This paper examines technical writing at the high school level and suggests methods of teaching technical writing to students. Such topics are discussed as demonstration, mechanism description, causal analysis, detail, spatial order, and chronological order. It is argued that writing about objects can sharpen a writer's powers of observation and accuracy of expression. Two specific exercises are described: writing about razors and a modification of "Monopoly" to teach analysis of a total document for coherence. Technical writing in high school can also combat public doublespeak by making students more careful observers and wary consumers. (TS)
For some time now I have held the conviction that every high school composition course should contain at least one unit on technical writing. I hold this conviction because I believe that any student with a predilection for engineering or technology has as much right to instruction in defining, describing, and analyzing concrete objects and mechanical processes as has a student with a bent toward creative writing or literary criticism to instruction in making a subjective response to a blind date, a poem, or a summer day. I also believe that exercises in mechanism and process description, establishing standards and specifications, and making multiple evaluations will sharpen the rhetorical skills which a composition course is, by tradition, supposed to inculcate. And, finally, I believe that a unit in technical writing may serve as a powerful antidote to Public Doublespeak.

Despite my view of technical writing as a cure for the world's ills, however, I can understand why this specialty is not taught in every high school. First of all, even though most teachers recognize that their students will, either in the "real" world or their major field in college (if it is scientific or technological) have far greater need of expertise in making reports than writing essays, they have difficulty in finding composition texts that incorporate useful chapters on technical writing. And, secondly, even the most intrepid high school teacher may doubt the advisability of mixing assignments designed to stimulate an appreciation of poetic synaesthesia with those aimed at teaching a student to "define and describe a rotary potato peeler". The mere thought of the result of such a merger may fill a teacher with horror, much as the mythological griffin, a fearsome
creature with the body of a lion and the head and wings of an eagle, did the ancient Greeks.

But it is my hunch that this strange creature, the griffin—offspring of a unit in technical writing wedded to a conventional composition course—is more of an ally than a foe in the high school classroom. The griffin, described by the American Heritage Dictionary as a "fabulous" mythological entity, is associated with speed, strength, and visual acuity. So, when well practiced, is technical writing. Good technical writers make an immediate and forthright statement of purpose, limit their scope to feasible goals (which they most often set about attaining with orderly, deductive logic), and then proceed to interpret and evaluate their findings with pristine objectivity.

Just as I feel that, in the high school English class, the griffin is more to be courted than feared, so do I believe that it is not so rare or shy an animal that it can be conjured up only by a magus on the curriculum committee or a radically different textbook. The lion body is simply that aspect of conventional composition that teaches students to make thesis statements and topic sentences, to develop paragraphs, to define and describe, to compare and contrast, and to analyze. The eagle aspects of the griffin are nothing more than these venerable skills honed to the point where they enable the student to perceive the salient purpose of an investigation in the flicker of an eyelash, to formulate a structure for a report without an instant's hesitation, and to exercise both classification and partition in an analysis that speedily gets at the cause of malfunction.

And the method I recommend for teaching students new technical uses for old composition skills is show-and-tell—a pedagogical ploy fondly remembered by some as the only prospect that made getting up to go to school worth the effort.
My own preference for demonstration was engendered by two semesters spent teaching ninth-grade English in a West Coast junior high school. One of my students was an over-age young man with a history of peccadilloes ranging from auto theft to setting fire to the boy's washroom five days in a row. For some reason I have never been able to fathom, the school psychologist had counseled this student to invest his restless energies in making a collection—of prostheses! Within a very short time the boy managed to come by enough money—I dared not ask how—to purchase an artificial arm, two legs, and, finally, as the pièce de résistance, a $60 glass eye.

The student himself did not need the eye—just as he did not need the arm or the legs. But he had yearned over that bluish-gray orb pictured in a glossy, full-color catalogue the way most California boys then yearned over a pageful of water-skis. And when he had finally acquired the object of his dreams, he magnanimously brought it to school to share it with his less fortunate classmates.

To make a long story short, in the process of passing the costly marble about the room, the owner forgot to keep his own eyes on his property and someone pocketed the bauble. Because I was reluctant to frisk the most likely prospects—several of them two feet taller than I—I called on the assistant principal, an erstwhile chemistry teacher, for help. He herded the suspects into the Boy's Locker Room and within a remarkably short time returned, bearing the eye on the palm of his hand.

When I asked how he had gotten such quick results, he informed me that he had simply used the scientific method: through careful observation, he had detected an extraordinary bulge in a particular blue-jean pocket; he had investigated the phenomenon and, in short order, had subtracted the solid, spherical object from its dark and grungy quarters, thereby disclosing both
the eye, and the culprit. Punishment was meted out; the students were es-
corted back to the classroom; and the principal returned to his office.

Years later, as I began to specialize in writing technical reports
and proposals, I strove consciously to emulate my friend, the principal,
in economy of phrase, directness of attack, and forcefulness of conclu-
sions. Moreover, I realized as I began to teach technical writing, I
had been indelibly marked by the bizarre experience, for, given my
"druthers," I choose show-and-tell--"demonstration" we call it in higher
education--over lecture every time.

For an assignment in mechanism description I bring to class some of
my treasures—a rotating potato peeler that also slices fingers; a ham-
burger press that occasionally jams; a perverse French cork remover I
bought under the influence of Julia Childs; a plastic nut-grater that
never releases its morsels from the extrusions on the tin-plate against
which the nuts are shredded; and a loose-tea holder whose flanges are so
imperfectly machined they do not meet. Faulty as these gadgets are, they
not only lend themselves to the classical organization ordained for a
mechanism description*, they also provide material for causal analysis—
a couple of days' work, at least, to determine the factors responsible
for malfunction.

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*1) Divide the mechanism into component parts; 2) describe each part;
3) show how all the parts work together; 4) make the reader's job of
conceiving the object described easier through a drawing or diagram; and 5)
use an analogy whenever possible to facilitate the reader's understanding.
In general, the same descriptive techniques used in imaginative writing may be used in technical writing. As in imaginative or creative writing, the details of a technical description are held together by adverbs of time, place, and logical relationship—for example, beyond, above, in addition, and furthermore—and may be given in spatial order, chronological order, or order of importance. The exceptions are that technical description should impart facts, not feelings, and that nearly all words should be strictly denotive.

My experience has been that almost any attempt to get students to reify concepts results in better writing—and not just better technical writing. The presence of the object to be described is an inexorable check on the writer's powers of observation and accuracy of expression. Moreover, I believe that repeated reification ultimately arms the able student with the capability to perform the intricate intellectual calisthenics required for setting standards and specifications and performing multiple evaluations—tasks that await even students who go directly from high school to the work world.

One show-and-tell exercise I developed to teach standard-setting and multiple evaluation I take particular delight in. It is entitled "A Razor for Ouagadougou" and is as appropriate to high school as college students:

Dr. Juan Perez, an anthropologist, has been assigned by UNESCO to Ouagadougou, Upper Volta (Africa), to study the effects of prolonged drought on native farming techniques. He will be stationed in Ouagadougou for six months.

The town is little more than a village, with only two telephones for 2000 people, one general store (stocking food staples and coal oil), no electricity or running water, and mail service once a month. (Postage rates from either Europe or the United States are ten times those from the United States to Europe).
Therefore Dr. Perez must carry in his luggage virtually everything he will need in the way of clothing and items for medicinal or hygienic use. It should be noted that he must remain clean-shaven during his African sojourn inasmuch as he has a skin allergy that is made worse by the presence of a beard.

Distributed throughout this room are several razors to be considered for inclusion in the doctor's luggage. Your group is responsible for evaluating each razor and recommending, if possible, one that would be ideal for Dr. Perez. If none of the razors is even relatively satisfactory, your group should suggest a razor or type of razor that would meet the requirements for a shaving device suitable for use in Ouagadougou. Following are the conditions which prevail in the village:

1. The world's highest humidity
2. The world's highest mid-day temperature
3. Terrazzo floors in those bungalows usually inhabited by "foreigners"
4. No electricity or running water
5. An exotic insect called the "Uma-Uma Bug" which is attracted by shiny objects and manages, by acetic secretions, to pit the surface of polished metals.

As a group, prepare a written report to turn in at the next class session and to summarize aloud for other groups in the class. The report will be given a grade, which will then become the grade of every member of the group which prepared the evaluation.

Props for this exercise consist of my own collection of unaesthetic objects—razors ranging from the 69¢ disposable variety to the trusty Gillette double-edged family heirloom. In the interests of scientific evaluation, I permit dismantling, shaving, repeated manipulation of adjustable dials, and violent hurling of the razors against asphalt tile floors. (From long observation, I can testify that the oft-sneered-at "woman's razor"—the pink and white Flicker—is virtually shatterproof). In the interest of teaching syntax and format I insist upon parallel parts of speech in a list of standards, howling with outrage and inciting the class to do likewise over such mishmashes as:

1. Razor must be corrosion-resistant because of humidity
2. Non-breakable
3. Durable  
4. Light in weight  
5. Must be of heavy-gage metal or plastic to combat insect problem.

I also laud to the Upper Voltan skies the student who introduces his standards with: "The ideal razor must not:" and follows the colon with neatly parallel verb phrases such as "break when dropped on terrazzo floors;" "rust in high humidity;" and "warp under high heat."

I teach organization of material again by reminding the students that two possibilities exist for a multiple evaluation paper. They may evaluate one razor at a time, measuring it against each standard in turn, then proceed to the next razor and the one after that; or they may start with a standard, measuring each razor against it and then going on to the other standards, using each one as a particular yardstick for all razors. I advise students to establish a continuum of ratings—either numerical (1 through 10) or adjectival ("poor" through "excellent")—and sum up their evaluation by assigning these ratings to the objects being measured. And I emphasize the fact that there are no set answers to the problem—that the group, through establishing its own criteria and adhering to it, establishes a scale of correctness.

Toward the end of the college semester I use a modification of Parker Brothers' Monopoly to teach analysis of a total document for coherence. By the time we play Report Monopoly, the class has usually worked its way through mechanism and process description, proposals, introductions, instructions, standards and specifications, and multiple evaluation. Its members perform adequately at writing separate papers, but when I try to make them envision the introduction, standards, methods and procedure, evaluation, and conclusion and recommendations as integral parts of a single report, they smile
weakly and call attention to the beautiful parallelism they have achieved in their standards. To teach them the importance of the document as a coherent whole—that is, to teach them the principles of transition and continuity between parts, and the necessity for inevitability in conclusions—I have taken eight student-written reports, divided each into four more or less natural segments, and then substituted the thirty-two report segments for the "properties" and "utilities" featured in the original Parker Brothers game. For the players, the object of the game is to gain possession of the four parts of a totally coherent report. All segments, unlike the properties in Monopoly, cost the same, but at the end, when money and segments are added up, there are substantial bonuses for those reports in which: 1) there is an early and lucid statement of purpose; 2) every section, except the Introduction, logically evolves from the preceding one; 3) there are no irrelevant data, logical fallacies, or misleading transitional phrases; 4) the conclusion, in view of all the data that precede it, is inevitable; and 5) recommendations are practicable. For me, the object of the game is to teach students to denounce non sequiturs such as that which occurs in a report that claims in the Conclusion to have fulfilled the Statement of Purpose but has, in fact, gone off on a sharp and bewildering tangent.

Although the subjects of the reports I use at Purdue range from a Design for a Photoelectric Garage Door Opener to a Feasibility Survey of Fusion as a Source of Commercial Power, high school students daily cope with and observe problems which would make good subjects for formal reports—for example, an analysis of the fault in the parking-brake system that caused a cherished jalopy to slip down an incline and wreck itself—or a study of the conditions—soil, moisture, insect repellants—that make one Chinese elm in the schoolyard thrive while its neighbors succumb to
blight. So long as the student writes on a subject of unique interest to him or her—one on which he or she is somewhat knowledgeable—he is in a position to profit from instruction in both the formats and rhetorical strategies appropriate to technical writing.

And I should like to make a special plea that such units and approaches be more widely used, especially for instructing those students planning to go from high school to a science or engineering curriculum in college. After all, these young men and women will ultimately be dealing with problems which require quantitative solutions, answers furnished by the results of experimentation with chemicals and test tubes, stresses and strains, circuit boards and integrated chips. To deny them opportunities to practice utilitarian writing—as in the composition of a manual of instruction for performing a process with which they are familiar, or in the formulation of standards for a purchase they wish to make—is to deny them practice in those basic writing skills upon which is based the ability to write a substantive scientific or technical report. Furthermore, allowing scientifically or technologically oriented students to write on subjects dear to their hearts will warm egos long dampened by assignments tailored to students more interested in analyzing poetry and fiction than chronicling empirical observation.

As mundane as the exercises in mechanism and process description may appear alongside an assigned explication of "Stopping by Woods on a Snowy Evening," these demonstration projects help develop disciplined thinking and a meticulous care for the right phrase in budding poets and playwrights as well as the fledgling scientist or engineer. For in technical writing, mere impressionism will not suffice—and those of us who have taught creative writing know how often the ambiguous but euphonious phrase is brooked
because of the teacher's uneasy suspicion that it contains a symbolism too subtle to be picked up at first reading.

Lastly, I should like to urge those teachers concerned about the traps set by Public Doublespeak to look at a unit in technical writing as a highly effective classroom technique for preparing students to cope with the commercial propaganda deplored in the NCTE resolution passed at the 61st Annual Convention (Las Vegas). Exercises in definition and description practiced in full view of the object make students warier consumers. Exercises in setting standards alert some people to patterns of concealment in advertisements and public pronouncements. A methodical multiple evaluation often results in a degree of sophistication that makes the act of voting a carefully reasoned decision rather than a gut response. An analysis of a malfunctioning mechanism which involves painstaking deduction may provide a young person with a working model for testing the validity of a political argument. And a round of Report Monopoly sometimes teaches students to detect in Doublespeak what Hugh Rank, in his essay "Watergate and the Language" calls "sins of omission, calculated silence and secrecy, evasions and half-truths."¹

¹Language and Public Policy, ed. Hugh Rank (Urbana: 1974)