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A Movement West

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. . . *A Movement West*

ROBERT KATZ

I DID NOT discover that I had any interest in teaching or in academic life until late in my twenties, and then only through a sequence of unrelated circumstances.

It was not the promise of my teens that led me toward this goal. When I noted, on a Christmas card to a former professor, that I was leaving my job in a government laboratory to return to graduate school to get a Ph.D., his kindly note said in reply that it was always a good idea to take more courses. The implication was quite clear.

My private joke about the promise of my teens is not universally shared. During a lull in registration, when faculty members at Kansas State University act as registrar's clerks, I suggested to some of my colleagues that a man approaching his forties, realizing that he is unlikely to achieve any real distinction, sometimes wondered whether he was ever to fulfill the promise of his teens. I had intended the remark to be funny, but instead of generating gales of laughter, it was greeted by pained expressions and asides such as, "We all feel that way sometimes." Rather sharply I became aware that many of these men had always been at the head of their class, and even those that seemed dull and subdued had been salutatorians. Now in my forties, I have no vivid recollection

of grade school, of high school, or of college. I rather drifted through those years with no sense of goal or of achievement.

I was born in 1917. My parents were Russian-Jewish immigrants who came to New York City at about the turn of the century. In my school years my parents owned a grocery store, which my father opened at five in the morning and closed at midnight, managing about seven hours of sleep with the aid of a midafternoon nap. His was a daily routine, except for Sunday afternoon, when blue laws demanded that the store be closed. In those adolescent years I was anything but gregarious. A recent newspaper account of some psychological research caught my fancy, for this work reported that scientists display late psychosexual development. It was good to find that I was not unique.

We lived in a working-class neighborhood in the Bronx. Our neighbors were largely Irish, German and Italian immigrants. In accordance with the pedagogy of the 'twenties, I had skipped three semesters by the sixth grade. Whether for this reason, or because most of the kids on my block attended parochial school, I was rarely in the same class as my playmates. For no reason that I now recall I enrolled in a college preparatory course in the neighborhood high school. Looking back, it was a matter of great good fortune that such a curriculum was available, for I found myself taking four years of English and three years of foreign language without conscious planning on my part. I was able to get four years of mathematics, and this was one subject I enjoyed. I took these opportunities for granted, though now I know that educational fashions have changed, and that my own students rarely have such a curriculum offered them. By the time I was in high school, in 1930, the great depression had struck, and our neighborhood felt it keenly. In those years many kids quit

school, took out working papers, and found some sort of job.

At sixteen I enrolled in Brooklyn College, a recently organized, tuition-free, municipal college, then housed in rented office buildings in downtown Brooklyn. It took an hour to get to or from school on the subway. I managed to choose this inconvenient location because this school seemed most likely to accept my credentials. In 1933, I could see little point in college, and deferred making application until I could no longer withstand my father's insistence. If there was a guidance program at Brooklyn, it took no notice of me, nor I of it. I took courses as they were required, and found a sophomore required course in physics to have an amalgam of virtues. This course determined my choice of career. Today I count myself fortunate that I was not required to name a curriculum the day I entered college, that I was permitted to flounder around until I had some basis for choosing a field. My own students in Kansas come from different backgrounds, but have many similar problems, especially in making career choices. The numerous psychological tests are incapable of making sharp distinctions. Because of the crowded nature of a technical curriculum, students are forced to elect technical fields early. Not uncommonly, I find students who elect to major in aeronautical engineering because they were good at building model airplanes or who elect civil engineering because the only engineer they ever saw bossed a construction crew, and they like outside work.

As a college junior I had begun to wonder what I was to do when I got my degree. The times were not lush, and by way of insurance I managed to waste the equivalent of nearly a year of college work in a series of dull courses in pedagogy. Several of my classmates were highly regarded. These were the men who left college to take *jobs*, and they

loomed large. That summer I patrolled the technical employment agencies, and came to recognize the same well-scrubbed recent graduates filling out application forms in agency after agency to no avail. When I hear my students discuss their employment problems in terms of geography or fringe benefits, I smile and think back to this scramble for fifteen dollars a week. My own classmates were disciples of a newspaper called the *Chief*, which carried announcements of all civil-service examinations, and along with the crowd, I took examinations for everything—elevator operator, laboratory assistant, police clerk, junior physicist—for which I might qualify.

These were gray years. My employment problem was postponed for a year and a half by studying for a master's degree at Columbia University. There were serious difficulties at home. My father had suffered a crippling heart attack that was to kill him at fifty, after a protracted regimen of massage, pill and injection. The year he died one of my many civil-service examinations turned out well. I learned that I led the list for the position of junior physicist. With this assurance that I would find professional employment, I could turn down offers for many menial positions for which I had qualified, and, in September, I found my way to Dayton, Ohio, to go to work for the Army Air Force at Wright Field. I got off the train on Labor Day, 1939, to be assaulted by the headline that Hitler had invaded Poland. I was born in World War I, and had embarked on a career via World War II.

In all I spent seven years at Wright Field, working in two different laboratories. There were a great many reports to write, and in the course of writing them I learned some measure of coherence, for it was a serious deficiency of my education that I was not required to write theme after theme. I learned something of the business of engineering. As a

physicist I was able to compete favorably with engineers in the border areas between engineering specialties (as in the circumstance where a metallurgist required some knowledge of electricity), but found myself way behind when the problem lay clearly within conventional engineering bounds.

My first assignment was to become expert in the X-ray inspection of aircraft parts, in the art of taking X-ray pictures and of interpreting them. I bought books on metallurgy, and learned to distinguish between castings and forgings. I bought a set of drawing instruments and an appropriate text and learned what drafting I needed. I visited steel mills and foundries, aircraft factories and engine plants, and acquired a background in aircraft technology under the guidance of two very competent men who were chiefs of the metals unit and the materials laboratory. There was some research to do, and finally I produced the desired specifications for regulating the practice of the art. To the best of my knowledge these are still in use, with slight modification. Interestingly enough, the knowledge gained there was put to use almost as soon as I came to Kansas State, in developing X-ray techniques for finding internal insects in wheat kernels. These techniques are now in world-wide use, and special X-ray equipment for their application is built and sold by Westinghouse, General Electric and other manufacturers. In a sense the Air Force unintentionally subsidized agricultural research, and the state of Kansas gained an unexpected bonus.

For a second assignment I worked with a group attempting to solve an aircraft radio-noise problem called "precipitation static." That group was responsible for the development of the dischargers which hang from the wing tips of most large airplanes. My own contribution included the preparation of the production design of these devices, and the inven-

tion and development of other less noticeable gadgets. A great deal of work is involved in developing and producing the most transparently simple technical hardware and I developed a real respect for the work of the ingenious engineer.

At this time I lived in Yellow Springs, Ohio, about fifteen miles from Wright Field, and enjoyed the hospitality of Antioch College, its library, its fine faculty and its student body. My wife is an Antioch alumna, whom I met and married during that time. Concerts, lectures and theatre were available here. Antioch differed from Brooklyn College in many ways. It was small and intimate, where Brooklyn was large and impersonal. Antioch was located in an Ohio village, with a resident student body that came from everywhere in the United States, and went off to co-op jobs every other semester to extend their campus experiences. The student body at Brooklyn came largely from one borough of New York City, gathered by subway and el in the morning and dispersed by the same means in the evening. I think that it was in Yellow Springs that I came to appreciate the work of a college faculty, and to think of this as a possible occupation.

Time passed, and the war was over. I felt a hankering after graduate study, and decided that I must get on with it, for if I got past thirty without getting back to school, I would never make it. As it turned out, I was one of the two old men in graduate study in physics at the University of Illinois. Originally my decision to undertake further study had nothing to do with teaching, but rather stemmed from the observation that I simply did not know enough physics to do most effectively the work I was doing. I fully expected to return to Wright Field, or at least to industry, but without specific reason I slowly drifted toward the notion that I might like a college job.

Perhaps it is fortunate that I did not prepare for the university in any purposeful or directed way, for I suppose if I had been counseled, I might well have been counseled out of teaching. At the University of Illinois, where I went in 1946, graduate students in physics who were considered not to have it were given a pat on the head, a master's degree, and were sent on their way. One short step up and a student was told that he might teach, but that he would never do any research. At the very top of the ladder was academic research in a good school. A physicist at the top of his profession might do some teaching, but only to keep his hand in, and not as his primary concern. My own graduate preparation in physics was for the purpose of doing research, not teaching physics. And though two thirds to three fourths of my time has been spent in teaching, I would not alter this academic preparation. While it would have been difficult and most inefficient to attempt to learn physics for myself, I was able to evolve my own teaching patterns and to reach my own conclusions about the nature of pedagogy and of the university.

It is hard to imagine a subject about which more nonsense is written than the subject of teaching and of teacher preparation. Even bookmen who edit and sell texts in these subjects privately chuckle at a great many of them. I suppose the words that are supposed to tell a concertgoer of the virtues of a symphony, or the comments that are intended to evoke an appreciation for art are also in this nonsense contest. Surely the list of entries in this race includes the jargon that passes for understanding in the social studies, with its tables of statistical how-do-you-do. The latter field might better be rechristened *socistics*, for it consists largely of *social statistics* rather than studies or concepts.

From those who speak in pedageese we hear: The object of the verb *to teach* is *students*, not *subject*. Do not say, "I

teach Physics." Instead say, "I teach students." Lecture is bad. Discussion is good. A teacher must have sympathy, understanding, patience and ability to grasp the student's problems, to lead him surely and safely through his intellectual, financial and emotional difficulties. There is no hierarchy of the mind. No subject is better or worse than any other. We must strive to understand each other's problems. Bunk.

The best physics teacher I ever had deliberately avoided all but his own research students. He did so in self-defense. He lectured to graduate classes well over a hundred in size. There was no discussion with him, in class or after. In the two years I attended his lectures I did not exchange a paragraph of conversation with him, though I tried. My long and involved questions in class were answered with a nod of the head, a yes or no, and a patient expression. When one time I got my foot into his office door at the close of a lecture, I was patiently, but ever so clearly, advised that he had a full schedule of research planned for the afternoon. This was the common experience, and commonly we graduate students held him in the highest regard.

Sometimes I am nearly lulled into believing that it might be good for new faculty members to learn something of the structure and organization of the university. But I fear that this knowledge might be most disillusioning and might drive good candidates from the profession. It is better not to be too alert to these questions until the years have tempered one's judgment. It might be disillusioning to learn of college presidents who make impressive speeches they have not written about the importance of education, or that the course of a university is sometimes charted by a politician with an honorary degree, rather than a scholar. Although my opinion is sociistically unverified, I retain a bias that a commitment to scholarship, evidenced by its practice, is an essential in-

gredient in the make-up of a university administrator. From my own experience, a professor is most comfortable and most productive when his department head shares his dedication to their field.

On one occasion I tried to explain my concept of administration to a dean, to no avail. I tried to explain that the productive person in the university is the professor, not the administrator, and not the student. I tried to explain that the successful administrator was one who got his kicks vicariously, from the accomplishments of his faculty. It was his function to hew the wood and draw the water, and to undertake the nonproductive work of running an institution in order to free the faculty for the university's principal job. The burden of a university, the manner in which it fills its role, and its professional reputation depend solely on the faculty which teaches the classes, attracts the students and does the research. These notions seemed to me to be self-evident.

But the dean did not see things my way. In rebuttal I heard how impractical these ideas were. It would be expensive if the college hired clerks to handle the chores of registration, and after all, if the faculty didn't do this, what would they do with their time—paint storm windows? When I argued that faculty should be paid a salary comparable to the income of professional persons in the community, I heard of supply and demand, though my counter that the supply of would-be deans is far greater than the demand brought no response. All this discussion led to nothing, for we were operating from different premises: he from the notion that the faculty was to serve the administration, and I from the very opposite view.

The attitude of faculty members toward administration is often conditioned by the salary scale. From president to

dean to department head to assistant professor the salaries may be in the ratio of 5 to 3 to 2 to 1. Thus the salaries of professors may be compressed in the range from five to ten thousand a year, while the president earns twenty-five thousand. One certain way to judge the quality of an institution is to measure the value administrators (who fix the salary scale) place on their own services, in relation to the faculty. How many professors are paid more than their department heads or deans?

In an institution where administrative position is too well paid in relation to scholarship, one can see ambitious faculty members, sometimes urged by their wives, scrambling for administrative favor. At one time I toyed with the notion of a parlor game in which the players would roll dice for points, and advance toward a goal called "Dean." A point score was to be devised for service-club membership, for speeches, for civic participation, for committee work and so on. Points were to be earned in proportion to time dissipated (that might otherwise have been spent in pursuit of learning). The conduct of a survey to determine the fraction of American institutions enrolling between four thousand and five thousand five hundred students that accept three hours of transfer credit, in research, toward the master's degree is the sort of useless activity that would have earned a good score. While the game was a joke, and we do not roll dice for points, a number of faculty members scramble avidly for them as though they had perceived that these were the basis of acquiring administrative positions, status and salary. Perhaps, under other circumstances, their time might have been spent more productively, in pursuit of the scholarship for which they were trained and in which they had demonstrated competence.

When I read the advice freely given to college presidents

by corporation executives, I am grateful for what we have, in spite of its shortcomings. The president of a major corporation which prides itself on progress once pontificated that colleges would be run more efficiently if the faculty were paid on a piecework basis, so much a head. The popular professor who lectured to droves of students would be well paid, while the professor who taught only few students would get what he deserved. In this admirable proposal it might be well to separate the role of the inspector from the pieceworker, in the university as in industry. Another distinguished executive announced with great flourish that colleges would be run more cheaply if class sizes were increased. This is again a profound and novel view. It is not at all clear to me that colleges would be better places if they were run by businessmen. Quite the contrary. I think it most unfortunate that college administrators sometimes pattern themselves after corporation executives, and that in the minds of the public and the boards of trustees the same confusion exists.

I do not know the solution to the problem of college administration, but I suspect that the business manager must be returned to his place, and that place is not one of establishing academic policy. I am convinced that administrators must be practical, that they must be capable of sacrificing principle to expediency. But I would be glad if the sacrifice were painful.

The great advantage in being a professor lies in the freedom a professor has to choose his research, and to do his teaching in his own way; that is, he has free choice after he has fulfilled a tremendous list of duties and obligations, and has satisfied some of the pressures upon him. In the budget a fraction of his time may be assigned to teaching, and this

means classes which must be met; the balance is assigned to research and *other duties*. Those other duties? Consider the committee. This is another duty, a scheme for consuming endless amounts of time, without compensation, for losing touch with one's field completely. But then, points are garnered and local professional reputations are sometimes made in committee. Every college has a vast committee apparatus and even a corps of professional committeemen.

There is free choice in research, but funds are limited, and so the professor may be urged to undertake remunerative contracts off campus, for these will pay for the research, and provide a little overhead. In some universities a special system of commissions has been devised whereby a professor receives bonus pay for the contracts he garners. Under these circumstances there seems to be little attention paid to the quality of the work, whether it results in a weighty mimeographed report destined for burial in the contractor's files, or in a slim but meaningful publication. Nevertheless the award of a contract is greeted with a fanfare proportionate to the amount of the award, and the institution basks in the outside support received by its research program. In fact the program is not the program of the university but rather it is the program of the contractor, and the university may have taken on the aspect of a commercial research laboratory which has no program of its own but rather offers its facilities for hire. There are many occasions in which the program desired by the contractor and the research the professor would have done anyway are one and the same. But the word "contract" has a *quid pro quo* sound about it which tends to imply that the choice of research was tailored to suit those with the quid.

In an agricultural college such pressure may be exerted more subtly, for the college has a commitment to agricultural

research as part of its mission. Thus I have learned to get a kick out of some of the work into which I was seduced by a good friend and neighbor nearly ten years ago. My work in the X-ray inspection of wheat led to other problems that were fun. I was able to devise a gadget for separating sound wheat from buggy wheat that I chose to call a "grain spectrometer," just to use a term from physics. More recently a new grain-hardness tester came from this activity. But the choice was not wholly free, for there was ready support for agricultural research.

Much has been said about the rewards of the superior teacher, and while teaching can be fun, the rewards have been somewhat overstated. The rewards are internal, and so is the knowledge that the teaching is superior. One hears about staying young by contact with young minds, but for me the best part of teaching is the sharpened perception of my subject that I get from repeated exposition. When my students look blank, I know that I have failed to understand a point or at least to develop it properly. Only in this sense is there benefit from contact with young minds. Teaching is sometimes a tremendous challenge in that the young minds need stimulating, and it may take the teacher's every resource to awaken them. It is a rare student that generates a new insight, even in research, if only for the reason that the student lacks the background to know whether his ideas are novel. From popular fiction everyone knows that behind the award and honor accorded a professor there is the brilliant but unrecognized graduate student from whom the idea was stolen. More likely the professor has worked for years to formulate a problem and to equip a laboratory. More often the professor reads the first draft of a student's thesis and thinks wearily that he

is about to lose another weekend helping the student to straighten things out.

I would imagine that the freedom a professor has in his teaching varies with the field of his specialization. In physics there is a strong body of tradition which helps determine the content of a course. And there has never been any suggestion as to how I should teach my courses. As everywhere, the general physics course is one with considerable mortality. I am told that a motto hangs in the office of the president of one teachers' college which reads, "There are no F students, there is only F teaching." I wonder if it is not part of the problem of the physics teacher in college that there were no F students in the high schools. The courses students take in high school help to determine their choice of field in college. If the content of science and mathematics courses is at an unrealistically low level, and the grades are correspondingly high, it is easy to see that a student whose talents lie elsewhere might think himself suited for engineering. In defense of our own grading procedures, the results of a study (of physics grades in relation to the student's four-year average) showed that these were more tightly correlated than any other index available to the counseling center. As a result the student counselors now use the physics grade as one of the key pieces of information in helping the student make a choice of goals.

Why then does a professor remain on a faculty? The answer surely isn't salary. Professors are very conscious of the fact that they are underpaid in relation to their administrators and to their fee-earning counterparts, the lawyers, the dentists and the doctors. The professor's salary cannot buy the house, the books, the professional journals, the schools for his children that he must have, let alone the scale of living his tele-

vision image boasts. He works in a world-wide competition in his research while his well-to-do professional counterpart rarely competes on even a county-wide level. I stay in this business because I like it. Those of us in a technical field are merchantable and feel that, if some crisis arises where we need more money, it is possible to find more gainful employment. But the case of the scientist or the engineer is somewhat special, and in many academic fields there is no place else to go. This is particularly true in the humanities where the professor is generally at the lower end of the university salary scale, and sometimes indecently so. Speeches on the value of scholarship lose their fullness when a professor in the humanities is valued at from \$3500 to \$5000 a year, in 1959, while a green Ph.D. in physics can start in industry at \$9500.

With a built-in set of standards, a professor can enjoy his work. Without them, he spends his life jumping through other people's hoops. It is nice if your president knows you to be a first-rate teacher, but it is far more important that you know it and that you can derive occasional pleasure from the practice of this art. I chuckle when a dean tells me that it is just as easy to lecture to 150 as to 15, knowing that he has never done it and that he has never been around to wring me out after a lecture. It has been fun to pursue such diverse things as tornados and the Dirac monopole (a hypothetical particle of unit magnetic charge) without asking by your leave, as I could steal the time. Some of the things I've been interested in have worked out, and others have not. But compared to the years I spent in a government laboratory, my faculty years have been most productive. I have helped to process a couple or three thousand students in these ten years, and in the fourth of my time that the university has allocated to research, together with the night work they didn't

pay for, I've managed (with collaborators) to get out a half-dozen papers in physics, a dozen or so in agricultural applications, a half-dozen popular pieces, and a textbook. In seven years in a government laboratory I wrote a great many reports, but all there is to show is one paper and two patents. And now I sign my own letters, rather than prepare them for the signature of the commanding officer. And there are no time clocks, though I put in longer hours.

I have been using administrators as whipping boys for the problems of the faculty and the university. But the blame does not lie with them. It lies with the public.

One day I was walking home across campus, and saw a student busily screwing light bulbs into a sign advertising the Engineer's Open House, an annual exposition staged by student engineers. I called to him and kidded, perhaps unfairly, that this was what he would probably be doing ten years hence, after he had his degree as an Electrical Engineer in hand.

"At least I won't teach school," he fired back.

About a year later I told this story at a banquet table of student engineers gathered to initiate new members into a professional fraternity, and was loudly and appreciatively applauded.

And then I asked the question that shut off the applause and closed the evening.

"Is this story funny because you don't think you're worth the hire of a good man?"

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