DOCUMENT RESUME

ED 224 047 CS 207 291

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TITLE Introducing Past and Present Technical Writing into the Freshman Composition Course.
PUB DATE Nov 82
NOTE 25p.; Paper presented at the Annual Meeting of the National Council of Teachers of English (72nd, Washington, DC, November 19-24, 1982).
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS College English; College Freshmen; Higher Education; *Motivation Techniques; Student Motivation; *Teaching Methods; *Technical Writing; Writing Exercises; *Writing Instruction; *Writing Processes; *Writing Skills
IDENTIFIERS Audience Awareness; *Freshman Composition

ABSTRACT

Using technical writing in the regular freshman composition course stimulates student interest by having the appeal of novelty and expands the horizons of students in the humanities and the pure and applied sciences. To begin the unit, one might stimulate interest in the content and style of technical writing of the past by using Robert M. Hutchins' preface to "Great Books of the Western World." Next, students should scan the table of contents of the "Books," noting that of the 70 writers included in the 54 volumes, 20 are technical or scientific--among them, Euclid, Ptolemy, Galileo, Hippocrates, and Copernicus. A device for creating interest in current technical writing is the preface to W. Steve Anderson and Don Richard Cox's anthology, "The Technical Reader: Readings in Technical, Business, and Scientific Communication." After such introductions, students can begin the study of selected passages. In choosing selections, one might be guided by subject areas, rhetorical type, degree of difficulty, and human interest. In examining selections, one might consider audience, point of view, the concept of objectivity, sentence length, vocabulary, and rhetorical strategies. A number of activities can grow out of a study of past and present selections: students might do technical writing in which they emulate the best of the past and the present; write for differing audiences and with varying degrees of formality; do formatting exercises; and construct simple graphics. To help students gain historical perspective, one might give them undated passages of technical writing and ask them to speculate on the dates. Finally, the unit can also be the stimulus for research papers. Examples of process, description, classification, partition, analogy, and audience are provided for past and present technical writing. (HOD)

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Introducing Past and Present Technical Writing into the Freshman Composition Course

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INTRODUCTION

Many English teachers find that teaching technical writing affects the way they teach regular composition courses--not only in their increased emphasis on economy and formatting but also in content. Just as sometimes (in our composition courses) we use past and current literature, we may also use past and present technical writing. Our rationale is two-pronged. First, we can stimulate interest in material having the appeal of novelty. (Students are accustomed to hearing about the tradition of literature but probably not of technical writing.) A study of technical writing of the past and present can expand the horizons of students in both the humanities and the pure and applied sciences. Second, because of diminishing job opportunities in the humanities and growing technical writing programs, more of our students will eventually take technical writing courses. In a freshman composition course, students might appropriately be introduced to such writing.

My interest in the first half of this topic developed when, as a new teacher of technical writing, I read two articles: Roger E. Masse and Patrick M. Kelley's "Teaching the Tradition of Technical and Scientific Writing"[1] and Walter James Miller's "What Can the Technical Writer of the Past Teach the Technical Writer of Today?"[2]

While those authors suggest using past technical writing in classes taken by students majoring in pure and applied sciences, it occurred to me that freshmen, regardless of majors, might benefit from this material. My paper today (based on some things I have tried and some I am now planning) is intended as exploratory, providing possible selections and assignments to be used in a freshman composition course--either as a unit on technical writing or as additional options for reading and writing (to be inserted whenever appropriate).

To begin the unit, one might stimulate interest in the content and style of technical writing of the past by using, as Masse and Kelley suggest,[3] Robert M. Hutchins' preface to <u>Great Books of the Western World</u>. The Great Books, according to Hutchins, include not only those by poets but also "those who brought deep insight into the mystery of number and magnitude or the natural phenomena they observed about them. We do not agree that better means of observation or more precise instruments of measurement invalidate the thinking of great scientists of the past, even where such means cause us to correct the hypotheses of these scientists."[4] One might have students look at the Table of Contents of <u>Great Books of the Western World</u> and note that of the 54 volumes, 3 are introductory; and of the remaining 51, 9 are technical or scientific writing. Of the 70 writers included, 20 are technical or scientific--among them, Euclid, Nichomachus, Ptolemy, Hippocrates, Galen, Archimedes, Copernicus, Kepler, Galileo, Harvey, Newton, Lavoisier, Fourier, and Faraday.[5]

A device for creating interest in the second part of this topic, current technical writing, is the preface to W. Steve Anderson and

Don Richard Cox's anthology, The Technical Reader: Readings in Technical, Business, and Scientific Communication. "In order to present a broad spectrum of reports," the editors explain, they included "some functional, workaday documents that were not written to be read for pleasure. But all selections are readable, and most are even enjoyable. . . . report writing can be artful as well as functional." Thus, examination of technical writing of the past and the present serves both utilitarian and expansion purposes: ". . . a larger view [may] seep . . . through. . . ."[6]

After such introductions, students can begin the study of selected passages. Past material might come from Great Books of the Western World, standard histories of technology, and elsewhere. Present material can be collected from encyclopedias of science and technology, from anthologies like the one edited by Anderson and Cox, from instruction manuals, from specifications, etc. (I usually take some examples to class and ask students to bring in material they find.)

In choosing selections, one might be guided by subject areas, rhetorical type, degree of difficulty, and even human interest. In examining selections, one might consider audience, point of view, the concept of objectivity, sentence length, vocabulary, and rhetorical strategies such as process, classification, etc.

I have divided my paper, first, into Past Technical Writing and Present Technical Writing and, secondly (under each main heading), by rhetorical type. (One could, of course, instead arrange the material by rhetorical type and then do comparisons and contrasts of past and current examples.) Included here in Past Technical Writing are process (third, second, first person, and combinations thereof), description, classification, partition, and analogy. (The latter, however, is also discussed in passages dominated by one of the other strategies.) The final section is on audience (but, again, this will be considered in the other sections as well). Included in Present Technical Writing are process, description, definition, classification, partition, and (again) audience.

A number of activities can grow out of a study of the following past and present selections (and of outside readings [in students' majors] from Great Books of the Western World, excerpts in histories of technology, and current technical writing). Students might do technical writing in which they emulate the best of the past and the present; write for differing audiences ~~and~~ with varying degrees of formality; do formatting exercises; and construct simple graphics. To help students gain historical perspective, one might give them undated passages of technical writing and ask them to speculate on the dates. Finally, this unit can also be the stimulus for research papers--for example, on tools of the past and the present.

PAST TECHNICAL WRITING

PROCESS

This section covers two types of process (for the observer and for the doer): the first (explaining how something is done) in the third person, and the second (explaining how to do something) in second person. Some passages, however, are a combination of the two, and some include first person as well.

Third Person

1. Vetruvius (first century B.C.), Architecture (section on making artillery)

Note the signals of place, definitions of terms, and handling of detail.

All the dimensions of the machines as designed are given from the proposed length of the arrow which the machine is to let fly. The ninth part of this gives the size of the opening in the frame. Through these openings twisted cords are stretched,* which are to hold back the arms of the catapults themselves. The height and breadth of the frame are fixed by the size of the hole. The cross-pieces at the top and bottom of the frame are called . . . perforated beams and are to be one hole thick, and one and three-quarters wide; at the ends, one and a half.

*The cords are wound as tightly as possible round the nuts above and below the cross-pieces. The arm passes between the cords and still further stretches them.

Also, note some use of first person and a reference to audience: ". . . in order that persons who are ignorant of geometry may be equipped and may not be delayed by calculation amid the perils of war, I will expound in accordance with my own knowledge. . . ."[7]

2. Philo of Byzantium (circ. 200), Mechanics, Book IV (section on artillery)

This is another process passage written in third person but also containing first person references: "I think," "I hope," and "I will only tell you of my own experiences."[8]

3. Pliny (A.D. 79), Natural History

In the following passage on mining, note the explanations of action, definitions of terms, and use of analogy. Pliny describes the process of

> bringing streams along mountain-heights frequently a distance of 100 miles for the purpose of washing away the debris of . . . [a] collapse; the channels made for this purpose are called <u>corrugi</u>, a term derived I believe from <u>conrivatio</u>, a uniting of streams of water. This also involves thousands of workmen. . . . impassable rocks are hewn away and compelled to provide a position for hollowed troughs of timber. The workman hewing the rock hangs suspended with ropes, so that spectators viewing the operations from a distance seem to see not so much a swarm of strange animals as a flight of birds. . . . Trenches are excavated for the water to pass through--the Greek name for them means 'leads'; and these, which descend by steps, are floored with gorse--this is a plant resembling rosemary, which is rough and holds back the gold.

Pliny not only describes a process but also makes a judgment: contrasting peacetime and wartime uses of iron, he calls iron

> the most precious and at the same time the worst metal for mankind. By its help we cleave the earth, establish tree-nurseries, fell trees, remove the useless parts from vines and force them to rejuvenate annually, build houses, hew stone and so forth. But this metal serves also for war, murder and robbery; and not only at close quarters, man to man but also by projection and flight; for it can be hurled either by ballistic machines, or by the strength of human arms or even in the form of arrows. And this I hold to be the most blameworthy product of the human mind.[9]

4. Agricola, <u>De</u> <u>Re</u> <u>Metallica</u> (1556)
Note
/the sensory details in this process and the occasional use of

first person as well as third person:

> . . . first of all they hew out the rock of the hangingwall or of the footwall if it be less hard; then they place timbers set in hitches in the hanging or footwall, a little above the vein, and from the front and upper part, where the vein is seen to be seamed with small cracks, they drive into one of the little cracks one of the iron tools I have mentioned; in each fracture they place four thin iron blocks, and in order to hold them more firmly, if necessary, they place as many thin iron plates back to back. . . .

Here, too, is a passage containing an evaluation--a defense of metallic art: "If we remove metals from the service of man, all methods of protecting and sustaining health and more carefully preserving the course of life are done away with. If there were no metals, man would pass a horrible and wretched existence in the midst of wild beasts. . . ."[10]

5. <u>Benū Mūsā Instrument for Extraction of Objects from Water</u> (Islamic technology--9th century)

Note the clear process signals and the occasional use of first person:

> We will show how an instrument . . . can be produced with which a man, if he lets it down, can raise pearls from the sea, and can obtain objects that have fallen into wells or have sunk deep down in rivers and seas. For that purpose we construct the two identical halves . . . of a (hollow) copper cylinder. . . . One half-cylinder will be adjusted to the other so that there is not the least space between them. . . . Teeth are then soldered on to each half of the cylinder. . . . The teeth should be fixed to follow the shape of the cylinder. . . .[11]

Second Person (Instructions)

1. Theophilus (an 11th-century German Benedictine), Scheme of Various Arts (a description of the arts and crafts serving churches and religious houses)

Note the use of the imperative, the emphasis on action, and clear signals of time and place.

Of Tempering Files. Burn the horn of an ox in the fire, and scrape it, and mix with it a third part salt, and grind it strongly. Then put the file in the fire, and when it glows sprinkle this preparation over it everywhere, and, some hot coals being applied, thou wilt blow quickly upon the whole, yet so that the tempering may not fall off, and quickly withdrawing it, extinguish it equally in water, and taking it out, dry it slightly over the fire. Thou wilt in this manner temper all things which are made of steel.

Another kind of tempering of iron instruments is also made in this manner, by which glass is cut, and also the softer stones. Take a three year old buck-goat, and tie him up within doors for three days without food; on the fourth day give him fern to eat and nothing else. When he shall have eaten this for two days, on the night following enclose him in a cask perforated at the bottom, under which holes place another sound vessel in which thou wilt collect his urine. Having in this manner for two or three nights sufficiently collected this, turn out the buck, and temper thine instruments in this urine. Iron instruments are also tempered in the urine of a young red-haired boy harder than in simple water. . . .

In another section (Of Founding Bells), note the standard instruction language:

> In making a bell first cut a dry piece of wood, the length desired for the bell, so that on every side it may protrude beyond the shape to the length of one palm, and let it be square at one larger end, at the other more pointed and round, so that it can be revolved in a hole. And let it be drawn out larger and larger, so that, when the work has been finished, it can easily be taken out.

but also the unique references to fingers and a boy: "that a hollow may be made two fingers wide," "an incision must be made two fingers deep," "apply strongly beaten clay around it, first of all two fingers thick," and "Then set this mould between the planks, and the boy who can revolve it being seated, thou wilt turn it as thou mayest wish, and holding a cloth moistened in water thou wilt smooth it.[12]

2. Villard De Honnecourt of Picardy (13th-century architect and engineer)

Note, in his office record of about 1235, the standard instruction language (second person imperative), personal notes, and references to bishops:

> Villard de Honnecourt greets you, and begs that all those who work with the help given in this book will pray for his soul and keep him in memory. For good counsel can be found in this book on the great art of masonry and the construction of hand carpentry. . . . If you wish to make a Hand-warmer, you should make in copper a sort of apple, with two halves which can be locked into another. Within the copper apple must be six copper rings. . . . This apparatus is suitable for a bishop;

he can cheerfully hold High Mass, for if he bears this device in his hands, he will remain protected from cold so long as the fire lasts.

In the following passage on the construction of a wheel, note Honnecourt's concern with aesthetics vs. practicality and with purpose: ". . . construct a silver case . . . with carvings and perforations which you will make both for the sake of beauty and of lightening its weight. . . . You will then perforate it so that the eye of the ignorant shall not perceive what is cleverly inserted inside the case.[13]

3. Instruction Book: McCormick-Deering Farmall Tractor (1929)

Note the headings (for example, "Operation and Care of Magneto") and the imperative ("Line up the magneto on the magneto bracket and bolt it in place, leaving the two screws out of the adjustment coupling and being sure that any shims that were between the coupling are replaced. Disengage starter pawl."). Also like current instructions are the warnings ("Never overload the tractor," "Do not attempt any adjustment of the magneto without reading instructions carefully.") and concern for audience (the "experienced tractor operator" vs. "the man who is wintering his tractor for the first time"). Some sentences are short as recommended in current technical writing, but some are longer (for example, in this passage which shifts to third person): "Where a tractor operator has finished using his tractor, although at that time the weather may not be freezing, he should take care to drain his engine because, when the freezing weather does come, he may have forgotten that he left water in the cooling system." Finally, a chatty, informal tone appears in some sections: "A man may forget to drain his engine or he may not think it is going to be cold enough to freeze the water in the cylinder jacket."[14]

DESCRIPTION

1. Jakob Leupold--from Theatrum Machinarum hydraulicarum (1725) (on pumping apparatus)

Note the general to specific order and an informal, personal note:

> First it must be known that all . . . wheels are arranged in the same way; and that what one does, they all do and that whoever understands the structure and working power of one, understands also the others.
>
> The whole engine is really a force pump, for the inventor understood well that water in a cylinder or pipe cannot be brought all at once to such a height, and that neither cylinder, valves or pipes could possibly stand up to such work (just as in our mines we do not raise the water all at once in a single pipe or cylinder, but raise it through various intermediate stages). . . . Many might think that if he had used at least one 6 inch cylinder, he would have needed only about three of them and thereby would have been able to save money and labour. . . .[15]

2. William J. M. Rankine, Manual of the Steam Engine and Other Prime Movers (1859)

Note thathe mentions the components of the engine before he gives the names:[16]

> The name of a heat engine in which the fluid performs work consists essentially of an enclosed space whose volume is capable

of being alternately enlarged and contracted by the motion of one of its boundaries. The enclosed space is of a cylindrical form, in all engines that are extensively used in practice; and it is called the cylinder, even in those exceptional engines in which it has some other figure. Its movable boundary is called the piston, and is usually a cylindrical disc fitting the cylinder in which it moves to and fro in a straight line. In some . . . engines the piston has other forms, but its action always is to increase and diminish alternately the volume of a certain enclosed space.[17]

CLASSIFICATION

Leon Battista Alberti, "On the Process of Building" from Architectura (1451-52)

Note the standard classification techniques:

The Types of Vaults

There are several Sorts of Vaults; so that it is our Business here to enquire wherein they differ, and of what Lines they are composed. . . .[:] the plain Vault, the Camerated or mixed Vault, and the hemispherical Vault or Cupola, besides those others which partake of the Kind of some of these. . . .

and the comparisons: "like a Hill bored through," "the plain Vault therefore is like a Number of Arches joined together Sideways, or like a bent Beam," and "equal Lines meeting at the Angles like crooked Horns."[18]

PARTITION

Leon Battista Alberti, "On the Process of Building"

Note, in "Of Stone Bridges," the partitioning language ("It remains now that we treat of the Stone-Bridge, the Parts whereof are these: the Banks of the Shore, the Piers, the Arches and the Pavement"); concern for aesthetics ("An odd Number of Arches is both most pleasant to the Sight, and conduces also to Strength. . . ."); and informality ("The Piers ought to be placed in those Parts of the River where the Water flows the most slowly, and (to use such an Expression) the most lazily. . . .").[19]

ANALOGY

John Smeaton, Narrative of the Building of the Eddystone Lighthouse (1791)

Smeaton uses allusions and figurative language to describe his difficulties in the building of the lighthouse. For example, if he does not plan carefully, building the Eddystone lighthouse will be, he says, like "the rolling of the stone of Sisyphus." Here is an extended comparison ("a poetic, but . . . scientific analogy"):[20]

> On this occasion, the natural figure of the waist or bole of a large spreading oak presented itself to my imagination. Let us for a moment consider this tree: suppose at twelve or fifteen feet above its base, it branches out in every direction, and forms a large bushy top. . . . This top, when full of leaves, is subject to a very great impulse from the agitation of violent winds; yet partly by its elasticity, and partly by the natural strength arising from its figure, it resists them all, even for ages, till the gradual decay of the material diminishes the coherence of the parts, and they suffer piecemeal by the violence; but it is very rare that we hear of such a tree being torn up by the roots.
>
> Let us now consider its particular figure. Connected with its roots, which lie below ground, it rises from the surface thereof with a large swelling base, which at the height of one diameter is generally reduced by an elegant curve, concave to the eye, to a diameter less by at least one-third, and sometimes to half of its original base. From thence its taper diminishing more slow, its sides by degrees come into a perpendicular, and for some height form a cylinder. After that a preparation of more circumference becomes necessary, for the strong insertion and establishment of the principal boughs, which produces a swelling of its diameter.
>
> Now we can hardly doubt but every section of the tree is nearly of an equal strength in proportion to what it has to resist; and were we to lop off its principal boughs, and expose it in that state to a rapid current of water, we should find it as much capable of resisting the action of the heavier fluid, when divested of the greatest part of its clothing, as it was that of the lighter when all its spreading ornaments were exposed to the fury of the wind: and hence we may derive an idea of what the proper shape of a column of the greatest stability ought to be, to resist the action of external violence . . . .[21]

AUDIENCE

Two effective examples of audience considerations in past technical writing come from Sextus Julius Frontinus and Arthur M. Wellington. Frontinus, water commissioner of Rome (97 A.D.), set up alternate routes in his report, "Aqueducts of Rome." Technical readers were to take one route, and less technical ones, another. Much later, Arthur M. Wellington, in his The Economic Theory of the Location of Railways (1887), used different-sized print for various readers: large print, a general treatment; medium-sized print, some technical material; and small print, comprehensive technical material.[22]

PRESENT TECHNICAL WRITING

In the second part of this paper I have, again, arranged selections according to rhetorical type; but, again, these are obviously not exclusive. (For example, audience might be studied in all the selections.)

PROCESS

Third Person

1. How to Drill Your Own Well

While the title and some sections are in second person, some explanations of process are primarily in third person:

> ~~All underground water originates on the surface of the earth.~~ It is evaporated by the heat of the sun; it forms clouds and falls as rain or snow; it accumulates in streams, ponds, oceans, etc.; it seeps into the ground. . . . So how does water get in rock? It enters through cracks in the rock, and the point at which the water enters the crack determines the quality of

the water. For example, the water may be filtered through a layer of sand before it enters the crack. In that case, you would likely get good quality water. However, the crack could open into the bottom of a creek or river, causing the water to be polluted the same as surface water.[23]

2. Motorcycle (from Encyclopedia of Science and Technology)

Among the examples especially appealing to students is the operation of a motorcycle. In this passage, note the action words: "The driver starts the engine by pulling the cord, stepping on a ratchet lever, or actuating an electric starter to rotate the crankshaft. He then controls engine speed and the clutch, shifts gears, and applies brakes by twisting grips on the handlebars and by foot pedals."[24]

Second Person

The second person process passages may be neutral and formal (as in examples #1 and 2) or somewhat personal and less formal (as in example #3).

1. "To Assemble the Hydra-Drill 200-P" (from How to Drill Your Own Well)

   The drill stem is in 5' lengths. Take a length of drill stem and attach the MALE threads to the Earth Probe bit. . . . Attach the other end of the drill stem to the Power Swivel. . . . To assure easy making and breaking of connections, always smear the male threads with grease. . . . Attach a garden hose between the swivel and your supply of water pressure. Use at least a 3/4 inch hose.

This brochure also includes brief definitions of terms: "Now you 'case' the well, which simply means inserting a casing to keep the well from collapsing at some future time."[25]

2. 1/3 Sheet Orbital Finishing Sander

Note the standard instruction language in the section on "Attaching Abrasive Paper": "Unplug Sander"; "Position Sander as shown in Figure 1," "Turn Sander over," etc. Here there are no references to the giver of the instructions and no informal sections.[26]

3. Texas Instruments Programmable Slide-Rule Calculator SR-52: Owner's Manual

This is a set of instructions containing some neutral sections and some more personal ones. Note the neutral second person, imperative in "Enter the program," "Press," "Remove the card," etc. and the caution, "Do not restrict or hold the card after it is engaged by the drive motor." Note, however, these personal references to both the giver and the recipient of the instructions (which might be studied separately or compared and contrasted with those in earlier technical writing): the giver--"Now we will give you a quick introduction to programming the SR-52. . . ."; the recipient--"You have just purchased a highly advanced pocket calculator"; "By now you are probably eager to use your calculator"; "You have probably noticed"; "You may be wondering: How do I go from the calculate to the run mode?" Finally, included are informal sections like ". . . You are in for a pleasant surprise" and "To make matters worse, imagine."[27]

DESCRIPTION

1. Instruction Manual: Standard 83-052 Welding Torch; 83-053 Cutting Assembly

Here is a good example of paired rhetorical strategies--in this case, description and procedure (accompanied by a visual aid):

The Neutral Flame is produced by burning the correct mixture of oxygen and acetylene gas. The flame consists of two distinct parts: a smooth brilliant white cone on the tip end and an outer bushy transparent flame envelope. The easiest way to obtain a neutral flame is to first obtain a carburizing one and continue to add oxygen to the flame until the feathery edge of the small cone just disappers. This is the neutral flame. Welds made with this flame should be thoroughly fused and free from burned metal or hard spots.[28]

2. John Deere Company, FMO: Tractors

The section on the cooling system contains a description of two types of thermostats:

There are two types of thermostats: Bellows-type and Bimetallic-type. The BELLOWS-TYPE consists of a short length of circular corrugated tubing closed at both ends and filled with a liquid having a low boiling point (ether). . . . The thermostatic valve is located directly above the bellows. The elasticity of the bellows holds the valve closed when the water is cold. The water pump does not create enough pressure to force the valve open. The BIMETALLIC-TYPE of thermostat consists of a spiral of a bimetallic strip. . . . This is a strip of steel welded to a strip of bronze. Bronze expands more when heated than steel does, and as the temperature of the water surrounding the spiral rises, the spiral uncoils and opens the valve.[29]

DEFINITION

Here this rhetorical type is discussed separately, but it also appears in the Classification and Partition sections.

1. Microwave Oven Radiation (a government publication)

What Is Microwave Radiation?

Microwaves are a form of 'electromagnetic' radiation; that is, they are waves of electrical and magnetic energy moving together through space. Electromagnetic radiation ranges from the very energetic gamma rays and x rays to the less energetic radio frequency waves used in broadcasting. Microwaves fall into the radio frequency band of electromagnetic radiation. Microwaves should not be confused with x rays, which are more powerful.

Microwaves have three characteristics that allow them to be used in cooking: they are reflected by metal; they pass through glass, paper, plastic, and similar materials; and they are absorbed by foods.[30]

2. How to Drill Your Own Well

One section of this brochure contains definitions of a water well and ground water: "What Is a Water Well? Basically, a water well is a hole or shaft down to a water vein or water table below the surface of the ground. . . . What Is Ground Water? By the term 'ground water' we mean all of the water beneath the surface of the ground. Ground water is found in 3 general types of formations:

1. Layers of sand
2. Layers of gravel
3. Porous rock or a crack in rock."[31]

CLASSIFICATION

1. Texas Instruments Programmable Slide-Rule Calculator SR-52

The section following "Features" is "Modes of Operation"--

consisting of classification and some process (second person): calculate, run, and learn.

> Calculate Mode . . .[--] manually operate the SR-52 as a general-purpose calculator; Run Mode . . . [--]use a program designed by yourself or by someone else to solve a problem; Learn Mode . . . [--]After defining the steps you would use in the calculate mode to solve a problem, you can key these steps directly into the SR-52 program memory for immediate use in the run mode.[32]

2. <u>How to Drill Your Own Well</u>

In this passage, bits are defined and classified:

> There are three basic bits to perform three basic functions. THE EARTH PROBE BIT is a fish-tail shaped bit used to drill a pilot hole in materials other than rock. . . . THE CORE BIT is a tube-shaped bit to drill a pilot hole in solid rock. It cuts a core of rock. . . . THE REAMER BIT is a three-blade bit used to enlarge the pilot hole so you can install screen and casing into the well. . . .[33]

3. Bridge (from <u>Encyclopedia of Science and Technology</u>)

This passage includes first a definition: "A structure erected to span natural or artificial obstacles, such as rivers, highways, or railroads, and supporting a footpath or roadway for pedestrian, highway, or railroad traffic." Then appears the classification: "Bridges may be classified in several ways: . . . fixed and movable bridges [and] . . . the deck bridge . . . and the through bridge. . . . Fixed bridges are subdivided into short-span and long-span types.[34]

PARTITION

1. Automobile (from <u>Encyclopedia of Science and Technology</u>)

After the definition ("A generic term for a self-propelled, trackless personal or public carrier which encompasses passenger cars, recreational vehicles, taxis, and buses used to transport people in cities, on highways, or across country") comes the "Major Components" section:

> Ladder, swept-perimeter, x-type, and unitized frames of various designs are the foundation upon which the chassis is assembled. The chassis consists of all components essential to vehicle operation, except the body. These components include the engine, or power plant, the power train (clutch, transmission, and drive shaft), and the rear axle. In addition, there are the various systems: steering, suspension, brake, fuel-exhaust-emission control, electrical (ignition and lighting), cooling, and lubrication.[35]

2. <u>Tying Down Your Mobile Home</u> ("Tie-Downs")

Again, the definition ("Tie-downs for mobile homes are a system for anchoring to prevent rolling or pushing of your mobile home by winds. The Kansas Legislature defines a tie-down as any device designed for the purpose of anchoring a mobile home to ground anchors.") is followed by partition: "There are three major components to consider when tying down your mobile home [,] . . . pier, . . . ground anchor . . . [and] tie-down. . . . The components of each tie-down set include: two anchors, . . . tensioning devices . . . . [,] steel cable or strapping for the ties[,] and buffers. . . ."[36]

AUDIENCE

Among the numerous current examples of audience consideration is a John Deere Company paper in two versions: technical and general. The first version, "Recognizing Productive, Energy-Efficient Agriculture in the Complex U.S. Food System" (presented at a meeting of the American Society of Agricultural Engineers, December, 1975), contains a summary on the first page, technical language in the body (and graphics matching the language), and a list of primary and secondary sources at the end. The less formal version, "Energy: From Sun, to Plant, to Man," is printed in orange, black, and white (unlike the black and white first version), has no summary, uses general language and graphics appropriate for laypeople, and has no references at the end.[37]

CONCLUSION

From first-year college students' excursions into past and present technical writing will come two benefits: (1) knowledge of the roots of another tradition and (2) preparation for writing they may do in the future. This approach in a freshman composition course has the advantage of encouraging both research into the past (into histories of technology, encyclopedias, or even in primary sources) and collection of current materials. Further, the subject matter contains enough variety to appeal to students in both the humanities and the pure and applied sciences. Thus, the course can admirably accommodate not only the past and the present but also the humanities and technical fields.

Notes

[1] Technical and Professional Communication, ed. Thomas N. Sawyer (Ann Arbor: Professional Communication Press, Inc., 1977) (from a paper given at the Conference on College Composition and Communication, Philadelphia, PA, 23 March 1976), pp. 79-87.

[2] IRE Transactions of Engineering Writing and Speech, Vol. EWS-4, No. 3, Dec. 1961, pp. 69-76.

[3] Pp. 80-86.

[4] Preface, Great Books of the Western World, ed. Robert M. Hutchins and Mortimer J. Adler (Chicago: Encyclopaedia Britannica, Inc., 1952), I, p. xxiii.

[5] See Masse and Kelley, p. 81.

[6] Preface (New York: Holt, Rinehart and Winston, 1980), p. x.

[7] Leob Classical Library, 1914; rpt. Friedrich Klemm, A History of Western Technology (Cambridge, MS: The M.I.T. Press, 1964), pp. 31-33.

[8] Rpt. Klemm, pp. 30-31.

[9] Rpt. Klemm, p. 51.

[10] Rpt. Miller, p. 72.

[11] From the German trans. of the ninth-century Kitab al Hijal by Friedrich Hauser, Erlangen, 1922; rpt. Klemm, pp. 74-75.

[12] Theophilus Presbyter (also called Rugerus), Scheme of Various Arts, trans. Hendric, 1847; rpt. Klemm, pp. 67-68.

[13] Plates 2, 9, 17, 44 from R. Willis, Facsimile of the Sketch-book of Wilars de Honecort, London, 1859; rpt. Klemm, pp. 88-94.

[14] Instruction Book: McCormick-Deering Farmall Tractor (Chicago: International Harvester Co., 1929) (obtained from J. Donald Herr, Aaronsburg, PA , 1979), n. pag.

[15] Description of the Great Machine at Marly; rpt. Klemm, p. 207.

[16] See Miller, p. 73.

[17] Rpt. Miller, p. 73.

[18] Architectura, trans. James Leoni, London, 1755; rpt. Klemm, pp. 113-14.

[19] Alberti; rpt. Klemm, pp. 117-18.

[20] Miller, p. 73.

[21] Rpt. Miller, p. 73. This selection also appears in the Anderson and Cox anthology, pp. 115-16.

[22] Pointed out by Miller, pp. 71, 74.

[23] How to Drill Your Own Well [brochure] (Opelika, AL: Deep Rock Mfg. Co., 1978), p. 6.

[24] "Motorcycle," Encyclopedia of Science and Technology (New York: McGraw-Hill, 1977).

[25] How to Drill Your Own Well, pp. 16, 11.

[26] 1/3 Sheet Orbital Finishing Sander: Owner's Guide [brochure], Montgomery Ward, n.d., p. 4.

[27] (Dallas: Texas Instruments, 1975), pp. 9, 11, 1, 5, 7, 10, 1, 3.

[28] (Milwaukee: NAPA Service Equipment Company, 1978), p. 1.

[29] John Deere Company, FMO: Tractors, 1974; rpt. Deborah C. Andrews and Margaret D. Blickle, Technical Writing: Principles and Forms (New York: Macmillan, 1978), pp. 134-35.

[30] An FDA Consumer Memo: Microwave Oven Radiation (Rockville, MD: HEW, 1979), n. pag.

[31] How to Drill Your Own Well, p. 5.

[32] Texas Instruments, p. 4.

[33] How to Drill Your Own Well, p. 16.

[34] Encyclopedia of Science and Technology.

[35] Encyclopedia of Science and Technology.

[36] Richard L. Jepsen, Tying Down Your Mobile Home (Manhattan, KS: Cooperative Extension Service, Kansas State University, Sept. 1975), n. pag.

[37] Leon F. Nelson, William C. Burrows, and Fred C. Stickler [copies obtained from Bernard E. Ritzinger, Manager of Special Writing Services, John Deere Company].