, available online

Feb 14 Lecture 15: Fourier Analysis

OPTIONAL PAC (2nd edition, available online): p24-27.

Feb 16 Lecture 16: Sound Production

OPTIONAL PAC (2nd edition, available online): p33-63.

Section:

Review lectures and discuss examples of sound analysis, *particularly focusing on interpreting Fourier spectrograms and spectrums*. **There is no assigned section reading this week** because I want you to focus your section time on the topic of understanding how to use Fourier analysis for understanding animal communication.

WEEK 7

- Feb 19 **NO LECTURE, PRESIDENT'S DAY HOLIDAY**
Feb 21 Lecture 17: Sound Propagation
OPTIONAL PAC (2nd edition, available online): p65-83.
Feb 23 Lecture 18: Sound Reception
OPTIONAL PAC (2nd edition, available online): p83-111.

Section:

Review lectures and discuss examples of sound analysis, propagation, and reception. Focus on Fourier examples. **Prepare for Midterm 2.** You may notice that there is no special section reading assigned. This is because these topics are typically challenging and require more intensive discussion and review.

WEEK 8

- Feb 26 **SECOND MIDTERM in class (covering lectures 9-18)**
Feb 28 Lecture 19: Whale sound communication
Lecture 19 REQUIRED reading
March 2 Lecture 20: Properties of light
OPTIONAL PAC (2nd edition, available online): p113-121.

Section:

Review lectures. No special section reading is assigned. The instructor will hold a review section over the weekend before the exam. Please check online for date and time!

WEEK 9

- March 5 Lecture 21: Visual signal production
OPTIONAL PAC (2nd edition, available online): p121-151.
March 7 Lecture 22: Visual signal transmission & reception
OPTIONAL PAC (2nd edition, available online): p153-169
March 9 Lecture 23: Visual signal reception II.
OPTIONAL PAC (2nd edition, available online): p170-191.
Today is the deadline to drop the course (not that we want you to!)

Section:

Review second midterm results, discuss problem areas, and review light and vision. No special section reading is assigned.

WEEK 10

- March 12 Lecture 24: Olfactory signaling: production & transmission
OPTIONAL PAC (2nd edition, available online): p193 -213
March 14 Lecture 25: Olfactory signaling: reception
OPTIONAL PAC (2nd edition, available online): p214-234.
OPTIONAL Lecture 25 reading.
March 16 Lecture 26: Course Summary
NO ASSIGNED READING FOR THIS LECTURE

Section:

Review olfaction and review for final exam. No special section reading is assigned.

The instructor will give a special review section for the final exam. Please bring questions and see the course website for the time and location of this review. Other IA's may also give reviews. Please see the course website for details.

FINAL EXAM: THE DATE, TIME AND LOCATION OF THE FINAL EXAM WILL BE ANNOUNCED IN CLASS AND ON TRITONED.

All exams, including the final exam will be closed-book. No exam aids or electronic devices are allowed.

Material from any lecture and from the required readings can be tested on the final exam. The final exam is a comprehensive exam, but will emphasize material in Lectures 19-26 and material that you learned in Lectures 1-18 THAT YOU WERE NOT TESTED ON IN EITHER MIDTERM. For example, if you were tested on a particular concept or example in Midterm 1, it is less likely that you will be tested on this same concept or example in the final exam. In addition, the final exam will test you on the assigned papers. If no questions were asked about a particular assigned paper on either midterm, then you will be asked about this paper or papers on the final exam.

Bedtime Reading

If you would like to learn more about certain topics, I recommend:

Alcock, J. 1988. *The Kookaburra's Song*. Tucson: University of Arizona Press.

Cronin, H. 1991. *The Ant and the Peacock*. Cambridge: Press Syndicate of the University of Cambridge.

Delthier, V. 1992. *Crickets and Katydid, Concerts and Solos*. Cambridge: Harvard University Press.

Dethier, V. 1962. *To Know a Fly*. San Francisco: Holden-Day.

Diamond, J. 1992. *The Third Chimpanzee*. New York: Harper Collins.

Evans, H.E. 1966. *Life on a Little Known Planet*. New York: E.P. Dutton & Co., Inc.

Goodall, J. 1990. *Through a Window: My Thirty Years with the Chimpanzees of Gombe*. Boston: Houghton Mifflin.

Grandin, T. 1995. *Thinking in Pictures*. New York: Vintage.

Griffin, D. 2001 *Animal Minds*. Chicago: University of Chicago Press.

Heinrich, B. 2001. *Racing the Antelope*. New York: Cliff Street Books.

Moss, C. 1988. *Elephant Memories: Thirteen Years in the Life of an Elephant Family*. New York: W. Morrow Inc.

Sober, D. and D. S. Wilson. 1998. *Unto Others*. Cambridge: Harvard University Press.

Steinbeck, J. 1951. *The Log from the Sea of Cortez*. New York: Penguin Books.

Tinbergen, N. 1969. *Curious Naturalists*. New York: Anchor Books.

Ryan, M. 1985. *The Tungara Frog*. Chicago: University of Chicago Press.

von Frisch, K. 1967. *The Dance Language and Orientation of Bees*. Cambridge: Harvard University Press.

Weiner, J. 1999. *Time, Love, Memory: A Great Biologist and His Quest for the Origins of Behavior*. New York: Vintage.

Wilson, E.O. 1994. *Naturalist*. Washington, D.C.: Island Press.