



# 9

## Analytical Writing: Looking Closely

### AIMS OF THE CHAPTER

Academic disciplines introduce new ways of looking at things. These new ways are often analytical: you look at parts of phenomena and determine how the parts work together. Analysis is one of the central intellectual skills in academic life. This chapter discusses how analysis works and how you can write more analytically. By increasing your analytic skills you will be able to develop your individual point of view into effective contributions to academic and professional inquiry.

### KEY POINTS

1. Analysis means to cut a whole into various parts or categories to understand what it is or how it works.
2. Analysis is often tied to specific disciplinary methods. Underlying every analysis usually is a theory.
3. Analysis helps you observe and understand many things about disciplinary, professional, and public problems.
4. Specific procedures can help you analyze phenomena and write up analyses.

### QUESTIONS TO THINK ABOUT

- Which things do you understand that sometimes other people don't? How does your insight depend on understanding how these things work or fit together? What do you see that allows you to analyze those things? On the other hand, when have you been totally confused about how something works or why things happen as they do? Understanding what parts of that situation or object might help you understand the whole?

- How often do your instructors use the words *analysis* or *analytical*? In what situations do they use terms related to analysis, and what are the tasks or thoughts they are referring to?
- How do you determine what the parts of an object or situation are? Where can you get the terms of your analysis from?
- How can looking at the parts of an object or situation help you resolve some problem you are facing?

## Analytical Insight

Disciplinary knowledge shows the parts and processes of things we usually treat as a whole in daily life. By offering explanations of how things are put together and how they work, the various disciplines give you a way of looking at events and objects in greater detail. Such detailed understanding allows you to diagnose what goes right and wrong and to intervene in focused, effective ways. This pulling apart of objects and events and looking inside to see their components is known as analysis.

In many courses instructors want you to become skilled in the methods of analysis that are appropriate to the field. Rather than just tell you that the formula for a situation is thus and such, or that a condition is caused by these factors, they ask you to look at the situation, pull it apart, and tell *them* what is going on.

Sometimes analysis is obviously combined with other activities, as when in a political science class you analyze the structure of a legislative body in order to understand who can influence legislation in what ways. In a mechanical engineering course you might analyze an engine so that you can design a more efficient one or solve problems with the current one. Sometimes analysis is the primary activity, as when a neurobiologist analyzes the process by which a sensory impulse sets off brain activities, or when an art historian analyzes the style of a particular painter.

## Some Key Features of Analysis

The procedures, methods, and uses of analysis vary widely in the disciplines, and even within a single discipline there are many types of analysis, which need to be presented and discussed in a range of ways. Nonetheless, several key elements are part of almost all analytical processes.

*Analysis is initiated by some need or desire to know the components, dynamics, structure, or workings of some phenomenon in greater detail than is at first evident.* Thus the central activity is seeing more deeply, more closely, in greater detail,

something that looks at first glance to be a whole, or a unit. To understand a computer program, you need to know its parts; to understand how to build a bridge, you need to know the components that give it strength; to settle a philosophic argument, you need to know the issues that contribute to the larger problem. Analysis is crucial to most disciplines because they frequently want to understand why things happen as they do, so they open up the hood and look inside to see the parts.

*Analysis looks for those things that are not obvious on the surface, that seem to be hidden to casual inspection.* Analysis uncovers the unseen. Where there is nothing hidden, nothing smaller than meets the eye or common-sense judgment, there is little to analyze. Thus to find interesting or significant things you look in certain kinds of places in certain kinds of ways. Much of the art of analyzing is finding the right subject to analyze — interesting enough to tell you what you want, but not too complicated to make sense of. For this reason biologists often work with simpler animals that have less developed systems than humans; for example, because the flatworm *Aplysia* has one very large nerve cell, it is ideal for understanding nerve cell operation. Sometimes it may seem obvious what to analyze; for example, in studying why a company is profitable, it may seem obvious to begin with the balance sheet. However, the crucial place to look may be far from obvious; the real answer may lie in the patterns of motivation among the workers, or in the association of a name brand with a cultural hero.

*Each object or phenomenon may be viewed through many different forms of analysis.* Some of these will be more appropriate and revealing for your purposes than others. Psychiatric analysis will not tell you much about a stone, but various kinds of geologic and chemical analyses will. Depending on what you need or want to know, you pick the right mode of analysis for the stone — radioactive dating, spectroscopic analysis, assays for specific minerals, comparison of composition and structure to surrounding geologic formations, and so on. Sometimes the appropriateness of a particular analytic method is clear, as when you are given a method for analyzing problems of force and motion in physics or are asked to analyze the grammatical structure of a sentence. At other times the choice of method is based on a hunch, as when you *think* that a particular poem's effect depends on metaphors. If you then notice that several metaphors are repeated in the poem, you are more sure that you have a useful approach.

*Each mode of analysis identifies specific procedures that make particular elements visible or accessible.* Chemical analyses require precise laboratory procedures for preparing a sample, adding reagents, and measuring results. If you have decided to explore the economic situation of the voters in the district, you need to get appropriate economic data and carry out certain statistical procedures. Having decided that you want to look at the conflict of characters in a play, you identify the opposing concerns of the characters and the specific moments of conflict that occur on stage.

*Some methods of analysis are so well defined that all the steps are predetermined, whereas others require more creativity.* With certain well-known chemical procedures, the results will follow unproblematically if all the steps are followed. However, when you are given substances whose structure we only partly un-

derstand, you have to bring to bear all you know about the subject to make sense of the clues. Then you may need to create further analytical procedures to develop new conclusions. In analyzing poems, political situations, or human psychology — where each situation is different and complex — you almost always have to move beyond familiar, defined procedures.

*Each level of analysis involves working with identifiable aspects or parts, isolating those parts from each other, and seeing the specifics of each of the parts.* If you are working with the mineral components of a geologic sample, you identify what the various components are and the amount of each in the sample. In working with the metaphors of a poem, you identify the different strains of metaphor in the poem, then how frequently, in what places, and with what effect each kind of metaphor is used. In working with the socioeconomic background of voters, you identify what categories you place the voters in and how many belong in each.

*An analysis may require several levels or aspects of examination.* Having seen a problem or issue at one level, you may decide to look more deeply to find what you need. Thus, after looking at the current socioeconomic status of voters, you may decide that no clear pattern of voting emerges. However, when you look deeper into the voters' past and economic situation and their attitude toward the future, you find that people who believe they can become middle class tend to vote for middle-class interests. You may also want to explore some related aspects, such as the voters' religious background and ethnic affiliation, to see how they affect attitudes toward economic advancement and thus political loyalties.

*Frequently the analysis takes something apart and then puts the parts back together to show how they make up the whole.* After having found the components and percentages of some chemicals, you may need to consider what happens when they are brought together. You may find that several variables influence a voter; but to understand how any one voter votes, you will have to look at how socioeconomic status, perception of mobility, religion, ethnicity, education, and many other variables come together in a single voting choice.

*Usually a theory underlies the analysis.* Each analysis creates a certain picture of how something works or how it is composed. Many different kinds of pictures can be drawn for one object. The analysis of geologic formations, for example, is based on beliefs that are not immediately evident and have not necessarily been believed for all time, such as that the earth is billions of years old and has been formed in a process of cooling down, that there is an interior movement in a fluid center, and that there is surface movement of large plates. If you believe in Freudian psychology, which connects early experience, repressed emotions, and current symbolic expressions like dreams and jokes, you will analyze dreams differently than if you believe that dreams are the overflow of cognitive processes or messages from beyond the earth.

When there is a current debate or division over which of several theories is strongest, several types of analyses may go on simultaneously. One group of political scientists may study the symbols of political culture, others may examine group affiliations and interests, and still others may study only economics. Each group believes that its theory explains all political processes. When favored theories change, the kind of analysis generally practiced also

changes. In literary and other cultural studies in the middle of the century, people believed that texts operated within themselves, so most analyses were confined to what appeared on the page or in the picture. Today many strong theories have emerged making connections among power, politics, social organization, and the objects of culture, so that now analyses often reach into the social, political, and economic context of each text or picture.

## Analysis in the Classroom

Because analysis is so crucial to academic disciplines and professional activity, in most fields much emphasis is placed on analysis. In almost all fields you will be doing substantial analyses by the time you take upper-division courses. The analysis may be carried out in classroom activity, as in discussions or lab work. Frequently, however, you will analyze something with a group or by yourself and then present your analysis in written form. The analysis may be connected with data you have gathered or with data already presented, as in a case study (see Chapter 14).

Depending on the style of the discipline and the teaching strategy of the teacher, the analytical methods may be more or less clearly explained. On one extreme, teachers list specific procedures that must be followed and then supervise you, as in statistical analysis within economics. Others use informal discussion using a variety of analytical approaches, as in a literature class where the teacher talks about short stories in a variety of ways but never explicitly says what those are. Open discussion, directed by a few teacher questions, may give you practice in these methods, but they still are never laid out as an explicit method or formulaic set of procedures. In the middle are situations where the lecture or discussion examines a case in detail and provides a model, or where the instructor, in discussing the implications of a theory, uses that theory to analyze a case in class discussion. Sometimes the instructor sets up a problem and asks students to develop their own method of analysis.

Group work frequently requires developing some appropriate method of analysis of the project so that you will develop common ways of seeing the issues and coordinating your perception, observation, ideas, and work. Also, the group needs to break the project into parts for different people to work on at different times. The more deeply you analyze the task and issues at hand, the more deeply you will share a way of seeing what you are doing, and the more effectively you will work together.

# Assignments

## ANALYZING ANALYSES

1. Describe some of the common types of analyses in a discipline you are studying or a profession in which you are interested. Are the analyses given specific names? What do they find out? For what purpose? What might happen if the analysis is incorrect? In what ways might the analysis go wrong? What kinds of data or phenomena are analyzed? What are the methods of analysis? Are specific terms used to identify the parts revealed in the analyses? At what point do people entering that profession or discipline start learning how to do these analyses? How are they taught?
2. Describe analytical tasks you have been asked to do in classrooms. What was the class? What kind of analysis was it? What kinds of data or phenomena did you analyze? What were you trying to find out? How did you carry out the analysis? How precisely did the instructor define what you were to do, and what did you have to improvise on your own? What special terminology did you use? What did you learn?
3. Compare the kinds of analysis you have done in literature classes with the kinds you have done in social science classes and in science and math classes.
4. Examine the following three passages of analysis: one from the biological sciences, one from the physical sciences, and one from the humanities. Then choose one to describe and analyze in a short essay that answers the following questions: What is being analyzed? What is the writer trying to show or find out by the analysis? What are the categories or parts used in the analysis? What specific data are associated with each category or part? What does the separation of the parts indicate about what is being analyzed? Does the writer try to show connections among the parts, and, if so, what are they?

### A. Biology: Samuel Scudder

It was more than fifteen years ago that I entered the laboratory of Professor Agassiz, and told him I had enrolled my name in the Scientific School as a student of natural history. He asked me a few questions about my object in coming, my antecedents generally, the mode in which I afterwards proposed to use the knowledge I might acquire, and, finally, whether I wished to study any special branch. To the latter I replied that, while I wished to be well grounded in all departments of zoology, I purposed to devote myself specially to insects.

"When do you wish to begin?" he asked.

"Now," I replied.



Louis Agassiz (1807–1873), noted for his study of fossil fish, was the leading American naturalist of his day.

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This seemed to please him, and with an energetic “Very well!” he reached from a shelf a huge jar of specimens in yellow alcohol. “Take this fish,” he said, “and look at it; we call it a haemulon; by and by I will ask what you have seen.”

With that he left me, but in a moment returned with explicit instructions as to the care of the object entrusted to me.

“No man is fit to be a naturalist,” said he, “who does not know how to take care of specimens.”

I was to keep the fish before me in a tin tray, and occasionally moisten the surface with alcohol from the jar, always taking care to replace the stopper tightly. Those were not the days of ground-

glass stoppers and elegantly shaped exhibition jars; all the old students will recall the huge necklace glass bottles with their leaky, wax-besmeared corks, half eaten by insects, and begrimed with cellar dust. Entomology was a cleaner science than ichthyology, but the example of the Professor, who had unhesitatingly plunged to the bottom of the jar to produce the fish, was infectious; and though this alcohol had a "very ancient and fishlike smell," I really dared not show any aversion within these sacred precincts, and treated the alcohol as though it were pure water. Still I was conscious of a passing feeling of disappointment, for gazing at a fish did not commend itself to an ardent entomologist. My friends at home, too, were annoyed when they discovered that no amount of eau-de-Cologne would drown the perfume which haunted me like a shadow.

In ten minutes I had seen all that could be seen in that fish, and started in search of the Professor — who had, however, left the Museum; and when I returned, after lingering over some of the odd animals stored in the upper apartment, my specimen was dry all over. I dashed the fluid over the fish as if to resuscitate the beast from a fainting fit, and looked with anxiety for a return of the normal sloppy appearance. This little excitement over, nothing was to be done but to return to a steadfast gaze at my mute companion. Half an hour passed — an hour — another hour; the fish began to look loathsome. I turned it over and around; looked it in the face — ghastly; from behind, beneath, above, sideways, at a three-quarters view — just as ghastly. I was in despair; at an early hour I concluded that lunch was necessary; so, with infinite relief, the fish was carefully replaced in the jar, and for an hour I was free.

On my return, I learned that Professor Agassiz had been at the Museum, but had gone, and would not return for several hours. My fellow-students were too busy to be disturbed by continued conversation. Slowly I drew forth that hideous fish, and with a feeling of desperation again looked at it. I might not use a magnifying-glass; instruments of all kinds were interdicted. My two hands, my two eyes, and the fish: it seemed a most limited field. I pushed my finger down its throat to feel how sharp the teeth were. I began to count the scales in the different rows, until I was convinced that was nonsense. At last a happy thought struck me — I would draw the fish; and now with surprise I began to discover new features in the creature. Just then the Professor returned.

"That is right," said he; "a pencil is one of the best of eyes. I am glad to notice, too, that you keep your specimen wet, and your bottle corked."

With these encouraging words, he added:

"Well, what is it like?"

He listened attentively to my brief rehearsal of the structure of parts whose names were still unknown to me: the fringed gill-arches and movable operculum; the pores of the head, fleshy lips and lidless eyes; the lateral line, the spinous fins and forked tail; the compressed and arched body. When I finished, he waited as if expecting more, and then, with an air of disappointment:

"You have not looked very carefully; why," he continued more earnestly, "you haven't even seen one of the most conspicuous features of the animal, which is plainly before your eyes as the fish itself; look again, look again!" and he left me to my misery.

I was piqued; I was mortified. Still more of that wretched fish! But now I set myself to my task with a will, and discovered one new thing after another, until I saw how just the Professor's criticism had been. The afternoon passed quickly; and when, towards its close, the Professor inquired:

"Do you see it yet?"

"No," I replied, "I am certain I do not, but I see how little I saw before."

"That is next best," said he, earnestly, "but I won't hear you now; put away your fish and go home; perhaps you will be ready with a better answer in the morning. I will examine you before you look at the fish."

This was disconcerting. Not only must I think of my fish all night, studying, without the object before me, what this unknown but most visible feature might be; but also, without reviewing my discoveries, I must give an exact account of them the next day. I had a bad memory; so I walked home by Charles River in a distracted state, with my two perplexities.

The cordial greeting from the Professor the next morning was reassuring; here was a man who seemed to be quite as anxious as I that I should see for myself what he saw.

"Do you perhaps mean," I asked, "that the fish has symmetrical sides with paired organs?"

His thoroughly pleased "Of course! Of course!" repaid the wakeful hours of the previous night. After he had discoursed most happily and enthusiastically — as he always did — upon the importance of this point, I ventured to ask what I should do next.

"Oh, look at your fish!" he said, and left me again to my own devices. In a little more than an hour he returned, heard my new catalogue.

"That is good, that is good!" he repeated; "but that is not all; go on"; and so for three long days he placed that fish before my eyes, forbidding me to look at anything else, or to use any artificial aid. "Look, look, look," was his repeated injunction.

This was the best entomological lesson I ever had — a lesson whose influence has extended to the details of every subsequent study; a legacy the Professor had left to me, as he has left it to so many others, of inestimable value, which we could not buy, with which we cannot part.

A year afterward, some of us were amusing ourselves with chalking outlandish beasts on the Museum blackboard. We drew prancing starfishes; frogs in mortal combat; hydra-headed worms; stately crawfishes, standing on their tails, bearing aloft umbrellas; and grotesque fishes with gaping mouths and staring eyes. The Professor came in shortly after, and was as amused as any at our experiments. He looked at the fishes.

“Haemulons, every one of them,” he said; “Mr. \_\_\_\_\_ drew them.”

True; and to this day, if I attempt a fish, I can draw nothing but haemulons.

The fourth day, a second fish of the same group was placed beside the first, and I was bidden to point out the resemblances and differences between the two; another and another followed, until the entire family lay before me, and a whole legion of jars covered the table and surrounding shelves; the odor had become a pleasant perfume; and even now, the sight of an old, six-inch, worm-eaten cork brings fragrant memories.

The whole group of haemulons was thus brought in review; and, whether engaged upon the dissection of the internal organs, the preparation and examination of the bony framework, or the description of the various parts, Agassiz’s training method of observing facts and their orderly arrangement was ever accompanied by the urgent exhortation not to be content with them.

“Facts are stupid things,” he would say, “until brought into connection with some general law.”

At the end of eight months, it was almost with reluctance that I left these friends and turned to insects; but what I had gained by this outside experience has been of greater value than years of later investigation in my favorite groups.

Source: Samuel Scudder, “Take this Fish and Look at It.”

### **B. Chemistry: C. Carl Sagan**

Let us approach a much more modest question: not whether we can know the universe or the Milky Way Galaxy or a star or a world. Can we know, ultimately and in detail, a grain of salt? Consider one microgram of table salt, a speck just barely large enough for someone with keen eyesight to make out without a microscope. In that grain of salt there are about  $10^{16}$  sodium and chlorine atoms. This is a 1 followed by 16 zeros, 10 million billion

atoms. If we wish to know a grain of salt, we must know at least the three-dimensional positions of each of these atoms. (In fact, there is much more to be known — for example, the nature of the forces between the atoms — but we are making only a modest calculation.) Now, is this number more or less than the number of things which the brain can know?

How much *can* the brain know? There are perhaps  $10^{11}$  neurons in the brain, the circuit elements and switches that are responsible in their electrical and chemical activity for the functioning of our minds. A typical brain neuron has perhaps a thousand little wires, called dendrites, which connect it with its fellows. If, as seems likely, every bit of information in the brain corresponds to one of these connections, the total number of things knowable by the brain is no more than  $10^{14}$ , one hundred trillion. But this number is only one percent of the number of atoms in our speck of salt.

So in this sense the universe is intractable, astonishingly immune to any human attempt at full knowledge. We cannot on this level understand a grain of salt, much less the universe.

But let us look a little more deeply at our microgram of salt. Salt happens to be a crystal in which, except for defects in the structure of the crystal lattice, the position of every sodium and chlorine atom is predetermined. If we could shrink ourselves into this crystalline world, we would see rank upon rank of atoms in an ordered array, a regularly alternating structure — sodium, chlorine, sodium, chlorine, specifying the sheet of atoms we are standing on and all the sheets above us and below us. An absolutely pure crystal of salt could have the position of every atom specified by something like 10 bits of information.\* This would not strain the information-carrying capacity of the brain.

If the universe had natural laws that governed its behavior to the same degree of regularity that determines a crystal of salt, then, of course, the universe would be knowable. Even if there were many such laws, each of considerable complexity, human beings might have the capability to understand them all. Even if such knowledge exceeded the information-carrying capacity of the brain, we might store the additional information outside our bodies — in books, for example, or in computer memories — and still, in some sense, know the universe.

\*Chlorine is a deadly poison gas employed on European battlefields in World War I. Sodium is a corrosive metal which burns upon contact with water. Together they make a placid and unpoisonous material, table salt. Why each of these substances has the properties it does is a subject called chemistry, which requires more than 10 bits of information to understand.

### C. English: Robert Scholes

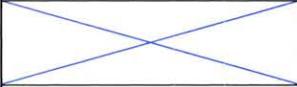
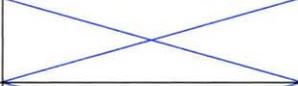
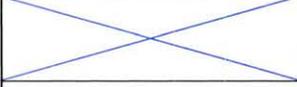
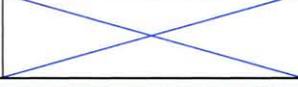
The field of English is organized by two primary gestures of differentiation, dividing and redividing the field by binary opposition. First of all, we divide the field into two categories: literature and non-literature. This is, of course, an invidious distinction, for we mark those texts labeled literature as good or important and dismiss those non-literary texts as beneath our notice. This division is traversed and supported by another, which is just as important, though somewhat less visible. We distinguish between the production and the consumption of texts, and, as might be expected in a society like ours, we privilege consumption over production, just as the larger culture privileges the consuming class over the producing class (as noted, for example, by Paula Johnson in "Writing Programs and the English Department").

One further distinction and our basic structure will be complete. This is the least obvious, the most problematic, and, therefore, perhaps the most important. We distinguish between what is "real" and what is "academic" to our own disadvantage. At some level we accept the myth of the ivory tower and secretly despise our own activities as trivial unless we can link them to a "reality" outside academic life. Thus we may consume "literature," which comes from outside our classrooms, but we cannot produce literature in classes, nor can we teach its production. Instead, we teach something called "creative writing"—the production of pseudo-literary texts.

The proper consumption of literature we call "interpretation," and the teaching of this skill, like the displaying of it in academic papers, articles, and books, is our greatest glory. The production of literature is regarded as beyond us, to the point where even those writers who are hired by academies to teach creative writing are felt to dwindle into academics themselves, and we suspect that their work may only be creative writing, too. How often are the works of the faculty of the Iowa Writers Workshop studied in the classrooms of the Iowa English department?

The consumption of non-literature can be taught. It is called "reading," and most college and university English departments are content to hope that it has been dealt with in secondary school—a hope that seems less and less well founded as we go on. But actual non-literature is perceived as grounded in the realities of existence, where it is produced in response to personal or socio-economic imperatives and therefore justifies itself functionally. By its very usefulness, its non-literariness, it eludes our grasp. It can be read but not interpreted, because it supposedly lacks those secret-hidden-deeper meanings so dear to our pedagogic hearts. Nor can it be produced when cut off from the exi-

FIGURE 9.1

PRODUCTION	TEXTS	CONSUMPTION
	literature	interpretation
creative writing	pseudo-literature	
	non-literature	reading
composition	pseudo-non-literature	

Source: Robert Scholes, *Textual Power*, New Haven: Yale University Press, 1985, pp. 5–7.

gencies of its real situations. What *can* be produced within the academy is an unreal version of it, “pseudo-non-literature,” which is indeed produced in an appalling volume. We call the production of this stuff “composition.”

## Analysis and Your Authority

The more a class provides opportunities for analysis, the more authority you gain as a participant in the discipline. The teacher then is no longer the single authority in the classroom, because you will have your own analytical results to add. As you gain skill in disciplinary practices, your responses include disciplinary perception within your personal vision. You go beyond being able to identify examples of concepts out in the world to seeing how they are composed and work. You are then in a position to argue for the validity of one set of findings over another. You will be responsible for presenting your analyses as conceptually precise, theoretically sound, methodologically appropriate and careful, and insightfully creative (see Chapter 15).

At this point the instructor serves as a coach, helping you see and articulate stronger perceptions about those phenomena you study. Although you still to some extent write to demonstrate skill and accomplishment, your main goal is to produce statements of relevance. Your relationships with your classmates also change as you become colleagues sharing disciplined

perceptions of events. You are in a position to share insights with each other, help each other see new things, and argue with each other over findings and interpretations.

These changing relationships change the way you write. You now present serious interpretations of events to show and persuade others of something they might not yet have seen themselves. Your statements contribute to the learning of the entire class. You have the opportunity both to gain increased respect and to influence others by presenting persuasive and insightful accounts of the objects studied. But this also puts you more on a spot, as you have to present things more as you see it. This changing relationship also pertains to the kinds of writing discussed in the remaining chapters of this book: investigating, synthesizing, problem solving, and arguing — also all activities carried out by full professionals in your field.

## Skillful Practice Is More Than a Set of Rules

Your instructor in each subject will provide guidance in setting up analytical tasks and helping you accomplish them. Since the tasks, instructions, and procedures will vary from discipline to discipline and from problem to problem, you should attend closely to explicit instructions as well as to indirect hints. Some special skills may not be fully and clearly articulated in instructions and must be figured out by just watching the instructor.

As mentioned before, the analytical procedures appropriate for a particular situation may be quite strictly defined by disciplinary standards or may hardly be defined at all. Various levels and kinds of guidance fall in between. There are many reasons for this variation, including the way problems are formulated in the field, the availability of tools, the reigning theories, the kind of arguments, and the range of concerns in the field, and as you learn more it is worth inquiring into the reasons why your field follows its particular analytical practices.

If you are given a wider freedom in selecting, developing, or finding novel ways of carrying out your analysis, you need to become even more aware of the choices you are making. It may be useful to discuss with your instructor the consequences of proceeding one way or another. These more open-ended analytical situations give you greater creativity and allow you to use more of what you know. In even the most highly developed and rule-governed field, there is always some open area for novelty and advance, and those who use this opportunity to become leaders in the field.

## Computer Tools and Analysis

Computer tools aid analysis in many fields. These tools include spreadsheets for organizing data and graphing programs for displaying data in many for-

mats. Statistical packages allow you to find correlations among numerical data and control for the effect of different variables. Other computer tools help in finding patterns in texts, analyzing the motions of pole vaulters, or noticing at a glance the heat absorption of different parts of the earth as monitored by satellite.

These remarkable tools allow you to deal with massive amounts of data in coherent and intelligible ways, as well as in alternative configurations. They allow you to see patterns and correlations that would be inconceivable without modern computing. Nonetheless, it is up to you to make sense of the data and to understand what the tool is doing. If you don't understand, you can be faced with mountains of data and calculations that make no sense. By simply loading numbers or visual images in a computer, pushing some buttons, and then looking for any result that might come out at the other end, you are guessing about what is going on and in danger of oversimplifying the issues. You may be looking at entirely the wrong things, just because the computer makes certain calculations easy. For this reason it is always important to understand what kind of calculations the machine is doing and how to interpret the results.

## Assignments

### WRITING FOR REFLECTION

1. Reflect on or describe an incident when you had to analyze a problem in a class, on the job, or in your family.
2. Describe an area where you are able to analyze problems or events easily. You may be able to analyze the recipe of a dish you eat or what happens in a football play, what makes a successful party, or what has caused your car to break down. In describing the kind of analysis you regularly do, tell what kind of information you gather, what issues you look for, and what categories you use to make sense of the information. Describe how your analysis goes beyond gathering data to helping you see new things.



## REVIEWING WRITING PROCESSES

### Planning to Write

**L**ike most ventures in life, successful writing requires advance planning. Some of the most important work that writers do occurs before they write a single word. Many of the chapters of this book, such as this chapter, offer specific advice to help you plan the particular kind of

writing described in that chapter. There are, however, some general principles that apply to most writing situations.

Before you begin a paper, check that you have selected an appropriate topic, thought of the main points you want to make, worked through the arguments that will support these points, and decided on an organizational framework that will present these ideas effectively to your audience. Sometimes appropriate structures are suggested in the assignment, but more often you will analyze your main assertions and decide for yourself how to arrange and present them.

Imagine, for example, that your instructor has assigned a paper comparing or contrasting the use of color in two different paintings. You might decide to treat the first painting in the first half of the paper and the second painting in the second half. This would allow you to construct strong arguments about both paintings and examine internal comparisons within each work. Or you might want to compare one element in the first painting with a similar element in the second and then to return to a second element in the first. This would allow you to go back and forth between the paintings in a “Ping-Pong” fashion and compare different features more directly than the first kind of paper.

There are many possible ways to organize your information for any given paper, and no one way is inherently better than any other. However, when you consider the material you wish to present and the objectives you wish to achieve, certain patterns will seem more advantageous than others. For this reason it is important to spend time considering how you want to present your material.

The time that you spend formulating a plan will pay off in several important ways. First, it will give you a strong sense of purpose and confidence. When you start a paper with a strong sense of your overall structure in mind, you will always know what you have to do next and how long it will probably take to get there. Second, planned writing takes much less time than haphazard writing, since you will not have to spend time groping for ideas or following dead ends. Finally, and most importantly, a good organizational framework allows you to present your ideas in a more organized, logical fashion to your audience. Since most college teachers place a great deal of value on organization, good planning is an essential part of successful writing.

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## Writing and Analyzing

When you carry out analytical tasks in a class, there is almost always some element of simply practicing a skill and demonstrating to your teacher what you can do. When this is your goal, you explain as much of your procedure and thinking as you can so that your instructor can see how you carried out

the task and can suggest ways to find out more or analyze the facts more precisely.

Sometimes you may have a more personal stake in presenting your analysis. You may be convinced that your analysis of bilingual education has some important implications for policy, or that your analysis of a short story reveals important truths about emotions. In this case you still need to present your reasoning and procedures clearly to persuade readers of your view, but you do not need to exhibit as much of your backstage thinking for coaching and guidance. The analytical procedure becomes a way of generating evidence and findings rather than an end in itself.

The processes of analyzing and writing up your analysis are closely linked. When you are first thinking about what to analyze or how to go about it, you are also aware that you will be producing an analytical statement at the end of the process. You are thinking about all the things you need to do so that you will have appropriate material and ideas to write about. The more clearly you know what you want to put in your final statement, the more you will know what you need to do to carry out the analysis — everything from what kinds of procedures you will follow and what details you will want to record, to how much you need to think through the theoretical implications of your method and findings or how broadly you need to investigate alternative methods or objections people may raise.

By the time you write your first draft, you are likely to have many formulations written that you can use — perhaps early journal entries about what you will do, descriptions of the object you are studying, notes from your data collection, ideas you have come up with by talking with others, or outlines and sketches. When you start to draw these pieces together, you may find that you need to rethink the connection of the parts or perhaps do some more digging into further details or follow-up issues. So there is constant interaction between taking your object of study apart and putting your ideas and information together in writing. Analysis and writing go hand in hand.

The following section presents general guidelines for producing an analysis in all courses. Afterwards, samples from analytical essays in a variety of courses are presented.

## General Procedures for Analysis

These guidelines are presented in very general terms to allow you to adapt them to any situation that requires analysis. As you work with these guidelines in different situations, you will develop a more concrete sense of how analysis works.

1. Understand your aim.
2. Think about the object or kind of object you need to analyze to accomplish that task.
3. Identify, define, and if possible isolate the object of analysis.

4. Identify an appropriate method of analysis.
5. Examine the object carefully in light of the task and method, trying to understand it and gathering relevant data.
6. Establish the specific categories suggested by your problem and method.
7. See how the categories apply to your object.
8. Isolate and record relevant details according to the categories or process.
9. Examine the reorganized data carefully to answer your underlying question, whether it is to understand how the object is constructed, to explain how the event unfolds, or to identify what went wrong.
10. Formulate your analytical conclusions.
11. Develop further implications and conclusions.
12. Sketch out an outline.
13. Write the first draft.
14. Revise to highlight the most important issues for the task and make clear the reasoning that ties the sections together.



## USEFUL CONCEPTS FROM RHETORIC

### Genre

**G**enre means a type, as in a type of writing, a type of movie, or a type of song. We all recognize many types of things. In listening to the radio, from the first few bars of a song you can recognize if it is a soft-rock love song or a heavy-metal headbanger. You can guess what much of the song will sound like, and you know the kinds of words that will be in the lyrics, the kinds of chords the music will use, and the kinds of special ornaments and improvisations the soloists will add to the basic music. You would be surprised to hear heavy-metal lyrics to a soft-rock sound. Even more, you know the kinds of feelings and experience you will get from listening to the music, and you can make a quick decision about whether you want to listen.

Text genres are the same way. By recognizing the kind of text you are reading, you can make good guesses about the kind of language and details that will be used, the kind of tasks that will be accomplished, and the kind of organization the text will use. You also know something about how the writer is relating to you and what kind of responses the text will try to evoke. You can then focus your mind, mood, and expectations so as to understand, interpret, think about, and appreciate what you are reading. For example, as you read through the morning newspaper, even though all the articles appear in the same publication, you rapidly shift your frame of mind as you quickly notice whether you are reading a news story, a news analysis, an editorial, a human interest story, an entertainment story, a

sports story, a love-lorn column, a classified automobile advertisement, or any one of the dozen other genres that appear every day.

Similarly, as a writer, by identifying the genre you are working in, you can focus on the tasks, language, details, organization, and other features that you will use. You can get a strong sense of the kind of thinking you need to do and the kind of text you are trying to produce. If you are writing a letter to your friend from high school days, you immediately set out on a different kind of work and in a different mood than if you are writing an analysis of a short story for your literature class.

This textbook in its different chapters describes many of the typical genres students work in: journals, summaries, personal experience papers, analyses, library research reports, and so on. Nonetheless, even within these types disciplines establish particular varieties. You can immediately recognize if you are reading a psychological analysis of a social problem or an engineering analysis of an electrical problem, and not only because they are using different words.

To improve your ability to work in the specific forms of writing in your major, you should examine the various genres used in that field, both at the student and the professional level, to figure out what makes them distinctive. What kinds of tasks do they accomplish? What kinds of language do they use? How are they organized? What kinds of details, illustrations, or evidence do they present? What kinds of reasoning do they display? The more rapidly and precisely you can identify the kinds of things you are reading and writing, the better you can focus your work and the more intelligently you can communicate within the forms appropriate to your field. Ultimately, too, you can decide whether any of the standard forms are too restricting in some way or don't accomplish what you feel needs accomplishing. Then you can try to change or combine genres to go in new directions while still meeting the needs and expectations of people who will be reading what you write.

## Writing an Analytical Essay

The form for reporting analyses varies from discipline to discipline and situation to situation. The following general guidelines, however, may help you identify what you need to include.

1. Early in the essay, identify the problem or task you are addressing, the specific object, event, or other phenomenon you are analyzing, and the method of analysis you have used.
2. Also early in the essay, discuss why it is important to study the object or event and what you hope to learn from it.
3. Before you begin the full analysis, provide specific details about the method you use, from the way you gathered and recorded your data to the specific procedures for defining categories and assigning elements

- to those categories. Make sure you identify all the key steps and describe all the special considerations that were necessary in carrying out the analysis. All analytical categories you will use need to be identified, defined, and discussed. Discuss as well the reasons for the choice of method.
4. Report the problems in carrying out the analysis and difficulties that turned up in the course of work. This is especially important for classroom situations, where instructors need to monitor how you are carrying out the procedures.
  5. Report your findings and results, using the analytical categories you defined earlier.
  6. Discuss the meaning of your findings and draw conclusions that address the original task or problem.

## Sample Analyses from Different Disciplines

The following four opening paragraphs from analytical essays in different disciplines give a sense of the many ways analysis is used in different fields. In reading through them, notice the fundamental problem each analysis is addressing, the categories used to show the parts of the issue or phenomenon, and the way the categories are used to develop a view of the issue or phenomenon.

The fifth sample is a complete analytical essay. The two primary analytical concepts established in the opening paragraph (freedom of religion and separation of church and state) are elaborated by examining constitutional phrasing and supreme court decisions, and then are used to reveal the tension involved in any school prayer controversy.

### Literature: An Analysis of Gender in a Pop Song

Claire Richards

**The sixties, we have always been told, were a time of radical change and revolution, and nothing contributed to these new radical values more than the music of people like Bob Dylan and the Beatles. However, for all of the radical theories of these pop icons about social justice, their attitudes towards women remained remarkably backward. The songs of the sixties are full of lyrics that justify the objectification and devaluation of women and women's roles. This devaluation of the feminine ranges in tone from the fun-loving celebration of female passivity in "I Wanna Hold Your Hand" by the Beatles to the equation of femininity with Satanic darkness in Led Zeppelin's "Dazed and Confused." Somewhere between these two extremes, Bob Dylan's influential pop anthem "Like a Rolling Stone" maintains an attitude of**

contempt for women by continually associating traditional women's roles with dishonesty and deception.

## Chemistry: An Analysis of What Happens When Metal Corrodes

Andrew Mancey

Most people know that many metals, when exposed to moisture, air, or other environmental factors, will corrode. Corrosion can come in the form of rust on iron or steel, black tarnish on silver, or the green patina that often covers things made of brass or copper. Less well known, perhaps, are the chemical reactions that cause these easily observable effects. All three forms of corrosion result from the chemical processes of oxidation and reduction that take elements from the atmosphere and combine them with elements in the metals in order to produce new chemical compositions.

## Business: An Analysis of a Marketing Research Report

Ken Fuscolini

Recently, the Wasatch Feed Factory, a large farm-supply concern, hired a market research firm to contact 500 of its past customers for a customer satisfaction survey. The data collected by this survey indicate that, while very few consumers were dissatisfied with Wasatch's service, not very many felt any customer loyalty to the firm either. In the following analysis, we will examine statistical responses in three key areas—product satisfaction, price, and service—in an attempt to suggest ways that Wasatch might successfully retain more customers.

## Earth Sciences: An Analysis of an Earthquake

Patrice Ferrin

Every year there are nearly a million earthquakes in the world. The overwhelming majority of these are too small to be detected without sophisticated equipment; however, large earthquakes have been among the most devastating natural disasters in the world's history, releasing energy many times in excess of that released by the most powerful nuclear weapon. While the details of nuclear fission have occupied scientists for years, the physical mechanics of an earthquake are actually quite simple: 1) the heat coming from the earth's interior puts tremendous pressure on rocks in the earth's

crust; 2) this stress causes the earth's crust to break and slip; and 3) shock waves from this slippage travel along the earth's surface at high speeds.

## Political Science: An Analysis of Prayer in School: Constitutional Rights in Conflict

Andre D'Onville

When the United States Supreme Court first ruled that students could not offer prayers in public schools, religious students and their parents began protesting the infringement of their rights. In recent years, restoring this "right" to pray in schools has become one of the main items on the agenda of the religious right. On the other side of the political spectrum, liberal groups such as the ACLU have concentrated on preventing any prayers in public or educational settings. They argue that the most important right in question is not the right of religious students to pray, but the right of all students not to have religious ideals forced upon them. The issue of school prayer has required the government to negotiate some kind of compromise between two legitimate but conflicting Constitutional principles: the separation of Church and State and the right to freedom of religion.

Both of the rights in question can be found in the First Amendment to the Constitution, which states, in part, that "Congress shall make no law respecting an establishment of religion or prohibiting the free exercise thereof." This single sentence contains two distinct and important individual clauses. The first, or the "establishment clause," mandates that the state not be permitted to advocate or mandate any specific religious beliefs; the second, the "free exercise clause," requires that the government respect the right of each individual to worship—or not to worship—according to the dictates of their own consciences.

School prayer proponents base their arguments on the latter of these two clauses. The well-known conservative talk-show host Rush Limbaugh, for example, argues that the free-exercise clause of the First Amendment precludes any prohibition on voluntary prayer in school, or anywhere else for that matter (282). This is so, Limbaugh maintains, because praying is part of the way that many people exercise religion, and, as long as they are not trying to force these beliefs on anyone else, they should be able to exercise their religion

anywhere. To some extent, the Supreme Court agrees with this interpretation: in the 1991 *Lamb's Chapel v. Center Moriches School District* decision, the Court ruled that religious groups must be free to use school facilities for religious purposes—including prayer—on the same terms that other clubs and community groups use them. Thus, if a school allows a group of students to come together voluntarily during non-school hours and play chess or discuss politics, it must also allow them to meet in the same way to read the Bible or say prayers.

However, when schools do anything to endorse or encourage prayers, they run the risk of violating the establishment clause of the First Amendment, which forms the Constitutional basis for the Separation of Church and State. Originally, this clause was meant to prevent the federal government or any state from establishing, supporting, or requiring attendance at a state Church. As America has grown more culturally and religiously diverse, however, the Supreme Court has consistently ruled that the establishment clause prevents any state encouragement of or support for any beliefs that favor one religion or belief system over another.

In 1962, the Court ruled in *Engle v. Vitale* that official prayers at public schools violated the First Amendment's Establishment Clause by requiring non-Christian and non-religious students to participate in a religious activity of specific faiths. In 1985, the Court ruled in *Wallace v. Jaffree* that even voluntary "moments of silence" violate the free exercise clause since they tacitly encourage prayers and could alienate or embarrass students who prefer not to pray. This does not mean that students cannot pray silently while they are in school. Spontaneous individual prayers have always been protected by the Constitution—wherever they occur. However, teachers and school officials cannot subsidize, support, offer, or encourage prayers of any kind during school hours. To do so, the Supreme Court has ruled, would violate the Constitution's prohibition against the establishment of religion.

The establishment clause and the free exercise clause represent two distinct and often conflicting attitudes about the relationship between religion and government. By including both of these clauses in the Constitution, its framers required future generations to walk a thin line between respecting all religions and supporting none. The debate over school prayer requires us to look at both parts of the First Amendment and attempt to negotiate a position that protects the

broadest spectrum of individual interests. Such negotiations are never easy, and they rarely result in total victory for either position, but they are an essential part of the process of democratic rule that our Constitution outlines.

## Thinking About Student Writing

1. In each of the five opening paragraphs, what is the problem being addressed? What is the phenomenon being examined? What categories are used to break up the phenomenon? How do the categories help address the problem?
2. In the political science essay on school prayer, what are the two rights analyzed as being in conflict? What is the basis or origin of each of these rights? How have these rights evolved in the history of the United States? How do various people argue that those rights apply to school prayer?
3. What Supreme Court cases concerning school prayer are discussed in the essay by Andre D'Onville? How do these cases relate to the earlier analysis of conflicting rights?
4. What conclusions does Andre D'Onville draw from his analysis? Do you agree with him? To what extent and in what way has his analysis made clear to you the issues at stake in the school prayer controversy? Do you see other relevant issues raised by this controversy that are not included in his analysis? How might you analyze this controversy?



## Assignments

### ANALYSIS

1. Analyze the general education requirements in your college catalogue. Look at the required courses and formulate some general philosophy that seems to explain the college's choices.
2. Analyze the different notions of romance in two popular songs. Determine each song's attitude about romantic love and show how these attitudes come through in the texts and the music.
3. Look up news articles about a recent presidential or congressional election and analyze the voting patterns or trends that determined the final result.
4. Write a brief, 500-word essay analyzing the effect of television violence on youth culture.



5. Write a journal entry analyzing the way that one class you have taken this quarter has changed the way you think about an issue you have studied.
6. Examine the tables on pages 217–218 concerning employment and wages in the United States. Then develop some analytic questions to use on the data, choose the relevant data, and arrange it according to the categories appropriate to your analytical questions. After analyzing the selected data, write a 500-word essay describing your analysis and what you found. For example, you may be interested in understanding whether the kinds of work that pay best are in the fastest growing segments of the job market. Or you may be interested in comparing the wages of male and female workers in various industries.

## Getting Involved Electronically

1. Describe a computer tool that you have found useful or that is used for an area in which you are interested. What does the tool do, and what doesn't it do? What can it tell you, and what does it not tell you? What problems will it solve, and what won't it? For example, if you are examining a writing style analyzer, you might notice that it provides a word count, a sentence length analyzer, and a spell-checker. How do these measures support your writing? How might they mislead you? What do you have to know to use the information the style analyzer provides? What do you need to know about writing that programs don't help you with? What other criteria do you use to analyze and evaluate your writing that are not supported by automated analyzers?
2. For any subject you are now studying or are interested in studying soon, identify some of the computerized tools used in that field. For example, you might look at statistical and graphing programs in the social sciences or economic simulation packages that examine the effect of different economic factors on a situation. In languages you may look at grammar parsing programs. Describe what programs you find, what they do, and how they are used in your subject of interest.



FIGURE 9.2

## Employment in the Fastest Growing and Fastest Declining Occupations: 1992 to 2005

OCCUPATION	EMPLOYMENT (1,000)				PERCENT CHANGE		
	1992	2005 <sup>1</sup>			1992-2005		
		Low	Moderate	High	Low	Moderate	High
<b>Total, all occupations<sup>2</sup></b>	<b>121,099</b>	<b>139,007</b>	<b>147,482</b>	<b>154,430</b>	<b>14.8</b>	<b>21.8</b>	<b>27.5</b>
<b>FASTEST GROWING</b>							
Home health aides .....	347	794	827	835	128.7	138.1	140.6
Human services workers .....	189	429	445	451	127.6	135.9	139.2
Personal and home care aides .....	127	283	293	296	122.0	129.8	132.0
Computer engineers and scientists .....	211	409	447	484	93.9	111.9	129.2
Systems analysts .....	455	891	956	1,001	95.7	110.1	120.0
Physical and corrective therapy assistants and aides .....	61	113	118	119	84.6	92.7	95.1
Physical therapists .....	90	163	170	173	80.2	88.0	91.4
Paralegals .....	95	166	176	180	75.8	86.1	89.8
Occupational therapy assistants and aides .....	12	20	21	21	70.5	78.1	80.1
Electronic pagination systems workers .....	18	29	32	33	65.1	77.9	84.0
Teachers, special education .....	358	594	625	648	65.9	74.9	81.0
Medical assistants .....	181	296	308	313	63.5	70.5	73.0
Detectives, except public .....	59	94	100	104	60.1	70.2	76.8
Correction officers .....	282	452	479	503	60.0	69.9	78.1
Child care workers .....	684	1,100	1,135	1,183	60.6	65.8	72.8
Travel agents .....	115	167	191	196	45.2	65.7	69.9
Radiologic technologists and technicians .....	162	252	264	267	55.4	62.7	64.6
Nursery (farm) workers .....	72	110	116	123	53.1	62.0	71.3
Medical records technicians .....	76	118	123	125	54.4	61.5	63.6
Operations research analysts .....	45	67	72	75	50.1	61.4	68.0
Occupational therapists .....	40	61	64	65	52.9	59.6	62.5
Subway and streetcar operators .....	22	33	35	37	48.1	57.2	64.9
Legal secretaries .....	280	415	439	447	48.3	57.1	59.9
Teachers, preschool and kindergarten .....	434	646	669	682	48.9	54.3	57.2
Manicurists .....	35	54	55	56	51.2	54.1	58.3
EEG technologists .....	6	9	10	10	46.6	53.8	55.4
Producers, directors, actors, and entertainers .....	129	190	198	205	47.0	53.5	58.7
Speech-language pathologists and audiologists .....	73	105	110	113	44.6	51.3	55.7
Flight attendants .....	93	121	140	144	30.3	51.0	55.5
Guards .....	803	1,138	1,211	1,255	41.7	50.8	56.2
Nuclear medicine technologists .....	12	17	18	18	43.1	50.1	51.6
Insurance adjusters, examiners, and investigators .....	147	205	220	220	39.3	49.1	49.5
Respiratory therapists .....	74	104	109	110	41.4	48.3	49.9
Psychologists .....	143	204	212	222	42.1	48.0	54.7
<b>FASTEST DECLINING</b>							
Frame wipers, central office .....	11	2	3	3	-77.4	-75.3	-74.7
Signal or track switch maintainers .....	3	1	1	1	-76.6	-74.6	-72.9
Peripheral EDP equipment operators .....	30	11	12	12	-62.6	-60.2	-59.0
Directory assistance operators .....	27	12	13	14	-54.9	-50.6	-49.4
Central office operators .....	48	22	24	24	-54.7	-50.3	-49.1
Station installers and repairers, telephone .....	40	18	20	20	-54.7	-50.3	-49.1
Portable machine cutters .....	11	5	6	6	-48.3	-40.1	-39.4
Computer operators, except peripheral equipment .....	266	151	161	168	-43.2	-39.3	-36.6
Shoe sewing machine operators and tenders .....	16	9	10	10	-46.3	-38.4	-35.8
Central office and PBX installers and repairers .....	70	41	45	46	-41.3	-35.6	-34.1
Child care workers, private household .....	350	220	227	242	-37.1	-35.1	-31.0
Job printers .....	15	9	10	10	-39.4	-35.0	-33.2
Roustabouts .....	33	20	22	32	-38.4	-33.2	-2.0
Separating and still machine operators and tenders .....	21	13	14	15	-37.0	-32.8	-29.8
Cleaners and servants, private household .....	483	316	326	347	-34.6	-32.5	-28.2
Coil winders, tapers, and finishers .....	20	12	14	16	-41.2	-32.4	-22.1
Billing, posting, and calculating machine operators .....	93	62	66	68	-33.6	-29.5	-27.0
Sewing machine operators, garment .....	556	338	393	396	-39.1	-29.2	-26.7
Compositors and typesetters, precision .....	11	7	8	8	-30.7	-26.5	-23.3
Data entry keyers, composing .....	16	11	12	12	-31.7	-26.4	-23.8
Motion picture projectionists .....	9	7	7	7	-29.3	-25.8	-24.0
Telephone and cable TV line installers and repairers .....	165	117	125	134	-29.4	-24.4	-18.7
Cutting and slicing machine setters <sup>3</sup> .....	94	68	73	76	-28.1	-22.6	-19.5
Watchmakers .....	9	7	7	8	-26.5	-11.6	-18.4
Tire building machine operators .....	14	10	11	12	-29.4	-22.3	-19.0
Packaging and filling machine operators and tenders .....	319	232	248	257	-27.1	-22.3	-19.4
Head sawyers and sawing machine operators and tenders <sup>4</sup> .....	59	44	46	53	-25.7	-22.3	-10.3
Switchboard operators .....	239	177	188	194	-25.9	-21.3	-18.8
Farmers .....	1,088	831	857	914	-23.7	-21.2	-16.0
Machine forming operators and tenders, metal and plastic .....	155	113	123	133	-27.8	-20.8	-14.3
Cement and gluing machine operators and tenders .....	35	26	28	30	-25.7	-20.2	-12.7

<sup>1</sup>Based on low, moderate, or high trend assumptions. <sup>2</sup>Included other occupations, not shown separately. <sup>3</sup>Includes operators and tenders. <sup>4</sup>Includes setters and set-up operators.  
Source: U.S. Bureau of Labor Statistics, *Monthly Labor Review*, November 1993.

FIGURE 9.2

## Full Time Wage and Salary Workers—Number and Earnings: 1983 to 1994

CHARACTERISTIC	NUMBER OF WORKERS (1,000)				MEDIAN WEEKLY EARNINGS (Dollars)			
	1983	1985	1990	1994 <sup>1</sup>	1983	1985	1990	1994 <sup>1</sup>
<b>All workers<sup>2</sup></b> .....	<b>70,976</b>	<b>77,002</b>	<b>85,082</b>	<b>87,379</b>	<b>313</b>	<b>343</b>	<b>415</b>	<b>467</b>
Male .....	42,309	45,589	49,015	49,992	378	406	485	522
16 to 24 years old .....	6,702	6,956	6,313	6,040	223	240	283	294
25 years old and over .....	35,607	38,632	42,702	43,952	406	442	514	576
Female .....	28,667	31,414	36,068	37,386	252	277	348	399
16 to 24 years old .....	5,345	5,621	5,001	4,403	197	210	254	276
25 years old and over .....	23,322	25,793	31,066	32,983	267	296	370	421
White .....	61,739	66,481	72,637	73,500	319	355	427	484
Male .....	37,378	40,030	42,563	42,816	387	417	497	547
Female .....	24,361	26,452	30,075	30,685	254	281	355	408
Black .....	7,373	8,393	9,642	10,199	261	277	329	371
Male .....	3,883	4,367	4,909	5,099	293	304	360	400
Female .....	3,490	4,026	4,733	5,100	231	252	308	346
Hispanic origin <sup>3</sup> .....	(NA)	(NA)	6,993	8,274	(NA)	(NA)	307	324
Male .....	(NA)	(NA)	4,410	5,295	(NA)	(NA)	322	343
Female .....	(NA)	(NA)	2,583	2,979	(NA)	(NA)	280	305
Family relationship:								
Husbands .....	28,720	30,260	31,326	(NA)	410	455	532	(NA)
Wives .....	14,884	16,270	18,666	(NA)	257	285	363	(NA)
Women who maintain families .....	3,948	4,333	5,007	(NA)	256	278	339	(NA)
Men who maintain families .....	1,331	1,313	1,786	(NA)	377	396	444	(NA)
Other persons in families:								
Men .....	5,518	6,173	6,434	(NA)	219	238	296	(NA)
Women .....	4,032	4,309	4,475	(NA)	201	213	271	(NA)
All other men <sup>4</sup> .....	6,740	7,841	9,468	(NA)	350	380	442	(NA)
All other women <sup>4</sup> .....	5,803	6,503	7,920	(NA)	274	305	376	(NA)
<b>Occupation, male:</b>								
Managerial and professional .....	10,312	11,078	12,263	13,021	516	583	731	803
Exec., admin., managerial .....	5,344	5,835	6,401	6,785	530	593	742	797
Professional specialty .....	4,967	5,243	5,863	6,236	506	571	720	809
Technical, sales, and administrative support .....	8,125	8,803	9,596	9,764	385	420	496	548
Tech. and related support .....	1,428	1,563	1,747	1,838	424	472	570	622
Sales .....	3,853	4,227	4,666	4,836	389	431	505	575
Admin. support, including clerical .....	2,844	3,013	3,183	3,289	362	391	440	482
Service .....	3,723	3,947	4,476	4,784	255	272	320	350
Private household .....	11	13	12	14	(B)	(B)	(B)	(B)
Protective .....	1,314	1,327	1,523	1,674	355	391	477	538
Other service .....	2,398	2,607	2,942	3,096	217	230	273	293
Precision production <sup>5</sup> .....	9,180	10,026	10,169	9,824	387	408	488	515
Mechanics and repairers .....	3,418	3,752	3,669	3,593	377	400	477	519
Construction trades .....	2,966	3,308	3,603	3,407	375	394	480	492
Other .....	2,796	2,966	2,897	2,824	408	433	510	553
Operators, fabricators and laborers .....	9,833	10,585	11,257	11,333	308	325	378	406
Machine operators, assemblers, and inspectors .....	4,138	4,403	4,510	4,469	319	341	391	415
Transportation and material moving .....	3,199	3,459	3,721	3,854	335	369	418	469
Handlers, equipment cleaners, helpers, and laborers .....	2,496	2,724	3,027	3,010	251	261	308	319
Farming, forestry, and fishing .....	1,137	1,150	1,253	1,266	200	216	263	290
<b>Occupation, female:</b>								
Managerial and professional .....	7,139	8,302	10,595	12,187	357	399	511	592
Exec., admin., managerial .....	2,772	3,492	4,764	5,548	339	383	485	541
Professional specialty .....	4,367	4,810	5,831	6,639	367	408	534	623
Technical, sales, and administrative support .....	13,517	14,622	16,202	15,954	247	269	322	376
Tech. and related support .....	1,146	1,200	1,470	1,536	299	331	417	466
Sales .....	2,460	2,929	3,531	3,633	204	226	292	324
Admin. support, including clerical .....	9,911	10,494	11,202	10,785	248	270	332	374
Service .....	3,598	3,963	4,531	4,702	173	185	230	257
Private household .....	267	330	298	311	116	130	171	177
Protective .....	139	156	216	277	250	278	405	430
Other service .....	3,139	3,477	4,017	4,115	176	188	231	256
Precision production <sup>5</sup> .....	784	906	893	970	256	268	316	370
Mechanics and repairers .....	120	144	139	160	337	392	459	520
Construction trades .....	45	53	50	52	(B)	265	394	408
Other .....	619	709	704	758	244	253	300	342
Operators, fabricators and laborers .....	3,486	3,482	3,675	3,412	204	216	262	293
Machine operators, assemblers, and inspectors .....	2,853	2,778	2,840	2,563	202	216	260	292
Transportation and material moving .....	159	189	227	242	253	252	314	361
Handlers, equipment cleaners, helpers, and laborers .....	474	514	608	608	211	209	250	279
Farming, forestry, and fishing .....	143	138	171	161	169	185	216	234

B Data not shown where base is less than 50,000. NA Not available. <sup>1</sup>See footnote 2, table 626. <sup>2</sup>Includes other races, not shown separately. <sup>3</sup>Persons of Hispanic origin may be of any race. <sup>4</sup>The majority of these persons are living alone or with nonrelatives. Also included are persons in families where the husband, wife or other person maintaining the family is in the Armed Forces, and persons in unrelated subfamilies. <sup>5</sup>Includes craft and repair.

Source: U.S. Bureau of the Census, *Statistical Abstract of the United States: 1995* (115th edition.) Washington, D.C., 1995. Pages 415, 433; tables 651, 677.