E 325M

Advanced Expository Writing

Kinneavy

Spring 1995

Readings for E 325M--Spring, 1994

Wald, George. "The Origin of Life." *Writing About Science*. Eds. and . Originally published in *Scientific American*,

Kinneavy, James, McCleary, William, Nakadate, Neil. "Evaluating." *Writing in the Liberal Arts Tradition: A Rhetoric with Readings.* New York: Harper & Row Publishers, 1985. Pp. 349-387.

Hemingway, Ernest. "The Morality of Bullfighting." In James L. Kinneavy, John Cope, J. W. Campbell. *Writing: Basic Modes of Organization.* Dubuque, Iowa: Kendall Hunt Publishing Company, 1976. Pp. 130-132.

Kinneavy, James L. "Forging a Moral Language for Public Schools and Public Debate." Talk given at Washington, D. C., April, 1994.

Gregory, David L. "Teaching Moral Values in Public Schools: Some Constitutional Considerations." *Catholic Lawyer*, XXXI, 3, 173-182.

SYLLABUS FOR ADVANCED EXPOSITORY WRITING

E 325m--Spring, 1995

Jan 18 W Policy statement, syllabus, text announcements. Introduction to Daedalus.
20 F Read *The Daily Texan* for today by class time. Analysis of aims of the different items. Discussion in Interchange.

23 M Rough draft of paper in hard copy for cluster group.
25 W Discussion of rough drafts. Read Kinneavy, *Theory*, pp. 48-68.
27 F Final version of "Aims in *The Daily Texan*" due for me in hard copy.

30 M Read Wald, "Origin of Life" in anthology. First discussion.
Feb 1 W Tentative topic chosen and discussed in Interchange.
3 F Gathering of evidence. Some examples.

6 M Rough outline due for group conferences.
8 W Discussion of projected first draft in group conferences.
10 F First draft due for group.

13 M Critiques of first drafts due. Enter on line during class. Discussion.
15 W Continuation of reactions to first drafts and critiques.
17 F Organization problems discussed in group conferences.

20 M Work on final draft. Graphics and style problems
22 W Graphics and style problems, ctd.
24 F Final version of Wald analysis due in hard copy for me. Informal discussion of evaluation on Interchange.

27 M Read Kinneavy, et al. "Evaluating," in anthology.
Mar 1 W Read Hemingway, "The Morality of Bullfighting," in anthology.
3 F Topic due. General discussion on Interchange.

6 M Group conferences discuss organization and topic.
8 W " " work on rough draft on evaluation paper.
10 F Rough draft due for conference group.

13-17 Spring Break

20 M Critique of rough drafts due for conference groups.
22 W Work on final draft.
24 F I will be away at a conference. Work in the lab on your paper.

	27	M	Hand in final drafts of evaluation paper. Read Kinneavy, "Forging a Moral Language for Public Schools and Public Debate." Talk given in Washington, D. C., l994. Discussion.
	29	W	Discussion of possible topics for a moral or political issue in your major field.
	30	F	Topic choice due. Read Kinneavy, *Theory*, sections on Exploratory discourse, pp. 73-77, 96-106, 141-147, 162-165, 186-194.
Apr	3	M	Topic due. Discussion of topics and assignment of groups.
	5	W	Computer search for bibliography.
	7	F	Computer search, continued.
	10	M	Bibliography for topic due. Conference group discussion.
	12	W	Organization of paper planned in groups.
	14	F	Notes due to show me. Groups discuss notes.
	17	M	Rough draft of exploratory research paper due. Groups discuss.
	19	W	Critiques of rough drafts due.
	21	F	Final drafts of exploratory paper due.
	24	M	Read Kinneavy, *Theory*, "Persuasive Discourse," 211-299.
	26	W	Conference groups discuss how to use research materials in a persuasive paper.
	28	F	Audience and organization and style discussed in groups.
May	1	M	Rough draft due for conference group.
	3	W	Critiques of rough drafts due.
	5	F	Final version of persuasion paper due.
	8	M	Dead day.
	19	W	I haven't checked the date for the final exam yet.

POLICY STATEMENT FOR E 325 M--SPRING, 1995
Dr. James L. Kinneavy

1. GRADING. The papers written for the class will determine the grade to a large extent. However, since this type of class is a collaborative endeavor, I will also consider the cooperation you extend to the other members of the class. Consequently the grade will be determined as follows:

Analysis of The Daily Texan	10
Analysis of a Scientific Essay	20
Evaluation	15
Research paper	20
Persuasion paper	10
Participation and Attendance	10
Examination and quizzes	15
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	100

2. PARTICIPATION. The procedures of the class are established to give you maximum feedback on your writing. Sometimes we will look at an individual paper. At other times a cluster groups of three members will examine each other's plans and drafts. In addition, I will also critique the first and grade final drafts.

3. READINGS AND THEORY. There will be readings and theory for each assignment. Especially the theory will be the basis for the examination. There may be class quizzes on the readings and theory.

4. ATTENDANCE AND DEADLINES. Because of the collaborative nature of the classroom procedures, I expect regular attendance. Three absences will result in lowering your grade one level (e.g., B to C). Four absences will result in an F. A rough draft or a final draft which is late will be penalized a half level (e.g., B+ to B-) for every class date it is tardy.

5. GRADE LEVELS. A+ 98, A 95, A- 92; B+ 88, B 85, B- 82; C+ 78. C 75, C- 72; D+ 68, D 65, D- 62; F+ 58, F 55, F- 52. There are also F--, etc. A paper not turned in gets a 0.

6. OFFICE HOURS: MWF, 11:00-12:00, or by appointment, in Parlin 227. Do not hestitate to arrange a conference with me if you need some assistance. Office phone: 471-8765; Residence phone: 288-1423. E-mail: kinneavy@uts.cc.utexas.edu

7. MATERIALS: you will need two 3.5 HD diskettes for the second class. For texts, see syllabus.

8. MODIFICATION. Circumstances may necessitate modifying the weighting of the various themes and final examination.

9. Textbooks.

Hacker, Diana. The Bedford Handbook for Writers. New York: Bedford Books of St. Martin's Press, 1991.

Kinneavy, James L. A Theory of Discourse: The Aims of Discourse. New York: W. W. Norton & Company, 1981.

Kinneavy, James L. E 325M: Advanced Expository Writing, Spring, 1995. Austin, Texas: Jenn's Copy and Binding, 1995.

The manual for the Daedalus program--to be announced in class.

READINGS FOR E 325M, ADVANCED EXPOSITORY WRITING
DR. JAMES L. KINNEAVY, SPRING, 1994

Wald, George. "The Origin of Life."

Kinneavy, McCleary, Nakadate. "Evaluating," in *Writing in the Liberal Arts Tradition*, pp. 349-387.

Hemingway, Ernest. "The Morality of Bullfighting." pp. 130-132 in *Writing--Basic Modes of Organization.*

Kinneavy, James L. "What Does the Killeen Tragedy Have to Do with Teaching Writing?" Manuscript.

Kinneavy, James L. "Writing About Ethical or Political Issues" Manuscript.

Mendel was a careful worker, no doubt about that. And one certainly wouldn't presume to doubt the honesty of a monk. But he'd been raising those peas of his for a long time, and with such single-minded devotion that he might have developed some odd ideas about the implications of his work. Remember, too, that he was little more than a horticultural hobbyist, however dedicated. He lacked a degree, had no University connection, had no previously published research to give him a reputation. Now, if Pasteur had advanced the idea, or Darwin . . .

Anyway, who *really* expects the boy next door to grow up to be President? Surely the gentlemen of the Brünn Society can be forgiven for failing to realize that their modest neighbor had made a brilliant discovery about the fundamental nature of life. They printed his paper in their *Proceedings*—and remembered it as an oddity, if they remembered it at all.

QUESTIONS AND SUGGESTIONS

1. According to the Beadles, why was Mendel's work not accepted? Has this happened to other scientists?
2. The Beadles suggest that had Mendel seen the exceptions to his rules, he might have decided his theory was wrong. When are the exceptions in science important?
3. Notice how the Beadles go from analyzing the process by which Mendel's mind worked, to using historical material, to conveying the content of Mendel's theory and back to using historical material again. Do you think this is an effective method of organization in writing about a process of discovery? Why?
4. In analyzing the process of making a discovery, the Beadles imply certain things about the meaning of objectivity in science, the relationship of fact to theory, the role of luck, the relationship between theory, observation, and experiment. Any one of these terms might serve as the subject of another essay.
5. In their introduction to Mendel, the Beadles debunk the view of the scientist as cold and infallible. Compare theirs with James Watson's conception of the scientist. Write an essay persuading your audience that some conception of the scientist is or isn't true.

GEORGE WALD

The Origin of Life

GEORGE WALD (b. 1906) has done important work on the chemistry of vision. In 1932–1933, he discovered vitamin A in the retina of the eye and was able to establish its role in vision and subsequently to work out the chemical reactions through which light stimulates vision. For this he shared the 1967 Nobel Prize in medicine or physiology. He has been a member of the Harvard University faculty since 1934 and recently has taken a stand against recombinant DNA research. This essay was written for *Scientific American*.

About a century ago the question, How did life begin? which has interested men throughout their history, reached an impasse. Up to that time two answers had been offered: one that life had been created supernaturally, the other that it arises continually from the nonliving. The first explanation lay outside science; the second was now shown to be untenable. For a time scientists felt some discomfort in having no answer at all. Then they stopped asking the question.

Recently ways have been found again to consider the origin of life as a scientific problem—as an event within the order of nature. In part this is the result of new information. But a theory never rises of itself, however rich and secure the facts. It is an act of creation. Our present ideas in this realm were first brought together in a clear and defensible argument by the Russian biochemist A. I. Oparin in a book called *The Origin of Life*, published in 1936. Much can be added now to Oparin's discussion, yet it provides the foundation upon which all of us who are interested in this subject have built.

The attempt to understand how life originated raises a wide variety of scientific questions, which lead in many and diverse directions and should end by casting light into many obscure corners. At the center of the enterprise lies the hope not only of explaining

a great past event—important as that should be—but of showing that the explanation is workable. If we can indeed come to understand how a living organism arises from the nonliving, we should be able to construct one—only of the simplest description, to be sure, but still recognizably alive. This is so remote a possibility now that one scarcely dares to acknowledge it; but it is there nevertheless.

One answer to the problem of how life originated is that it was created. This is an understandable confusion of nature with technology. Men are used to making things; it is a ready thought that those things not made by men were made by a superhuman being. Most of the cultures we know contain mythical accounts of a supernatural creation of life. Our own tradition provides such an account in the opening chapters of Genesis. There we are told that beginning on the third day of the Creation, God brought forth living creatures—first plants, then fishes and birds, then land animals and finally man.

The more rational elements of society, however, tended to take a more naturalistic view of the matter. One had only to accept the evidence of one's senses to know that life arises regularly from the nonliving: worms from mud, maggots from decaying meat, mice from refuse of various kinds. This is the view that came to be called spontaneous generation. Few scientists doubted it. Aristotle, Newton, William Harvey, Descartes, van Helmont, all accepted spontaneous generation without serious question. Indeed, even the theologians—witness the English Jesuit John Turberville Needham—could subscribe to this view, for Genesis tells us, not that God created plants and most animals directly, but that He bade the earth and waters to bring them forth; since this directive was never rescinded, there is nothing heretical in believing that the process has continued.

But step by step, in a great controversy that spread over two centuries, this belief was whittled away until nothing remained of it. First the Italian Francesco Redi showed in the seventeenth century that meat placed under a screen, so that flies cannot lay their eggs on it, never develops maggots. Then in the following century the Italian abbé Lazzaro Spallanzani showed that a nutritive broth, sealed off from the air while boiling, never develops microorganisms, and hence never rots. Needham objected that by too much

boiling Spallanzani had rendered the broth, and still more the air above it, incompatible with life. Spallanzani could defend his broth; when he broke the seal of his flasks, allowing new air to rush in, the broth promptly began to rot. He could find no way, however, to show that the air in the sealed flask had not been vitiated. This problem finally was solved by Louis Pasteur in 1860, with a simple modification of Spallanzani's experiment. Pasteur too used a flask containing boiling broth, but instead of sealing off the neck he drew it out in a long, S-shaped curve with its end open to the air. While molecules of air could pass back and forth freely, the heavier particles of dust, bacteria and molds in the atmosphere were trapped on the walls of the curved neck and only rarely reached the broth. In such a flask the broth seldom was contaminated; usually it remained clear and sterile indefinitely.

This was only one of Pasteur's experiments. It is no easy matter to deal with so deeply ingrained and common-sense a belief as that in spontaneous generation. One can ask for nothing better in such a pass than a noisy and stubborn opponent, and this Pasteur had in the naturalist Félix Pouchet, whose arguments before the French Academy of Sciences drove Pasteur to more and more rigorous experiments. When he had finished, nothing remained of the belief in spontaneous generation.

We tell this story to beginning students of biology as though it represents a triumph of reason over mysticism. In fact it is very nearly the opposite. The reasonable view was to believe in spontaneous generation; the only alternative, to believe in a single, primary act of supernatural creation. There is no third position. For this reason many scientists a century ago chose to regard the belief in spontaneous generation as a "philosophical necessity." It is a symptom of the philosophical poverty of our time that this necessity is no longer appreciated. Most modern biologists, having reviewed with satisfaction the downfall of the spontaneous generation hypothesis, yet unwilling to accept the alternative belief in special creation, are left with nothing.

I think a scientist has no choice but to approach the origin of life through a hypothesis of spontaneous generation. What the controversy reviewed above showed to be untenable is only the belief that living organisms arise spontaneously under present conditions. We have now to face a somewhat different problem: how

organisms may have arisen spontaneously under different conditions in some former period, granted that they do so no longer.

10 To make an organism demands the right substances in the right proportions and in the right arrangement. We do not think that anything more is needed—but that is problem enough.

11 The substances are water, certain salts—as it happens, those found in the ocean—and carbon compounds. The latter are called *organic* compounds because they scarcely occur except as products of living organisms.

12 Organic compounds consist for the most part of four types of atoms: carbon, oxygen, nitrogen and hydrogen. These four atoms together constitute about 99 per cent of living material, for hydrogen and oxygen also form water. The organic compounds found in organisms fall mainly into four great classes: carbohydrates, fats, proteins and nucleic acids. . . . The fats are simplest, each consisting of three fatty acids joined to glycerol. The starches and glycogens are made of sugar units strung together to form long straight and branched chains. In general only one type of sugar appears in a single starch or glycogen; these molecules are large, but still relatively simple. The principal function of carbohydrates and fats in the organism is to serve as fuel—as a source of energy.

13 The nucleic acids introduce a further level of complexity. They are very large structures, composed of aggregates of at least four types of unit—the nucleotides—brought together in a great variety of proportions and sequences. An almost endless variety of different nucleic acids is possible, and specific differences among them are believed to be of the highest importance. Indeed, these structures are thought by many to be the main constituents of the genes, the bearers of hereditary constitution.

14 Variety and specificity, however, are most characteristic of the proteins, which include the largest and most complex molecules known. The units of which their structure is built are about 25 different amino acids. These are strung together in chains hundreds to thousands of units long, in different proportions, in all types of sequence, and with the greatest variety of branching and folding. A virtually infinite number of different proteins is possible. Organisms seem to exploit this potentiality, for no two species of living organism, animal or plant, possess the same proteins.

15 Organic molecules therefore form a large and formidable array, endless in variety and of the most bewildering complexity. One cannot think of having organisms without them. This is precisely the trouble, for to understand how organisms originated we must first of all explain how such complicated molecules could come into being. And that is only the beginning. To make an organism requires not only a tremendous variety of these substances, in adequate amounts and proper proportions, but also just the right arrangement of them. Structure here is as important as composition—and what a complication of structure! The most complex machine man has devised—say an electronic brain—is child's play compared with the simplest of living organisms. The especially trying thing is that complexity here involves such small dimensions. It is on the molecular level; it consists of a detailed fitting of molecule to molecule such as no chemist can attempt.

16 One has only to contemplate the magnitude of this task to concede that the spontaneous generation of a living organism is impossible. Yet here we are—as a result, I believe, of spontaneous generation. It will help to digress for a moment to ask what one means by "impossible."

17 With every event one can associate a probability—the chance that it will occur. This is always a fraction, the proportion of times the event occurs in a large number of trials. Sometimes the probability is apparent even without trial. A coin has two faces; the probability of tossing a head is therefore 1/2. A die has six faces; the probability of throwing a deuce is 1/6. When one has no means of estimating the probability beforehand, it must be determined by counting the fraction of successes in a large number of trials.

18 Our everyday concept of what is impossible, possible or certain derives from our experience: the number of trials that may be encompassed within the space of a human lifetime, or at most within recorded human history. In this colloquial, practical sense I concede the spontaneous origin of life to be "impossible." It is impossible as we judge events in the scale of human experience.

19 We shall see that this is not a very meaningful conception. For one thing, the time with which our problem is concerned is geological time, and the whole extent of human history is trivial in the balance. We shall have more to say of this later.

20 But even within the bounds of our own time there is a serious

flaw in our judgment of what is possible. It sounds impressive to say that an event has never been observed in the whole of human history. We should tend to regard such an event as at least "practically" impossible, whatever probability is assigned to it on abstract grounds. When we look a little further into such a statement, however, it proves to be almost meaningless. For men are apt to reject reports of very improbable occurrences. Persons of good judgment think it safer to distrust the alleged observer of such an event than to believe him. The result is that events which are merely very extraordinary acquire the reputation of never having occurred at all. Thus the highly improbable is made to appear impossible.

To give an example: Every physicist knows that there is a very small probability, which is easily computed, that the table upon which I am writing will suddenly and spontaneously rise into the air. The event requires no more than that the molecules of which the table is composed, ordinarily in random motion in all directions, should happen by chance to move in the same direction. Every physicist concedes this possibility; but try telling one that you have seen it happen. Recently I asked a friend, a Nobel laureate in physics, what he would say if I told him that. He laughed and said that he would regard it as more probable that I was mistaken than that the event had actually occurred.

22 We see therefore that it does not mean much to say that a very improbable event has never been observed. There is a conspiracy to suppress such observations, not among scientists alone, but among all judicious persons, who have learned to be skeptical even of what they see, let alone of what they are told. If one group is more skeptical than others, it is perhaps lawyers, who have the harshest experience of the unreliability of human evidence. Least skeptical of all are the scientists, who, cautious as they are, know very well what strange things are possible.

23 A final aspect of our problem is very important. When we consider the spontaneous origin of a living organism, this is not an event that need happen again and again. It is perhaps enough for it to happen once. The probability with which we are concerned is of a special kind; it is the probability that an event occur *at least once*. To this type of probability a fundamentally important thing

happens as one increases the number of trials. However improbable the event in a single trial, it becomes increasingly probable as the trials are multiplied. Eventually the event becomes virtually inevitable. For instance, the chance that a coin will not fall head up in a single toss is 1/2. The chance that no head will appear in a series of tosses is $1/2 \times 1/2 \times 1/2 \ldots$ as many times over as the number of tosses. In 10 tosses the chance that no head will appear is therefore 1/2 multiplied by itself 10 times, or 1/1,000. Consequently the chance that a head will appear at least once in 10 tosses is 999/1,000. Ten trials have converted what started as a modest probability to a near certainty.

24 The same effect can be achieved with any probability, however small, by multiplying sufficiently the number of trials. Consider a reasonably improbable event, the chance of which is 1/1,000. The chance that this will not occur in one trial is 999/1,000. The chance that it won't occur in 1,000 trials is 999/1,000 multiplied together 1,000 times. This fraction comes out to be 37/100. The chance that it will happen at least once in 1,000 trials is therefore one minus this number —63/100—a little better than three chances out of five. One thousand trials have transformed this from a highly improbable to a highly probable event. In 10,000 trials the chance that this event will occur at least once comes out to be 19,999/20,000. It is now almost inevitable.

25 It makes no important change in the argument if we assess the probability that an event occur at least two, three, four or some other small number of times rather than at least once. It simply means that more trials are needed to achieve any degree of certainty we wish. Otherwise everything is the same.

26 In such a problem as the spontaneous origin of life we have no way of assessing probabilities beforehand, or even of deciding what we mean by a trial. The origin of a living organism is undoubtedly a stepwise phenomenon, each step with its own probability and its own conditions of trial. Of one thing we can be sure, however: whatever constitutes a trial, more such trials occur the longer the interval of time.

27 The important point is that since the origin of life belongs in the category of at-least-once phenomena, time is on its side. However improbable we regard this event, or any of the steps which it

involves, given enough time it will almost certainly happen at least once. And for life as we know it, with its capacity for growth and reproduction, once may be enough.

Time is in fact the hero of the plot. The time with which we have to deal is of the order of two billion years. What we regard as impossible on the basis of human experience is meaningless here. Given so much time, the "impossible" becomes possible, the possible probable, and the probable virtually certain. One has only to wait: time itself performs the miracles.

This brings the argument back to its first stage: the origin of organic compounds. Until a century and a quarter ago the only known source of these substances was the stuff of living organisms. Students of chemistry are usually told that when, in 1828, Friedrich Wöhler synthesized the first organic compound, urea, he proved that organic compounds do not require living organisms to make them. Of course it showed nothing of the kind. Organic chemists are alive; Wöhler merely showed that they can make organic compounds externally as well as internally. It is still true that with almost negligible exceptions all the organic matter we know is the product of living organisms.

The almost negligible exceptions, however, are very important for our argument. It is now recognized that a constant, slow production of organic molecules occurs without the agency of living things. Certain geological phenomena yield simple organic compounds. So, for example, volcanic eruptions bring metal carbides to the surface of the earth, where they react with water vapor to yield simple compounds of carbon and hydrogen. The familiar type of such a reaction is the process used in old-style bicycle lamps in which acetylene is made by mixing iron carbide with water.

Recently Harold Urey, Nobel laureate in chemistry, has become interested in the degree to which electrical discharges in the upper atmosphere may promote the formation of organic compounds. One of his students, S. L. Miller, performed the simple experiment of circulating a mixture of water vapor, methane (CH_4), ammonia (NH_3) and hydrogen—all gases believed to have been present in the early atmosphere of the earth—continuously for a week over an electric spark. The circulation was maintained by boiling the water in one limb of the apparatus and condensing

it in the other. At the end of the week the water was analyzed by the delicate method of paper chromatography. It was found to have acquired a mixture of amino acids! Glycine and alanine, the simplest amino acids and the most prevalent in proteins, were definitely identified in the solution, and there were indications it contained aspartic acid and two others. The yield was surprisingly high. This amazing result changes at a stroke our ideas of the probability of the spontaneous formation of amino acids.

A final consideration, however, seems to me more important than all the special processes to which one might appeal for organic syntheses in inanimate nature.

It has already been said that to have organic molecules one ordinarily needs organisms. The synthesis of organic substances, like almost everything else that happens in organisms, is governed by the special class of proteins called enzymes—the organic catalysts which greatly accelerate chemical reactions in the body. Since an enzyme is not used up but is returned at the end of the process, a small amount of enzyme can promote an enormous transformation of material.

Enzymes play such a dominant role in the chemistry of life that it is exceedingly difficult to imagine the synthesis of living material without their help. This poses a dilemma, for enzymes themselves are proteins, and hence among the most complex organic components of the cell. One is asking, in effect, for an apparatus which is the unique property of cells in order to form the first cell.

This is not, however, an insuperable difficulty. An enzyme, after all, is only a catalyst; it can do no more than change the *rate* of a chemical reaction. It cannot make anything happen that would not have happened, though more slowly, in its absence. Every process that is catalyzed by an enzyme, and every product of such a process, would occur without the enzyme. The only difference is one of rate.

Once again the essence of the argument is time. What takes only a few moments in the presence of an enzyme or other catalyst may take days, months or years in its absence; but given time, the end result is the same.

Indeed, this great difficulty in conceiving of the spontaneous generation of organic compounds has its positive side. In a sense, organisms demonstrate to us what organic reactions and products

are *possible*. We can be certain that, given time, all these things must occur. Every substance that has ever been found in an organism displays thereby the finite probability of its occurrence. Hence, given time, it should arise spontaneously. One has only to wait.

It will be objected at once that this is just what one cannot do. Everyone knows that these substances are highly perishable. Granted that, within long spaces of time, now a sugar molecule, now a fat, now even a protein might form spontaneously, each of these molecules should have only a transitory existence. How are they ever to accumulate; and, unless they do so, how form an organism?

We must turn the question around. What, in our experience, is known to destroy organic compounds? Primarily two agencies: decay and the attack of oxygen. But decay is the work of living organisms, and we are talking of a time before life existed. As for oxygen, this introduces a further and fundamental section of our argument.

It is generally conceded at present that the early atmosphere of our planet contained virtually no free oxygen. Almost all the earth's oxygen was bound in the form of water and metal oxides. If this were not so, it would be very difficult to imagine how organic matter could accumulate over the long stretches of time that alone might make possible the spontaneous origin of life. This is a crucial point, therefore, and the statement that the early atmosphere of the planet was virtually oxygen-free comes forward so opportunely as to raise a suspicion of special pleading. I have for this reason taken care to consult a number of geologists and astronomers on this point, and am relieved to find that it is well defended. I gather that there is a widespread though not universal censensus that this condition did exist. Apparently something similar was true also for another common component of our atmosphere—carbon dioxide. It is believed that most of the carbon on the earth during its early geological history existed as the element or in metal carbides and hydrocarbons; very little was combined with oxygen.

This situation is not without its irony. We tend usually to think that the environment plays the tune to which the organism must dance. The environment is given; the organism's problem is to adapt to it or die. It has become apparent lately, however, that

some of the most important features of the physical environment are themselves the work of living organisms. Two such features have just been named. The atmosphere of our planet seems to have contained no oxygen until organisms placed it there by the process of plant photosynthesis. It is estimated that at present all the oxygen of our atmosphere is renewed by photosynthesis once in every 2,000 years, and that all the carbon dioxide passes through the process of photosynthesis once in every 300 years. In the scale of geological time, these intervals are very small indeed. We are left with the realization that all the oxygen and carbon dioxide of our planet are the products of living organisms, and have passed through living organisms over and over again.

In the early history of our planet, when there were no organisms or any free oxygen, organic compounds should have been stable over very long periods. This is the crucial difference between the period before life existed and our own. If one were to specify a single reason why the spontaneous generation of living organisms was possible once and is so no longer, this is the reason.

We must still reckon, however, with another destructive force which is disposed of less easily. This can be called spontaneous dissolution—the counterpart of spontaneous generation. We have noted that any process catalyzed by an enzyme can occur in time without the enzyme. The trouble is that the processes which synthesize an organic substance are reversible: any chemical reaction which an enzyme may catalyze will go backward as well as forward. We have spoken as though one has only to wait to achieve syntheses of all kinds; it is truer to say that what one achieves by waiting is *equilibria* of all kinds—equilibria in which the synthesis and dissolution of substances come into balance.

In the vast majority of the processes in which we are interested the point of equilibrium lies far over toward the side of dissolution. That is to say, spontaneous dissolution is much more probable, and hence proceeds much more rapidly, than spontaneous synthesis. For example, the spontaneous union, step by step, of amino acid units to form a protein has a certain small probability, and hence might occur over a long stretch of time. But the dissolution of the protein or of an intermediate product into its component amino acids is much more probable, and hence will go ever so much more rapidly. The situation we must face is that of

patient Penelope waiting for Odysseus, yet much worse: each night she undid the weaving of the preceding day, but here a night could readily undo the work of a year or a century.

How do present-day organisms manage to synthesize organic compounds against the forces of dissolution? They do so by a continuous expenditure of energy. Indeed, living organisms commonly do better than oppose the forces of dissolution; they grow in spite of them. They do so, however, only at enormous expense to their surroundings. They need a constant supply of material and energy merely to maintain themselves, and much more of both to grow and reproduce. A living organism is an intricate machine for performing exactly this function. When, for want of fuel or through some internal failure in its mechanism, an organism stops actively synthesizing itself in opposition to the processes which continuously decompose it, it dies and rapidly disintegrates.

What we ask here is to synthesize organic molecules without such a machine. I believe this to be the most stubborn problem that confronts us—the weakest link at present in our argument. I do not think it by any means disastrous, but it calls for phenomena and forces some of which are as yet only partly understood and some probably still to be discovered.

At present we can make only a beginning with this problem. We know that it is possible on occasion to protect molecules from dissolution by precipitation or by attachment to other molecules. A wide variety of such precipitation and "trapping" reactions is used in modern chemistry and biochemistry to promote syntheses. Some molecules appear to acquire a degree of resistance to disintegration simply through their size. So, for example, the larger molecules composed of amino acids—polypeptides and proteins—seem to display much less tendency to disintegrate into their units than do smaller compounds of two or three amino acids.

Again, many organic molecules display still another type of integrating force—a spontaneous impulse toward structure formation. Certain types of fatty molecules—lecithins and cephalins—spin themselves out in water to form highly oriented and well-shaped structures—the so-called myelin figures. Proteins sometimes orient even in solution, and also may aggregate in the solid state in highly organized formations. Such spontaneous architectonic tendencies are still largely unexplored, particularly as they may

occur in complex mixtures of substances, and they involve forces the strength of which has not yet been estimated.

What we are saying is that possibilities exist for opposing *intra*molecular dissolution by *inter*molecular aggregations of various kinds. The equilibrium between union and disunion of the amino acids that make up a protein is all to the advantage of disunion, but the aggregation of the protein with itself or other molecules might swing the equilibrium in the opposite direction: perhaps by removing the protein from access to the water which would be required to disintegrate it or by providing some particularly stable type of molecular association.

In such a scheme the protein appears only as a transient intermediate, an unstable way-station, which can either fall back to a mixture of its constituent amino acids or enter into the formation of a complex structural aggregate: amino acids ⇆ protein → aggregate.

Such molecular aggregates, of various degrees of material and architectural complexity, are indispensable intermediates between molecules and organisms. We have no need to try to imagine the spontaneous formation of an organism by one grand collision of its component molecules. The whole process must be gradual. The molecules form aggregates, small and large. The aggregates add further molecules, thus growing in size and complexity. Aggregates of various kinds interact with one another to form still larger and more complex structures. In this way we imagine the ascent, not by jumps or master strokes, but gradually, piecemeal, to the first living organisms.

Where may this have happened? It is easiest to suppose that life first arose in the sea. Here were the necessary salts and the water. The latter is not only the principal component of organisms, but prior to their formation provided a medium which could dissolve molecules of the widest variety and ceaselessly mix and circulate them. It is this constant mixture and collision of organic molecules of every sort that constituted in large part the "trials" of our earlier discussion of probabilities.

The sea in fact gradually turned into a dilute broth, sterile and oxygen-free. In this broth molecules came together in increasing number and variety, sometimes merely to collide and separate, sometimes to react with one another to produce new combinations,

sometimes to aggregate into multimolecular formations of increasing size and complexity.

54 What brought order into such complexes? For order is as essential here as composition. To form an organism, molecules must enter into intricate designs and connections; they must eventually form a self-repairing, self-constructing dynamic machine. For a time this problem of molecular arrangement seemed to present an almost insuperable obstacle in the way of imagining a spontaneous origin of life, or indeed the laboratory synthesis of a living organism. It is still a large and mysterious problem, but it no longer seems insuperable. The change in view has come about because we now realize that it is not altogether necessary to *bring* order into this situation; a great deal of order is implicit in the molecules themselves.

55 The epitome of molecular order is a crystal. In a perfect crystal the molecules display complete regularity of position and orientation in all planes of space. At the other extreme are fluids—liquids or gases—in which the molecules are in ceaseless motion and in wholly random orientations and positions.

56 Lately it has become clear that very little of a living cell is truly fluid. Most of it consists of molecules which have taken up various degrees of orientation with regard to one another. That is, most of the cell represents various degrees of approach to crystallinity—often, however, with very important differences from the crystals most familiar to us. Much of the cell's crystallinity involves molecules which are still in solution—so-called liquid crystals—and much of the dynamic, plastic quality of cellular structure, the capacity for constant change of shape and interchange of material, derives from this condition. Our familiar crystals, furthermore, involve only one or a very few types of molecule, while in the cell a great variety of different molecules come together in some degree of regular spacing and orientation—i.e., some degree of crystallinity. We are dealing in the cell with highly mixed crystals and near-crystals, solid and liquid. The laboratory study of this type of formation has scarcely begun. Its further exploration is of the highest importance for our problem.

57 In a fluid such as water the molecules are in very rapid motion. Any molecules dissolved in such a medium are under a constant barrage of collisions with water molecules. This keeps small and

moderately sized molecules in a constant turmoil; they are knocked about at random, colliding again and again, never holding any position or orientation for more than an instant. The larger a molecule is relative to water, the less it is disturbed by such collisions. Many protein and nucleic acid molecules are so large that even in solution their motions are very sluggish, and since they carry large numbers of electric charges distributed about their surfaces, they tend even in solution to align with respect to one another. It is so that they tend to form liquid crystals.

58 We have spoken above of architectonic tendencies even among some of the relatively small molecules: the lecithins and cephalins. Such molecules are insoluble in water yet possess special groups which have a high affinity for water. As a result they tend to form surface layers, in which their water-seeking groups project into the water phase, while their water-repelling portions project into the air, or into an oil phase, or unite to form an oil phase. The result is that quite spontaneously such molecules, when exposed to water, take up highly oriented positions to form surface membranes, myelin figures and other quasi-crystalline structures.

59 Recently several particularly striking examples have been reported of the spontaneous production of familiar types of biological structure by protein molecules. Cartilage and muscle offer some of the most intricate and regular patterns of structure to be found in organisms. A fiber from either type of tissue presents under the electron microscope a beautiful pattern of cross striations of various widths and densities, very regularly spaced. The proteins that form these structures can be coaxed into free solution and stirred into completely random orientation. Yet on precipitating, under proper conditions, the molecules realign with regard to one another to regenerate with extraordinary fidelity the original patterns of the tissues.

60 We have therefore a genuine basis for the view that the molecules of our oceanic broth will not only come together spontaneously to form aggregates but in doing so will spontaneously achieve various types and degrees of order. This greatly simplifies our problem. What it means is that, given the right molecules, one does not have to do everything for them; they do a great deal for themselves.

·parin has made the ingenious suggestion that natural selec-

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tion, which Darwin proposed to be the driving force of organic evolution, begins to operate at this level. He suggests that as the molecules come together to form colloidal aggregates, the latter begin to compete with one another for material. Some aggregates, by virtue of especially favorable composition or internal arrangement, acquire new molecules more rapidly than others. They eventually emerge as the dominant types. Oparin suggests further that considerations of optimal size enter at this level. A growing colloidal particle may reach a point at which it becomes unstable and breaks down into smaller particles, each of which grows and redivides. All these phenomena lie within the bounds of known processes in nonliving systems.

We suppose that all these forces and factors, and others perhaps yet to be revealed, together give us eventually the first living organism. That achieved, how does the organism continue to live?

We have already noted that a living organism is a dynamic structure. It is the site of a continuous influx and outflow of matter and energy. This is the very sign of life, its cessation the best evidence of death. What is the primal organism to use as food, and how derive the energy it needs to maintain itself and grow?

For the primal organism, generated under the conditions we have described, only one answer is possible. Having arisen in an oceanic broth of organic molecules, its only recourse is to live upon them. There is only one way of doing that in the absence of oxygen. It is called fermentation: the process by which organisms derive energy by breaking organic molecules and rearranging their parts. The most familiar example of such a process is the fermentation of sugar by yeast, which yields alcohol as one of the products. Animal cells also ferment sugar, not to alcohol but to lactic acid. These are two examples from a host of known fermentations.

The yeast fermentation has the following over-all equation: $C_6H_{12}O_6 \rightarrow 2\ CO_2 + 2\ C_2H_5OH$ + energy. The result of fragmenting 180 grams of sugar into 88 grams of carbon dioxide and 92 grams of alcohol is to make available about 20,000 calories of energy for the use of the cell. The energy is all that the cell derives by this transaction; the carbon dioxide and alcohol are waste products which must be got rid of somehow if the cell is to survive.

The cell, having arisen in a broth of organic compounds accumulated over the ages, must consume these molecules by fermentation in order to acquire the energy it needs to live, grow and reproduce. In doing so, it and its descendants are living on borrowed time. They are consuming their heritage, just as we in our time have nearly consumed our heritage of coal and oil. Eventually such a process must come to an end, and with that life also should have ended. It would have been necessary to start the entire development again.

Fortunately, however, the waste product carbon dioxide saved this situation. This gas entered the ocean and the atmosphere in ever-increasing quantity. Some time before the cell exhausted the supply of organic molecules, it succeeded in inventing the process of photosynthesis. This enabled it, with the energy of sunlight, to make its own organic molecules: first sugar from carbon dioxide and water, then, with ammonia and nitrates as sources of nitrogen, the entire array of organic compounds which it requires. The sugar synthesis equation is: $6\ CO_2 + 6\ H_2O$ + sunlight $\rightarrow C_6H_{12}O_6 + 6\ O_2$. Here 264 grams of carbon dioxide plus 108 grams of water plus about 700,000 calories of sunlight yield 180 grams of sugar and 192 grams of oxygen.

This is an enormous step forward. Living organisms no longer needed to depend upon the accumulation of organic matter from past ages; they could make their own. With the energy of sunlight they could accomplish the fundamental organic syntheses that provide their substance, and by fermentation they could produce what energy they needed.

Fermentation, however, is an extraordinarily inefficient source of energy. It leaves most of the energy potential of organic compounds unexploited; consequently huge amounts of organic material must be fermented to provide a modicum of energy. It produces also various poisonous waste products—alcohol, lactic acid, acetic acid, formic acid and so on. In the sea such products are readily washed away, but if organisms were ever to penetrate to the air and land, these products must prove a serious embarrassment.

One of the by-products of photosynthesis, however, is oxygen. Once this was available, organisms could invent a new way to acquire energy, many times as efficient as fermentation. This is the process of cold combustion called respiration: $C_6H_{12}O_6 + O_2 \rightarrow 6\ CO_2 + 6\ H_2O$ + energy. The burning of 180 grams of sugar in

cellular respiration yields about 700,000 calories, as compared with the approximately 20,000 calories produced by fermentation of the same quantity of sugar. This process of combustion extracts all the energy that can possibly be derived from the molecules which it consumes. With this process at its disposal, the cell can meet its energy requirements with a minimum expenditure of substance. It is a further advantage that the products of respiration—water and carbon dioxide—are innocuous and easily disposed of in any environment.

71 It is difficult to overestimate the degree to which the invention of cellular respiration released the forces of living organisms. No organism that relies wholly upon fermentation has ever amounted to much. Even after the advent of photosynthesis, organisms could have led only a marginal existence. They could indeed produce their own organic materials, but only in quantities sufficient to survive. Fermentation is so profligate a way of life that photosynthesis could do little more than keep up with it. Respiration used the material of organisms with such enormously greater efficiency as for the first time to leave something over. Coupled with fermentation, photosynthesis made organisms self-sustaining; coupled with respiration, it provided a surplus. To use an economic analogy, photosynthesis brought organisms to the subsistence level; respiration provided them with capital. It is mainly this capital that they invested in the great enterprise of organic evolution.

72 The entry of oxygen into the atmosphere also liberated organisms in another sense. The sun's radiation contains ultraviolet components which no living cell can tolerate. We are sometimes told that if this radiation were to reach the earth's surface, life must cease. That is not quite true. Water absorbs ultraviolet radiation very effectively, and one must conclude that as long as these rays penetrated in quantity to the surface of the earth, life had to remain under water. With the appearance of oxygen, however, a layer of ozone formed high in the atmosphere and absorbed this radiation. Now organisms could for the first time emerge from the water and begin to populate the earth and air. Oxygen provided not only the means of obtaining adequate energy for evolution but the protective blanket of ozone which alone made possible terrestrial life.

73 This is really the end of our story. Yet not quite the end. Our entire concern in this argument has been to bring the origin of life within the compass of natural phenomena. It is of the essence of such phenomena to be repetitive, and hence, given time, to be inevitable.

74 This is by far our most significant conclusion—that life, as an orderly natural event on such a planet as ours, was inevitable. The same can be said of the whole of organic evolution. All of it lies within the order of nature, and apart from details all of it was inevitable.

75 Astronomers have reason to believe that a planet such as ours—of about the earth's size and temperature, and about as well lighted—is a rare event in the universe. Indeed, filled as our story is with improbable phenomena, one of the least probable is to have had such a body as the earth to begin with. Yet though this probability is small, the universe is so large that it is conservatively estimated at least 100,000 planets like the earth exist in our galaxy alone. Some 100 million galaxies lie within the range of our most powerful telescopes, so that throughout observable space we can count apparently on the existence of at least 10 million million planets like our own.

76 What it means to bring the origin of life within the realm of natural phenomena is to imply that in all these places life probably exists—life as we know it. Indeed, I am convinced that there can be no way of composing and constructing living organisms which is fundamentally different from the one we know—though this is another argument, and must await another occasion. Wherever life is possible, given time, it should arise. It should then ramify into a wide array of forms, differing in detail from those we now observe (as did earlier organisms on the earth) yet including many which should look familiar to us—perhaps even men.

77 We are not alone in the universe, and do not bear alone the whole burden of life and what comes of it. Life is a cosmic event —so far as we know the most complex state of organization that matter has achieved in our cosmos. It has come many times, in many places—places closed off from us by impenetrable distances, probably never to be crossed even with a signal. As men we can attempt to understand it, and even somewhat to control and guide

its local manifestations. On this planet that is our home, we have every reason to wish it well. Yet should we fail, all is not lost. Our kind will try again elsewhere.

QUESTIONS AND SUGGESTIONS

1. Is the idea that we are not alone in the universe a comforting one to you? Does it magnify or lessen the importance of the earth?
2. Assume that you are the last human inhabitant of the earth and that you have established communication with another planet. Write a statement about what you would have that planet know about ours. According to Wald, how much of our scientific knowledge could you communicate to its inhabitants and have it still apply on their planet?
3. Wald analyzes the process by which molecules "invented" photosynthesis. Describe another evolutionary process in a similar manner.
4. Wald's essay is a graceful summary of current thinking on a problem that has been around for some time. Contrast it with the more informal Howard Ensign Evans essay. A good review article, whether formal or informal, conveys a similar impression—even-minded, consistent. Write a formal review article: a summary of current thinking on a scientific problem, citing your sources in the body of the text.
5. Does Wald redefine the concept of spontaneous generation which he introduces at the beginning of the article?

GERALD HOLTON

Johannes Kepler's Universe: Its Physics and Metaphysics

For many years, GERALD HOLTON (b. 1922) has taught a famous introductory science course to Harvard undergraduates. His own research has been on the properties of materials under high pressure and in ultrasonics. He has written on the history and philosophy of science and has been active in curricular reform as well. This essay was originally published in the *American Journal of Physics*, and was reprinted in *Thematic Origins of Western Science*.

The important publications of Johannes Kepler (1571–1630) preceded those of Galileo, Descartes, and Newton in time, and in some respects they are even more revealing. And yet, Kepler has been strangely neglected and misunderstood. Very few of his voluminous writings have been translated into English.[1] In this language there has been neither a full biography[2] nor even a major essay on his work in over twenty years. Part of the reason lies in the apparent confusion of incongruous elements—physics and metaphysics, astronomy and astrology, geometry and theology—which characterizes Kepler's work. Even in comparison with Galileo and Newton, Kepler's writings are strikingly different in the *quality* of preoccupation. He is more evidently rooted in a time when animism, alchemy, astrology, numerology, and witchcraft

[1] Books 4 and 5 of the *Epitome of Copernican Astronomy*, and Book 5 of the *Harmonies of the World*, in *Great Books of the Western World* (Chicago: Encyclopedia Britannica, 1952), Volume 16.

[2] The definitive biography is by the great Kepler scholar Max Caspar, *Johannes Kepler*, Stuttgart: W. Kohlhammer, 1950; the English translation is *Kepler*, trans. and ed. C. Doris Hellman, New York: Abelard-Schuman, 1959. Some useful short essays are in *Johann Kepler, 1571–1630* (A series of papers prepared under the auspices of the History of Science Society in collaboration with the American Association for the Advancement of Science), Baltimore: Williams & Wilkins Co., 1931. [Since this article was written, a number of useful publications on Kepler have appeared—Ed.]

9. Write an informative or persuasive essay that classifies the kinds of pollution caused by your fellow students. Define each type carefully with different types of definitions.
10. Classify the different colleges and universities of your state by different criteria. Make this essay comprehensive in the sense that you account for all of the institutions of higher education in your state. Your divisions may not be comprehensive, but try to create three levels in the tree you erect to classify the colleges. At each level, attempt a careful definition for each division. Write this paper with an acquaintance of yours in high school as the audience.

Evaluating

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THE IMPORTANCE OF EVALUATING

In encountering a chapter on evaluation in a book on composition you may be troubled by a curious paradox, a paradox that may be only half conscious. The authors of many composition texts and many teachers who use them frown on "value judgments" and relegate them to some kind of linguistic hell to which other concepts like *opinion* and *subjectivity* have also been consigned. Most composition books, high school or college, do not have chapters on evaluation to parallel those on narration, description, and exposition. Nor is the derogatory treatment of evaluation limited to teachers of composition. Whole disciplines in universities often rule out evaluations as valid types of rational statements. There is a very influential school of academic philosophers who have dismissed all value judgments as meaningless and nonsensical.

What makes these positions seem paradoxical is that the students who become aware of these pejorative attitudes toward value judgments are also vividly aware that they are systematically evaluated by these same teachers, and routinely by their parent(s), their clergy, peers, the police, hiring agencies, the universities or colleges that admitted them, as well as others. In many universities, the students are even asked to evaluate their instructors. Students are also aware that logicians, mechanical engineers, literary critics, physicians, and sports writers *evaluate*, respectively, logical arguments, building materials, novels, new drugs, and football teams; and their evaluations are reported regularly in scientific journals or newspapers. The astute student may even discern that the instructor who condemns "value judgments" is actually making one. Finally, many

modern students revolt against a system that has no place for value and many other students repudiate the values of the establishment.

In any case, whether some academics think that they are respectable or not, value judgments surround us at every turn. Family life, politics, business, religion, sex, entertainment, careers, and hobbies all involve values—and are important only because they do.

In studying composition, you encounter values implicitly at every stage. Most notably, each aim of discourse embodies values: for example, scientific discourse seeks truth and literature incorporates beauty. And we try to persuade others to read a book, go to a play, eat at a restaurant, or join a church because we believe that there is a value in such a pursuit.

In the final analysis, the student of composition ought to be able to distinguish a good deduction from an invalid one, a good generalization from an illicit one, a good exploratory procedure from a poor one, good literature from bad literature, effective persuasion from ineffective persuasion, and healthy self-expression from harmful self-expression. Also, evaluations should not be limited to uses of language. By the end of a college career, hopefully a student will have evaluated his or her entire range of value systems, whether religious, political, educational, economic, or whatever. If this is not part of the educational heritage, then the education itself must be judged a failure (and the preceding clause is another value judgment).

SOME EXAMPLES OF EVALUATION

In order to focus our study of evaluating on some particular issues, it will be useful to take a careful look at three different types of evaluations. The first two examples are by professional writers and the third is by a student. We can learn profitably from a careful reading of the three samples.

The first is an evaluation of some of the zoos in a few of the large cities of Texas. Don't be taken in by the tone of such subheadings as "An absolutely arbitrary, subjective, and unscientific rating of Texas zoos." Stephen Harrigan poses some of the most important issues of writing evaluations in this interesting piece.

Prereading Activities

At first glance "Life Behind Bars" may strike you as difficult reading because of the fairly large number of strange words. Most of them, however, are names of animals that we do not ordinarily encounter; as we shall see, the author uses them for a purpose. In any case, you might look up in a dictionary or an encyclopedia some of the following animal terms: monitor lizard, skink, lemur, tamarin, binturong, gecko, hyrax, dik-dik, klipspringer, guan, curassow, gibbon, nylghai, nyala, gaboon viper. Most of the time, however, the meaning will be clear from the text.

But there are quite a few other words in the article that may give you some difficulty. Many college students may have trouble with the following (the paragraph in which a word occurs is given in parentheses):

primate (1)—a member of the most highly developed order of animals
reverberant (1)—re-echoing
veld (2)—open grassy country in South Africa
***kopje* (2)**—small hill in South Africa
flaccid (5)—soft, flabby
diorama (8)—a partially three-dimensional setting
viability (14)—ability to live and develop under normal conditions
***resaca* (4a)**—lake (Spanish, used in the Southwest)
malevolently (12a)—wishing evil, malicious
anthropomorphic (12a)—characteristic of human beings
rapacious (16)—plundering, greedy
defecate (18)—to excrete waste matter; *feces* is the waste matter itself and *fecal* is the adjective.
totem (20)—an animal or object considered by a clan or family as its symbol and relative
traipse (24)—walk or wander idly
mammalian (30)—of a mammal (an animal having milk-secreting glands)
wattled (36)—built with twigs
aviculturist (39)—a person who raises and cares for birds

As you read the selection ask yourself these questions: (1) What criteria does the author use to evaluate zoos? (2) What attitude does the author take toward the visitors to the zoo? (3) What is the attitude taken toward the animals? (4) Why is the sequence of the piece partly determined by the sequence of the caretakers in the zoo? (5) Is there a pattern in the sequence of the caretakers?

LIFE BEHIND BARS

Stephen Harrigan

What are nice animals like you doing in a zoo like this?

1 When he makes his rounds of the zoo at night Dick Bonko often stops his electric cart in front of the primate house and sits there eavesdropping on the inhabitants. He says that the noise the primates make at night is very different from the madhouse racket—the shrieks and whoops and strange reverberant moans—with which they express themselves during the day. It is instead a low-pitched, mumbling sound, like human beings muttering

nonsense syllables in their sleep. Long after dark, with only Bonko there to hear them, the monkeys speak in tongues.

2 One night I made the rounds with him. We sat in the cart and listened for a long time, but no sound at all came from the primate house, nor from the rest of the Houston Zoo. There was no moon that night, and it was so dark that I could not be sure if the movement inside the cages was something I really perceived or only imagined. I pictured all the zoo animals stretched out on the ground with their heads resting on their forelimbs, like bored, disconsolate dogs. They were sleeping, or merely waiting out the night, complying with their natural cycles in the constricted environment of the zoo. Few of them had ever seen the velds or kopjes or rain forests they had been designed to inhabit. They had no idea where on earth they were or what their presence here meant to the constant human swarm that passed by their cages every day. But it was impossible to imagine that all those animals—Asiatic bears and scimitar-horned oryx, tapir and tigers and fennec foxes—lay there unaware, empty of sensation, soulless. They knew something. What was it?

3 "Naw, they're not going to say anything," Bonko said, driving away from the primate house. He stopped at the alligator pond and cocked his head, listening again.

4 "Sometimes at night you'll hear 'em growlin'," he whispered. "They'll make a funny sound with their bodies—a vibration sound—and then that tail'll slap the water. You hear that sound and you don't know what it is but you're ready to leave the zoo. Then sometimes you'll see 'em bouncin' back and forth in the water. They get to quiverin', like, and that's when they give you the spook."

5 But the alligators did not oblige. They lay there by the pond, great flaccid shapes a shade lighter than the darkness around them. Bonko headed up to the reptile house, reminiscing along the way about the times when, making his nocturnal rounds, he'd been scared half to death by a stray house cat unexpectedly brushing up against his leg.

6 Bonko is the night watchman at the Houston Zoo. Like all employees there, he is a civil servant, since the zoo is fundamentally a municipal enterprise. He is a quiet old man who seems comfortable with his routine, which involves making a circuit of the zoo every two hours, checking on the temperature of the buildings and noting any obvious distress on the part of the animals. Occasionally he might have to roust a group of drunk medical students off the grounds, or put in an emergency call to the vet, or keep an escaped mental-patient from nearby Ben Taub hospital from committing suicide in the bear pits.

7 Before he became a night watchman Bonko worked as a keeper, at Houston and at a zoo in Clovis, New Mexico. Way before that, back in 1936, he worked on the National Bison range in Montana. "I don't know what decided me on this kind of work," he said. "I guess it was really decided for me before I even knew there was such a thing as a zoo. My dad was a cowboy and my mother's family were all stock raisers. I worked considerable with feedin' stock and my granddad gave me a Shetland pony when I was four or five. I grew up with animals. I have respect for them."

8 At the reptile house Bonko got out of the cart and went inside to read the thermostats. The lights were still on in the exhibits, and I could see the Houston Zoo's famous display of the effects of a venomous snakebite—a model of a human arm covered with ghastly black sores that looked like some sort of carnivorous fungus. The snakes and monitor lizards and thick-bodied skinks—glistening and moving by patient degrees in their little dioramas—gave Bonko the creeps. He was more comfortable in the small-mammal house, where we went next. It contained a large assortment of furtive, dreamlike creatures: miniature lemurs that hopped about like crickets, tufted tamarins with faces like those plastic shrunken heads sold in joke shops, a flying fox bat that hung upside down and held her newborn against her breast with her wing.

9 We went back behind the displays, into a perimeter area where off-exhibit animals were kept in plain metal cages. In a little kitchen Bonko read the thermostat and noted the temperature on a clipboard. On the way out he stopped at the cage of a red-fronted lemur and let it play tug-of-war with his ball-point pen. The lemur moved about in a disturbingly human way, as if it were in reality a miniature man who had put on some weird, bug-eyed costume.

10 "I guess my favorite animals to work with when I was a keeper were the big cats," Bonko told me as we continued on his rounds. "The cats aren't afraid of you—they'll come after you if they want to. It keeps you alert. You work with the other animals, you get lax. You don't stay as sharp in your mind as you do workin' with the big cats.

11 "I like the birds pretty well. If I was comin' in the gate lookin' for a job and knowin' what I know today about the zoo, the big cats would be the one's I'd ask for, and next would be the birds. I don't care about workin' monkeys at all. They're too dirty, for one thing. You never know when one of em's gonna hit you alongside the head with a load of crap."

12 The Houston Zoo, a more or less typical big-city zoo, is in the process of evolving from a haphazard, exploitative menagerie to a center for wildlife husbandry. "We want to become producers, not consumers, of wildlife," John Werler told me. Werler is the zoo director. His office, in the reptile building, is not quite as large as the adjoining exhibit area for the endangered Houston toad.

13 We had a long, thoughtful conversation about zoos, during which the phone on Werler's desk rang with regularity. The calls were from people who wanted to know the zoo's operating hours or who wanted advice on such matters as inducing box turtles to mate. There was a call from some disco demento type who had acquired a Bengal tiger to supplement his ego and was now eager to sell the creature to the zoo. On April Fools' Day, Werler said, it is impossible to conduct any business on the phone. Secretaries all over town leave message slips on their bosses' desks advising them to call "Mr. Fox" or "Mr. Bear" at the zoo's phone number.

14 "We no longer want what we call a 'postage stamp' collection," Werler explained between phone calls. "We want fewer species and more natural groupings of those that we have. This also gives us more of a genetic viability. Almost every major zoo is gearing up in this area."

ZOOS WHO

An absolutely arbitrary, subjective, and unscientific rating of Texas zoos.

1a Our reactions to zoos are based largely upon notions of decor that may be irrelevant to the zoo's inhabitants. A given animal may be as content in a steel cage with a doggy dish as he would be in a vast stage set depicting his native pampas. Simulated waterfalls, concrete baobab trees, and decorative Watusi shields are not necessarily a guarantee of the animal's well-being.

2a What we must assume an animal needs from a zoo environment are the same things we would need if we were held captive there: room to move, shelter, cleanliness, an appropriate diet, company, and privacy. Few zoos provide all of these things for all of their animals, and so one's reaction toward a particular zoo may vary from exhibit to exhibit.

3a The following assessments of the state's major zoos are admittedly subjective, based on my own reactions as a casual visitor. The zoos are listed more or less in order of preference.

Islands of Sanity

4a Brownsville's Gladys Porter Zoo is the most acceptable zoo in Texas. Built in 1973, it is also the newest zoo in the state and the only one designed with a clear vision of what a zoo should be. Despite the outdoor Muzak and the preponderance of fake rock works that make it look like a gigantic electric train layout, the zoo impresses you immediately with its thoughtfulness and restraint. In the best latter-day fashion, there are no cages or bars. Instead there are islands and expansive enclosures, separated from the visitor's walkway by the waters of a resaca. The happy effect of all this is that none of the animals seem particularly neurotic. Even the great burly chimp who, after a spectacular windup, throws feces at visitors, seems to do so only out of a sense of sport. Don't miss the northern leaftailed gecko and the pygmy hedgehog.

5a Located at 500 Ringgold/ (512) 546-7187/ Open daily 10 a.m.–dusk/ Adults $3, students $2, children $1.

Elephant Walk

6a The San Antonio Zoo is a very large one, built mostly into an old quarry site that provides spacious habitats for some of the larger mammals. Portions of the zoo, such as the African plains exhibit, are striking and well conceived. Unfortunately, most of the big cats and primates are housed in small, ugly cages only a few feet removed from the zoo clientele, which on a typical summer weekend consists of raucous adolescents and crying, overheated babies. The elephants are put to work giving rides to a dozen children at a time on platforms set upon the apexes of their backbones. When the ride concession is closed, the elephants are chained by a hind foot and a sign out in front proclaims "Elephant's Day Off." San Antonio is for the most part an unrepentant, WPA-era zoo, with Mold-A-Rama machines and shacks selling watered-down soft drinks at every turn of the trail, the kind of place where kids can drop cotton candy into the open mouth of a pygmy hippopotamus and no one seems to mind. A grand institution but a disturbing zoo.

7a Located at 3903 N. St. Mary's/ (512) 734-7183/ Open daily 9:30 a.m.–5 p.m./ Adults $2, children 75 cents.

Gone Fishing

8a The newer sections of the Forth Worth Zoo are exceptional, with large outdoor exhibits that seem designed to blend in with the natural features of Forest Park. Fort Worth also has the best signs of any zoo in the state. In the excellent aquarium, I measured four square feet of posted information on the electric eel. But just past the aquarium the slums begin, rows of cinder-block or chain-link cages that, one assumes, are even more dispiriting to the animals than they are to the visitors. The children's zoo, which is soon to be replaced, looks like an abandoned miniature golf course whose fanciful hazards—giant pumpkins and miniature castles—have been taken over by guinea pigs and hyraxes.

9a Located at 2727 Zoological Park Drive, off S. University/ (817) 870-7050/ Open daily 9 a.m.–5 p.m./ Adults $1, children free.

For the Birds

10a The Houston Zoo is discussed at length in the adjoining article.

11a Located at Hermann Park, 1612 Zoo Circle/ (713) 523-0149/ Children's zoo, tropical bird house, and gorilla house open Monday through Saturday 10 a.m.–4 p.m., Sunday 10-5/ Other areas open daily 9:30–6/ Free.

Backyard Zoo

12a One of the first animals I saw at the Dallas Zoo was a gorilla sitting in a yoga position and staring malevolently through the fogged window that separated us. My assessment of his foul mood was, no doubt, an anthropomorphic one, but it colored the rest of my visit. The Dallas Zoo is well laid out, with numbered exhibits, so that you feel a sense of forward progression as you stroll about. I liked the combined reptile and bird house and found some amusement in the fact that one corner of the zoo abutted a residential neighborhood, affording residents a view of dik-diks and klipspringers and giant red kangaroos from their living room windows. Most of the rest of the zoo I found either unexceptional or unacceptable. The grizzly bear, for instance, whose range in the wild covers several hundred square miles, was housed in a pit about the size of my bedroom. Scattered through the zoo are sentimental sculptures—five little children riding on the back of a rhinoceros, a girl swinging from the neck of a giraffe—meant to demonstrate the benign affection of the animal world for the human species. It doesn't wash.

13a Located at Marsalis Park, 621 E. Clarendon/ (214) 946-5154/ Open daily 9 a.m.–5 p.m./ Adults $1, children 50 cents/ Parking $1 on weekends and holidays.

S.H.

Werler leaned forward as he talked, his elbows on his knees. He seemed to have a sense of mission, which is appropriate, since zoos today are likely the final hope for the survival of a great number of wild species.

Werler said he could not remember the last time the Houston Zoo had bought an animal. Most of the new residents had either been born here or were on breeding loan from other zoos. The enlightened posture among zoo people these days is to regard the institution primarily as a way of holding endangered species in trust. While their wild counterparts are stripped of their habitat or poached into extinction, the zoo animals will be reproducing, keeping the species alive for the day when they might be reintroduced into a less rapacious world.

Everyone wants to believe this, but among even the most optimistic zoo people a secret, disturbing voice keeps whispering that the wild populations of the earth are doomed. Soon the zoos will be filled with living examples of creatures the planet can no longer support. There is already a term for them—"cage relics."

The Houston Zoo's progress toward its mission is impeded by the usual shortage of funds and by its own past, which lives on in the form of crowded and outmoded facilities. Houston's reptile and bird collections are among the finest in the country; it has a new if rather eccentric-looking gorilla habitat; an aquarium and administration complex is already under construction; and there are plans for a new cat habitat and clinic. But many of the zoo's animals continue to live out their lives in featureless kennels, left over from the days when the term "zoological garden" gave off no hint of irony, as if all those drooling, defecating, cage-crazy beasts were no more cognizant, or disturbing to their human observers, than an exhibition of exotic orchids.

I have from time to time thought of myself as being "against" zoos, but it is perhaps closer to the truth to say that I have always been troubled by my own fascination with them. The zoo was the nexus of my childhood. It was not only the animals that were on display there but also the possibility they suggested that all life did not disappear beyond the rim of human awareness. I thought of the animals as spirit guides, willing to point the way to this new dimension. I felt secure among them and managed to interpret their numbed awareness as some exotic concern for my own well-being.

But of course the zoo animals were not the benevolent totems I had invented for myself. They were misplaced creatures, kidnapped from their environments and displayed for human amusement and human profit. As an adult, I don't feel that connection I felt as a child. I remember only the polar bear, pacing in his stainless steel cage with a fluid, waltzlike motion that did not vary in the slightest particular for all the years of his life, or a gorilla—with that same metronomic regularity—endlessly regurgitating and eating his own vomit. Such behavior is not necessarily neurotic; it could be merely an extension of natural activities. But even viewing the best behaved animals in the zoo, one senses a loss, a kind of spoilage. It is a distressingly neutral feeling to stand there in front of a Malaysian binturong or an Indian elephant and realize that nothing is happening, that no information is being transmitted, that you are both bored.

But I keep visiting zoos; I am a "zoogoer." It's a habit, I suppose, and it has its provocative moments. I came to the Houston Zoo thinking that if I was not able to form a firm opinion about zoos, I could at least learn something about what goes on inside them.

22 The basic thing that goes on in a zoo is what is referred to politely as "removing the fecal." During a week at the zoo I heard it referred to politely only once. There is a lot of the fecal around. Its raw materials are hay, fruit, vegetables, various sizes of dog biscuits, white mice, hard-boiled eggs, Zu-Preem protein compound, insects, and—for the vampire bats—blood from local slaughterhouses.

23 A young woman named Carmen Beard, a big-cat keeper, was kneeling beside a small clump of grass in the tiger pit. It was evident that one of the tigers had taken his ease at this spot a few days back. Beard picked through the grass with a look of professional distaste and then, seeing that it was beyond salvation, simply uprooted it, and tossed it into her garbage bag.

24 The tiger habitat consists of an island surrounded by a deep dry moat, the whole thing made out of some sort of spray-on concrete that is meant to suggest solid rock but feels brittle and hollow beneath the feet. While I glanced back across the moat to be sure the tigers were still locked up in their holding pens, Beard traipsed across the island and then down into the moat carrying her shovel and trash bag. She sang a John Denver song to herself as she shoveled the scat.

25 "What gets me," she said, interrupting her song, "is you'll be in this pit cleaning it out and the people will just stand up there and stare at you. I don't know why they're so fascinated. Do they think these animals clean up after themselves?

26 "I was talking to these people the other night. When I told them where I worked, the girl says, 'Can you believe that? She has to shovel lion shit and she *likes* it!' Well, I don't like that part of it, but it's not that big a deal. It's like having a child and having to change its diaper."

27 Down in the moat her voice bounced off the textured walls. "I'm not real wild about this moat at all," she said. "It's beautiful and everything but it only has this one tiny drain. Those cats they put in there have got really big feces that just won't go down the drain. Then there's this echo. When there are a lot of kids up there screaming it sounds like an insane asylum. It's really eerie. I can imagine how those poor cats must feel."

28 After she was through with the moat Beard walked back inside the building. The interior of the cat house consists of a wide corridor with cages on both sides, each one of which has an outside compartment that serves as the display area. I had been advised to walk in the center of the corridor, since the cats have been known to take swipes at passersby. At this time of the morning—eight o'clock, an hour before the zoo opens to the public—they were alert and curious. I was aware of their eyes, which were as hard and brilliant as minerals, and of their languid, soaring grace when they jumped up and down off their wooden platforms. The tigers and lions and leopards tracked me with their eyes as I walked down the hallway, and their keen scrutiny made me realize that I was no longer in the zoo; I was in their home.

29 "Albert!" Beard called to one of the Bengal tigers, who had laid his great head up against the bars and was staring off into space in a masterful feline way. "That's my boy! You're my favorite kitty, yes, you are!"

Beard is a slight woman in her early twenties, with a forthright mammalian love for the great cats and bears that are in her charge. The way she spoke to the tigers and scratched their big tabby ears made me think she saw herself as their defender; someone who, if the battle lines were ever drawn, would stand on the side of the animals.

She started out working in the children's zoo, but after her husband died a year ago she didn't feel like meeting and dealing with the public every day. She wanted quiet and privacy, the mute solace of pacing beasts. The management assigned her to the bears and cats. It's the most dangerous job in the zoo, since it is assumed that a Kodiak bear or a Bengal tiger would not think twice about eating its beloved keeper if it should find itself suddenly in the same pit with her.

While I stood in the center of the corridor and stared at the cats, Beard and another woman keeper named Pat O'Connor hosed out the interior cages, every once in a while giving the occupants a friendly squirt.

"Are zoos good or are zoos bad?" O'Connor mused as she yanked a kink out of her hose. "I don't know. You can weigh the pros and cons forever; it's like a balance scale. All of us sit around and talk about zoos all the time, trying to decide."

As the cats slunk and leaped all about them and growled for their Zu-Preem, the two women showed me snapshots of a snow leopard cub that had been born in the zoo in the spring and had died at the age of ten weeks from causes that were still undetermined. They commented on the photographs in a wistful, detached manner. Since the snow leopard is an endangered species, the cub's body had been donated to the Houston Museum of Natural Science instead of being hauled to the dump, which is where most of the animals that die at the zoo go.

"They're going to mount him," Beard said. "I'm going to go over there when they're through, I guess. I know it's going to upset me, but I just want to know if they did a good job."

I spent some time in the bird area, admiring the zoo's collection of Central and South American guans and curassows, which are varieties of wild ornamental fowl, wattled and tufted, with radiant plumage. Certain species of guans, I had read in my animal encyclopedia, are "irresistibly attracted to fire" and are lured to their capture by small fires set in the branches of trees.

The guans and curassows were all housed in a string of outdoor cages known as the pheasant run. This was a specialized collection with only one anomaly, an apparition called the great hornbill. The hornbill's beak, like the toucan's, looks like an oversized wax banana, but the beak has an extra component above it, a kind of air scoop that makes the entire bird look—as we used to say of eccentric, otherworldly automobiles—"customized."

The bird house itself was closed to the public because of an outbreak of Newcastle disease in the city. The curator, Robert Berry, took me through anyway. It's an intriguing building, with large exhibit windows and an open "rain forest" where the birds fly about more or less freely.

Berry is a dry, unsentimental man who put himself through college working as a professional dancer. Before he came to work at the zoo he was a private aviculturist. "I don't have any emotional attachment to birds at all,"

he said as we stood in the rain forest. "I respect them as living creatures, but I don't like to scratch them on the head and all that. I appreciate the beauty and the behavior of them."

40 Berry recently earned international attention for the Houston Zoo when he bred, for the first time in captivity, a scarlet cock-of-the-rock chick. Cocks-of-the-rock come from the Amazon valley and have huge puffball crests on their heads that make the males, with their bright orange plumage, look like pieces of fruit.

41 After the first chick was born Berry and his associates fretted about its diet until they discovered that the benign-looking cock-of-the-rock was in fact a latent bird of prey. The mother passed up the fruit she was offered in favor of a mouse that she caught herself. The keepers, who had been setting out rodent poison, took the mouse away from her, but then Berry brought a lizard from the reptile house and held it up in the air. The female immediately swooped down from her perch, plucked the lizard out of Berry's fingers, crushed it in her beak, and poked it down the chick's throat.

42 Although the chick died soon after this breakthrough, two more were born the next year. Berry took them home with him, nursing them 24 hours a day for six weeks, peeling their grapes for them, feeding them chopped newborn mice and blueberries, and monitoring—as Berry wrote in an article for a zoo magazine—"the character of the bowels." One of the birds died; the other, named Geronimo, survived, although Berry had a few tense moments in transporting him to the zoo. "The bird became carsick and regurgitated all of its food," he wrote. "Not only did I go into shock, I also became suicidal."

43 On my way out of the building I stopped for a while at the exhibit featuring a male cock-of-the-rock. The bird sat on a limb, placid and undemanding. It and the rest of the birds elicited curiosity and occasional amazement, but one could view them without that emotional disturbance that the more sentient and slovenly creatures of the zoo provoke.

44 The birds are living ornaments, elements in a design, but there are some animals that no human design can truly accommodate. I went into the primate house, pausing to dip the soles of my shoes into a chemical bath so that I would not track in the diseases of the outside world. Inside, the primate house had the red brick construction and wide corridors of an elementary school. One of the keepers was eating a piece of lemon pie for breakfast, and another was heating a frozen sweet roll on a pice of aluminum foil that was placed on the burner of a stove.

45 The siamang gibbons had started their morning hooting, and it was difficult to hear anyone speak. The gibbons had a big cage at one end of the house, and as they yelled they swung about on their grapevines, moving through the air with an astonishing, fluid velocity. In the wild they are capable of grabbing birds in flight.

46 I strolled down the corridor with an old-time keeper named Oscar Mendieta. He was rubbing with a rag at a dark spot on his shirt where a chimpanzee named Kamaka had just scored a hit with his own by-products. "In the morning he'll throw carrots or biscuits at me," Mendieta said, sounding hurt, "but shit he seldom throws anymore."

47 When we passed Kamaka's cage he beat furiously against the walls and bared his fangs but threw nothing. An agile gibbon across the hall casually

shoved her posterior up against the bars. "She's in estrus right now," Mendieta said, "She's presenting to me. She always does that."

Mendieta has been at the zoo since 1957. Today the Houston Zoo requires of its employees some kind of formal animal care experience, which can be acquired by a kind of apprenticeship set up through the children's zoo. But in 1957 there were no particular qualifications. Mendieta had been working for an oil drum company, washing out barrels. One day he and his wife visited the zoo. "You know what, honey?" he said, "I think I'd like to work here." He took the city civil service test and found there were openings in water, sewer, and zoo.

"When I retire I plan to raise chickens or something," he told me. "I don't think I can ever get way from working with animals."

For most of the morning the staff cleaned out the cages and washed the floors with a chemical solution. I watched as a woman named Beryl Fisher, a former circus elephant trainer, entered the orangutan cage carrying two grocery bags filled with Purina Monkey Chow and fruit. The orangs liked to open the bags themselves and compare the contents.

While Fisher sat in the center of the cage they soared overhead on the grapevines and dropped, unannounced, into her lap. Then they stalked about on the sides of their feet with their arms wrapped about their torsos, staring at me through the bars. I could not help reading the gazes of the other primates as sober and accusing, but the orangutans emanated an unsettling mildness. These two had been born and bred in zoos, but in the forests of Borneo and Sumatra, where their species is being harassed into extinction, the word "orangutan" suggests a shadowy human nature—it means "man of the woods."

The Houston Zoo has one gorilla. It used to have two, but now a sign at the entrance of the habitat informs visitors: "Due to the untimely death of 'Je-Je,' our male gorilla, from colitis with secondary kidney failure, only the female is on display."

The female's name is Vanilla. She lives by herself in a large circular building that looks from the outside like the stump of a giant tree. The exhibit area is contained indoors, a great swath of stage scenery with sculptured terraces and dead trees and a tiny waterfall that cascades through a series of pools. Off the exhibit area are small cages where Vanilla prefers to spend her time. When the keeper leaves in the afternoon he turns on a television and Vanilla takes her food into one of these cages and watches cartoons.

When I dropped by one morning Bill Grissom, Vanilla's keeper, had locked her out in the exhibit area and was waiting for her to urinate so he could get a sample of her urine and run it through the contents of a box labeled "Subhuman Primate Pregnancy Test." In great apes, the test works not only for discovering pregnancy but for determining ovulation. Once they have Vanilla's ovulation pattern figured out, they'll try to inseminate her.

"The problem is the males," Grissom told me. "A guy at Baylor has electroejaculated five different gorillas and they've all been infertile."

Grissom let Vanilla in and gave her a cup of an orange juice, milk, and wheat-germ oil mixture, along with a raw egg. She cracked the egg in one hand and sucked out the contents, then looked at me and stuck her tongue out.

"That's a greeting," Grissom said. "She expects you to return it."

I did, but it seemed to communicate nothing to her. She held out her hand, wanting me to touch it. I had been warned not to, since one or the other of us could transmit TB. I just looked at the hand, feeling uncertain and flustered. The nails were black and very thick, and the palm and fingers looked upholstered. She kept withdrawing her hand and offering it again distractedly, as if it was a matter of indifference to her whether I touched it or not.

"Sometimes she's just like us," Grissom said. "She gets off in her own little world. Since Je-Je died she's kind of a crybaby at times. When I leave her out in the morning to pee she'll scream at me, like she's saying, 'Come back! Don't leave me out here!'

"Je-Je was probably the biggest draw of the whole zoo. Sometimes you try to forget about him, but the public won't let you. They come in and say they remember how he used to do something or other and it'll bring it all back."

Grissom lives in fear that Vanilla will contract TB or some other disease from the visitors. He or another keeper usually sits on a folding chair out in front of the habitat, to make sure no one throws anything inside it. Vanilla can see him out there while she is on display; in that constant stream of twittering, gaping, guffawing creatures about whom she knows nothing, there is at least one steady, familiar face.

During most of my time at the zoo I was part of that crowd, drifting along with them from cage to habitat in an aimless fashion, roving past a whole section of animals and barely seeing them at all. I kept making the same circuit of the zoo over and over, pacing, wanting to cover ground. Eventually certain animals began to stand out. In the children's zoo I watched a group of alligator snapping turtles through a window in the side of their pool. They lay on the bottom, and every now and then a single perfect bubble would emerge from one of their bony nostrils. They had pale, parchment-colored eyes overlaid with a design that reminded me of an old-fashioned television test pattern. When it was time for them to come up for air they had to fight their way off the bottom, clawing for the surface in a heavy, ungainly manner.

In that same part of the zoo there were two Galapagos tortoises mating, the male propped up against the female's back as if some fortuitous natural event like an earthquake had placed him there. He made a deep lowing noise with each thrust and moved against her back like a jeep stuck in high gear at the bottom of a hill.

Early in the morning, before the Houston miasma had had a chance to assert itself and cause the animals to wheeze and pant and lollygag around, before the smell of stale popcorn began to infest the air, it was possible to believe that the zoo was an innocent pleasure. That was when you would see Kodiak bears, as large as bison, perform backward somersaults, when the keepers led skittish camels around the grounds for their morning walk. At that hour the most mysterious, compelling animals in the zoo turned out to be the antelope and deer I routinely passed by, giving them hardly a look as I trailed my fingers along their chain-link corrals. Every movement of the small fallow deer seemed involuntary, hinged on some ancient evolutionary

esson. But the great horse-headed antelopes, the nylghais, the nyalas, were more aware of themselves. Their bodies were disjointed and misproportioned; they seemed to have turned out that way not in fulfillment of the genetic code but by an act of will on the part of the animal.

In the reptile house every creature had that air of deliberate presence, of having been created for a reason that human beings were somehow specifically proscribed from understanding.

In the hallways and warrens behind the exhibit cages, the reptile keepers, who as a rule were bearded and cerebral, spent a good deal of time cleaning the glass in terrariums, transferring torpid snakes from one to the other as if they were coils of stout wire.

"Most of the animals back here," a keeper named John McLain told me, "are juveniles being raised to maturity or separated for breeding purposes. This one, for instance, is a male, and this one over here is a female. When they finally meet each other we hope there'll be more than a handshake going on."

The snakes he was referring to were Bismarck ringed pythons. There were other pythons around: Angolans, reticulateds (which the staff called retics), and a baby green tree python, which was brilliant yellow in its immaturity and which, coiled upon a twig, managed to suggest a sea horse.

Placed at intervals throughout the reptile house were wall units labeled "Snakebite Alarm Box." If a keeper should get bitten by a venomous snake—an event that has not happened here for years—the alarm is sounded in the reptile house. The zoo keeps antivenin on hand—"If we can't get the antivenin," McLain said, "we won't stock the snake"—and has frequent snakebite drills to keep reaction time to a minimum.

While McLain cleaned the terrariums I wandered about a little, inspecting various exotic tree frogs, a washtub full of three-week-old Chinese alligators, a pair of deadly gaboon vipers as thick as my arm that made a loud snoring sound I could hear twenty yards away. There was another noise, an incessant squeaking that I realized I had been hearing all along. It came from a small cage full of newborn mice, pink and hairless, crowded together like packing material. There was another cage next to it, equally crowded with baby mice in the next stage of development, with new pelts of white fur.

I could not take my eyes off them. All those mewling infant mice, as insignificant as the sawdust that covered the bottoms of the cages in which they would be ingested by a finicky snake. They reminded me of the term used by fishermen to describe the unwelcome, inedible species that occasionally take the hook: "trash fish."

From the reptile house it was perhaps fifty yards and several rungs up the evolutionary ladder to the elephant compound. The keeper there is a woman named Lucille Sweeney, and when I walked up she was putting her two Indian elephants through a low-key circus routine that involved having them stand up on a stool and raise their forelimbs. Sweeney works the elephants this way not to please the visitors but to keep the elephants in control and used to her presence. That way she can groom them with no trouble, scraping off dead skin with a stiff wire brush and maintaining their feet, which are subject to a variety of diseases.

When the male elephant—Thai—reared up on the stool, he used the opportunity to unload a prodigious amount of the fecal. There was a first-grade class there watching him, and they were properly grossed out and agog at the evidence of his subsequent sexual arousal. The teachers tried to divert the kids' attention to Indu, the female who was considerably more discreet.

"Get that trunk up, Indu!" Sweeney was calling. "Get it up. Oh, look at that girl stand."

Lucille Sweeney first came to work at the zoo more than ten years ago after she had finished her honors thesis on William Faulkner. She thought she would give herself a year to "get animals out of my system," but it became her life's work.

"The first elephant I ever saw was at the circus. They let us little ones come up close and sit on the floor. So there I was, watching these huge animals go by. I was awestruck. That these creatures would actually work for a human being when they had so much power to hurt was beautiful to me."

She used to visit the Houston Zoo a lot when she was a little girl. Her favorite animal was the bull elephant, Hans, who was already getting along in years and who died in 1979 at the age of 62. It was Sweeney who was with him when they put him to sleep by injecting a combination of barbiturates through a vein in his ear. She had grown up to be his keeper.

"I had three years with Hans," she said. "That's all I had. I would have loved to have been with him for his last twenty or thirty years."

Before Sweeney took over as his keeper Hans had been in chains day and night throughout the first half of his long life at the zoo. He was skittish about people, but she got him gentled down enough to trust her. By that time he had severe arthritis from the chains, and the pad of one of his feet was beginning to rot. Finally there was just nothing left to support him, and he collapsed. They hauled his body out of the elephant enclosure with a low truck, and buried it on the grounds.

Sweeney related all this soberly. Her attention was focused on Thai and Indu now, who were eating a load of roughage, sweeping it up dexterously in their trunks. Thai came over and flopped his trunk over the rail that separated us. I touched it, as he seemed to want, and he coiled it around my arm and nearly yanked me into the pen with him. His bulk, his power, his knowledge were inexpressible. I had that old sentimental boyhood dream: that we understood each other, that my mind converged with his in all the crucial particulars. But I am an adult, and I realized if that fantasy were true I would not have been at the zoo in the first place, staring dumbly at those eyes and at the wide trackless brow between them.

That is perhaps one of the things a human being can finally learn at the zoo. We dominate the animals there, we have their attention, we are in fact their salvation. But we should not expect this to matter to them. On those nights that Dick Bonko talks about, when the monkeys settle down and begin to babble in their wordless speech, they are talking to each other and not to us.

The second sample is also a professional piece, a routine entry on spot removers from *Consumer Reports 1979 Buying Guide Issue*. Unlike the

first piece, which is an interesting overlap of informative, persuasive, and literary aims, this piece is almost a pure example of informative discourse as to aim and of evaluation as to mode (although classification and description are used to achieve the evaluation).

You should have no vocabulary problems with this piece at all, since the authors knew they were writing for a popular audience and chose their words with this in mind. But the following guiding questions may help you read the selection. (1) What criteria are used to evaluate the spot removers? (2) Does there seem to be a hierarchy in the importance of the criteria? (3) What characteristics differentiate the three levels in the ranking? (4) Is there any noticeable organizing principle in the presentation of the information in this brief selection?

SPOT REMOVERS

Try to remove a spot right after you get it. Often, a quick application of cold water will do the job. If it takes more than that, or if water will damage the fabric, you may want to use a spot remover. Before you try anything, make sure that removing the spot won't leave the fabric permanently marked. If a garment's care label states "professionally dry-clean only," don't try to remove a stain yourself. Take the garment to the cleaners and tell them what caused the stain. If the label indicates the garment should *not* be dry-cleaned, don't use spot removers; their solvents may damage the fibers. Before using a spot remover, test it on an inconspicuous part of the garment. Manipulate the fabric as you would in cleaning a real spot. Even though the fibers may be undamaged, the appearance of a fabric can be spoiled by rings, running dyes, or a marred fabric finish. TEST SPOT MIXTURES, developed to simulate the sort of spots that might be caused by food, were: a coffee-cream-and-sugar mix, a mustard-mayonnaise-catsup-and-gravy mix, and a mix of several red wines. We also prepared a mix of grease, soot, and road dust—the kind of stain you might get when working around a car. We applied those mixtures uniformly to fabric squares of cotton, polyester, and nylon. We applied each spot remover as its label directs and compared results with those we got from a five-minute soak and rinse in plain water, and from spotting with heavy-duty liquid detergent followed by machine-washing in warm water with the detergent. Only *Whoosh!* consistently outdid the washing regimen, but note that it requires the use of water.

Hazards.

Many spot removers are flammable and all those in common use are poisonous. The Federal Hazardous Substances Act has set down regulations for fire hazards. Under those regulations three of the products we bought should have bee labeled "Flammable," and all of them were. We rated all three Not Acceptable because much safer products are available to do the same job. All the Acceptable liquid products contain chlorinated hydrocarbons, petroleum distillates, or both. Such chemicals, or their vapors, may irritate skin, eyes, and lungs and may be harmful or fatal if swallowed.

Packaging and Application.

The removers come in a variety of cans, glass bottles, and other containers (see Ratings). The container is usually tall and narrow-based—be careful not to knock over and splash the dangerous contents on a table, floor, or yourself. Dropping and breaking a glass container presents the same kind of hazard. With some samples of *Whoosh!*, the paste dried in the tube and was hard to squeeze out. The *Brush Top* bottle has a useful, built-in applicator; it would hold spills to a trickle if you accidently overturned the bottle. But removing a cap liner before we used the applicator, and replacing the liner afterwards, was a nuisance.

Ratings.

Consumer Reports, June 1977. Listed by groups in order of estimated overall quality; within groups, listed alphabetically. All were judged reasonably effective in removing simple clear-grease stains, but not *CU*'s test stains except as noted. All have a container closure judged insufficiently child-resistant. Except as noted, each is packaged in a screw-cap container and lacks an applicator.

The following was judged effective on CU's *test spots. Because it requires the use of water, the product was judged suitable for use only on fabrics that water will not harm.*

WHOOSH! SPOT REMOVER. Paste in tube. Labeled as eye irritant and combustible.

The following were judged much less effective on CU's *test spots than the preceding. Because they contain solvents, the products were judged suitable for use only on fabrics that solvents will not harm.*

BRUSH TOP HANDY APPLICATOR SUPER SPOT REMOVER. Liquid in applicator bottle. Labeled as combustible, harmful or fatal if swallowed, and having a harmful vapor.
CARBONA CLEANING FLUID. Liquid in bottle. Labeled as combustible, harmful or fatal if swallowed, and having a harmful vapor.
ENERGINE CLEANING FLUID FIREPROOF. Liquid in can. Label fails to warn contents may be harmful if inhaled or swallowed and that careful use requires adequate ventilation.
SUNNYSIDE CARBO-CHLOR NON-FLAMMABLE CLEANING SOLVENT AND SPOT REMOVER. Liquid in can. Labeled as having potentially harmful vapor.
WALGREEN'S FIREPROOF SPOT & FABRIC CLEANER. Liquid in can. Labeled as potentially harmful if inhaled or swallowed.

Not Acceptable

The following were judged Not Acceptable for home use because they are labeled to contain trichloroethylene, which the National Cancer Institute

judged potentially hazardous to human health on the basis of its tests that indicated cancer-causing activity by the chemical in laboratory mice.

AERO NON-COMBUSTIBLE SPOT REMOVER. Liquid in applicator bottle.
AFTA CLEANING FLUID. Liquid in can.

The following were judged Not Acceptable for home use because they posed excessive fire hazards. All were appropriately labeled "Flammable."

GODDARD'S DRY CLEAN SPOT REMOVER. Aerosol spray.
TEXIZE K2r SPOT LIFTER. Paste in tube.
WALGREEN'S FLAMMABLE SPOT & FABRIC CLEANER. Liquid in can.

The third example of evaluating is a speech written by a high school student at the end of his senior year. Danny Orange had spent his first three years in high school at Anderson High School in affluent northwest Austin, Texas. Anderson High School was a modern plant, recently constructed, and equipped with the best resources and teachers that money could buy. It was attended by white students from professional, upper- and middle-class families. Then, because of a court decision, which had been contested for years at every level of appeal, massive busing was ordered for all years of the junior and senior high school systems in the Austin Independent School District. White students from northwest and southwest Austin were bused to Johnston High School in the eastern part of the city, an area largely populated by blacks and Chicanos. Some of the blacks and Chicanos were bused to high schools in other parts of the city. As a result of the court decision, Danny Orange found himself finishing his high school career in a totally different situation from that of his first three years.

This speech was his evaluation of the decision of the court. He delivered it at the commencement exercises in May, 1981. There has been no attempt to edit out the oral flavor of the speech.

SALUTATORIAN SPEECH

Johnston High School, 26 May 1981

Danny Orange

1 At the outset, let me say that as salutatorian of Johnston High School, I represent many people, not just myself. This class of 1981 is a unique one. We're unique in that we are the first bused class of Johnston. This group of people consists of a diversified selection of Austinites:

some are from South Austin
some are from East Austin
some are from North Austin

How the class got this way and what busing's done to us are the themes of my remarks today.

2 Before I get into that, there is credit due to many people whom I would like to recognize. First, I'd like to congratulate the members of the class of '81 for making this year a great year and a helluva lot of fun. Secondly, I feel that the parents of these kids deserve to be mentioned, for, if anything, the mere fact that they've survived eighteen years. And last, thanks ought to be given to the faculty and administration for giving seniors special treatment and striving to make us happy.

3 But first let me say that this speech is not designed to convince you of the merits or drawbacks of busing and desegregation. More than likely, all of you have formed a definite opinion on busing. Until now, virtually all opinions and viewpoints on the subject have been presented by people who will never know what it's like to be bused. This speech will present the opinion of one who has been bused—my opinion—and I'm sure this view is not held by everybody.

4 Before we concern ourselves with details, let's ask ourselves: What is an education? An education is not merely books, classrooms, and memorizations. You probably learn more from people than you do from books. High school is not just a preparation for college, it's a preparation for life, and in life you have to deal with people. We learned how to in school, our school, Johnston.

5 And now that the year is over, we can look back and see that desegregation went very smoothly, but the question is, *did we accomplish anything*?

6 Before we can determine this we have to investigate the history of desegregation in Austin. In the beginning, busing in Austin was limited for a long time to just minority students. Nobody ever dreamed that large scale desegregation was ever going to come about.

7 But when it did happen, it took us all by surprise. All I remember is that suddenly there was a public uproar about busing. There was even the possibility mentioned that we would be switching schools on January 23, in the middle of the year. We went to rallies, made bumper stickers, and chanted, "Hell no, we won't go!"

8 And through it all I wondered why people didn't want their kids to go to Johnston.

Was it the expense?
The Blacks and the Chicanos?
Was it the losing football team?
Was it the fact that the kids had already established a loyalty to a school?
Was it the lack of academic quality or the long bus ride?

9 If you look at these closely, only one of them is really a valid argument against busing; and that is the long bus ride. Many new Johnstonites say they like Johnston better than their old school, but they despise the long bus ride. [Authors' note: Some of the students were bused 44 miles a day, 22 miles each way.]

10 But there is one other point I mentioned that could be used to justify integration—and that is the supposed lack of academic quality. The fact that Johnston long held the reputation of being a vocational school vividly points out why we need desegregation. For example, Johnston has never had a real

calculus class before this year. During first semester we had *one* original Johnston student in our calculus class. It's true that all of the others were from Anderson or Crockett, but the fact that a Johnston student had the *opportunity* to take calculus means something. It means that from now on, kids will be able to take classes that didn't even exist here before.

The examples go on and on, but what this comes down to is an opinion, whether these examples justify integration. I happen to feel that they do. And the courts have ruled that, in order to implement integration, students will be bused.

My scholastic education hasn't really been hurt by the move to Johnston. But it may not have been helped either. The courses I would've taken at Anderson I took at Johnston. But what counts is the teacher. I believe that the quality of the class depends on the quality of the teacher, and the teachers at Johnston are generally pretty good. The shortcoming that they do have is that they haven't had many opportunities to teach advanced classes—and this will change with time.

On the other hand, my *real* education has been vastly improved by my move to Johnston. I learned a lot about different lifestyles and different parts of town, and I learned how to get along with people who were from an entirely different slice of life than I was. But, most importantly, I had a great time doing it.

So what have we accomplished?

We have succeeded in what some people thought was impossible.
We brought three very different groups together, and they now function as one community.
We have created a powerful campus that derives its strength from diversity.
And
We have survived as friends.

There's another point I feel I need to bring up, and that concerns the people who avoided busing. I don't know how prevalent this was in South Austin, but I know of several people who did it in North Austin. They did this by any of a number of methods, both legal and illegal:

they moved
they changed their addresses
they went to private schools
they bought apartments

The list goes on.

What they did is place themselves *above* the law and consider themselves immune to a federal court order. I would have to say to these people that they've made a mistake, for in missing out on Johnston High School, they've missed a very valuable learning experience, as well as one of the best times of their lives.

So, in conclusion, I would have to say that this year at Johnston has been a valuable experience for me, as well as one of the best years of my life.

In my somewhat more deranged moments I thank God that I was bused, for if I wasn't, I would not have met all you wonderful people. Thank you. Good night. And good luck to the Johnston High School Class of 81.

PREWRITING: PROCESSES INVOLVED IN PREPARING AN EVALUATION

The Dimensions of a Value System: The Communication Triangle Again

These three examples can serve us in sorting out some of the sometimes complex issues of evaluation. Writers on evaluation often call these various issues the different dimensions of a value system. For our purposes it may be convenient to organize them around a model that we have used at several stages in this text, the communication triangle. As we saw in Chapter 1, the communication triangle involves a writer, a reader, a subject matter, and the language used to unite these three into a process of communication. In the case of evaluation, the subject matter involves the object that is being evaluated and the language constitutes the essay or theme.

Issues relating to the object concern the types of objects that can be evaluated and where exactly the *value* of an object is located (the *locus* of the value). Issues relating to the writer have to do with the particular faculty or faculties of the writer involved in making the evaluation, the method by which the evaluation is carried out, and the writer's hierarchy of values. Issues relating to the reader have to do with the reader's hierarchy of values, especially if it differs from that of the writer and with the acceptance of the norm of evaluation posed by the writer. Issues having to do with the theme itself have to do with organization and style.

Thus the dimensions of the value system can be represented graphically, as in Figure 12.1, by clustering them around the components of the communication triangle. Such a diagram does not at all attempt to present all of the dimensions of a value system but it does attempt to isolate some of the important issues that the writer must consider in evaluating. And, although the diagram has a reasonable reliability, it also simplifies some of the issues for graphic purposes. Indeed, as has been the case with the communication triangle throughout the textbook, we must look upon it here as a teaching tool of some usefulness but not as a dogma that must be totally adhered to. All of the triangle parts interact with all the other parts.

Object Issues

The three evaluation samples assess very different types of objects: zoos, spot removers, and a Supreme Court decision. As we saw, anything can be evaluated and from many points of view. Further, evaluating is as extensive a mental operation as describing, classifying, or narrating, and

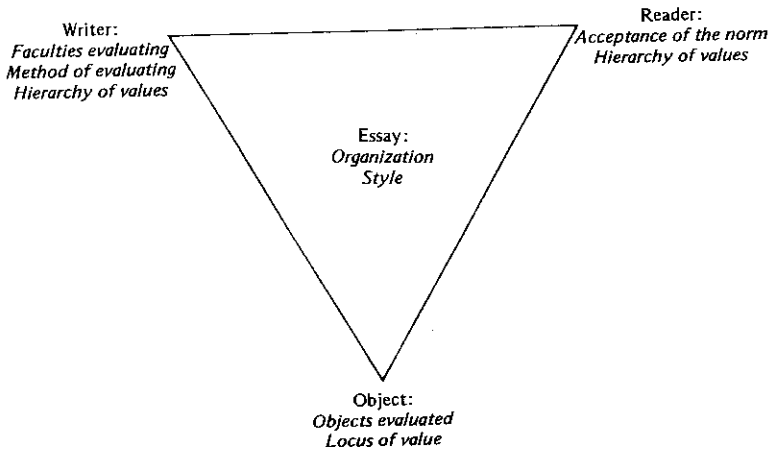

FIGURE 12.1. The dimensions of a value system.

the process of evaluation is often more complex than that of the other modes. Let us look at some of these complexities.

LOCUS OF VALUE. Whenever we make a value judgment about some object, we are saying that the object has value or that it lacks value. But we might ask the obvious question: Do objects really have value or do we just impute or assign values to them? Are values in the object or only in the subject who evaluates?

Some values seem to be only subjective. My taste in music may not at all be your taste. In what sense are any values objective or are they all like musical taste? There is no doubt that the editors of *Consumer Reports* believe that Texize K2r Spot-Lifter is not an acceptable spot remover because it poses "excessive fire hazards," and they further believe that this judgment is not simply a whimsical or subjective feeling that they, the editors, have about this product. They believe that research has furnished objective evidence that such a fire hazard exists with this spot remover and that other researchers and users would confirm such a danger if they tested the product in question.

In the same fashion, Stephen Harrigan believes that he is not the only individual who will find the deficiencies that he finds in the San Antonio Zoo. Now, it might be objected that some of the observers of this zoo might not consider the adolescents "raucous," or might not think the drinks were watered-down "at every turn of the trail," and some will not object to putting the elephants to work—these seem to be personal and subjective values.

Harrigan is aware of this. In fact, the subhead under the inset "Zoos Who" reads "An absolutely arbitrary, subjective, and unscientific rating of

Texas zoos." But Harrigan is being ironic here; he really feels that *the audience to whom he is writing* will object to the same aspects of the zoo he objects to. He also believes that they can also detect the level of noise, the ubiquitous sale of drinks, and the fact that animals are put to work. These characteristics are observable; some find them objectionable and others don't. For those who agree with Harrigan that such characteristics are undesirable in a zoo, the zoo will be viewed as a poor one. Since these characteristics can be observed, they can be called objective.

The article on zoos, however, raises a quite different issue of objectivity if we focus, not on the inset that ranks the five main Texas zoos, but on the major portion of the article in which Harrigan takes the reader through the Houston zoo, talks about the different sections, and introduces the reader to the caretakers and the favorite animals. This part of the essay is undoubtedly more *subjective*, personal, and emotional than is the evaluative inset.

And yet a curious inversion takes place in this segment of the article. The inversion is signaled by the first subheading of the article, "What are nice animals like you doing in a zoo like this?" Normally, in a piece about animals and people, the animals would be the *objects* and the people would be the *subjects*. But this subheading hints at a reversal of the roles. And the first paragraph makes clear that the subheading is to be taken seriously. At night the animals make a "low-pitched, mumbling sound, *like human beings* muttering nonsense syllables in their sleep. Long after dark . . . *the monkeys speak in tongues*." The suggestion continues in the second paragraph; the animals know something and they are contrasted to "the constant human swarm that passed by their cages every day."

This contrast is sustained throughout the essay. The villains of the story are the visitors to the zoo, the "constant human swarm," "the drunk medical students," the "raucous adolescents" and "overheated babies," the kids who "can drop cotton candy into the open mouth of a pygmy hippopotamus and no one seems to mind," and others. The heroes and heroines of the piece are the caretakers and the animals. Both are portrayed as beings with feelings and sensitivities and often they resent and isolate themselves from the visitors. Frequently the caretaker and the pet animal are paired in intimate twosomes: Beryl and Je-Je, Grissom and Vanilla, Sweeney and Hans the elephant, Beard and Albert the tiger, Mendieta and Kamaka the chimpanzee.

There is a message about objectivity in this inverted world. Harrigan is making the point that we humans have dehumanized ourselves by our total lack of feeling and sensitivity for the animals in most of our zoos. We end up putting innocent animals in prisons, hence the title "Life Behind Bars." Our own notions of subjectivity and objectivity about animals ought to be reexamined. The main theme of this section of the essay throws further light on the subheading of the "Zoos Who" inset, to which we referred earlier, "An absolutely arbitrary, subjective, and unscientific

rating of Texas zoos." By the end of the article, it is distressingly clear that Harrigan's attitude is not absolutely arbitrary, nor subjective, nor unscientific.

Many evaluations end up doing something like this to our values and hierarchies of values; our values will be upside down and we will be forced to reassess our unexamined assumptions.

CHOOSING A TOPIC. Nearly everything we have said about the object of value can be of some assistance in helping to find a topic for an evaluation theme.

In one sense, it is easier to find a topic for evaluation than for any of the other modes. Although evaluating has been placed last in our study of modes of discourse, evaluation is not a late arrival on the scene of human thought. We only pay attention to something because it interests us, because it has value. We may have had to search for events to narrate, objects to describe, or concepts to define; but we shouldn't have to look very hard to find something we value. It may be that the values we have are so ingrained in us that they are not usually subjected to reflective analysis on our part, but they are there dictating the whole rhythm of our lives.

One of the easiest set of values to write about, at least in the sense of being conscious, is the set that is undergoing change at a given time. If you are departing from a set of values you acquired at home in the direction of another set that seems to be undermining the first, you might consider such a topic for an evaluation theme. The values could be academic, career oriented, political, or religious. They need not be so fundamental; you may simply be changing allegiances to sports idols or teams, movie actors or actresses, or clothes fashions. Or the pattern of your friends, your music, or your reading may be changing. Any of these changes is symptomatic of a change of values. And because you are moving from one value to another, you can involve both in a comparison or contrast of values.

The locus of value should be taken into account in view of the aim of discourse you are writing. If your paper is to be an expository piece that will explain or prove something with solid evidence, or explore a subject seriously, or pass on verifiable and factual information, you will stress the objective loci of value—the type that can be validated by the reader, should he or she choose to do so. But if your piece is personally expressive, literary, or even persuasive, then you can draw more on subjective loci of value.

It is not enough that the writer be convinced of the importance of the issue; the reader is the one who must be sold on the evaluation you are presenting. Consequently, you must choose a topic that interests you and that has the potential of interesting your reader. Even the norms of evaluation that you will use must be agreed upon by your reader. Let us look at some questions and exercises that can help you select a topic in light of these considerations.

Exercises on Selecting a Topic

1. **If no immediate topic jumps to your mind when you are told to write an evaluation theme, then make a rapid inventory of your own value system by asking yourself some searching questions.**
   a. **What do I spend most of my free time doing?**
   b. **What have I spent most of my own money on, after necessities have been taken care of?**
   c. **If I weren't constrained by schedules and obligations dictated by others, what would I be doing? If my formal education were finished, what would I be doing?**
2. **Given a topic, the next major concern should be establishing the purpose of the paper that you are going to write. Is it going to be expository (explaining, proving, informing, exploring), persuasive, literary, or expressive?**
3. **Who is the audience for the paper? Can you visualize a typical reader, or better still, can you find a typical reader who would be willing to read and react to your earlier drafts?**
4. **What point do you intend to make with the paper? This is a narrower question than the aim of the discourse, which was discussed in question 2. You could prove many things in an evaluation paper; this question asks you to specify.**
5. **What particular object are you going to evaluate? What particular aspect?**

Writer Issues

Nearly all of the preceding questions focused on the topic itself, but they could not help also focusing on the writer since the writer was choosing the topic. Let us look at some of these writer issues a bit more closely.

As we noted, there are three issues having to do with the writer that are important here: the method of evaluating, the faculties of evaluation, and the hierarchy of the writer's values.

METHOD OF EVALUATING. All three readings display the typical method of evaluating, which many writers use in arriving at their final assessments. Let us examine this technique.

The evaluation of spot removers is given in the rankings at the end of the article. But the section that precedes it makes very clear to the reader the norms to be used in the rankings. The four paragraphs preceding the rankings explain the criteria quite specifically. A good spot remover must not spoil the fabric of the garment, must not cause the dye to run, must not leave water rings, and must not mar the finish; all of these are spelled out in

the first paragraph. In the next paragraph the reader is acquainted with the more obstinate type of spots used for the tests of the removers. In the third paragraph the health and fire hazards of some removers are outlined. Finally the packaging assets and liabilities of the various removers are given. By the end of the brief introduction, the reader has a clear conception of the norms that the authors are using in the evaluations of the products under consideration. The application of these norms to the products is almost a formula. If a product meets the norms, the product is acceptable; if it doesn't the product is not acceptable.

The same technique is used in both of the other two pieces. At the beginning of the inset (p. 354), Harrigan sets up the criteria he will use to evaluate the five zoos:

> What we must assume an animal needs from a zoo environment are the same things we would need if we were held captive there: room to move, shelter, cleanliness, an appropriate diet, company, and privacy. Few zoos provide all of these things for all of their animals, and so one's reaction toward a particular zoo may vary from exhibit to exhibit.

Harrigan applies these criteria consistently throughout the inset and indeed throughout the entire article. If we agree with his criteria, we should agree with his conclusions, assuming his factual findings are accurate.

Danny Orange, the salutatorian, also sets up his criteria when he asks about the nature of education, its academic goals, and its life goals. Since Johnston met both of these goals, he pronounces favorably upon his senior year there and upon the court decision that decreed it.

In each of these three cases, the method of evaluation can be reduced to a principle similar to the following: *If the object achieves a desired end, then it is valuable; it can be demonstrated that the object does achieve this end; therefore it is valuable*. And, of course, if it does not achieve the desired end or, in so doing, achieves other undesirable ends, then the object is not valuable or is harmful.

The first part of the italicized principle is the *conditional norm*—if the object meets this norm, it will be judged valuable. The second part *applies* the norm to the object to be evaluated—usually there is an empirical testing or tryout of the object. The third part of the principle draws the inference that is implicit in the other two parts: the object is either valuable or not depending on whether it meets or does not meet the norm. In summary, we might say that the method of evaluation consists of three steps: stating the *norm*, *applying* the norm to the object, and *evaluating*.

Each example makes an evaluation in terms of an end to be achieved. But there is another type of evaluation that judges value in terms of meeting the specifications of a rule or law, regardless of the end that is achieved—in a sense the end is to meet the rule. For example, many

Christians accept the Ten Commandments that were given to Moses and judge many moral situations in terms of compliance or noncompliance with one of these Commandments. Sometimes such decisions are made *regardless of the consequences*. In these cases we have simple *rule* evaluation, not *purpose* evaluation. Thus a person who applies the Fifth Commandment, "Thou shalt not kill," indiscriminately in all situations even to the forbidding of abortions necessary to save the life of the mother, is applying the rule strictly, regardless of the consequences.

Purpose evaluations and rule evaluations, however, make up nearly all evaluations, as far as methods of evaluating are concerned. In both cases, there is a norm (a purpose or a rule), an application of the norm to the object, and a consequent evaluation. These methods apply to all aims of discourse. Even literary evaluations in poetry or fiction or expressive evaluations of the most subjective and whimsical sort follow these methods.

HIERARCHY OF VALUES. In the case of even the same individual, two different norms, whether purposes or rules, may conflict with each other. A person may have to choose between lying or killing in the case where a lie could save a life. Which norm takes precedence? To solve such conflicts, most of us have arranged our norms in a certain scale of importance. Thus many people would choose to tell a lie if it could save a life, everything else being equal. Such a scale of values is usually called a *hierarchy of values*.

In the writing of evaluations, hierarchies of values become critical when the hierarchy of values of the writer comes into conflict with the hierarchy of values of the reader. We will return to this concern when we examine the reader issue. First, one other important issue concerned with the writer, and related closely to subjective evaluations, must be given brief consideration.

FACULTIES OF EVALUATION. In the report on spot removers, some of the removers were judged to be irritating to the eyes or to have a harmful vapor. Clearly, not only the reasoning ability of the evaluator, but also his or her senses must be a part of these evaluations. Similarly, in an evaluation of teas in the same issue, "Woody, musty, strawlike, or perfumy traces weren't acceptable," whereas moderate bitterness and moderate tartness were acceptable.* And in these cases, evaluators must be called in whose senses of taste and smell can be trusted. These reports from the senses are then incorporated into the final evaluation. In fact, they are a part of the second stage of the evaluation: applying the norm to the object.

*"Tea," *Consumer Reports Buying Guide Issue* (Mount Vernon, New York, 1978), p. 85.

Besides reason and sensations, other faculties are used in many evaluations. It is obvious to all of us that emotions play a substantial role in many of our evaluations in family life, in love, in national issues, in religion, and so on. This is so overwhelmingly true that some philosophers have maintained that all evaluations are, at bottom, emotive.

Again, particularly in the area of ethics, certain evaluations seem necessarily to incorporate aspects of the will. The law courts and some, if not all, moral theorists, insist that the element of *intent*, of wanting to do something, is an essential element in some types of actions. Plagiarism, for instance, in most states, is a crime that incorporates the element of intent; and in most schools and colleges, cheating, collusion, and plagiarism require the element of intent to be *evaluated* as breaking the rules of the institution. Similarly, courts distinguish between voluntary and involuntary manslaughter.

All of these various cases illustrate a further complexity involved in the process of evaluating. Many different human faculties are involved in value judgments of different types.

What all of this tells the writer is that evaluation is not a purely rational act. It often involves all the intensity of which some senses may be capable; it often involves emotions of quite different kinds and degrees; and it may involve an exercise on the part of someone else. You can find these complexities in the evaluation of the zoos and in the student's evaluation of the experiment in desegregation. They are even evident in the expository piece from *Consumer Reports*.

Audience Issues

Let us now look at two of the major issues that the writer must consider, which relate directly to his audience. Although all three samples are instructive, the most fascinating of the three from this standpoint is Harrigan's study of the zoos. It is interesting for our purposes because Harrigan had to solve both of the two major issues evaluators face with audiences that are not immediately receptive to the evaluation they are asked to accept. The first issue, you will recall, had to do with acceptance of the norm that will be applied to the object to arrive at the ultimate evaluation (see pages 373–375). The second issue had to do with the conflict of the hierarchy of values of the writer with that of the reader.

Because Harrigan realizes that the norms of evaluation he will ask the reader to accept are based on a hierarchy of values that the reader may not initially accept, Harrigan first works on the hierarchy of values. Notice that the actual bald statement of norms is given at the beginning of "Zoos Who" (page 354). These norms are then applied, almost in formulaic fashion, to the five zoos in the rest of the inset. But "Zoos Who" is not encountered until after the reader has gone through a substantial part of the first section of the article. In fact, if a reader follows the narrative sequence, he or she will first read all of the section about the Houston zoo before returning to the inset.

The treatment of the reader in the inset differs from the treatment in the main body of the article. The main body of the article, the tour through the Houston zoo, does not directly address the reader until the final paragraph. The last paragraph, repeating a motif sounded in the first, says that the monkeys are not talking to us, but to each other. The isolation of the reader from the world of the zoo has been the careful work of the entire article. As we saw in discussing the *subjects* and *objects* in the article, there is an inversion of value systems: the animals and the caretakers become the humanlike creatures with feelings and sensitivities and a sense of each others' languages, whereas the visiting people are the real brutes who should be behind bars. But this glaring reversal of ordinary values has happened slowly and unobtrusively. The readers have not been called upon at all to change their values. They haven't even been addressed directly at all. In a sense they have been silent spectators to the travelogue. They witness the author and the caretakers address each other and occasionally address the animals. But they haven't been involved in any of the dialogue. This friendly, sensitive, and beautiful (in its own way) world of the zoo has been screened off. But it has been even more violently screened off from the visitors. The screaming kids, the raucous adolescents, the overheated babies—notice the emphasis on youth—are deliberately excluded from the world of the zoo. The readers obviously cannot side with them. Ultimately the readers must realize that such a crowd will never understand the zoo:

> In the reptile house every creature had that air of deliberate presence, of having been created for a reason that human beings were somehow specifically proscribed from understanding. (paragraph 62)

Those who understand the animals, respect them, know their language, and feel for them include the caretakers and the author—and, hopefully, the readers, *after making the tour*. The tour introduces them to 10 caretakers, all of whom respect and love the animals under them. Harrigan goes to great lengths to establish this point and you, the reader, can check it out for yourself (see paragraphs 7, Bonko; 12, Werler; 29, Beard; 36, Berry; and other examples). By the end of the tour we are ready to accept Harrigan's position that the animals are "cognizant" (paragraph 18); that the way we treat them should be "disturbing to human observers" (paragraph 18); that they are misplaced creatures, "kidnapped from their environment and displayed for human profit" (paragraph 20); and that we should keep them "alive for the day when they might be reintroduced into a less rapacious world" (paragraph 16).

The readers have been slowly moved away from the stereotyped manner of looking at a zoo and at animals and are ready for the norms that they will be asked to use in reading "Zoos Who."

Harrigan's technique teaches us two critical lessons about audience-author relationships. A writer who senses a conflict in hierarchy of values must first address this problem, although he or she may not choose an open confrontation. Then the author may be ready to propose his or her norms (purpose or rule) to the reader. In this case, as we have seen, Harrigan's norm is a purpose: Zoos ought to exist for a purpose and we have dehumanized ourselves by subverting the purpose and substituting entertainment and profit.

Harrigan's inversion of the reader's value system was accomplished only through an adroit sequence of vignettes, miniature sketches of caretakers and animals in the different sections of the zoo. This sequencing is a matter of organization, to which we should now turn.

Exercises on the Method of Evaluation and the Audience

1. At this stage of your preparation can you articulate your norms of evaluation clearly to yourself? Draw up a precise list of these norms, even if you do not intend to express them explicitly in the paper (for instance, if you are doing an expressive, or literary, or persuasive paper).
   a. Are these norms clear enough to be understood by the reader?
   b. Is your reader likely to grant you these norms? If not, you must establish their validity, either by deriving them from some principles your reader would grant you or by establishing them on independent evidence.
2. Is the application of the norms to the object being evaluated clear to the reader?
   a. Is the object itself adequately described so that the reader can align the object and the norms?
   b. You might try this alignment on a reader.
3. Do the norms of evaluation ask the reader to readjust his or her hierarchy of values? If so, do you want this done explicitly or implicitly?
4. If this paper is a paper that requires objective proof, have you given careful attention to the deductive or inductive techniques of proof?
   a. Ordinarily in an evaluative theme, deductive proof will be used to derive or apply the norms of evaluation.
   b. Inductive evidence in an evaluative theme nearly always involves the generalizations made about the object to see if it conforms or does not conform to the norm.
   c. In either case, you might want to refer back to Chapter 5, "Explaining and Proving," to refresh your memory on these matters. This stage of your paper preparation could require considerable field, library, or personal analytic work.

ORGANIZATION OF EVALUATION THEMES

With organization we come to the *essay* section of the communication triangle, the fourth set of issues that we outlined in Figure 12.1 at the beginning of the chapter.

In an overall sense, all three of the essays have a similar organizational format and all three derive from the basic principles of all evaluation: the positing of the norm, the application of the norm to the object, and the resulting evaluation. The spot remover article first posits the norms in the introductory paragraphs and then applies them to the objects in turn, evaluating each as the norms are applied. The student, after a brief introduction, posits his norms for education in paragraph 4, and then presents the object in juxtaposition with the norms, and the evaluation follows as naturally as the conclusion of a syllogism follows from the first two premises. We have already examined the two large structures of the article about the Texas zoos, but it might be useful to take a more careful look at the smaller structures operating within these two frameworks.

To explain the organization of "Life Behind Bars," it might be useful to present an outline of the sections, with paragraphs listed at the ends of the lines (see next page).

We examined the relationship between the main body of the article and "Zoos Who" when we talked about the reader issues of adjusting a hierarchy of values and acceptance of the norms. Now let us take a brief look at the interior structure of the two macrostructures.

The interior structure of the inset is indicated by the author: "The zoos are listed more or less in order of preference" (paragraph 3a). This is the same order as in the second part of the spot-remover article, when the editors moved from the most preferred to the least preferred.

The interior structure of the main body of the essay, however, is more complex. The introduction and the conclusion (both of which take place at night, in contrast to the body, which takes place in the mornings), establish the tone and the theme. The theoretical statement of the theme comes when Harrigan talks to Werler, the director of the zoo. But the practical justification of this statement occurs in the body of the essay, the detailed tour through the five main sections of the zoo and, more importantly, the acquaintance with the caretakers and their favorites.

The interior organization of the main body seems to be framed by the two most sympathetic caretakers, Beard and Sweeney, and their favorites, Albert the tiger and Hans the elephant. There is little doubt that Sweeney is the most sympathetically treated of all the caretakers. In a sense she is the climax of the story and her handling of Hans is beautifully told. After Sweeney and Hans, we are again ready for night and the restatement of the theme.

Structure of "Life Behind Bars"

I. Introduction (1–21)
   A. The mini-tour—Bonko, the night watchman (1–11)
   B. Werler, the administrator (12–21)

Zoos Who
Norms (1a–3a)
Brownsville (4a–5a)
San Antonio (6a–7a)
Fort Worth (8a–9a)
Houston (10a–11a)
Dallas (12a–13a)

II. Body (22–79)
   A. Cats
      1. Beard and Albert the Tiger (22–35)
      2. Conner and the snow leopard (34–35)
   B. Birds: Berry and the cock-of-the-rock chick (36–43)
   C. Primates
      1. Mendieta and Kamaka (44–48)
      2. Fisher and the orangs (49–50)
      3. Grissom and Vanilla (51–60)
   D. Reptile house (preceded by another small tour): McLain and the pythons (61–70)
   E. Elephants: Sweeney and Hans (71–79)

III. Conclusion (80)

Exercises on Organizing the Theme

There really are only two basic issues in organizing the ordinary theme of evaluation. One concerns the introduction and the other the body of the material.

1. **Does the introduction make clear the importance of the evaluation to be presented? Has necessary background material been omitted?**
2. **Are the three major elements of the body clear to the reader?**
   a. **Is the *object* presented at the most advantageous time in the essay? If a sort of dramatic method of presentation is desired, it might be presented before the norms.**
   b. **Are the norms clear to the audience? Sometimes, especially in expository papers, they must be presented first and even justified before proceeding with the presentation of the object and the evaluation itself. At other times, norms are best left implicit, so that the reader can supply them.**
   c. **Is the application of the norms to the object clear to the reader? Sometimes, of course, the presentation of the norms and the presentation of the object allow the reader to draw his or her own conclusions. Such strategy is often effective with quite intelligent and informed readers. At other times, however, the opposite is the case: the evaluation must be presented at the outset in most precise terms, repeated in the body of the essay, and reiterated in the conclusion. This strategy is needed if the material is quite difficult or if the readers are not too informed on the issue.**

THE STYLE OF EVALUATING

Much has been written about the style of evaluative writing, mostly focusing on the presence of "loaded" words, words that indicate a bias or subjective position. The assumption behind much of this analysis is that ordinary prose shouldn't evaluate and that, consequently, when "value" words do make their way into writing, something underhanded, even immoral, is taking place. Hopefully, this entire chapter has given you a different attitude toward evaluation and expository themes that evaluate.

It is true, though, that evaluating does call on some language resources that are not conspicuous in other types of prose. There have to be some loaded words, even in the most neutral scientific and informative prose when evaluation is going on. The spot remover article certainly should not be labeled flaming oratory or yellow journalism. Yet it says of the best spot remover found in the experiments: "Labeled as eye irritant and combustible." And the second ranked remover, Brush Top Handy Applicator Super Spot Remover, is labeled as "combustible, harmful or fatal if swallowed, and having a harmful vapor." These are not nice words; and the product was judged "suitable for use only on fabrics that solvents will not harm." Most likely, the manufacturers of this product felt that this is not neutral prose.

Let us look at some of the characteristics of evaluative pieces. The first, and probably the major factor determining the style of any evaluation, is the aim of the discourse. Scientific and expository evaluations tend to be similar to the tone and style of the article on the spot remover; it is restrained, precise, and informative. Expressive, literary, and persuasive evaluations can be emotional, however, sometimes even intense and passionate.

Harrigan's article is an interesting combination of the informative and the persuasive, with even a strand of the expressive. Consequently, it might be worthwhile to look at some of the rather arresting features of his style.

Anthologized in a textbook like this, Harrigan's article may strike you

as unusual, even mildly bizarre. But it is characteristic of the type of journalism in the magazine in which it originally occurred. The writing is mildly sophisticated—notice the large number of vocabulary items listed in the prereading activity. Not only is the diction somewhat discriminating, so also is the theme of value-system inversion that is worked out. In other words, although the essay may initially strike you as unconventional, it is really conventional *for the magazine and the audience it addresses*. The other two samples, in their own ways, are also conventional. The salutatorian address follows the conventions of high school graduations but still manages to be effective. And the spot remover assessment adheres carefully to the conventions of publications of this sort.

The style of "Life Behind Bars," which comes across so effectively, is closely bound up with the method of evaluation and with the organizational pace of the article. As was pointed out earlier, the hierarchy of values of the reader is challenged slowly but relentlessly in the movement of the main body of the essay. The world of the caretaker and the animals (and the author) is vividly and consistently contrasted to the world of visitors of the zoo. The confrontation of the two worlds allows Harrigan to muster a number of different stylistic devices to reenforce the evaluation. Place, time, nature, characters, miniplots, personification and depersonification, symbols, and other elements are combined to construct each world.

The two worlds occupy different settings. One is the *natural* and original habitations of the animals, the velds, kopjes, rain forests, islands, expansive enclosures, and ranges of hundreds of miles. The other is *artificial*, sprayed concrete fake rock, sentimental sculptures, Muzak, constricted environments, rows of cinder-block or chain-link cages, oil drums, stage scenery, and so on.

The two worlds, nature and artifice, move in different time dimensions. The real world is the world of the night and the early morning, the time of the caretakers and the cared-for animals, and the time of the author's tours. The artificial, consuming world of the visitors to the zoo is the hot noon and afternoon.

We have already referred to the cast of characters of the worlds. They make up the ultimate inverted subject and object actors and patients in the overturned hierarchy of values that Harrigan is constructing. And these characters act out miniplots that symbolize the themes of the essay; they illustrate the love and respect of the caretakers for the animals. And the animals are the *people* in the minidramas.

At the end all of these elements of the two worlds have become symbols of Harrigan's theme. Possibly the most dominant and recurring symbol of the inversion of the two worlds is the continual reference to "removing the fecal," as the caretakers call it. It is repulsive to the visitors; but there is a distinct progression in the attitudes of the caretakers. Bonko, the night watchman, doesn't "care about working with the monkeys at all. They're too dirty, for one thing. You never know when one of em's gonna

hit you alongside the head with a load of crap" (paragraph 11). Harrigan sees "removing the fecal" as the "basic thing that goes on in a zoo" (paragraph 22). Beard, in charge of the tigers, compares the job to changing the diaper of a child (paragraph 26). And Mendieta almost completely reverses the attitude of Bonko and of the visitors to the zoo. Harrigan tells us:

> He was rubbing with a rag at a dark spot on his shirt where a chimpanzee named Kamaka had just scored a hit with his own by-products. "In the morning he'll throw carrots or biscuits at me," Mendieta said, sounding hurt, "but shit he seldom throws anymore." (paragraph 46)

Perhaps nothing more dramatically symbolizes the differences between two worlds. It is in the style finally that the opposition can most clearly be seen. But the logic of the evaluation, the organization of the entire piece, in fact all of the elements of the essay support each other in carrying out the contrast.

Exercises on the Style of an Evaluative Theme

Many of the exercises and questions on style of the previous chapters, especially in the chapters on the aims of writing, will be applicable here. Depending on your purpose, you might refer to these exercises. But some questions about style usually recur in evaluation themes. Let us focus on a few of the most important.

1. *Loaded words*. **We distinguished between two types of loaded words in the text. There are the emotionally loaded words that apply to the evaluation and there are the words that are used in the description of the object, which themselves might have emotional connotations. The examples given of the latter include "combustible," "fatal if swallowed," and "having a harmful vapor." These words can be defended, even in an expository paper, because they are verifiable by the reader. To use the term we used in Chapter 11, they are *operationally definable*. The emotionally loaded words that accompany the evaluation are justifiable if the evaluation has been carried out according to the terms of the writer-reader contract, given the type of paper being written. Check for both types of loaded words in your paper, and draw up lists of the two types of words.**
2. *Purpose*. **These two types of loaded words will be handled quite differently, depending on the purpose of the paper.**
   a. **If the paper is an expository paper, the descriptive terms ought to be carefully defined initially. The loaded terms ought to accompany the evaluation only at the time of the evaluation.**

b. If the paper is literary, expressive, or persuasive, the loaded terms ought to be exploited for the aim of the paper. If the paper is persuasive, has the loaded language of the ethical and the pathetic arguments been exploited? (On these terms, see Chapter 3 if you have forgotten their stylistic implications.) Two of the three samples analyzed in the chapter are exemplary in this respect.

3. *Graphics.* Have you given any thought to the use of graphics in your paper? Pictures of the object, charts, sketches, and other tools often enhance an evaluation theme.

Exercises on Evaluating

1. Turn back to page 245 and reread the review of the play that appeared on Broadway in 1972. As you read it, try to isolate the evaluative elements in it from the descriptive or narrative or even classificatory elements. Then answer the following questions.
   a. Would you say that all readers of this review (originally intended for a New York audience) would look upon the play with the same reactions the author had? Would you characterize this as a *subjective* or an *objective* assessment? Or would you rather go with a view that it might be *intersubjective*, that is, a healthy segment of the readers of a New York daily might be inclined to accept the assumptions on which the author relied for his inferences and would find the play unacceptable on these grounds?
   b. What assumptions has the author made in his derogatory evaluations? Go through the piece and attempt to isolate the assumptions that the author expects his readers to grant him. For example, it seems obvious that he expects a program printer to give the audience an accurate listing of scenes and songs; that "some sort of meaningful entertainment" must emerge from the "narrative segments" the author indicates; that he clearly finds a "homosexual enthusiasm" in performance and in text a "tasteless" element (at least in this play); and others. Which of these assumptions would you be prepared to grant the author?
   Which of the evaluations seem to be made on the basis of assumptions not made clear (at least implicitly) in the article? Has the author told the reader why the musical disaster was *drab* or *pallid*? Why is *Heathen* the "ugliest production of many seasons," why is it "scenically misdesigned," and why is it "ludicrously costumed"? Is it possible that the author expects the reader to have general norms for drabness, for pallidness, and for the ugly, the scenically misdesigned, and ludicrous costuming? Do you think the average reader has such norms? Would these norms agree with those of the author, generally speaking?
   c. What do you think of the style of this piece? Make a list of the loaded words that might not appear in a news story about the same item.

   d. What do you think is the purpose or what are the purposes of this piece? Do you think some persuasion is involved? In other words, do you think the author is trying to deter some potential customers from wasting their money on *Heathen*? Is the author also trying to entertain? Would some readers find this review amusing? Does the amusement contribute to making other purposes more palatable? If you feel there is a persuasiveness to the piece, is it assisted by the entertaining devices, particularly of the style?
   e. What is the organizational structure of the piece? The middle paragraphs do not follow an obvious sequence. Would the effect of the review change if paragraph 2 were to be placed after the next two paragraphs? Or if paragraphs 6, 7, and 8 were to be placed before 4 and 5?
   The first and last paragraphs seem to frame the rest of the material, in the sense of giving a view of the whole before presenting the parts. Could this be viewed as an organization drawing from the descriptive nature of the presentation, that is, the whole-part relationship? Explain.
   f. Write a paper based on some of the preceding considerations. The paper would be a *descriptive* analysis of an evaluative review. Write it for your fellow students as audience.
2. Write a paper analyzing some of your own value judgments. Consider the object being evaluated (or at least the aspect of the object under consideration), the locus of the value (subjective or objective), the faculty you use in making the evaluation, and the assumptions you use as the norms for evaluation. Ask yourself if your assumption uses a purpose or a rule as norm. You can apply this paper to your moral judgments, your political judgments, your assessments of friends, or your evaluations of automobiles, football teams, and so on.
3. Analyze the Ten Commandments from the following perspectives: range of audience, source of obligation, rule or purpose, norm, hierarchy of values, faculty of evaluation.
4. Analyze the value system implicit in your college's grading system. Consider some of the following points: range of audience (people expected to accept the evaluations), the kind of norm involved (rule or purpose), the method by which the norm is applied to the particular instance (theme, test, or performance), and hierarchy of values.
5. Analyze the evaluations present in the descriptive passage by Solzhenitsyn in Chapter 9. Consider the same points we have been suggesting in the preceding questions: range of audience, possible antagonistic audiences, kinds of norms involved (rule or purpose), methods by which the norms are applied to the particular instances under consideration (the Czarist and the Soviet prison systems), and the hierarchy of values implicit in the piece.
6. Analyze the value system of a local politician (campus, city, state, nation) from the same perspectives suggested in the preceding question.

Writing Evaluations

PROBLEMS WITH EVALUATION THEMES. Most themes that attempt to evaluate something are an interesting combination of inductive and deductive themes—two types considered in the chapter on "Proving and Explaining." Even when the theme is not an expository theme with explicit logical patterns, the logic of deduction and induction will be implied. The reason for this is simple: evaluation always implies the application of a general norm (purpose or rule) to a particular object. The application of the general norm to the particular case is a matter of a deductive sequence in logic. But the matter of proving that the general principle applies to the particular case quite frequently involves the making of some statements about the particular object; frequently this involves making generalizations from particulars, and this is an inductive procedure.

You therefore usually face two processes. First, you must get your audience to accept the norm you will use. Second, you must apply that norm to the individual case in point. This frequently involves a careful inspection of the object to be evaluated, and often this inspection takes up the major portion of the essay. Thus, Harrigan's statement of his norms for evaluating zoos is a fairly short part of the essay. Most of the essay consists in applying the norms to the five zoos (see pages 356–363).

CAMPUS TOPICS. You could evaluate many aspects of your college life: your instructors, the available programs, the cultural activities, the social facilities, the food, the dormitory facilities, the guidance procedures, the counseling facilities, the library, the athletic teams, and so on. You might want to evaluate the usefulness of fraternities or of intercollegiate athletic events; or the effectiveness of the student assembly, the administrative officers, the janitorial staff, the board of regents, or others.

One very useful approach in evaluations is the contrastive approach: contrast one professor with another, one team with another, one library with another, or one institution with another.

1. If you decide to do a "proof" evaluation, that is, a thesis paper that will incorporate convincing evidence of your evaluation(s), then the aim of the evaluation paper is to prove by logical procedures. This may involve the careful inductive or deductive (or both) procedures of these types of themes as they were presented in the chapter on "Proving and Explaining."
2. If you decide to do a persuasive evaluation, then all the evaluative material should be incorporated into the machinery of the persuasive techniques examined in Chapter 3. And, of course, more stylistic options are available in persuasion than in the restrained language of expository writing.
3. Your instructor may allow you to do an expressive evaluation, one in which the evaluations are much more personal and subjective and the language changes considerably (as in a journal).

CITY AND STATE TOPICS. In the city in which you live, or in your college town, many objects are simply begging to be evaluated. Indeed, you may evaluate them informally in oral language with your friends every day. The day-care, hospital, transportation, recreation, and other types of facilities might be evaluated. Local restaurants might be evaluated or local night life or local cultural activities. Current politicians, police, the school system, the town-gown relationships, job possibilities for summer and winter, ethnic relationships in the city, hiring practices in the town—all of these and many other facets of local life can be looked into. On a larger scale, most of these can be transferred to the state perspective and evaluated.

It is important to note that the same *problems* considered before any of the writing topics are still relevant here. And the same types of themes (expository, persuasive, expressive, even literary) suggested in (1), (2), and (3) above are also possible here.

DISCOURSE TOPICS. At the beginning of this chapter, we used three particular evaluation themes, which we examined for examples of the principles of evaluation. But, instead of objects for *classificatory* analysis, as they were then, the same three themes might be objects of *evaluation*. Using your own norms of what you think would be successful evaluations, you might assess these three pieces as successful (or not, or partially successful) evaluations.

Other types of evaluations are possible. You might evaluate your local newspaper (possibly by using a comparison-contrast technique again). You might evaluate a novel or a short story you recently read (or you might evaluate one of the short fiction pieces used in the chapter on narration). You might evaluate a weekly periodical you use regularly (maybe compare *Newsweek* and *Time*—but the comparison must incorporate evaluative elements). You might evaluate your college newspaper. You might evaluate one of the textbooks you are using. Since this is the last chapter in this textbook you might evaluate this text as a book that is supposed to help you learn to write intelligent prose.

relate to the whole. Either you have this or you have not, just as, without implying any comparison, you have or have not an ear for music. Without an ear for music the principle impression of an auditor at a symphony concert might be of the motions of the players of the double bass, just as the spectator at the bullfight might remember only the obvious grotesqueness of a picador. The movements of a player of the double bass are grotesque and the sounds produced are many times, if heard by themselves, meaningless. If the auditor at a symphony concert were a humanitarian as he might be at the bullfight he would probably find as much scope for his good work in ameliorating the wages and living conditions of the players of the double bass in symphony orchestras as in doing something about the poor horses. However, being, let us suppose, a man of culture and knowing that symphony orchestras are wholly good and to be accepted at their entirety he probably has no reactions at all except pleasure and approval. He does not think of the double bass as separated from the whole of the orchestra or as being played by a human being.

Evaluation of Crest Toothpaste[2]

COUNCIL ON DENTAL THERAPEUTICS

After careful consideration of the results of clinical studies conducted on Crest toothpaste, manufactured by the Procter & Gamble Company, the Council on Dental Therapeutics has recognized the usefulness of the dentifrice as a caries preventive agent and has classified it in Group B. In view of the foregoing and the manufacture's willingness to limit advertising claims to those points supported by adequate research, the Council has authorized the use of the following statement in commercial advertisements: Crest has been shown to be an effective anticaries dentifrice that can be of significant value when used in a conscientiously applied program of oral hygiene and regular professional care; Crest dentifrice may also be of value as a supplement to public dental health procedures.

Crest toothpaste contains as its principal active ingredient stannous fluoride. The present Crest formulation contains 0.4 per cent stannous fluoride, 39 per cent calcium pyrophosphate, 30 per cent glycerin, 1.0 per cent stannous pyrophosphate, 24.97 per cent water and 4.63 per cent miscellaneous formulating agents .

Thus far seven clinical studies have been conducted on Crest.[1-11] At the time of the Council's evaluation complete reports of some of these studies were not yet published, but data not in the literature were made available to the Council. The present Crest formulation was used in three of these studies.[6-10] Earlier studies were conducted on a Crest formulation which was less stable than the present formulation. Caries increments in groups of subjects who used Crest toothpaste were compared with caries increments in groups using a control dentifrice which was identical to Crest with the exception that the control paste contained no stannous fluoride. The data from these tests are consistent insofar as all seven test groups exhibited fewer new carious lesions during the study period than did the control groups. However, the magnitude of the decrease in caries incidence in each test is difficult to express without making specific reference to the conditions of each study. Average caries increments may vary with age. Since the prophylactic effect of Crest must be expressed in terms of the caries increments of the test groups in relation to those of the control groups, the incidence of new carious lesions in the control groups, the incidence of new carious lesions in the control groups will influence the apparent degree of effectiveness of the dentifrice when the latter is expressed in terms of per cent reduction in caries incidence. Thus, percentage figures may be misleading, especially when used to express the results of short term studies. Greater reliance can be placed on percentage figures as expressions of the results of long term studies where many examinations at periodic intervals provide a more reliable measure of caries increments. Of even greater importance in contributing to variations in the magnitude of effectiveness of a caries preventive dentifrice is the frequency with which the dentifrice is used. Reduction in caries incidence varied markedly in a group of subjects who used Crest for one year under conditions normal in their homes (23 per cent reduction) from groups whose brushing was supervised once daily (34 per cent reduction) or thrice daily (57 per cent reduction). The Council feels that the variation of effect among those groups who used the dentifrice with varying frequency is of great importance for it illustrates the probable need for frequent use of Crest to achieve maximum benefits and associates Crest's usefulness with a program of good oral hygiene.

The Council wishes to point out that certain aspects of the potential usefulness of Crest have not been delineated by the studies thus far conducted. Further investigation may provide information in the following areas. The maximum duration of any

[2]*The Journal of the American Dental Association*, LXI, 2 (August, 1960), pp. 272-274.

ETHICS AND RHETORIC:
FORGING A MORAL LANGUAGE FOR PUBLIC SCHOOLS AND PUBLIC DEBATE

It is a distinct pleasure and an honor to be asked to address you today. I took my first course here forty-five years ago, an introduction to literary theory by the person in honor of whom this sequence of talks is named, Father William J. Rooney. Under Craig La Driere and Dr. Rooney, Catholic University was certainly one of the earliest schools to participate in the renaissance of rhetoric in English departments in this century. Consequently, it is most fitting--a favorite concept for both La Driere and Rooney--that a series of talks on rhetoric should be initiated here, and that the interrelationship between rhetoric and ethics should be the topic of the first of these talks.

Interrelationships between ethics and rhetoric go back to the dawn of both. A famous anthropologist, speaking of the duty to abstain from lying and the duty to keep one's promises, says, "Within certain limits these two duties seems to be universally recognized" (Westermarck, II, 72). In other words, the rebuke of ethics to rhetoric is a universal moral principle.

And many of us in rhetoric have been explicitly concerned with the dangers of the techniques of our own discipline. A book by a close friend of mine, which was published three years ago and which won an award at the recent Conference on College Composition and Communication, is called Rhetoric and Irony and its subtitle is Western Literacy and Western Lies, and it chronicles a serious strain of immorality in both our rhetorical and our literary tradition.

Today I would like to address a specific modern problem having to do with the relation of ethics to rhetoric. I have been studying this issue since 1987, when, at the invitation of Brother Patrick Ellis , who was then president of La Salle University, I spoke to the teachers of rhetoric in their cross disciplinary writing program about the problems posed when teachers ask students to write about moral or political concerns. Even at that time, I faced a quite different problem than did the teachers at La Salle, since I taught in a secular university and could not expect the rather homogeneous audience of La Salle. I also train teachers who are going into generally public school venues from kindergarten through graduate school.

Lest Brother Patrick be concerned that he is to hear the La Salle talk again, I can assure him that most of this talk is new material.

By circumstances rather than by design my studies of this issue have gone through four separate stages, but the chronological evolution took on a curious conceptual development. Consequently I would like to devote some time to each of the following four stages: (1) the need for a social, rather than an individual, ethic and the language to talk about it; (2) the major dimensions of such a social ethic; (3) the anthropological basis for a such a meta-ethics; (4) the motivation behind such an ethic for students at various levels and the pedagogical and the pedagogical methodologies for teaching such an ethic.

I. A SOCIAL ETHIC AND ETHICAL LANGUAGE.

I have been a teacher for fifty-three years, with stints in

elementary school, in high school, in undergraduate and graduate college teaching; and I have asked my students at all of these levels to write about moral and political issues. But until about eight or nine years ago, I had not given particular attention to the disparity between their abilities to carry out such assignments and their abilities to analyze or write about issues in their own fields or in literature, which I frequently taught. In 1983 we organized an English course for upper division students, a course which required the students to write about issues in their fields. It became a course required of all students in all undergraduate major programs. This course, which was implemented in 1983-84 for the first time required 158 classes and handled 3762 students in four different areas: sciences and technology, humanities, fine arts, and business. I taught the course for several years with quite a range of majors, and it was in these courses that I first became aware of this disparity. Students did not have the language and conceptual skills to write about moral issues in their own chosen major fields. In fact they did not even have the language or the concepts to talk about such issues.

I spoke about this matter to several of the people who taught ethics in the philosophy department and asked them if there had been any recent studies in the abilities of people to speak about ethical issues. I found out that only one in ten of the undergraduate students ever takes a course in ethics in the college programs at The University of Texas at Austin. And, of course, only those students who had gone to private religious schools had had ethics courses at at the high school or elemen-

tary levels. Of course, there is some ethical instruction given in churches, for the 60% of Americans who say they attend church regularly (U. S. News and World Report, April 4, 1994, p. 50). I was also given some experts who had indeed done some analyses of the language abilities of Americans to speak or write about moral issues.

Reading these authorities constituted the first stage of my investigation, which culminated with my speech at La Salle University in 1987. Since then I have added some other authorities. The common denominator to all of these studies is an effort to establish or partly re-establish a social ethic and the language to communicate about it, rather than an individual ethic, which many of these authorities feel is the dominating ethic and language about ethics today in Europe and America today.

Two major figures in the movement started from different positions, but reached much the same conclusions. Alasdair MacIntyre, a major figure in this movement, has written seven ? books on ethics and morality, the most prominent being After Virtue: A Study in Moral Theory, 1981 (2nd ed., 1984) and Whose Justice? Which Rationality (1988). He has also written many articles. He summarizes his position early in the book:

> The hypothesis which I wish to advance is that in the actual world which we inhabit the language of morality is in . . .[a] state of of grave disorder. What we possess, if this view is true, are the fragments of a conceptual scheme, parts which now lack those contexts from which their significance derived. We possess indeed simulacra of morality, we

> continue to use many of the key expressions. But we have--very largely, if not entirely--lost our comprehension, both theoretical and practical, of morality (2).

He admits that most of us feel that we would be aware of such a situation, if it were true. As he says,

> If a catastrophe sufficient to throw the language and practice of morality into grave disorder had occurred, surely we should all know about it. It would indeed be one of the central facts of our history (3).

In fact, half of his book is an attempt to prove--I believe successfully--that such a catastrophe has come about without our realizing it.

The morality and the language which we have lost was grounded on a philosophical view of human nature, derived from the Greeks, which had been grafted onto Judaism, Christianity, and Islam. The Greek view and that of the three religions were compatible because they both viewed human nature as having a purpose (a telos) and a notion that achieving that purpose brought about happiness to human beings. The two concepts also had a view of the view of the roles of a human being in society and of the harmony of these roles with the fulfillment of human nature. All four views were social ethics, and they dominated Western civilization's moral theory from the fourth or fifth century B. C. until the seventeenth century. MacIntyre calls this the classic view of morality.

Since the seventeenth century, according to MacIntyre, this view has been gradually been supplanted by an opposing view of morality, which he calls emotivism. Another term might be liber-

tarianism, implying complete individual choice in any situation. It is a very common view in contemporary Western culture than each individual decides for him or herself what is morally good. There is no universal principle, and there is no teleological view of human nature which determines what a human being is supposed to aim at. It is not a rational view which can be shared with others because each person is an isolated entity out for him- or herself. With such a view of morality permeating important areas of society, all choices are selfishly determined and social agreements are built upon competitive interests. Such a moral system, in effect, cannot logically entail a rational public policy except as an arena of competition.

MacIntyre believes that Nietzsche best epitomizes this view of morality. At the present time, it possibly best epitomized by some postmodernists, such as Jean-Francois Lyotard. Such people are variously called radical individualists, libertarians, anarchists, or emotivists.

The title of William Sullivan's book Reconstructing Public Philosophy indicates that his initial concern was more political than moral. However, there is an interesting symmetry to his methodology, when compared with MacIntyre's. While MacIntyre set out to establish a social ethic and to move away from the individual, he inevitably ended considering the place of the individual in the polis. In other words, he politicized the individual morality. Sullivan, looking at the problems with the modern state, found it lacking in morality. In other words, he moralized the political situation. As he says, speaking of three

liberal thinkers, Fred Hirsch, Daniel Bell, and Robert Heilbroner, they "make out a strong case that liberal capitalist affluence finds itself entangled, indeed, nearly immobilized, by its own contradictions (12-13)." And all three turn to morality or something like a religious tradition to curb the inherently uncontrollable appetites of a liberal capitalism, even though such a tradition is not a component of such a theory, indeed is incompatible with it (163-170).

Sullivan was one of the co-authors with Robert Bellah and others who, in a celebrated anthology, Habits of the Heart, made a further plea for a sense of community and for a social ethic in public issues.

Another very vocal group, the communitarians, headed by Amitai Etzioni, The Responsive Connunity, William Galston of Maryland, and Mary Ann Glendon of Harvard, have added their voices to those of people like MacIntyre, Sullivan, and Bellah. They insist on the importance of the community and oppose radical individualist positions in both morality, economics, and politics. Many of these thinkers decry the overemphasis on rights and entitlements and the neglect of the accompanying duties and responsibilities which rights of others entail. Terry Eagleton, in a speech at The University of Texas last week in fact called all of these people communitarians.

Communitarianism is not, however, a novel phenomenon. A good deal of MacIntyre's two books mentioned above as well as his A History of Ethics document the fact that the interweaving of the individual and the social life has been a constant concern of ethical systems since their beginning. Sullivan's analyses also

have long historical antecedents. Stephen Toulmin, who has written on the academic history of the divorce of ethical and social concerns from the development of the individual disciplines, scientific and humanistic, also has joined the voices of the communitarians by insisting that the separate disciplines have a long list of IOU's to society for their neglect of such issues in the past three hundred years (Toulmin, 116).

From a historical perspective, MacIntyre lines up a fairly impressive of moral systems which have practiced social ethics: he includes Greek moral philosophy, Judaism, Christianity, Islamism, Marxism, , utilitarianism, Kantianism. I believe that authors like Cicero, whose De Officiis," is based on natural and social fitness, should be included. I also believe that the "other" philosophers, such as Heidegger and Sartre and Camus, should be added. So should Buddhism and Hinduism and Confucianism. And of course, so should the modern commnitarians. So should philosophers of fairness and justice, like Dworkin and Rawls, be added.

This is a fairly impressive assemblage. Thus, at least, under the umbrella of a social ethic, many quite diverse groups can be gathered. This umbrella provides the common language and axioms which we can use in teaching. Given this umbrella, people of many quite varied groups can still engage in dialogue with one another, such as Marxists and Christians, Muslims and Jews, and agnostic utilitarians with all four of these groups.

The first stage of my research thus came to an important conclusion: there are many different moral systems across the

world which share a social ethic and which opposed the radical individualism of Nietzsche and post-modernism. Indeed, many of the students in the classes at my secular university share this social ethic.

II. THE MAJOR DIMENSIONS OF A SOCIAL ETHIC.

This conclusion represented my thinking at about the middle of 1992, with a few extrapolations. Then, by a curious circumstance of fate, I was pushed into a new dimension of this inquiry. You may recall that on October 16, 1991, an ex-merchant Marine, George Jo Hennard, drove a truck into Luby's Restaurant in Killeen, Texas, and killed 25 people and wounded 23 more in a terrible tragedy. About nine months later, I was asked if I could speak to a group of high school and elementary teachers at a memorial conference to be held on the anniversary of the tragedy. I was asked to speak about the educational implications of the tragedy. At first I hesitated, but then I accepted, although I did not really yet know exactly what I would end up talking about.

I first decided to refresh my mind with the details of the incident and to read what journalists had written about it at the time and after. I checked on microfiche what the Houston Post had written about it in the 32 stories or columns which it ran on the tragedy over a period of about a month following the massacre. These stories confirmed a persistent perspective which I remembered from the Austin coverage during the same time period. Was this reaction larger than the state of Texas? I wondered. So I checked the New York Times index and read the 13 accounts and reactions which this prestigious newspaper had in the week

following the incident. The same emphases were repeated. Would they change when the story crossed the ocean? I checked The Times of London and found a clear approximation of the same reactions and emphases. Eventually, through a data-base called Lexis-Nexis, I read over 500 coverages of the event from a good number of countries of the world, though not from some. Reuters, a wire-service based in Germany, ran 16 stories on the tragedy in the first 37 hours after it happened; Agence France Presse ran 8 in the same period.

What was interesting about these 500 coverages from many countries, many cultures, and several languages was that the same pattern of reactions recurred throughout. This pattern gave me my educational theme for the talk in Killeen, and the same pattern introduced a second dimension to my search for a common ethic and language for classroom use.

What was this general pattern of the local, nationa, and international reactions to the drama in Killeen? I would say that there were four major recurring features in the vast majority of the nearly 500 treatments of the tragedy. These four features were a sense of shock at the brutal murders, an expression of sympathy for the victims and the families of the victims, a surprise at the destruction of property involved in this particular massacre, and a meticulous concern for truth and accuracy in reporting the details of the drama, both in the newstories and in columns and editorials. There were other concerns that came up now and then: the Congress was at that time considering a law about gun control, and this was brought in, even in other

countries; the psychological background of Hennard was also an issue in some items, etc. But these four features dominated. Now these four features may seem fairly obvious to you, but I think that they are more important than they appear on the surface. Let me explain each in a little detail.

Shock at Murder. The aspect of the tragedy which captured most of the headlines and the leads in the newstories and the theses in the editorials and columms was the shock at the number, the ruthlessness, and the senseless nature of the murders. This is true of both the newstories and the editorials and columns. The headline for the story in the French newspaper Le Monde on October 18, that year, was typical: "A 'mad gunman' kills twenty-two persons in Texas." There was universal concern for the immediate victims, the twenty-three killed and the killer and the twenty-three wounded. This concern was not rooted in any evident ideology, either religious or political.

Concern for Family. This was the first emphasis, the headline interest for the first story. But in the ensuing week a second motif took over: the concern for the families as well as the victims. The following headline from an October 18 story in the Houston Post typifies the local, national, and even international coverge: Shootings leave families, friends trying to cope with grief, questions."

Concern for Property A third, though minor concern runs the same stories, and was usually given prominence in photos accompanying the stories: the destruction and devastation of the cafeteria in which the shootings took place. And the reopening of the cafeteria, about a year ago, occasioned a spate of articles from across

this country and Canada to wire services for the Pacific Press, Reuter's of Germany, and Agence France Presse for French readers. As I say, however, this was a minor motif.

Concern for Truth One fourth feature remains to be signaled out. When I first began looking at a large number of stories, especially outside of Texas, I wondered whether there would be wild distortions and stereotypes. I found that my fears were groundless. Generally, there was a professional restraint even in headlines. Facts were generally accurate; names were correct; estimates were cautious; generalizations were circumspect, prudent, and accompanied with justifying facts. This is as evident in the newstories as in the many editorial treatments of gun control issues, the most frequent editorial concern here and abroad, especially since the U. S. Congress was considering a gun control law at that time. An article on gun sales in Texas and Killeen in The Times of London was typical. One exception was a story from Le Monde, the French daily. After the first headline, "A 'mad gunman' kills twenty-two in Texas, a second headline, in considerably larger print, read: "A Cowboy syndrome." But this stereotype was not exploited in the article, which did not even mention "cowboys," but which first presented the facts of the story and then spent three-fourths of the space on gun control and the crime bill before the House of Representatives.

Now I believe that these four features have major educational implications. A universal respect for life and shock at murder, a global sympathy for families, a worldwide concern for property destruction, and an ubiquitous solicitude for truth are

the four characteristics which dominate the many treatments of the Killeen tragedy. I think that it is more than coincidental that these same four concerns are the four cornerstones of most ethical systems, whether religious, philosophical, or just practiced without elaborate theoretical undergirding.

Let me illustrate this common moral system by comparing it to another, with which you are already familiar--the Judeo-Christian moral efifice. This structure is most explicitly defined in the ten commandments of the Bible. The religious dimension of this system is expressed in the first three commandments which outline man's relations with the deity. I will return to these three shortly. But, firt let us look at the remaining seven. Three of them relate to the family (I will use the Oxford translation, approved by both Catholic and Protestant groups): Honor your father and your mother, You shall not commit adultery, You shall not covet your neighbor's wife. One commandment relates to life; You shall not commit murder. One relates to truth: You shall not give false evidence against your neighbor. And two relate to property: You shall not steal, You shall not set your heart on your neighbor's house, his land, his slave, his slave-girl, his ox, his ass, or on anything that belongs to him.

These four concerns are--respect for life, family, truth, and property--are also the basis for many other moral edificies. Buddhism, for example, parallels these four concderns in the first four of its five precepts, which admonish the Buddhist "to abstain from taking life (including animal life), stealing, wrong sexual relations, abuse of speech (such as lying and malicious

gossip), and the consumption of alcohol or drugs (Funk and Wagnall's New Encyclopedia [New York, 1973], 4:323). This fundamental social ethic is paralleled in Hinduism in the Hindu respect for all living beings and the common duties that all class must observe (see Maitra, i, 10, 16, 18; Crawford, 209-223). Unlike Judeo-Christianity, there is not a religious foundation at the base of either of these ethical systems.

Thus the Killeen tragedy gave some specific axioms to the social ethical system which MacIntyre, Sullivan, Bellah, Etzioni and other communitarians felt the need of. These authorities, however, had not spelled out the specifics of such a system.

III. THE ANTHROPOLOGICAL BASIS FOR A SOCIAL ETHIC.

At the end of the first section of this talk, I summarized a fair number of religious and philosophical systems of ethics which embrace a social ethic. Some critics of talks which I have given on these matters have raised the issue of a more general look at civilizations and cultures. Does an anthropological view of ethics in many different cultures lend any support to the sort of social ethic represented by these religious and philosophical systems? Or, on the contrary, does anthropological evidence support a more individualized, diversified, and subjective view of morality?

The third stage of my study attempts a partial answer to that question. And I am still working on this, so this stage of my report has to be taken as a progress report of an unfinished project. I have read several histories of morality and ethics, including one by MacIntyre, but his and most of the others tend

to focus on philosophical issues and distinctions with little attention to anthropological data. Two studies, however, are in marked distinction to the others. Edward Westermarck, a Swedish-speaking Finn, who wrote his major works in English, published a two-volume work, The Origin and Development of the Moral Ideas and another book called Ethical Relativity. His last work was entitled Christianity and Morals, and an earlier one was on The Goodness of Gods. He has four other books on marriage, its history and its future. He also has a two-volume work on Ritual and Belief in Morocco and another book on Early Beliefs and Their Social Influence. His work shows a life-long interest in ethical issues and in their embodiment in particular cultures. He spent the better part of four decades doing field research, particularly in Morocco.

In meta-ethics, Westermarck is usually listed as both an ethical relativist--as one might suspect from the title of his book on the subject--and an ethical subjectivist. He is also considered an excellent field researcher and a superb summarizer of other anthropologists' studies. In fact, the bibliography for The Origin and Development of the Moral Ideas is eighty pages long.

An ethical relativist and an ethical subjectivist would not seem, at first blush, to be a support for something like a social ethic with rather common dimensions of respect for life, property, family integrity, and truth. But Westermarck is a special kind of relativist and subjectivist, and he has managed to reduce ethical issues to relatively few major concerns. Let us first look at the second of these matters--the dimensions of an ethical

theory.

Westermarck insists on limiting his investigation into the "major modes of conduct with which the moral consciousness is concerned" (The Origin. . .," I,, p. 327). He focuses on six groups:

> . . . The first group includes such acts, forbearances, and omissions as directly concern the interests of other men, their life or bodily integrity, their freedom, honour, property, and so forth. The second includes such acts, forbearances, and omissions as chiefly concerns a man's own welfare, such as suicide, temperance, asceticism. The third group, which partly coincides with, but partly differs from, both the first and the second, refers to the sexual relations of men. The fourth includes their conduct towards the lower animals; the fifth, their conduct towards dead persons; the sixth their conduct towards beings, real or imaginary, that they regard as supernatural (I, p. 328).

Now, if one ignores the conduct towards lower animals and towards supernatural beings, one is left with the same major concerns which preoccupied us in the previous section: respect for life, for property, for family integrity, and for truth. He devotes eleven chapters to homicide, suicide, bodily injuries and cannibalism (I, 327-526, II, 229-264, 553-581). He devotes two chapters to property (II, 1-71). He devotes six chapters to family and sexual issues (I, 597--669, II, 364-552). By far the vast majority of Westermarck's energies are devoted to these four

issues.

Secondly, as I remarked above, Westermarck is a curious sort of relativist. Consider, in this regard, his statements on the concern for these four issues in the different civilizations which he investigated, either by primary or secondary sources. At the beginning of eleven chapters devoted to murder and bodily injuries, he says:

> It is commonly maintained that the most sacred duty which we owe our fellow-creatures is to respect their lives. I venture to believe that this holds good not only among civilised nations, but among the lower races as well; and that, if a savage recognises that he has any moral obligations at all to his neighbors, he considers the taking of their lives to be a greater wrong than any other kind of injury inflicted upon them (I, 328).

He does give a few quite rare exceptions of tribes--seven all told--in which homicide does not seem to have been considered wrong (I, 328-9).

About property, he begins with this statement:

> Hence the universal condemnation of what we call theft or robbery proves that the right of property exists among all races known to us (II, 1).

He devotes two chapter to truth and good faith. At the beginning of his second chapter on the issue he says:

> Men have a natural disposition to believe what they are told. This disposition is particularly obvious in young children; it is acquired wisdom and experience only that

constitutes incredulity . . .

> But men are not only ready to believe what they are told they also like to know the truth. Curiosity, or the love of truth, is coeval with the first operations of the intellect; it seems to be an ultimate fact in the human frame (II, 109-110).

His statements with regard to the family are also most interesting. His major field of expertise in anthropology had to do with the family. About the family he says,

> In the human race the family consisting of father, mother, and offspring is probably a universal institution, whether founded on a monogamous, polygynous, or polyandrous marriage (I, 190).
>
> . . . . . .
>
> Besides parental, conjugal, and filial attachment we find among all existing races of men altrusism of the fraternal type, binding together children of the same parents, relatives more remotely allied, and, generally, members of the same social unit (II, 194-195).

Marriage (II,399), prohibitions against incest (II, 364-366) and against adultery (II, 447-450) are fairly universal. Seven exceptions are given for adultrery (II, 447, fn. 1). Rape and conjugal infidelity are less universally condemned.

Now for a theorist who calls himself an ethical relativist, these are rather remarkable statements. He states rather categorically that respect for life, for property, for family integrity, and for truth are concerns that we find almost universally.

The number of exceptions is statistically almost insignificant.

The point which concerns me is that such near universality does give us the major axioms for a language of morality. Beginning with these, we can go into differences and hopefully in most cases discuss them. Thus, a basic respect for the life of the other has not precluded taking a life in self-defense in nearly all civilizations. The accomodation of the principle to the situation can be made without sacrificing the principle; in this case, it would seem that there is a choice between respecting one's own life and that of the attacker. With regard to polygamy, the definition of the family differs when one compares the Islamic and, for example, the Judaic-Christian notions. In both cases, however, the respect for life and for family integrity are still upheld.

I am still working on this anthropological base for the language of morality. Westermarck, after all, published his work Ethical Relativity in 1932, and The Origin and Development of Moral Ideas came out, in the second edition, in 1917. Consequently, I have tried to update Westermarck and anthropological views since that time.

Westermarck still commands respect today. In 1982 three books appeared, assessing his contributions to anthropology and ethics. One was an anthology with thirteen experts in either anthropology or ethics taking a retrospective view of his work in this century. All thirteen still consider him a major figure. Claude Levi-Strauss, writing in 1945, a fews years after Westermarck's death, still considered him a giant. He lauded Westermarck's concept of what Levi-Strauss called a "permanent

humanity" in all civilizations (in Stroup, p. 180). He also spoke of the "monumental character" and "prodigious erudition" of Westermarck's work (p. 190). J. L. Mackie, writing in 1968 in The Encyclopedia of Philosophy, concludes his article on Westermarck with this statement:

> Nevertheless, some contemporary moral philosophers believe that Westermarck's views on ethics are substantially correct and that he made an important contribution to the development and defense of views of this kind (VIII, 286).

Speaking of subsequent developments in comparative anthropology, by, for example, Ruth Benedict, Melville J. Herkovits, Clyde Kluckhohn, and by himself, Abraham Edel said, in 1982, these people had added a morally explicit evaluative component to the descriptive, causal, and classificatory dimensions of Westermarck (in Stroup, 85 ff.) A few pages later he added,

> The anthropological revelation of differences [emphasized by Westermarck] had produced multiple reactions. Prominent among them had been a renewed search for the moral unity of mankind. But this search was successful only to a limited extent. . . . it helped us understand common grounds for morality (p. 92).

This is my understanding and use of Westermarck. None of these assessments, however, questioned the anthropological data and the descriptive conclusions which Westesrmarck had drawn from them.

IV. THE ETHICAL AND PEDAGOGICAL RAMIFICATIONS OF A COMMON SOCIAL ETHICAL LANGUAGE.

Given the importance of establishing a modern moral language for a social ethics, the point made by MacIntyre, Bellah, Sullivan, Etzioni, Toulmin and others, which I addressed in the first part of this talk; given further the underlying moral axioms which can undergird such a language and its relative neutrality which I attempted to show in the second part of the talk; and given the fairly universal character which these axioms have, as is illustrated by comparative anthrolopology, what can be done with this framework of a language in the public schools and in public debate about these matters?

As I see, from trying to implement this position in classroom for the past five or six years, there are four major problems in motivating students to consider using such an approach in their papers. The first is to convince the students of the necessity or usefulness of a moral language. The second is to teach them how to adjust a meta-language such as this one to their own particular moral codes; this problem is interwoven with the pedagogical problem of the neutrality of the teacher and of his or her respect for the individual moral codes of the students. Fourthly, I would like to illustrate this methodology by applying it to literature, both classical and contemporary.

A. Convincing Students of the Necessity and Usefulness of a General Moral Language.

Judging by my own classes in the past several years, MacIntyre is right about one major issue. Generally, students do have only the fragments of a moral language to communicate about moral issues, even with each other, at a degree of fluency parallel with their abilities to discuss other academic issues. As

MacIntyre says, this is in part due to the loss of such a language in society at large. But part of this inadequacy is the lack of academic training in these matters at both the pre-college and the college level.

Many of the students recognize this inadequacy when faced with writing about such issues, and many welcome the possibility of learning such a language. This is a positive motivation. But frequently talk of a moral language strikes students as negative, restrictive, and confining. This is also reflective of our current society's largely libertarian and individualistic views of the nature of moral decisions. A recent poll by U. S. News and World Report reported that 70% of Americans believe that "Each individual must determine what is right or wrong" and 48% agree that there is no one set of values that is right (April 4, 1994, p. 51). Now, neither MacIntyre, nor Bellah, nor Sullivan, nor Etzioni, nor I would disagree with the notion that moral judgments are matters of individual free choice. But if the statement "Each individual must determine what is right or wrong" means that moral choices are completely a-social, then all of these people would dissent from this inference. How can one integrate individual free choice with a social ethic?

One way is to approach a moral code precisely from the point of view of the libertarian. Start with an individual's rights. If I assert that I have right to life, then those in my surrounding society cannot take away that life. In other words, any right has a corresponding social duty. If you have a right to property, then neither I nor anyone else in your society can

steal. If you have a right to family integrity, then I cannot rape or commit adultery. In other words, my rights are your responsibilities, your rights are my responsibilities. Etzioni especially, among the communitarians has emphasized this reciprocity of rights and duties, arguing that too many individual radicalists emphasize their rights without taking into consideration the corresponding duties which they empose on society.

In fact, any assertion of an individual right does impose a social burden on society. The four principles of respect for life, for property, for family integrity, for truth are the assertion of four basic rights of individuals. A moral code can thus be read as an affirmation of basic rights. There is also the insistence that not only I but my neighbors have such rights. My rights impose moral burdens on my neighbors, and their rights impose moral burdens on me. This is the compromise that we arrive at: individual rights for everyone are decreed, and the social corollaries of social duties follow. To achieve my moral rights, I agree to respect the rights of others. There is a moral social contract which parallels the legal social contract, a notion which has been a feature of legal theory from Cicero, through Christian and Protestant theologians, and in international law with Grotius, through major French, English, and German thinkers in the eighteenth century, on down to our own day.

Such a view presents a moral code as a means to an end, individual happiness and rights. This is called a teleological view of morality. It does not view the moral code as a law dictated by an outside authority; such an ethic is called a deontological system. Students generally view ethics deontologi

cally, rather than teleologically. A teleological presentation of a moral code is consequently much more appealing to them. This way of presenting a moral code is the usual manner in which utilitarian views of ethics are characterized.

This does not mean that such a a teleological system cannot be compatible in its major dimensions with a deontological system. Thus this general social ethical language with its four basic axioms is certainly compatible with the Ten Commandments of the Bible, usually looked upon as a deontological code. However, it is perfectly possible to consider the Ten Commandments as a Bill of Rights, embodying the rights to life, family integrity, property, and truth--considering only the moral dimensions of the code, the last seven commandments.

The teleological view of a moral code, in addition to giving a positive turn to the presentation of a moral code, also provides a useful response to extreme libertarians, anarchists, and individualists, the opponents of a social ethic. A radical individualist, who would claim the right to do anything he wanted to do, would effectively deny freedom to the rights of those in his environment: if he can kill, his neighbors are deprived of the right to life; if he can steal, his neighbors are deprived of their rights to property; if he can commit adultery, his neighbors are deprived of their rights to family integrity; if he can lie, they are deprived of their rights to the truth. Such a radical individualist, in effect, deprives neighbors of all of their rights. He asserts freedom for himself, while denying it to others. This reciprocity of rights and duties is often not

grasped by libertarians or anarchists.

B. The Adjustment by the Student of the General Code to an Individual Ethic.

The compatibility of the general code with individual codes, whether deontological or teleological, bridges the discussion to the second part of this section, the use of the general code in conjunction with the particular moral code of individual students. As I pointed out earlier, the moral code of Judaism and Christianity embedded in the last seven of the Ten Commandments is compatible with the general code which I have outlined. Thus a teacher can use the general code and Jewish and Christian students can resonate with their Biblical code. This allows a deontological motivation supplied by a particular student to provide the inspiration and support in specific case under consideration. This holds true not only for Judaic and Christian students; it also holds true for all of the other groups who espouse social ethics--and their number is legion, as I mentioned in the first section of this talk. It also holds true, if Westermarcks's scholarship is at all valid, of most of the civilizations of mankind.

Such a general language of morality is particularly useful with the teacher in a class whose students have different moral codes. It allows the teacher to speak to each group with the same language. And individual students can write papers which respect both the common language and the language of their particular code. But the common language also bridges another barrier--students talking to one another. If students find difficulties talking to one another because of differences in

their moral codes, for example, an Islamic student with a different view of family integrity talking to a Christian student, then the two students can be asked to articulate these differences and try to work out their difficulties under the terms of the common language. The same can be said of two students whose ideas about abortion differ, owing to different religious backgrounds. If we can agree to have them talk to one another in the common language of respect for human life, then maybe some problems can be solved. In this case, the discussion will probably boil down to a definition of "human life."

Thus the common language based on respect for the rights of all to life, family integrity, property, and truth enables the teacher to take a neutral stand in a class while allowing students with many different compatible moral codes to work out their own problems, and it also enables students with different moral codes to talk to one another. The one group that is excluded from this consensus is the radical individualist or extreme libertarian or anarchist.

In my use of this system in class, I encourage students with different moral codes which are compatible with this general system to go into specifics in their own papers, using their own moral code to work out their own moral solutions to issues. But if they are addressing more heterogeneous groups, I tell them that they have to consider the make-up of these audiences.

The procedure usually consists in the articulation of a student's particular moral code and then the deductive application of its principles to the particular case in hand. I and the

other readers of the paper pay careful to the articulation and to the logic of the application.

The same methodology applies to those who happen to profess a libertarian position in morality. I ask the student to see what would happen in a world in which, for instance, anyone who could get away with it, could steal. It is clear, as MacIntyre and many others have pointed out, that this leads to anarchy, and in an anarchy, the physically strongest prevails. Might becomes right.

How would this general system work in particular situations. Let me apply this four-fold social ethic to some specific cases. As a teacher of literature, I have used, in both high school and college, drama, fiction and poetry which bring these four issues to the foreground. Both Hamlet and Macbeth are common high school fare. In teaching, I usually paid attention to the esthetic structures of plot construction, juxtaposition and development of character, the rhythm of the poetry, and so on. But any treatment of Hamlet has to face up to the tragedy of Hamlet, and the tragedy of this play is built around the four ethical issues of murder, family, property, and truth. Hamlet's father has been murdered, and this one murder motivates the entire play. Further, Hamlet's father has been murdered by a member of the family, his uncle, in a conspiracy with Hamlet's own mother. The family motif is very important in the play. So is the issue of theft because the murder of Claudius has been perpetrated in order to enable Hamlet's uncle and Gertrude, his mother, to take over the kingdom. The truth of Gertrude and Hamlet's uncle is at stake, and the play revolves around Hamlet's uncovering their

lies. The four cornerstones of the moral system which we saw in the Killeen tragedy are here the heart of the drama. And one does not have to be doctrinaire to talk about the murders, the destruction of the family, the stealth of a kingdom and the truth and falsity of some of the major characters. Macbeth is in many ways similar to Hamlet. It is based on the murder by Macbeth and Lady Macbeth of Duncan, king of Scotland, and, as in Hamlet, this murder is the motivating force behind the play. Two major families are involved, that of the murderers, Macbeth and Lady Macbeth, and the family of the victim, Duncan and his son Malcolm, who eventually avenges his father's murder by killing Macbeth. Theft is involved because, to achieve his ambition to steal the throne, Macbeth must murder. The truth of several of the major character is again an issue, including the truth of the witches' prediction of the slayer of Macbeth and Macbeth's misinterpretation of this.

Let us move to two great Greek epics, often taught, at least in myth form, at the high school level, and to several great Greek dramas to examine these same major moral issues. The Iliad is the story of the abduction of Helen, the wife of Menelaus, king of Sparta, by Paris of Troy, and the attempts of the Greek chieftains to enable Menelaus to rescue Helen and reunite her with Menelaus. Killings are involved in the war, especially the killing of Achilles by Paris, and the eventual killing of Paris. One of the men involved in the Trojan war, and the author of the stratagem by which the Greeks defeated the Trojans, was Ulysses, and the second great Greek epic is the story of his

attempts to return home and reunite himself with his wife Penelope and his son Telemachus. The story involves, on the one hand, Ulysses adventures as he tries heroically to return to his family, and on the other hand, Penelope's efforts to fend off attempts by others to break up the family and take over Ithaca. Again, murder, family, theft, and truth are the cornerstones of the story, which cannot be taught without talking about these themes and their interweavings with plot, character, setting, and the poetry of the language.

The great Greek dramas illustrate the same point. Possibly the greatest tragedy of all literature, Oedipus, by Sophocles, is the tragic story of a man who unknowingly killed his own father and eventually married his own mother. In this play, murder and family are intricately interwoven. When Oedipus discovers what he has done to his own family, he puts out his own eyes. Antigone is one of the daughters of the incestuous relationship between Oedipus and his mother Jocasta and accompanies her father in his travels after his tragic discovery until his death in Oedipus at Colonus. The play Antigone, sometimes taught at the high school level, continues the story of the family of Oedipus. The two brothers of Antigone, the sons of Oedipus and Jocasta, killed each other in battle, and Creon, the king of Thebes will not allow Antigone to bury her brother, Polynices. Her opposition to the unjust law is the theme of the play. Eventually, after burying her brother, she is shut up in a subterranean cave, where she and her lover, the son of the king, both kill themselves. Again, killing and family are interwoven almost as intricately as in Oedipus and Oedipus at Colonus. Indeed, all

great literature seems to involve interrelations among these moral cornerstones of respect for life, for family, for property, and truth.

In fact, there are moral, social and political issues in all disciplines. And I believe that the teachers in those disciplines ought to point out these isues to students studying these different fields. This can't wait till college, since most student don't go on to college. Yet even in college, many disciplines are taught as if there were not issues of this nature involved.

And there is a moral system and a common language in which to discuss these matters, as I have attempted to show in this talk. We can teach students at all ages and in all disciplines a respect for life, for family, for property, and for truth. We can teach students in a non-doctrinaire way that respects their own personal opinions without imposing a given ideology on them.

who is teaching their children about sex. They should remember that teachers are role models for young people. And so it is crucial that sex education teachers offer examples of good character by the way they act, and by the ideals and convictions they articulate to students. As Oxford's Mary Warnock has written: "You cannot teach morality without being committed to morality yourself; and you cannot be committed to morality yourself without holding that some things are right and others wrong."

These are some of the principles which should be standing behind our schools' sex education courses. Character education is mostly a matter of common sense. If sex education courses are prepared to deal with the truth, with reality in all its complexity, with the hard truths of the human condition, then they should be welcome in our schools. But if sex education courses are not prepared to tell the truth, if instead they want to simplify or distort or omit certain aspects of these realities in this very important realm of human life, then we should let them go out of business. If sex education courses do not help in the effort to provide an education in character, then let them be gone from the presence of our children.

TEACHING MORAL VALUES IN PUBLIC SCHOOLS

Some Constitutional Considerations

DAVID L. GREGORY*

A renaissance is occurring in the theory, if not yet in the practice, regarding the appropriate function of teaching moral values in public elementary and secondary schools. The generally informed and prominent attention now focused on the pressing need to develop students' ability to make sound moral judgments in a very complex society is grounds for cautious optimism. Fortunately, the recently resurgent emphasis on teaching students how to make informed moral choice, as an indispensable ingredient of any civilized society, is much more than a reflexive backlash to pedagogical relativism.

Especially during the past twenty years, most public schools have taken great pains to avoid inculcation of ethics. This regrettable value-neutrality is partially attributable to increasing cultural relativism. It is also attributable to misunderstanding the religion clauses of the first amendment of the Constitution. Understandably, few public school officials are eager to endure the legal expense and controversy of becoming the Supreme Court's next major test case. However, the deliberate avoidance of moral values in public education transcended prudent legal considerations. Pandemic cultural relativism has afflicted all of society, with particularly disastrous consequences on an increasingly ignorant, uneducated, yet purportedly credentialed, population.[1] Court decisions and the

* Kenneth Wang Research Professor of Law, 1987-88, St. John's University School of Law; B.A., Catholic University of America, 1973; M.B.A., Wayne State University, 1977; J.D., University of Detroit, 1980; LL.M., Yale University Law School, 1982; J.S.D., Yale University Law School, 1987.

[1] A. BLOOM, THE CLOSING OF THE AMERICAN MIND (1987); E.D. HIRSCH, JR., CULTURAL LITERACY (1987).

Constitution were misperceived as somehow mandating value-free, and, ultimately, valueless public education.

Within this decade, more responsible public officials from across the entire political spectrum and many influential public educators have endorsed the teaching of moral values in public schools.[2] This article will examine these recent positive developments through the prism of constitutional law. Hopefully, the discussion can move beyond single issue, simplistic no-win advocacy, mandating which particular ethical values should be taught, at the expense of the rights of other persons who do not share those same values.[3] Instead, the task is to base public education on sound moral values within the bounds of the Constitution, while simultaneously respecting the heterogeneity of our republic in this bicentennial year.

American law in the twentieth century is permeated with the secular philosophy of pragmatism. This empirical, "real world" perspective on the law has been the United States' distinct, and perhaps unique, contribution to jurisprudence. Legal pragmatism reflects the wisdom borne of our Civil War, our commercial expansion, and the broad legal developments generally consonant with the spirit of laissez-faire capitalism. Oliver Wendell Holmes, Massachusetts Brahmin, scion of Harvard, Civil War colonel, and eminent justice of both the Massachusetts and United States Supreme Court, is perhaps most responsible for integrating the jurisprudence of European positivism into American law. Perhaps his most famous pragmatic aphorism is that "the life of the law has not been logic — it has been experience."[4] Holmes, the intellectual grandfather of American legal realism,[5] unquestionably ushered overtly secular, empirical qualities into our jurisprudence. Concomitantly, the jurisprudence of pragmatism and realism deliberately deemphasized the theological, spiritual values that had historically been at the heart of the Judeo-Christian natural law tradition. Thus, within the last century, jurisprudence was transmogrified from the propaedeutic to theology into instead the primary instrument of power in the service of the controlling elites of the secular state. Within the past decade, critical legal scholars,[6] the contemporary heirs of legal realism, have further attacked reliance on jurisprudential absolutes. The heavy integration of the European continental philosophy of Kant, Hegel, Husserl, and Marx into contemporary American legal philosophy,[7] and the increasing use of deconstructive linguistic techniques to critique legal texts,[8] have further contributed to the spread of intellectual, legal, and cultural relativism.[9]

Contemporary constitutional law has been deeply and profoundly affected by these important jurisprudential changes. The classic positivist position that law and morality must remain completely separate has understandably prospered in light of these contemporary jurisprudential developments. This makes it all the more imperative to remember the ringing words of Eugene Rostow, constitutional scholar and former Dean of the Yale Law School; by their very nature, law and morality are inextricably joined. Each mirrors the other. Rostow rhetorically queried, what does the law accomplish, and what is its purpose, if the law does not legislate morality?[10]

Never has this question been more apt, compelling, and timely. Law, if radically divorced from morality, ultimately becomes a contradiction in terms and makes a cruel mockery of assuredly then-unattainable justice. At its root, American law is grounded upon moral values. Fully consonant with classic natural law, American law and equity still form the synergy necessary to achieve justice. The Constitution is thoroughly grounded upon this rich natural law tradition. Rather than being antithetical to moral values, constitutional law is steeped in these considerations. It is not coincidental that the religion clauses begin the first amendment: "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof."[11] The Framers of the Constitution

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[2] *See* N.Y. Times, June 7, 1987, at A1, col. 1; N.Y. Times, May 24, 1987, § 4, at 7, col. 6; N.Y. Times, May 3, 1987, at § 4, at 27, col. 1; N.Y. Times, Apr. 28, 1987, at C9, col. 1; N.Y. Times, Apr. 19, 1987, at § 4, at 18, col. 1. *See also* N.Y. Times, May 12, 1987, at B6, col. 1 ("What concerns me is that we're becoming a bland society, valueless." (quoting White House Chief of Staff Howard Baker)); EDUCATION FOR DEMOCRACY: A STATEMENT ON PRINCIPLES (1987) (joint pamphlet project of the American Federation of Teachers, the Education Excellence Network, and Freedom House); M. Cuomo, *Religion, Belief, and Public Morality*, 31 N.Y. REVIEW OF BOOKS, Oct. 25, 1984, at 32. " 'I am for morality. In fact, I wish there were more of it taught in our schools.' " TIME, May 25, 1987, at 17 (quoting President Ronald Reagan).

[3] *See supra* note 2.

[4] O.W. HOLMES, THE COMMON LAW 1 (1881); *see* Holmes, *The Path of the Law*, 10 HARV. L. REV. 457 (1897).

[5] For the representative scholarship of American legal realism, at its height in the late 1920's and early 1930's at the Yale and Columbia Law Schools, see J. FRANK, LAW AND THE MODERN MIND (1930); L. KALMAN, LEGAL REALISM AT YALE, 1927-1960 (1986); K. LLEWELLYN, THE BRAMBLE BUSH (1951); Lasswell & McDougal, *Legal Education and Public Policy: Professional Training in the Public Interest*, 52 YALE L.J. 203 (1943).

[6] For a comprehensive list of representative critical legal scholarship, see Kennedy & Klare, *A Bibliography of Critical Legal Studies*, 94 YALE L.J. 461 (1984).

[7] *See* Boyle, *The Politics of Reason: Critical Legal Theory and Local Social Thought*, 133 U. PA. L. REV. 685 (1985); Peller, *The Metaphysics of American Law*, 73 CALIF. L. REV. 1151 (1985).

[8] Balkin, *Deconstructive Practice and Legal Theory*, 96 YALE L.J. 743 (1987).

[9] A. BLOOM, THE CLOSING OF THE AMERICAN MIND (1987); *see also* P. SOPER, A THEORY OF LAW (1984) (arguing that positivism has been misdirected for divorcing law from moral theory).

[10] *See* POWER AND POLICY IN QUEST OF LAW: ESSAYS IN HONOR OF EUGENE VICTOR ROSTOW (M. McDougal & W. Reisman eds. 1985).

[11] U.S. CONST. amend. I. The Constitution's other reference to religion is the proscription

thoroughly learned the bitter and bloody lessons of Henry VIII and English history. They were determined to ensure that the secular government would never "establish" or impose a state religion upon the people of the United States. Further, the Framers also took equal pains to safeguard individual free exercise of religion.

Ultimately, neither the establishment nor the free exercise clause is absolute. There is often potential tension between the two religion clauses of the first amendment. Prominent constitutional law scholar Professor Laurence Tribe[12] of Harvard Law School, quoting former Chief Justice Warren Burger, has expressly noted that:

> [a] pervasive difficulty in the constitutional jurisprudence of the religion clauses has accordingly been the struggle to find a neutral course between the two Religion Clauses, both of which are cast in absolute terms, and either of which, if expanded to a logical extreme, would tend to clash with the other.[13]

While it is possible that the Constitution's religion clauses may periodically conflict with one another,[14] neither clause prohibits the teaching of moral values in the public schools.

Catholics historically have been understandably and especially wary of the willingness of the non-Catholic political majority to fully protect Catholic religious rights. As victims of religious bigotry throughout much of the nation's history, Catholics have begun to come into proportionate national political power only during the past quarter century. Like other religious minorities, Catholics have thus had a deep mistrust of the judiciary's willingness to safeguard Catholic constitutional rights. United States Supreme Court Associate Justice Joseph Story, author of the influential multivolume *Commentaries On The Constitution*,[15] maintained that the First Amendment religion clauses protected only mainstream Protestants.

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that "no religious [t]est shall ever be required as a [q]ualification to any [o]ffice or public [t]rust under the United States." U.S. CONST. art. VI, cl. 3.

[12] *See* L. TRIBE, GOD SAVE THIS HONORABLE COURT (1985); L. TRIBE, CONSTITUTIONAL CHOICES (1985); L. TRIBE, THE AMERICAN CONSTITUTION (1978); Gregory, Book Review, 60 TUL. L. REV. 437 (1985). *See, e.g.*, Pennzoil Co. v. Texaco, Inc., 107 S. Ct. 1519 (1987). Professor Tribe successfully represented Pennzoil before the United States Supreme Court.

[13] L. TRIBE, AMERICAN CONSTITUTIONAL LAW 815 (1978) (quoting Walz v. Tax Comm'n, 397 U.S. 664, 668-69 (1970)).

[14] For thorough citations to the evolution of the history and the jurisprudence of the first amendment religion clauses, and for further elaboration of the tensions within the amendment, see Gregory, *The First Amendment Religion Clauses and Labor Employment Law in the Supreme Court, 1984 Term*, 31 N.Y.L. SCH. L. REV. 1, 2-13 (1986); *Religion and the State*, 27 WM. & MARY L. REV. 833 (1986); *Developments in the Law—Religion and the State: The Complex Interaction Between Religion and Government*, 100 HARV. L. REV. 1612 (1987).

[15] *See* J. STORY, COMMENTARIES ON THE CONSTITUTION OF THE UNITED STATES (5th ed. 1891).

Fringe groups, such as Catholics and Jews, were not intended to be protected, according to the single most influential constitutional commentator of the nineteenth century. In his dissent in the recent school prayer case of *Wallace v. Jaffree* in 1985,[16] Justice Rehnquist resurrected and cited the Story position with express approval, maintaining that the first amendment permitted state preferences for religion, short only of official state establishment of any particular religion.[17] If this ominous accommodationist view persuades a majority of the Court, the specter of state-sanctioned and constitutionally protected Protestant majoritarianism and the concomitant debilitation of the free exercise rights of Catholics and other religious minorities will again haunt this country.

Despite the nation's history of considerable anti-Catholic prejudice, the Supreme Court has also been a champion of protecting Catholic religious rights. In the landmark decision *Pierce v. Society of Sisters* in 1925,[18] the Court upheld the right to provide elementary education via private religious schools. The Court thus forcefully repudiated the virulent anti-Catholic attempt to eradicate Catholic elementary and secondary schools and to force all Catholic children to attend only public schools. However, the popular perception is that *Pierce* is the rare exception, proving the rule of value-neutral, almost anti-religious, public education effectuated under the establishment clause pretext of respecting the proper "wall" of separation between church and state.[19]

Perhaps the single most controversial, lightning-rod decision popularly representing Court-endorsed antagonism toward moral values in public education is *School District of Abington Township v. Schempp*.[20] Brought, in part, by the notorious atheist Maddlyn Murray O'Hare, *Schempp* represented the supposed judicial ban on bible reading in public schools. This perception was reinforced by the ban on the bare posting

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[16] 472 U.S. 38 (1985).

[17] *See id.* at 104 (Rehnquist, J., dissenting).

> The true meaning of the Establishment Clause can only be seen in its history . . . The Framers intended the Establishment clause to prohibit the designation of any church as a "national" one. The Clause was also designed to stop the Federal Government from asserting a preference for one religious denomination or sect over others. Given the "incorporation" of the Establishment Clause as against the States via the Fourteenth Amendment . . . , States are prohibited as well from establishing a religion or discriminating between sects. As its history abundantly shows, however, nothing in the Establishment Clause requires government to be strictly neutral between religion and irreligion, nor does that Clause prohibit Congress or the States from pursuing legitimate secular ends through nondiscriminatory sectarian means.

Id. at 113 (citations omitted).

[18] 268 U.S. 510 (1925).

[19] For extensive discussion of the metaphor of the "wall" of separation between church and state, originally attributed to Thomas Jefferson, see Gregory, *supra* note 14, at 7-9, n.14.

[20] 374 U.S. 203 (1963).

of the Ten Commandments in a Kentucky public school in *Stone v. Graham* in 1980.[21] Further, in 1985, the Court struck down an Alabama statute that had expressly encouraged voluntary prayer through the statutory moment of silence at the beginning of the public school day in *Wallace v. Jaffree*.[22]

None of these decisions was inherently antithetical to the inculcation of moral values in public school education. The Court recognized that the Bible could be taught in the context of a literature, history, or comparative religion class in public school.[23] Likewise, the Ten Commandments could also be taught in such a broader context. Contrary to the popular misconceptions surrounding many of its very scrupulous establishment cases,[24] the Court has never banned religious values *per se* in public schools. Rather, due judicial regard for the first amendment establishment clause has only prohibited state-sponsored "voluntary" prayer.[25] No teacher or student has ever been constitutionally prohibited from individual and personal silent prayer in the public school. In *Bender v. Williamsport Area School District* in 1986,[26] the Supreme Court endorsed the free exercise right of a Christian student prayer group to meet on public school property and during school hours, without violating the establishment clause.

For the forthcoming 1987-1988 term, the Court has granted certiorari to hear a "moment-of-silence" case emanating from New Jersey.[27] Unlike the Alabama statute struck down in *Wallace v. Jaffree*, the New Jersey statute, similar to those present in about half the states, simply provides for a moment of silence at the beginning of the school day. The statute does not expressly encourage prayer, although it is likely that many students may individually choose to pray in silence during this statutory moment. Thus, the New Jersey statute's respect for cultural and religious heterogeneity may sufficiently protect everyone's free exercise rights while simultaneously not running afoul of the establishment clause. In

[21] 599 S.W.2d 157 (Ky.), *rev'd*, 449 U.S. 39 (1980).
[22] 472 U.S. 38 (1985).
[23] *See* School Dist. of Abington Township v. Schempp, 374 U.S. 203 (1963).
[24] *See* N.Y. Times, July 10, 1985, at A13, col. 1 (Attorney General Meese called the decisions " 'bizarre.' "). *E.g.*, N.Y. Times, July 3, 1985, at A19, col. 2 (Secretary of Education Bennett criticized the Supreme Court's 1985 decisions striking down public aid programs to private schools as a " 'ridiculous' expression of the court's 'fastidious disdain for religion that is hard to fathom.' " He called the decisions " 'crazy,' 'terrible,' and 'badly reasoned.' ").
[25] It is dubious whether any voluntary prayer is ever fully "voluntary," especially given peer influence in the lower grades. One law school constitutional law class has been the setting for demonstrating that "voluntary" prayer may be something substantially less than truly voluntary. Day, *Teaching Constitutional Law: Role-Playing the Supreme Court*, 36 J. LEGAL EDUC. 268 (1986).
[26] 475 U.S. 534 (1986).
[27] May v. Cooperman, 780 F.2d 240 (3d Cir. 1985), *cert. granted*, 107 S. Ct. 946 (1987).

1985, Justice O'Connor expressly suggested in *Wallace v. Jaffree* that such a statute may pass constitutional muster.[28]

From this battery of case law, it is clear that neither the Constitution nor the Supreme Court is inherently antithetical to the inculcation of moral values in public education. The establishment clause mandates that such religious or value based education must be effectuated in a broader educational context. The schools must carefully avoid government sponsorship of any particular set of values to the exclusion of anyone else's religious or moral values. No one's free exercise of religion right can be fostered to the detriment of any other citizen's equally important and constitutionally protected free exercise right. Obviously, this is a very delicate and difficult, but not impossible, objective for responsible public educators to implement. Respect for cultural and religious heterogeneity under the auspices of the Constitution is the key to whether the public schools may teach moral values in an effective and constitutional manner.

Catholics must be particularly sensitive to the critical importance of constitutionally respecting both the establishment and free exercise clauses of the first amendment. Were it not for the Court's appreciation of cultural and religious heterogeneity over a half century ago in *Pierce v. Society of Sisters*,[29] private Catholic elementary and secondary schools could have been abolished and all Catholic children forced to attend public school. Fortunately, the free exercise clause of the Constitution protected the Catholic minority from the virulent anti-Catholic prejudice of the Know-Nothings and cultural isolationists. Catholics must now accord the same constitutional safeguards to all other persons, without abandoning the effort to teach moral values in public schools.

The contemporary necessity of according sufficient constitutional respect for everyone's free exercise rights, while avoiding establishment of religion, is obvious. If the Ten Commandments are starkly posted on a public school bulletin board, which version of the Ten Commandments would be displayed—Protestant, Catholic or Jewish? If each different version were posted, would public school teachers be able to explain the theological differences sufficiently in response to students' questions?

And what of the constitutional rights of the Buddhist or Moslem child? Can agnostic or atheist children be made the subtle targets for religious proselytizing, under the guise of teaching moral values? The same questions are raised if the Bible is read or if school-sponsored prayers are said aloud, apart from a broader educational context of a literature, history, or comparative religion class. What sort of prayers would be said? Which holy scripture would be read? The Torah? The

[28] Wallace v. Jaffree, 472 U.S. 38, 67 (1985) (O'Connor, J., concurring).
[29] 268 U.S. 510 (1925).

Koran? The Protestant or Catholic Bible? Again, what of the constitutional rights of other students? Assuming even that the public school reading from a Catholic Bible began the public school day, should not Catholics be wary of a stark Bible reading without the presence of a faculty sufficiently versed in Catholic theology to address student questions that the scriptural reading may inspire? Thus, even in an "ideal" context, public school-sponsored prayer or scripture reading is deeply problematic, especially for the Catholic minority. Few, if any, want to witness their religion debased by a tepid state-sponsored Christianization political agenda.

These difficult questions must not derail the ethical renaissance of teaching moral values in public schools. It may be possible to teach morality without simultaneously teaching overt religious values. For most Americans, religion and morality are closely and properly bound. But it is precisely for this reason, the synergy, indeed the near-fungibility of overt religious and moral values, that the Constitution compels meticulous regard for both the establishment and free exercise clauses of the first amendment.

Teaching moral values in public schools can be accomplished within the bounds of the Constitution. It is a constitutionally permissible, and, given the rich natural law tradition reflected in the constitutionally antecedent Declaration of Independence, a constitutionally endorsed pedagogical agenda. However, moral values must be taught with care, respect, and concern for the rights of all the public. This requires constitutional regard for cultural heterogeneity, and care to ensure against exclusive promulgation of any particular set of religious values to the exclusion of all other values. Anything less will probably violate the religion clauses of the Constitution. If done with constitutional prudence, moral values can be taught without ineluctably sliding down the dangerous slippery slope of accommodationism.[30]

It is unnecessary and irresponsible to mistakenly yield the high moral ground and to succumb to raw value neutrality. The Constitution does not require such abdication of responsibility by public educators. Moral values can be legitimately taught without becoming unconstitutionally transmogrified into a political agenda for a particular religious view. However, without due regard for both of the Constitution's religion clauses, efforts to teach moral values in schools are doomed. Teaching moral values must not be equated with ambitious proselytizing for a particular religion, to the exclusion of all other values. This unconstitutional parochialism ineluctably leads to the repugnant intellectual terrorism of banning

[30] *See* Gregory, *supra* note 14.

certain books[31] on various purported objectionable grounds, and, ultimately to mass home schooling and de facto disavowal of legitimate public education.

Those who object to teaching moral values in public schools argue that it is the ominous pretext for effectuating religious proselytization, and thus violates the establishment clause. This is a potentially legitimate concern. However, as has been demonstrated, moral values can and must be carefully taught without violating the Constitution. It is not appropriate for critics to argue that those who wish to teach moral values should instead exercise the option of attending private religious schools. Parochial schools have done an excellent job of opening their doors to the indigent, unable to afford private school tuition, and even to those not of the same religious faith who nevertheless seek the highest quality education available.[32] However, the ability of private religious schools to waive tuition for those unable to pay is not limitless. It is facile and transparently specious for those opposed to the teaching of moral values in public schools to argue that private religious schools are automatically available as the alternative means for those who desire an education expressly incorporating moral values. For reasons of both geographic and potential economic inaccessabilty, this counterargument fails. Meanwhile, students unable to attend private religious schools retain their constitutional right to have their free exercise of religion respected in the public school context. Although students in public schools may be exposed to a panorama of values antithetical to their own religious beliefs as the heavy price of constitutional protection against establishment of religion, they must not thereby be relegated to a debased, value-neutral, or anti-religion public education. Their free exercise constitutional right provides the effective counterbalance to ensure that moral values, if taught in an appropriate context, can be a constitutional part of public education.

Our Constitution and our public schools must be both open and principled enough to accommodate the teaching of moral values in public education within the scope of the first amendment. If neither the Constitution nor public schools are open to morality-based pedagogy, society will

[31] *See* Board of Educ. v. Pico, 457 U.S. 853 (1982); Smith v. Board of School Comm'rs, 655 F. Supp. 939 (S.D. Ala. 1987); N.Y. Times, May 10, 1987, at § 7; Trends in the Law, *War Between the Faiths: "Secular humanist" Books Banned*, 73 A.B.A. J. 128 (June 1987). *See also* Nat'l L.J., July 27, 1987, at 6, col. 1 (Upon hearing *Mozert v. Hawkins County Board of Education*, Nos. 86-6144, 86-6179, 86-6180, 87-5024, slip op. (6th Cir. Aug. 24, 1987), Sixth Circuit panel appeared "highly critical" of claim that elementary school children have right to skip reading classes when texts conflict with their religious beliefs).

[32] Laycock, *Towards A General Theory of the Religion Clauses: The Case of Church Labor Relations and the Right to Church Autonomy*, 81 COLUM. L. REV. 1373, 1387 (1981) ("[T]he . . . success of Catholic schools [is] in educating disadvantaged children. These children are frequently black Protestants whose public schools have failed them.").