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Piled Higher and Deeper

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Over the past several weeks the Sphex Club has been treated to an extraordinary series of lectures—lectures which have treated subjects of enormous gravity. Spring calls for a more modest exploration, one which in many ways is less serious than those of the past few months. After all, when the dogwoods are blooming and the air is warm, who can be totally serious?

I propose that we talk for a while about teachers, specifically college and university teachers. In recent years, I have come to realize that much of what I heard about professors as a student falls into the realm of folklore. That is, much of it in the same vein as a conversation with my sophomore roommate during the first week I was in college. "You're going for a BS degree? You know what bs stands for. MS is more of the same, and Ph.D. is piled higher and deeper. Everyone here has heard the same definition of those terms, and thus the story is ingrained in what can only be called a campus folklore. A rich lode of that folklore concerns college and university professors. In addition to various journals of folklore, I am particularly indebted to Dr. Simon J. Bronner of Penn State from whose excellent book I have borrowed the title for this talk and who is the leading collector of college folklore.

In recent years books such as *Profscam* and *The Closing of the American Mind* have leveled strong criticisms of college and especially university teaching. Responses to those critics await a lecture given at a more appropriate time of the year. Instead, during the next several minutes, I will share with you the tradition of which I am now a part, in the same sense that those who follow the legal profession walk in the footsteps of Oliver Wendell Holmes, Learned Hand, and Felix Frankfurter. You will hear a variety of observations regarding college teachers. Some of these will be descriptions of great teachers given by their pupils; some will be the stuff and substance of college folklore about teachers, and a few will be my own observations. You will have to decide which, if any, lie within the realm of folklore. Perhaps some of what you hear will jog your memory about those whose teaching affected your lives and we can share those recollections as we discuss the paper.

Since students often portray professors as absentminded, arrogant, dull, impractical or lacking common sense, singlemindedly devoted to their subjects, or in other ways eccentric, I will begin by talking about absent-minded professors.

"Students have reported the following story about both philosopher Irwin Edman of Columbia and mathematician Norbert Wiener of MIT. A student asks the professor the way to his office. The professor replies "If it is that way, then

I've had my lunch; if the other way, then I must be on my way to it." According to George Carey, the story as it is told at the University of Massachusetts has the vague professor answering a student's invitation to lunch with 'Which way was I headed when you stopped me?" "Toward Bartlett Hall," says the student. "Sorry, then," says the professor, "I can't join you. I've already eaten." A related story is told about Isaac Newton. When a friend paid a visit one evening, the servant announced that his master was in his study and not to be disturbed. The visitor decided to wait since it was approaching Sir Isaac's dining hour. The table was set and in a short time a boiled chicken under cover was brought in. Time passed. The fowl was growing cold, but Sir Isaac did not appear. Finally, being hungry, the visitor devoured the fowl and covered up the empty dish. At the same time he asked the servant to have another chicken boiled for Sir Isaac. But before the second bird was ready, the great man came down. He apologized to his visitor for his delay and added, "Give me leave to take my short dinner, and I shall be at your service; I am fatigued and faint." He then took the cover off the dish, and finding the plate empty, turned to the visitor with a wan smile. "You see what we studious people are; I forgot that I had dined."

"Many colleges have tales about the professor who drove his car to the city to do research. Forgetting he had driven, he took the train back. Some versions note that the professor "bawled out his wife for not meeting him at the station with the auto". Dr. Gertrude Teller was a legendary teacher of foreign languages at Lynchburg College during the fifties. She was well-known for simply stopping her old Studebaker wherever it suited her and leaving it. One could routinely see it parked in the middle of Main Street, where she left it to go into Leggetts, and it might stay there for a while if she chose to take the bus back to the College.

"The following tale is told as true on more than one campus. "A professor came into class one day, took his wrist watch off, and placed it on the desk in front of him so he could watch it as he lectured. He began his lecture, stopped, looked at the watch, picked it up, and said, 'I find someone's wrist watch here on my desk. Did anyone lose it?' A student raised his hand and suggested that the professor take the watch to lost-and-found after class. The next day the professor came to class and announced that he had lost his wrist watch. He asked if anyone had found it.

In the early sixties, Dr. Constance Rowe taught French at Lynchburg College. Stories of her absentmindedness were legendary. Dr. Rowe and Professor Jeter Parker owned tweed overcoats which were quite similar. However, Miss Parker was much taller and substantially larger than Dr. Rowe. After a faculty meeting, Dr. Rowe picked up Miss Parker's overcoat by mistake, a mistake which was immediately obvious when Miss Parker attempted to don the

much smaller coat. She assumed that Dr. Rowe would return the coat. Imagine her surprise later in the week, as she heard Dr. Rowe explaining to a colleague.."You won't believe this, but my coat grew. I've heard of clothes shrinking, but not growing. Anyway, I took it to the tailor to have it resized and now it fits fine."

"A Cornell Prof eased back to his office after class. He found a long line of students waiting in front of the door, so he took his place at the end of the line. Then there is the tale of Professor Brown's visit to Professor Smith. The evening wore on, the guest showed no signs of leaving, and finally Brown said, "Harry, I'm awfully sorry but it's 2 A.M. and I must ask you to go. I have an 8 o'clock class in the morning." "Bill," said Harry, "you're in my house."

"David Starr Jordan came to Stanford as president in 1891 with an international reputation for his encyclopedic knowledge of fish and their classification. He "determined that he would also come to know each student by name." Several years later he was asked how he was progressing. Jordan sadly said he had given up. "I found that every time I learned the name of a student, I forgot the name of a fish."

They also tell for true the story of the University of Illinois professor who invited a number of his associates to dinner. When the first guest showed up in a tuxedo, the host's wife motioned him upstairs to do a quick change into formal dress. The other guests arrived, but the host did not reappear. At length the frantic hostess excused herself and slipped up to his room. The professor was sound asleep. Taking off his clothes to change, he had forgotten what he was doing, and had unconsciously put on his pajamas and gone to sleep.

Professors are important, campus-wise, chiefly because they give grades. How they arrive at their decisions, folklore alone knows. The old story, of course, is that the prof throws the bluebooks down the stairs, and gives A's to those which land at the foot, F's to those at the head. "At Purdue, with its scientific bent, the students knew that blue books were thrown upstairs in order that the grade distribution more nearly approximate the bell-shaped curve." Or he throws them at the ceiling, and whichever stick receive an A. A Harvard tale has chemistry professor J. P. Cooke distributing his papers to his family; he gave the F's himself, his son-in-law the D's, and so on up to the baby, who, being the slowest, marked the A's. From Jim Huston, I recall the tale of the professor who customarily placed his papers in two heaps, representing the good and the bad students. When he came across an error by a good student he disregarded it, saying, "He knows better than that." When he saw a correct answer by a poor student he marked it wrong, saying, "He couldn't have meant that."

Professors arbitrarily piling papers in anal-retentive style frequently appear

in student stories. Famed Harvard professor Nathaniel Shaler (1841-1906) piled bluebooks in a mountainous heap on his sofa. After they had aged a week, he plunged both hands deep into the heap and carried all he could to a chair on the opposite side of the room. A second week went by and he carried another armload to another chair, and he made a similar move after the third and fourth week. Those in the first chair he gave As, those in the second got Bs, and so on. All those that slipped onto the floor flunked. At Hope College, the Reverend Mr. Dykstra supposedly received grades for students directly from God.

Since students often depend on cramming to get by, the idea of a "pop" or surprise quiz gives them nightmares. Especially at older college halls where doors have transoms, students tell the one about the professor who is asked by students whether he ever gives surprise quizzes. The professor laughs and tells the students that the day he gives a pop quiz is the day he climbs through the transom! A sigh of relief passes through the classroom. Then one day the transom began to creak open and, to the amazement of the students, in climbed their professor grinning happily and clutching a three-page quiz in his hand.

Students, aware of the "publish or perish" motto in academe, believe that professors treat them as secondary to their writing tasks. One story circulates about prolific Harold Bloom of Yale who was called at his home in New Haven by a graduate student. Bloom's wife answered, "I'm sorry, he's writing a book." "That's all right," the student replied, "I'll wait."

Students often judge harshly the performance of professors in class. It's not just that professor are dull, but that they are in control, right or wrong. From Wisconsin comes the story of the geography professor lecturing from faded notes, droning along about the Mississippi River dumping each year 9,980,000 tons. He turned the page and started another topic. A brave student asked, "The Mississippi River dumps each year 9,989,000 tons of what?" The professor turned the yellowed page back, and again intoned, "The Mississippi River each year dumps 9,989,000 tons," paused, turned the page, and said, "It don't say."

At Ohio State, the story gets around about the lecturer who began reading in a wheezy, cracked voice. At the bottom of page one, he turned the leaf and continued reading. What he read repeated the first page, and the third was the same. The typist had delivered the notes to him in triplicate. In a variation from Harvard, the story is about a famed philosophy professor who lectured on logic. Previous to the class, some graduate student sneaked into his office and disarranged his lecture notes. When the professor read through his notes, however, he didn't notice the difference.

Many apochryphal tales are attached to specific legendary characters. Many stories, for example, are told about the great Harvard professor of literature

George Lyman Kittredge (1860-1941), known as "Kitty" by his many students of ballad, folklore, and English literature. A distinguished, imposing figure, possessed of a stern New England morality, Kittredge once encountered several undergraduates raucously singing "The Bastard King of England." He rapped his cane sharply on the brick sidewalk and ordered them to stop singing. He told them that it was ungentlemanly to abuse the night in such a way. "Behind those open windows," he said, "are ladies in bed who cannot help but hear the words you are singing." The students apologized profusely. As he left, he tapped his cane, turned and told them, "By the way, the words you were singing to that last stanza were not quite correct. They should go like this..."

Stories also abound about the great mathematician, cybernetics pioneer, and MIT professor Norbert Wiener (1894-1964). Wiener supposedly was able to tell students exactly where books, even the most obscure, were located in the library, but he couldn't find his own house. It seems that Wiener and his family bought a new house. They had been living in the old place for years and years and they needed a place with more room for the growing family, so they moved out of their house. Knowing of his absentmindedness, his wife gave him a slip of paper with the new address. She even put it in his coat pocket. Wiener took the train from their home to spend the day at MIT, and when he came home, just as his wife expected, he went straight for the old house. He remembers then that he moved and that his wife wrote out the new address for him. He begins to look through his pockets, but then remembers that the new address is in his raincoat, which he left at his office. A little girl passes by on a bicycle, and Wiener is sure she lives in the neighborhood, so he stops her and says, "Little girl, little girl, I'm professor Wiener. I used to live here, but we moved today and I don't know where the new house is. Do you know where my family moved?" She replies, "Mommy thought you'd forget, Daddy."

This is the same professor who walked into a freshman calculus class and started writing difficult equations on the board. A freshman raised his hand and after a while, Wiener noticed him. "Yes?" "Ah excuse me, sir, but, I, um, think you're in the wrong classroom. This is freshman calculus "Oh," Wiener said and walked out the door. Five minutes later, still waiting for their instructor to come in, the freshman notice that Wiener had come in the back door and begun writing differential equations on the back board. According to a legend collected from an MIT alum in 1982, Wiener liked to read while walking around the room feeling for the moldings. But one day a class was in session inside an open door off the hall and Wiener walked right around the door jam and circumnavigated the classroom, before heading back out. He also went blindly around the room when he wrote on the board. He finished at the blackboard and kept on going writing on

the walls and the doors and everything that came into his way. He got into such a habit with this behavior that the school supposedly built a room for him with blackboards on four walls.

Also legendary is Notre Dame professor Frank "Big O" O'Malley (1909-1974). One story is about his extended lecture on James Joyce. The lecture is stunning in both its clarity and complexity. An admiring student offers congratulations as the professor fumbles to put away his notes, only to observe that these notes are blank sheets of paper. Professor, Fred L. Pattee of Penn State (in whose honor the library was named), has a similar story told about him. Pattee handled the devotional part of the college's morning chapel services. One morning he opened the big chapel Bible and proceeded to read, or so it seemed, one of the longer psalms. Admiring his delivery but suspecting some variation from the text, a student took a look at the Bible. Pattee later explained to the student's amazement, "I forgot my glasses and had to read from memory."

Despite folklore to the contrary, great teachers have existed and have occasionally left their imprints on students. Some of these have become legendary in a more serious way. In *Look Homeward, Angel*, Thomas Wolfe fictionalized his teachers at Chapel Hill. "His [Latin] instructor was a tall shaven man, with a yellow saturnine face. He parted his scant hair cleverly in such a way as to suggest horns. His lips were always twisted in a satanic smile, his eyes gleamed sideward with heavy malicious humor. Eugene had great hopes of him. When the boy arrived, panting and breakfastless, a moment after the class had settled to order, the satanic professor would greet him with elaborate irony: "Ah there, Brother Gant! Just in time for church again. Have you slept well?"

. . .[and] By far the most distinguished of his teachers this first year was Mr. Edward Pettigrew ("Buck") Benson, the Greek professor. Buck Benson was a little man in the middle-forties, a bachelor, somewhat dandified, but old--fashioned, in his dress. He wore wing collars, large plump cravats, and suede--topped shoes. His hair was thick, heavily grayed, beautifully kept. His face was courteously pugnacious, fierce, with large yellow bulging eyeballs, and several bulldog pleatings around the mouth. It was an altogther handsome ugliness.

His voice was low, lazy, pleasant, with an indolent drawl, but without changing its pace or its inflection he could flay a victim with as cruel a tongue as ever wagged, and in the next moment wipe out hostility, restore affection, heal all wounds by the same agency. His charm was enormous. Among the students he was the subject for comical speculation--in their myths, they made of him a passionate and sophisticated lover, and his midget cycle-car, which bounded like an overgrown toy around the campus, the scene of many romantic seductions.

But that which remained most vividly, later, in the drowning years which

cover away so much of beauty, was the vast sea-surge of Homer which beat in his brain, his blood, his pulses, as did the sea-sound in Gant's parlor shells, when first he heard it to the slowly pacing feet and the hexametrical drawl of Buck Benson, the lost last weary son of Hellas."

Jowett of Oxford was noted for the barbs he aimed at the young men of Balliol College. Many of his remarks are still preserved. To the young idealist who said his life was a search for the Holy Grail: "And what will you do with the Holy Grail when you find it, Mr. Bowen?" To the young atheist who told him: "I cannot see any signs of God in nature, and when I look into my own heart I fail to find him there," Jowett's command: "You must either find him by tomorrow morning, or leave the College."

William James found it impossible to make a long, sustained, orderly, authoritative speech and to unfold, stage by stage, argument by argument, proof by irresistable proof, a philosophlcal theory. He felt that any such speech would stiffen and cripple the essential flexibility of thought, and that any such theory must misrepresent the infinite complexities and novelties and inconsistencies of reality. It was wrong, he felt, to *tell* people things. He would rather add if and *maybe;* he interrupted himself to catch a fleeting suggestion and come back saying "What was I talking about?" He created objections to his own proposals, he preferred discussion to straight oratory, and he made jokes on the most solemn subjects, very much as life itself does. Once he read out Spencer's definition of evolution:

> "Evolution is an integration of matter and concomitant dissipation of motion; during which the matter passes from an indefinite, incoherent homogeneity to a definite, coherent heterogeneity.

And then he translated it:

> Evolution is a change from a no-howish, untalkaboutable all-alikeness to a somehowish and in general talkaboutable not-all-alikeness by continuous stick-togetherations and something-elsifications.

James also told the young men of Harvard that "God is not a gentleman."

Philosopher Irvin Edman, one of John Dewey's pupils, described Dewey's lecturing technique in these words:

> He sat at his desk, fumbling with a few crumpled yellow sheets and looking abstractedly out of the window. He spoke very slowly in a Vermont drawl. He looked both very kindly and very abstracted. He hardly seemed aware of the presence of a class. He took little pains to underline a phrase, or emphasize a point, or, so at first it seemed to me, to make any. . . . He seemed to be saying whatever came into his head next. . . . The end of the hour finally came and he simply stopped; it seemed to me that he might

have stopped anywhere. But I soon found that it was my mind that had wandered, not John Dewey's. I began very soon to do what I had seldom done in college courses—to take notes. It was then a remarkable discovery to make . . . to find that what had seemed so casual, so rambling, so unexciting, was of an extraordinary coherence, texture, and brilliance. I had been listening not to the semi-theatrical reperition of a discourse many times made—a fairly accurate description of many acadcmic lectures—I had been listening to a man actually thinking in the presence of a class.

T. H. Huxley, one of the finest lecturers of the nineteenth century was always nervous. He had miserable nervous indigestion for fifty years, and felt sick with anxiety even when entering the College of Surgeons, where his subject was familiar and his hearers sympathetic. His lectures were masterpieces of logical arrangement: for instance, when giving a course he began each lecture by recapitulating the points covered in the previous one; but they were dramatically set out. "He gave you in 50 minutes striking analyses of two or three phenomena in nature which did not seem quite cognate. He glanced at the clock, and in the remaining 10 minutes put them all together, showed their analogies, and left us with a sense that nature was 'not without a plan.'"

Louis Agassiz also lectured. Here he was nearly as eloquent as Huxley, and quite as vivid. (Like Huxley too, he was always nervous. He told Longfellow that before beginning a course he invariably felt "terrible fright.") Instead of talking in abstractions and generalities, he brought in specimens to describe. He would display a tank of shark embryos, or hand round a fossil, or give each of his hearers a grasshopper to hold and examine while he talked. When he could not show specimens, he would draw, vividly and beautifully, on the blackboard. For instance, when he described how an insect's egg changes into a larva, then into a pupa, and finally into a full-grown insect, he would draw the metamorphosis stage by stage on the board, "until suddenly the winged creature would appear as if it had burst from its chrysalis."

Agassiz's other method of teaching is better known. He used it, not like his lectures to instruct the general public, but to train professional scientists. A scientist, he thought, is first and foremost a man who sees things which other people miss. So he trained his laboratory pupils to see. One of them has left a fine account of this training.

I had assigned to me a small pine table with a rusty tin pan upon it.... When I sat me down before my tin pan, Agassiz brought me a small fish, placing it before me with the rather stern requirement that I should study it, but should on no account talk to anyone concerning it, nor read anything relating to fishes, until I had his permission so to do. To my inquiry "What

> shall I do?" he said in effect: "Find out what you can without damaging the specimen; when I think that you have done the work I will question you." In the course of an hour I thought I had compassed the fish; it was rather an unsavory objcct, giving forth the stench of old alcohol.... Many of the scales were loosened so that they fell off. It appeared to me to be a case of a summary report, which I was anxious to make and get on to the next stage of the business. But Agassiz, though always within call, concerned himself no further with me that day, nor the next, nor for a week.
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> At first, this neglect was distressing; but I saw that it was a game, for he was . . . covertly watching me. So I set my wits to work upon the thing, and in the course of a hundred hours or so thought I had done much--a hundred times as much as seemed possible at the start. I got interested in finding out how the scales went in series, their shape, the form and placement of the teeth, etc. Finally, I felt full of the subject and probably expressed it in my bearing; as for words about it then, there were none from my master except his cheery "Good morning." At length, on the seventh day, came the question "Well?" and my disgorge of learning to him as he sat on the edge of my table puffing his cigar. At the end of the hour's telling he swung out and away, saying "That is not right."
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> It was clear that he was playing a game with me to find if I were capable of doing hard, continuous work without the support of a teacher, and this stimulated me to labor. I went at the task anew, discarded my first notes, and in another week of ten hours a day labor I had results which astonished myself and satisfied him.

The teachers who have been most influential usually worked in three or four fields at once and combined their professional duties with a vivid and active private and public life. The research scholar can feed himself, but the teacher has to nourish many others: so he or she must draw vigor from many different sources. William James was a psychologist as well as a philosopher. Sir William Osler, the Canadian who was professor of medicine at McGill, then at Johns Hopkins, then at Oxford, and a jolly high-spirited fellow, was an amateur of the classics, a lover of books, and a host of other things. As with many great teachers, Osler insisted on vividness above all. Before he went to Johns Hopkins, American medical students studied textbooks and heard lectures, but were not shown how to connect theory and practice. Osler introduced the technique of teaching medicine by using the patients as texts. Instead of discussing an illness in theory, he explained it at the bedside of a man who was suffering from it. If he had not been so invariably kind and good-humored, perhaps this might have become a callous and cruel practice; but he inspired both patients and students with

his own vitality. He specialized in equally vivid epigrams: a certain type of bloated crimson face he described as "the Bardolphian facies," the result of "worship at the shrines of Bacchus, of Venus, and of Circe," who turns men into beasts. Perhaps he was able to give this description with a grave expression and a twinkling eye while the Bardolphian patient stood by him uncomprehending and unoffended. And he would always make facts memorable by casting unexpected lights on them--for instance, when a pupil used the name Graves' Disease for exophthalmic goiter, Osler made him look up Graves and write a paper on his work.

George Lyman Kittredge would take a scene from one of Shakespeare's tragedies and go over it word by word, analyzing the precise meaning of every speech, discussing the dramatic values of every shift in the plot, bringing out new psychological undertones, and setting the whole episode in its place until his hearers, finally and unforgettably, understood what the poet had written. But such detailed dissection is not possible unless the class has already read the scene and thought well over it: so Kittredge's pupils had heavy assignments of preliminary reading to do, and could expect to be closely questioned on what they had read. His class usually began with five minutes of queries addressed to him by the students, on points still obscure from the previous lecture--a very sound practice for establishing the confidence necessary in continuing an analysis of constantly increasing difficulty. Then Kittredge took over. Anyone present was liable to be called on, and if he could not answer, Kittredge made no effort to conceal his fury. He had a violent temper and an undisguised contempt for the average student. Whitebearded, cigar-puffing, loud-voiced, he commanded their respect rather than attracted their affection. They laughed at him once when he strode too far and fell off his platform. He glared at them, and said: "This is the first time I have ever reduced myself to the level of my audience." Kittredge would have fully understood the law professor portrayed so convincingly by John Houseman in *The Paper Chase.*

There was another type, the persuader and charmer. Those who only know the bony face and toothy smile of Woodrow Wilson from old photographs and caricatures are apt to forget that he was really a tall, noble, and commanding man. Those who only think of him as an idealistic President who failed are liable to forget that he was one of the greatest teachers of this century. Almost without exception, his pupils describe him as "the finest lecturer I have ever heard." His career began at Princeton University, where he taught jurisprudence and political economy. Wilson spoke on them with such energy, such conviction, such wealth of ideas and warmth of words, that his students often broke into cheers at the end of a lecture--a gesture which I assure you few teachers have experienced.

Hannah Arendt, the political philosopher who taught at the New School for Social Research, is remembered by Peter Stern and Jean Yarbrough.

"Hannah Arendt seemed to violate many of the canons that make for effective teaching. She had no special pedagogical methods and no set doctrines. She made no attempt to attract students through polemics or flattery, and she did not try to entertain them. In fact, the format of her lectures probably sounds quite dull: for the first hour or so she would read from a fully written set of notes; then, for the remaining forty minutes, she would answer questions.

This rather old-fashioned method of teaching--formal, rigorous, and full of potential pitfalls--Hannah Arendt mastered and transformed. She did so not by any special technique, but through the sheer brilliance and originality of her ideas and the mysterious force of her personality.

Certain rituals surrounded her classes. About ten minutes before the lecture was scheduled to begin, the room would start to fill up. By the time Miss Arendt actually began lecturing, all the chairs were taken (room size being designated on the basis of *official* enrollments), and students who came late would have to sit on the floor or raid nearby classrooms for more chairs. On the table in the front of the room were her props: a lectern, a glass, and a pitcher of water (from which she would pour a glass when she wanted to pause for emphasis, when a new thought suddenly occurred to her, or when she was just plain thirsty). Usually she came into the room escorted by her teaching assistant and sometimes, especially during her last several semesters, by her student secretary as well. As she entered, she seemed curiously apprehensive, as if deeply troubled, and the presence of her assistants seemed necessary to reassure her. Walking slowly to the lectern, still preoccupied, she would suddenly stop, turn to the class, and nod, smile, or wave to students she recognized--her usual cheerfulness returning. She then continued to the front of the room and, reaching the lectern, would remove the manuscript of her lecture from its folder, remind us where we had stopped the week before, and then begin reading from her notes.

Physicist Jeremy Bernstein remembers Nobel laureate Julian Schwinger. "I believe that there is an element of theater in all great teaching. One may well wonder what drama could possibly occur in a course on quantum mechanics, and I will explain. The nominal starting time for the class was 11 A.M. That's when the classroom began to fill up with the forty or fifty people who were taking, or auditing, the course. This group included not only graduate students in physics and mathematics, along with a few undergraduates like myself, but many of the junior--and occasionally the senior--faculties in these disciplines, with a few chemists tossed in for good luck. Schwinger, who in those days drove a light-blue Cadillac, would arrive sometime between 11 and 11:30, someone would spot the Cadillac,

and we would all rush for seats in the classroom. Schwinger had certain verbal mannerisms, characteristic phrases such as "we can effectively regard," that became part of the student *lingua franca.* A friend of mine once concocted a model Schwinger sentence, which began, "Although 1 is not perfectly 0, we can effectively regard . . ." Schwinger, at least in those days, pronounced "nuclear" as "nucular," and some of his students acquired this pronunciation as well. That was the superficial theater. The real theater was the content of the lectures.

Schwinger would lecture nonstop for well over an hour, doing the most intricate calculations imaginable *without notes.* Formulae appeared and disappeared, melted into other formulae as if by magic. Whenever Schwinger taught one of these courses, he simply recreated the subject. It was as if he were presenting three original research papers a week--and indeed many of these lectures were eventually published. During this period, it was a sort of "in" joke among physicists that Schwinger had solved nearly every problem in his unpublished lecture notes. I still have my notes and now, thirty years later, still find revelations in them. The simplest imaginable problems were done several ways, each of them novel.

These are persons whom I know only vicariously, through their own writing and through the writings of others. They and others like them have set the standards for my profession. And I have been privileged to know some teachers whose stature is or should be equal to theirs. So, if you'll forgive me, some personal vignettes—Shirley Rosser of Lynchburg College entering the classroom, carefully arranging a variety of notes and textbooks on the desk, taking out his pocket watch and placing it on the desk, and beginning his lecture with a slight stammer which was a remnant of a severe speech impediment of his youth; then proceeding to explain in clear and concrete terms the most complex physical or mathematical analysis, bringing the ideas to life with a series of analogies drawn from a rich set of experiences. Wayne Bowers of UNC, a tall grey gaunt physicist who looked rather like Don Quixote, but who in reality was "the fastest chalk in the east," who could cover a blackboard with equations faster than most people could erase the board and whose notes are still a better resource than most textbooks. Eugen Merzbacher, whose quantum mechanics text has been the graduate standard for nearly 30 years, coming to the Charlottesville for a colloquium and having the audacity to announce that he was there to speak to the students at their level and giving one of the four or five intelligible physics colloquia I heard in my five years of indenture. This same Merzbacher who, noticing me waiting at a colleague's door in Chapel Hill, asking if he could help and then spending about two hours giving me, whom he did not know, an incredible insight into a remote area of statistical physics. This same Merzbacher,

who for nearly 30 years has annually taken the entire UNC physics department, faculty, staff, students and spouses into the Carolina mountains for the semi-annual physics camping trip. My research adviser, Doris Wilsdorf, who would look at a blackboard full of equations, most of which were apparently unrelated to each other, gaze over her upraised thumb as if estimating a golf shot, and say "the answer is about four, after which a student would spend six months of computer calculations to verify that the answer was 4.12, who would doze through colloquia in her husband's materials science department and, when awakened by his elbow in her side, would instinctively raise her hand with a question, a penetrating and to the speaker often devastating query. This same Doris Wilsdorf who, during the press to finish my dissertation research as I was leaving home before my wife awoke in the morning and returning after she fell asleep in the evening, would call her daily to assure her that I would soon finish. Jesse Beams, one of three individuals who, in my mind, have epitomized the term "Virginia gentleman," was legendary for his expectations that graduate students should be in the laboratory at all hours of the day and night. His students haunted the second-hand clothing stores in Charlottesville so that they could leave an overcoat or other articles of apparel hanging on the rack in the lab when they were not physically present. Dr. Beams encountered one of my classmates who had gone to the lab to fill a cold trap on the afternoon of Christmas eve. "Why Tom, don't you know it's Christmas eve? You have children. Why don't you go home early, say at 5:00, this afternoon?" But there was also J.S. Plaskett of Virginia, who, on the first day of a core graduate course in electromagnetic theory, announced to the class that he had read every book ever written on electromagnetic theory, had worked every problem in those books, had made up and worked several thousand problems of his own and, frankly, was bored with the subject. He was so bored that, he told us, he would not lecture on the subject. And he did not, although we had weekly examinations on the subject. The same Plaskett who walked into a graduate final examination in quantum mechanics and announced that he assumed those assembled had an adequate grasp of quantum mechanics and thus he provided an examination on acoustics to see what they might know about that. I could go on—and on. I could tell you of Madame Cox, the French teacher who could and did reduce battle-hardened Korean War veterans to tears with her intimidating presence and her quiet, but sharp questioning. I could regale you with tales of John Mahan, dancing with skeletons, climbing up on the lecture table to demonstrate the movement of a liver fluke, or teaching the class the words to "It's a long way to Amphioxias." But perhaps those are stories best kept for another day.

College teaching is very different from the other professions, especially

since the credentialing process is not designed to prepare one to teach. Rather it is predicated on the notion that anyone can teach. When I entered this curious profession, I had not in any way been trained as a teacher. I had had to fight simphy to take courses which I thought were necessary parts of my preparation for teaching physics, but which were viewed simply as distractions to my research by most of the physics faculty at UVA. The folk understanding of acronym for my degree has has some real validity, particularly as it applies to the young Ph.D who enters teaching. The notion that a Ph.D. prepares a person to teach at the college level is less valid than the notion that the M.D. prepares a person to practice medicine. Learning to teach takes a substantial investment of time and energy, and some strong mentoring. Teaching is an art and like any art, it must be practiced and honed to get it right. Ultimately every great teacher has worked to master this art and, I believe, has done so for the simple personal reason that effective teaching is as inherently rewarding as any human activity can be.

#1,149

Piled Higher and Deeper
Julius Sigler April 14, 1994

Over the past several weeks the Sphex Club has been treated to an extraordinary series of lectures—lectures which have treated subjects of enormous gravity. Spring calls for a more modest exploration, one which in many ways is less serious than those of the past few months. After all, when the dogwoods are blooming and the air is warm, who can be totally serious?

I propose that we talk for a while about teachers, specifically college and university teachers. In recent years, I have come to realize that much of what I heard about professors as a student falls into the realm of folklore. That is, much of it in the same vein as a conversation with my sophomore roommate during the first week I was in college. "You're going for a BS degree? You know what bs stands for. MS is more of the same, and Ph.D. is piled higher and deeper. Everyone here has heard the same definition of those terms, and thus the story is ingrained in what can only be called a campus folklore. A rich lode of that folklore concerns college and university professors. In addition to various journals of folklore, I am particularly indebted to Dr. Simon J. Bronner of Penn State from whose excellent book I have borrowed the title for this talk and who is the leading collector of college folklore.

In recent years books such as *Profscam* and *The Closing of the American Mind* have leveled strong criticisms of college and especially university teaching. Responses to those critics await a lecture given at a more appropriate time of the year. Instead, during the next several minutes, I will share with you the tradition of which I am now a part, in the same sense that those who follow the legal profession walk in the footsteps of Oliver Wendell Holmes, Learned Hand, and Felix Frankfurter. You will hear a variety of observations regarding college teachers. Some of these will be descriptions of great teachers given by their pupils; some will be the stuff and substance of college folklore about teachers, and a few will be my own observations. You will have to decide which, if any, lie within the realm of folklore. Perhaps some of what you hear will jog your memory about those whose teaching affected your lives and we can share those recollections as we discuss the paper.

Since students often portray professors as absentminded, arrogant, dull, impractical or lacking common sense, singlemindedly devoted to their subjects, or in other ways eccentric, I will begin by talking about absent-minded professors.

"Students have reported the following story about both philosopher Irwin Edman of Columbia and mathematician Norbert Wiener of MIT. A student asks the professor the way to his office. The professor replies "If it is that way, then

I've had my lunch; if the other way, then I must be on my way to it." According to George Carey, the story as it is told at the University of Massachusetts has the vague professor answering a student's invitation to lunch with 'Which way was I headed when you stopped me?" "Toward Bartlett Hall," says the student. "Sorry, then," says the professor, "I can't join you. I've already eaten." A related story is told about Isaac Newton. When a friend paid a visit one evening, the servant announced that his master was in his study and not to be disturbed. The visitor decided to wait since it was approaching Sir Isaac's dining hour. The table was set and in a short time a boiled chicken under cover was brought in. Time passed. The fowl was growing cold, but Sir Isaac did not appear. Finally, being hungry, the visitor devoured the fowl and covered up the empty dish. At the same time he asked the servant to have another chicken boiled for Sir Isaac. But before the second bird was ready, the great man came down. He apologized to his visitor for his delay and added, "Give me leave to take my short dinner, and I shall be at your service; I am fatigued and faint." He then took the cover off the dish, and finding the plate empty, turned to the visitor with a wan smile. "You see what we studious people are; I forgot that I had dined."

"Many colleges have tales about the professor who drove his car to the city to do research. Forgetting he had driven, he took the train back. Some versions note that the professor "bawled out his wife for not meeting him at the station with the auto". Dr. Gertrude Teller was a legendary teacher of foreign languages at Lynchburg College during the fifties. She was well-known for simply stopping her old Studebaker wherever it suited her and leaving it. One could routinely see it parked in the middle of Main Street, where she left it to go into Leggetts, and it might stay there for a while if she chose to take the bus back to the College.

"The following tale is told as true on more than one campus. "A professor came into class one day, took his wrist watch off, and placed it on the desk in front of him so he could watch it as he lectured. He began his lecture, stopped, looked at the watch, picked it up, and said, 'I find someone's wrist watch here on my desk. Did anyone lose it?' A student raised his hand and suggested that the professor take the watch to lost-and-found after class. The next day the professor came to class and announced that he had lost his wrist watch. He asked if anyone had found it.

In the early sixties, Dr. Constance Rowe taught French at Lynchburg College. Stories of her absentmindedness were legendary. Dr. Rowe and Professor Jeter Parker owned tweed overcoats which were quite similar. However, Miss Parker was much taller and substantially larger than Dr. Rowe. After a faculty meeting, Dr. Rowe picked up Miss Parker's overcoat by mistake, a mistake which was immediately obvious when Miss Parker attempted to don the

much smaller coat. She assumed that Dr. Rowe would return the coat. Imagine her surprise later in the week, as she heard Dr. Rowe explaining to a colleague.."You won't believe this, but my coat grew. I've heard of clothes shrinking, but not growing. Anyway, I took it to the tailor to have it resized and now it fits fine."

"A Cornell eased back to his office after class. He found a long line of students waiting in front of the door, so he took his place at the end of the line. Then there is the tale of Professor Brown's visit to Professor Smith. The evening wore on, the guest showed no signs of leaving, and finally Brown said, "Harry, I'm awfully sorry but it's 2 A.M. and I must ask you to go. I have an 8 o'clock class in the morning." "Bill," said Harry, "you're in my house."

"David Starr Jordan came to Stanford as president in 1891 with an international reputation for his encyclopedic knowledge of fish and their classification. He "determined that he would also come to know each student by name." Several years later he was asked how he was progressing. Jordan sadly said he had given up. "I found that every time I learned the name of a student, I forgot the name of a fish."

They also tell for true the story of the University of Illinois professor who invited a number of his associates to dinner. When the first guest showed up in a tuxedo, the host's wife motioned him upstairs to do a quick change into formal dress. The other guests arrived, but the host did not reappear. At length the frantic hostess excused herself and slipped up to his room. The professor was sound asleep. Taking off his clothes to change, he had forgotten what he was doing, and had unconsciously put on his pajamas and gone to sleep.

Professors are important, campus-wise, chiefly because they give grades. How they arrive at their decisions, folklore alone knows. The old story, of course, is that the prof throws the bluebooks down the stairs, and gives A's to those which land at the foot, F's to those at the head. "At Purdue, with its scientific bent, the students knew that blue books were thrown upstairs in order that the grade distribution more nearly approximate the bell-shaped curve." Or he throws them at the ceiling, and whichever stick receive an A. A Harvard tale has chemistry professor J. P. Cooke distributing his papers to his family; he gave the F's himself, his son-in-law the D's, and so on up to the baby, who, being the slowest, marked the A's. From Jim Huston, I recall the tale of the professor who customarily placed his papers in two heaps, representing the good and the bad students. When he came across an error by a good student he disregarded it, saying, "He knows better than that." When he saw a correct answer by a poor student he marked it wrong, saying, "He couldn't have meant that."

Professors arbitrarily piling papers in anal-retentive style frequently appear

in student stories. Famed Harvard professor Nathaniel Shaler (1841-1906) piled bluebooks in a mountainous heap on his sofa. After they had aged a week, he plunged both hands deep into the heap and carried all he could to a chair on the opposite side of the room. A second week went by and he carried another armload to another chair, and he made a similar move after the third and fourth week. Those in the first chair he gave As, those in the second got Bs, and so on. All those that slipped onto the floor flunked. At Hope College, the Reverend Mr. Dykstra supposedly received grades for students directly from God.

Since students often depend on cramming to get by, the idea of a "pop" or surprise quiz gives them nightmares. Especially at older college halls where doors have transoms, students tell the one about the professor who is asked by students whether he ever gives surprise quizzes. The professor laughs and tells the students that the day he gives a pop quiz is the day he climbs through the transom! A sigh of relief passes through the classroom. Then one day the transom began to creak open and, to the amazement of the students, in climbed their professor grinning happily and clutching a three-page quiz in his hand.

Students, aware of the "publish or perish" motto in academe, believe that professors treat them as secondary to their writing tasks. One story circulates about prolific Harold Bloom of Yale who was called at his home in New Haven by a graduate student. Bloom's wife answered, "I'm sorry, he's writing a book." "That's all right," the student replied, "I'll wait."

Students often judge harshly the performance of professors in class. It's not just that professor are dull, but that they are in control, right or wrong. From Wisconsin comes the story of the geography professor lecturing from faded notes, droning along about the Mississippi River dumping each year 9,980,000 tons. He turned the page and started another topic. A brave student asked, "The Mississippi River dumps each year 9,989,000 tons of what?" The professor turned the yellowed page back, and again intoned, "The Mississippi River each year dumps 9,989,000 tons," paused, turned the page, and said, "It don't say."

At Ohio State, the story gets around about the lecturer who began reading in a wheezy, cracked voice. At the bottom of page one, he turned the leaf and continued reading. What he read repeated the first page, and the third was the same. The typist had delivered the notes to him in triplicate. In a variation from Harvard, the story is about a famed philosophy professor who lectured on logic. Previous to the class, some graduate student sneaked into his office and disarranged his lecture notes. When the professor read through his notes, however, he didn't notice the difference.

Many apochryphal tales are attached to specific legendary characters. Many stories, for example, are told about the great Harvard professor of literature

George Lyman Kittredge (1860-1941), known as "Kitty" by his many students of ballad, folklore, and English literature. A distinguished, imposing figure, possessed of a stern New England morality, Kittredge once encountered several undergraduates raucously singing "The Bastard King of England." He rapped his cane sharply on the brick sidewalk and ordered them to stop singing. He told them that it was ungentlemanly to abuse the night in such a way. "Behind those open windows," he said, "are ladies in bed who cannot help but hear the words you are singing." The students apologized profusely. As he left, he tapped his cane, turned and told them, "By the way, the words you were singing to that last stanza were not quite correct. They should go like this..."

Stories also abound about the great mathematician, cybernetics pioneer, and MIT professor Norbert Wiener (1894-1964). Wiener supposedly was able to tell students exactly where books, even the most obscure, were located in the library, but he couldn't find his own house. It seems that Wiener and his family bought a new house. They had been living in the old place for years and years and they needed a place with more room for the growing family, so they moved out of their house. Knowing of his absentmindedness, his wife gave him a slip of paper with the new address. She even put it in his coat pocket. Wiener took the train from their home to spend the day at MIT, and when he came home, just as his wife expected, he went straight for the old house. He remembers then that he moved and that his wife wrote out the new address for him. He begins to look through his pockets, but then remembers that the new address is in his raincoat, which he left at his office. A little girl passes by on a bicycle, and Wiener is sure she lives in the neighborhood, so he stops her and says, "Little girl, little girl, I'm professor Wiener. I used to live here, but we moved today and I don't know where the new house is. Do you know where my family moved?" She replies, "Mommy thought you'd forget, Daddy."

This is the same professor who walked into a freshman calculus class and started writing difficult equations on the board. A freshman raised his hand and after a while, Wiener noticed him. "Yes?" "Ah excuse me, sir, but, I, um, think you're in the wrong classroom. This is freshman calculus "Oh," Wiener said and walked out the door. Five minutes later, still waiting for their instructor to come in, the freshman notice that Wiener had come in the back door and begun writing differential equations on the back board. According to a legend collected from an MIT alum in 1982, Wiener liked to read while walking around the room feeling for the moldings. But one day a class was in session inside an open door off the hall and Wiener walked right around the door jam and circumnavigated the classroom, before heading back out. He also went blindly around the room when he wrote on the board. He finished at the blackboard and kept on going writing on

the walls and the doors and everything that came into his way. He got into such a habit with this behavior that the school supposedly built a room for him with blackboards on four walls.

Also legendary is Notre Dame professor Frank "Big O" O'Malley (1909-1974). One story is about his extended lecture on James Joyce. The lecture is stunning in both its clarity and complexity. An admiring student offers congratulations as the professor fumbles to put away his notes, only to observe that these notes are blank sheets of paper. Professor, Fred L. Pattee of Penn State (in whose honor the library was named), has a similar story told about him. Pattee handled the devotional part of the college's morning chapel services. One morning he opened the big chapel Bible and proceeded to read, or so it seemed, one of the longer psalms. Admiring his delivery but suspecting some variation from the text, a student took a look at the Bible. Pattee later explained to the student's amazement, "I forgot my glasses and had to read from memory."

Despite folklore to the contrary, great teachers have existed and have occasionally left their imprints on students. Some of these have become legendary in a more serious way. In *Look Homeward, Angel,* Thomas Wolfe fictionalized his teachers at Chapel Hill. "His [Latin] instructor was a tall shaven man, with a yellow saturnine face. He parted his scant hair cleverly in such a way as to suggest horns. His lips were always twisted in a satanic smile, his eyes gleamed sideward with heavy malicious humor. Eugene had great hopes of him. When the boy arrived, panting and breakfastless, a moment after the class had settled to order, the satanic professor would greet him with elaborate irony: "Ah there, Brother Gant! Just in time for church again. Have you slept well?"

. . .[and] By far the most distinguished of his teachers this first year was Mr. Edward Pettigrew ("Buck") Benson, the Greek professor. Buck Benson was a little man in the middle-forties, a bachelor, somewhat dandified, but old--fashioned, in his dress. He wore wing collars, large plump cravats, and suede--topped shoes. His hair was thick, heavily grayed, beautifully kept. His face was courteously pugnacious, fierce, with large yellow bulging eyeballs, and several bulldog pleatings around the mouth. It was an altogther handsome ugliness.

His voice was low, lazy, pleasant, with an indolent drawl, but without changing its pace or its inflection he could flay a victim with as cruel a tongue as ever wagged, and in the next moment wipe out hostility, restore affection, heal all wounds by the same agency. His charm was enormous. Among the students he was the subject for comical speculation--in their myths, they made of him a passionate and sophisticated lover, and his midget cycle-car, which bounded like an overgrown toy around the campus, the scene of many romantic seductions.

But that which remained most vividly, later, in the drowning years which

cover away so much of beauty, was the vast sea-surge of Homer which beat in his brain, his blood, his pulses, as did the sea-sound in Gant's parlor shells, when first he heard it to the slowly pacing feet and the hexametrical drawl of Buck Benson, the lost last weary son of Hellas."

Jowett of Oxford was noted for the barbs he aimed at the young men of Balliol College. Many of his remarks are still preserved. To the young idealist who said his life was a search for the Holy Grail: "And what will you do with the Holy Grail when you find it, Mr. Bowen?" To the young atheist who told him: "I cannot see any signs of God in nature, and when I look into my own heart I fail to find him there," Jowett's command: "You must either find him by tomorrow morning, or leave the College."

William James found it impossible to make a long, sustained, orderly, authoritative speech and to unfold, stage by stage, argument by argument, proof by irresistable proof, a philosophlcal theory. He felt that any such speech would stiffen and cripple the essential flexibility of thought, and that any such theory must misrepresent the infinite complexities and novelties and inconsistencies of reality. It was wrong, he felt, to *tell* people things. He would rather add if and *maybe;* he interrupted himself to catch a fleeting suggestion and come back saying "What was I talking about?" He created objections to his own proposals, he preferred discussion to straight oratory, and he made jokes on the most solemn subjects, very much as life itself does. Once he read out Spencer's definition of evolution:

> "Evolution is an integration of matter and concomitant dissipation of motion; during which the matter passes from an indefinite, incoherent homogeneity to a definite, coherent heterogeneity.

And then he translated it:

> Evolution is a change from a no-howish, untalkaboutable all-alikeness to a somehowish and in general talkaboutable not-all-alikeness by continuous stick-togetherations and something-elsifications.

James also told the young men of Harvard that "God is not a gentleman."

Philosopher Irvin Edman, one of John Dewey's pupils, described Dewey's lecturing technique in these words:

> He sat at his desk, fumbling with a few crumpled yellow sheets and looking abstractedly out of the window. He spoke very slowly in a Vermont drawl. He looked both very kindly and very abstracted. He hardly seemed aware of the presence of a class. He took little pains to underline a phrase, or emphasize a point, or, so at first it seemed to me, to make any. . . . He seemed to be saying whatever came into his head next. . . . The end of the hour finally came and he simply stopped; it seemed to me that he might

have stopped anywhere. But I soon found that it was my mind that had wandered, not John Dewey's. I began very soon to do what I had seldom done in college courses—to take notes. It was then a remarkable discovery to make . . . to find that what had seemed so casual, so rambling, so unexciting, was of an extraordinary coherence, texture, and brilliance. I had been listening not to the semi-theatrical reperition of a discourse many times made—a fairly accurate description of many acadcmic lectures—I had been listening to a man actually thinking in the presence of a class.

T. H. Huxley, one of the finest lecturers of the nineteenth century was always nervous. He had miserable nervous indigestion for fifty years, and felt sick with anxiety even when entering the College of Surgeons, where his subject was familiar and his hearers sympathetic. His lectures were masterpieces of logical arrangement: for instance, when giving a course he began each lecture by recapitulating the points covered in the previous one; but they were dramatically set out. "He gave you in 50 minutes striking analyses of two or three phenomena in nature which did not seem quite cognate. He glanced at the clock, and in the remaining 10 minutes put them all together, showed their analogies, and left us with a sense that nature was 'not without a plan.'"

Louis Agassiz also lectured. Here he was nearly as eloquent as Huxley, and quite as vivid. (Like Huxley too, he was always nervous. He told Longfellow that before beginning a course he invariably felt "terrible fright.") Instead of talking in abstractions and generalities, he brought in specimens to describe. He would display a tank of shark embryos, or hand round a fossil, or give each of his hearers a grasshopper to hold and examine while he talked. When he could not show specimens, he would draw, vividly and beautifully, on the blackboard. For instance, when he described how an insect's egg changes into a larva, then into a pupa, and finally into a full-grown insect, he would draw the metamorphosis stage by stage on the board, "until suddenly the winged creature would appear as if it had burst from its chrysalis."

Agassiz's other method of teaching is better known. He used it, not like his lectures to instruct the general public, but to train professional scientists. A scientist, he thought, is first and foremost a man who sees things which other people miss. So he trained his laboratory pupils to see. One of them has left a fine account of this training.

> I had assigned to me a small pine table with a rusty tin pan upon it.... When I sat me down before my tin pan, Agassiz brought me a small fish, placing it before me with the rather stern requirement that I should study it, but should on no account talk to anyone concerning it, nor read anything relating to fishes, until I had his permission so to do. To my inquiry "What

shall I do?" he said in effect: "Find out what you can without damaging the specimen; when I think that you have done the work I will question you." In the course of an hour I thought I had compassed the fish; it was rather an unsavory objcct, giving forth the stench of old alcohol.... Many of the scales were loosened so that they fell off. It appeared to me to be a case of a summary report, which I was anxious to make and get on to the next stage of the business. But Agassiz, though always within call, concerned himself no further with me that day, nor the next, nor for a week.

At first, this neglect was distressing; but I saw that it was a game, for he was . . . covertly watching me. So I set my wits to work upon the thing, and in the course of a hundred hours or so thought I had done much--a hundred times as much as seemed possible at the start. I got interested in finding out how the scales went in series, their shape, the form and placement of the teeth, etc. Finally, I felt full of the subject and probably expressed it in my bearing; as for words about it then, there were none from my master except his cheery "Good morning." At length, on the seventh day, came the question "Well?" and my disgorge of learning to him as he sat on the edge of my table puffing his cigar. At the end of the hour's telling he swung out and away, saying "That is not right."

It was clear that he was playing a game with me to find if I were capable of doing hard, continuous work without the support of a teacher, and this stimulated me to labor. I went at the task anew, discarded my first notes, and in another week of ten hours a day labor I had results which astonished myself and satisfied him.

The teachers who have been most influential usually worked in three or four fields at once and combined their professional duties with a vivid and active private and public life. The research scholar can feed himself, but the teacher has to nourish many others: so he or she must draw vigor from many different sources. William James was a psychologist as well as a philosopher. Sir William Osler, the Canadian who was professor of medicine at McGill, then at Johns Hopkins, then at Oxford, and a jolly high-spirited fellow, was an amateur of the classics, a lover of books, and a host of other things. As with many great teachers, Osler insisted on vividness above all. Before he went to Johns Hopkins, American medical students studied textbooks and heard lectures, but were not shown how to connect theory and practice. Osler introduced the technique of teaching medicine by using the patients as texts. Instead of discussing an illness in theory, he explained it at the bedside of a man who was suffering from it. If he had not been so invariably kind and good-humored, perhaps this might have become a callous and cruel practice; but he inspired both patients and students with

his own vitality. He specialized in equally vivid epigrams: a certain type of bloated crimson face he described as "the Bardolphian facies," the result of "worship at the shrines of Bacchus, of Venus, and of Circe," who turns men into beasts. Perhaps he was able to give this description with a grave expression and a twinkling eye while the Bardolphian patient stood by him uncomprehending and unoffended. And he would always make facts memorable by casting unexpected lights on them--for instance, when a pupil used the name Graves' Disease for exophthalmic goiter, Osler made him look up Graves and write a paper on his work.

George Lyman Kittredge would take a scene from one of Shakespeare's tragedies and go over it word by word, analyzing the precise meaning of every speech, discussing the dramatic values of every shift in the plot, bringing out new psychological undertones, and setting the whole episode in its place until his hearers, finally and unforgettably, understood what the poet had written. But such detailed dissection is not possible unless the class has already read the scene and thought well over it: so Kittredge's pupils had heavy assignments of preliminary reading to do, and could expect to be closely questioned on what they had read. His class usually began with five minutes of queries addressed to him by the students, on points still obscure from the previous lecture--a very sound practice for establishing the confidence necessary in continuing an analysis of constantly increasing difficulty. Then Kittredge took over. Anyone present was liable to be called on, and if he could not answer, Kittredge made no effort to conceal his fury. He had a violent temper and an undisguised contempt for the average student. Whitebearded, cigar-puffing, loud-voiced, he commanded their respect rather than attracted their affection. They laughed at him once when he strode too far and fell off his platform. He glared at them, and said: "This is the first time I have ever reduced myself to the level of my audience." Kittredge would have fully understood the law professor portrayed so convincingly by John Houseman in *The Paper Chase.*

There was another type, the persuader and charmer. Those who only know the bony face and toothy smile of Woodrow Wilson from old photographs and caricatures are apt to forget that he was really a tall, noble, and commanding man. Those who only think of him as an idealistic President who failed are liable to forget that he was one of the greatest teachers of this century. Almost without exception, his pupils describe him as "the finest lecturer I have ever heard." His career began at Princeton University, where he taught jurisprudence and political economy. Wilson spoke on them with such energy, such conviction, such wealth of ideas and warmth of words, that his students often broke into cheers at the end of a lecture--a gesture which I assure you few teachers have experienced.

Hannah Arendt, the political philosopher who taught at the New School for Social Research, is remembered by Peter Stern and Jean Yarbrough.

"Hannah Arendt seemed to violate many of the canons that make for effective teaching. She had no special pedagogical methods and no set doctrines. She made no attempt to attract students through polemics or flattery, and she did not try to entertain them. In fact, the format of her lectures probably sounds quite dull: for the first hour or so she would read from a fully written set of notes; then, for the remaining forty minutes, she would answer questions.

This rather old-fashioned method of teaching--formal, rigorous, and full of potential pitfalls--Hannah Arendt mastered and transformed. She did so not by any special technique, but through the sheer brilliance and originality of her ideas and the mysterious force of her personality.

Certain rituals surrounded her classes. About ten minutes before the lecture was scheduled to begin, the room would start to fill up. By the time Miss Arendt actually began lecturing, all the chairs were taken (room size being designated on the basis of *official* enrollments), and students who came late would have to sit on the floor or raid nearby classrooms for more chairs. On the table in the front of the room were her props: a lectern, a glass, and a pitcher of water (from which she would pour a glass when she wanted to pause for emphasis, when a new thought suddenly occurred to her, or when she was just plain thirsty). Usually she came into the room escorted by her teaching assistant and sometimes, especially during her last several semesters, by her student secretary as well. As she entered, she seemed curiously apprehensive, as if deeply troubled, and the presence of her assistants seemed necessary to reassure her. Walking slowly to the lectern, still preoccupied, she would suddenly stop, turn to the class, and nod, smile, or wave to students she recognized--her usual cheerfulness returning. She then continued to the front of the room and, reaching the lectern, would remove the manuscript of her lecture from its folder, remind us where we had stopped the week before, and then begin reading from her notes.

Physicist Jeremy Bernstein remembers Nobel laureate Julian Schwinger. "I believe that there is an element of theater in all great teaching. One may well wonder what drama could possibly occur in a course on quantum mechanics, and I will explain. The nominal starting time for the class was 11 A.M. That's when the classroom began to fill up with the forty or fifty people who were taking, or auditing, the course. This group included not only graduate students in physics and mathematics, along with a few undergraduates like myself, but many of the junior--and occasionally the senior--faculties in these disciplines, with a few chemists tossed in for good luck. Schwinger, who in those days drove a light-blue Cadillac, would arrive sometime between 11 and 11:30, someone would spot the Cadillac,

and we would all rush for seats in the classroom. Schwinger had certain verbal mannerisms, characteristic phrases such as "we can effectively regard," that became part of the student *lingua franca.* A friend of mine once concocted a model Schwinger sentence, which began, "Although 1 is not perfectly 0, we can effectively regard . . ." Schwinger, at least in those days, pronounced "nuclear" as "nucular," and some of his students acquired this pronunciation as well. That was the superficial theater. The real theater was the content of the lectures.

Schwinger would lecture nonstop for well over an hour, doing the most intricate calculations imaginable *without notes.* Formulae appeared and disappeared, melted into other formulae as if by magic. Whenever Schwinger taught one of these courses, he simply recreated the subject. It was as if he were presenting three original research papers a week--and indeed many of these lectures were eventually published. During this period, it was a sort of "in" joke among physicists that Schwinger had solved nearly every problem in his unpublished lecture notes. I still have my notes and now, thirty years later, still find revelations in them. The simplest imaginable problems were done several ways, each of them novel.

These are persons whom I know only vicariously, through their own writing and through the writings of others. They and others like them have set the standards for my profession. And I have been privileged to know some teachers whose stature is or should be equal to theirs. So, if you'll forgive me, some personal vignettes—Shirley Rosser of Lynchburg College entering the classroom, carefully arranging a variety of notes and textbooks on the desk, taking out his pocket watch and placing it on the desk, and beginning his lecture with a slight stammer which was a remnant of a severe speech impediment of his youth; then proceeding to explain in clear and concrete terms the most complex physical or mathematical analysis, bringing the ideas to life with a series of analogies drawn from a rich set of experiences. Wayne Bowers of UNC, a tall grey gaunt physicist who looked rather like Don Quixote, but who in reality was "the fastest chalk in the east," who could cover a blackboard with equations faster than most people could erase the board and whose notes are still a better resource than most textbooks. Eugen Merzbacher, whose quantum mechanics text has been the graduate standard for nearly 30 years, coming to the Charlottesville for a colloquium and having the audacity to announce that he was there to speak to the students at their level and giving one of the four or five intelligible physics colloquia I heard in my five years of indenture. This same Merzbacher who, noticing me waiting at a colleague's door in Chapel Hill, asking if he could help and then spending about two hours giving me, whom he did not know, an incredible insight into a remote area of statistical physics. This same Merzbacher,

who for nearly 30 years has annually taken the entire UNC physics department, faculty, staff, students and spouses into the Carolina mountains for the semi-annual physics camping trip. My research adviser, Doris Wilsdorf, who would look at a blackboard full of equations, most of which were apparently unrelated to each other, gaze over her upraised thumb as if estimating a golf shot, and say "the answer is about four, after which a student would spend six months of computer calculations to verify that the answer was 4.12, who would doze through colloquia in her husband's materials science department and, when awakened by his elbow in her side, would instinctively raise her hand with a question, a penetrating and to the speaker often devastating query. This same Doris Wilsdorf who, during the press to finish my dissertation research as I was leaving home before my wife awoke in the morning and returning after she fell asleep in the evening, would call her daily to assure her that I would soon finish. Jesse Beams, one of three individuals who, in my mind, have epitomized the term "Virginia gentleman," was legendary for his expectations that graduate students should be in the laboratory at all hours of the day and night. His students haunted the second-hand clothing stores in Charlottesville so that they could leave an overcoat or other articles of apparel hanging on the rack in the lab when they were not physically present. Dr. Beams encountered one of my classmates who had gone to the lab to fill a cold trap on the afternoon of Christmas eve. "Why Tom, don't you know it's Christmas eve? You have children. Why don't you go home early, say at 5:00, this afternoon?" But there was also J.S. Plaskett of Virginia, who, on the first day of a core graduate course in electromagnetic theory, announced to the class that he had read every book ever written on electromagnetic theory, had worked every problem in those books, had made up and worked several thousand problems of his own and, frankly, was bored with the subject. He was so bored that, he told us, he would not lecture on the subject. And he did not, although we had weekly examinations on the subject. The same Plaskett who walked into a graduate final examination in quantum mechanics and announced that he assumed those assembled had an adequate grasp of quantum mechanics and thus he provided an examination on acoustics to see what they might know about that. I could go on—and on. I could tell you of Madame Cox, the French teacher who could and did reduce battle-hardened Korean War veterans to tears with her intimidating presence and her quiet, but sharp questioning. I could regale you with tales of John Mahan, dancing with skeletons, climbing up on the lecture table to demonstrate the movement of a liver fluke, or teaching the class the words to "It's a long way to Amphioxias." But perhaps those are stories best kept for another day.

College teaching is very different from the other professions, especially

since the credentialing process is not designed to prepare one to teach. Rather it is predicated on the notion that anyone can teach. When I entered this curious profession, I had not in any way been trained as a teacher. I had had to fight simphy to take courses which I thought were necessary parts of my preparation for teaching physics, but which were viewed simply as distractions to my research by most of the physics faculty at UVA. The folk understanding of acronym for my degree has has some real validity, particularly as it applies to the young Ph.D who enters teaching. The notion that a Ph.D. prepares a person to teach at the college level is less valid than the notion that the M.D. prepares a person to practice medicine. Learning to teach takes a substantial investment of time and energy, and some strong mentoring. Teaching is an art and like any art, it must be practiced and honed to get it right. Ultimately every great teacher has worked to master this art and, I believe, has done so for the simple personal reason that effective teaching is as inherently rewarding as any human activity can be.