



Richard Feynman, still dignified at Caltech in 1956.

The Dignified Professor

by Richard P. Feynman with Ralph Leighton

I DON'T BELIEVE I can really do without teaching. The reason is, I have to have something so that when I don't have any ideas and I'm not getting anywhere I can say to myself, "At least I'm living; at least I'm *doing* something; I'm making *some* contribution" — it's just psychological.

When I was at Princeton in the 1940s I could see what happened to those great minds at the Institute for Advanced Study, who had been specially selected for their tremendous brains and were now given this opportunity to sit in this lovely house by the woods there, with no classes to teach, with no obligations whatsoever. These poor bastards could now sit and think clearly all by themselves, OK? So they don't get an idea for a while: They have every opportunity to do something, and they're not getting any ideas. I believe that in a situation like this a kind of guilt or depression worms inside of you, and you begin to *worry* about not getting any ideas. And nothing happens. Still no ideas come.

Nothing happens because there's not enough *real* activity and challenge: You're not in contact with the experimental guys. You don't have to think how to answer questions from the students. Nothing!

In any thinking process there are moments when everything is going good and you've got wonderful ideas. Teaching is an interruption, and so it's the greatest pain in the neck in the world. And then there are the

longer periods of time when not much is coming to you. You're not getting any ideas, and if you're doing nothing at all, it drives you nuts! You can't even say "I'm teaching my class."

If you're teaching a class, you can think about the elementary things that you know very well. These things are kind of fun and delightful. It doesn't do any harm to think them over again. Is there a better way to present them? Are there any new problems associated with them? Are there any new thoughts you can make about them? The elementary things are *easy* to think about; if you can't think of a new thought, no harm done; what you thought about it before is good enough for the class. If you *do* think of something new, you're rather pleased that you have a new way of looking at it.

The questions of the students are often the source of new research. They often ask profound questions that I've thought about at times and then given up on, so to speak, for a while. It wouldn't do me any harm to think about them again and see if I can go any further now. The students may not be able

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to see the thing I want to answer, or the subtleties I want to think about, but they *remind* me of a problem by asking questions in the neighborhood of that problem. It's not so easy to remind *yourself* of these things.

So I find that teaching and the students keep life going, and I would *never* accept any position in which somebody has invented a happy solution for me where I don't have to teach. Never.

But once I *was* offered such a position.

During the war, when I was still at Los Alamos, Hans Bethe got me this job at Cornell, for \$3700 a year. I got an offer from some other place for more, but I like Bethe, and I had decided to go to Cornell and wasn't worried about the money. But Bethe was always watching out for me, and when he found out that others were offering more, he got Cornell to give me a raise to \$4000 even before I started.

Cornell told me that I would be teaching a course in mathematical methods of physics, and they told me what day I should come — November 6, I think, but it sounds funny that it could be so late in the year. I took the train from Los Alamos to Ithaca, and spent most of my time writing final reports for the Manhattan Project. I still remember that it was on the night train from Buffalo to Ithaca that I began to work on my course.

You have to understand the pressures at Los Alamos. You did everything as fast as you could; everybody worked very, very hard; and everything was finished at the last

of experience by that time, working so hard for four years using mathematical tricks. So I laid out the different subjects in mathematics and how to deal with them, and I still have the papers — the notes I made on the train.

I got off the train in Ithaca, carrying my heavy suitcase on my shoulder, as usual. A guy called out, "Want a taxi, sir?"

I had never wanted to take a taxi: I was always a young fella, short on money, wanting to be my own man. But I thought to myself, "I'm a *professor* — I must be dignified." So I took my suitcase down from my shoulder and carried it in my hand, and said "Yes."

"Where to?"

"The hotel."

"Which hotel?"

"One of the hotels you've got in Ithaca."

"Have you got a reservation?"

"No."

"It's not so easy to get a room."

"We'll just go from one hotel to another. Stay and wait for me."

I try the Hotel Ithaca: no room. We go over to the Traveller's Hotel; they don't have any room either. I say to the taxi guy, "No use driving around town with me; it's gonna cost a lot of money. I'll walk from hotel to hotel." I leave my suitcase in the Traveller's Hotel and I start to wander around, looking for a room. That shows you how much preparation I had, a new professor.

I found some other guy wandering around looking for a room too. It turned out that the hotel room situation was utterly impossible. After a while we wandered up some sort of a hill, and gradually realized we were coming near the campus of the university.

We saw something that looked like a rooming house, with an open window, and you could see bunk beds in there. By this time it was night, so we decided to ask if we could sleep there. The door was open, but there was nobody in the whole place. We walked up into one of the rooms, and the other guy said, "Come on, let's just sleep here!"

I didn't think that was so good. It seemed like stealing to me. Somebody had made the beds; they might come home and find us sleeping in their beds, and we'd get in trouble.

So we go out. We walk a little further, and we see, under a streetlight, an enormous mass of leaves that had been collected — it was autumn — from the lawns. I say, "Hey! We could crawl in these leaves and sleep

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minute. So, working out my course on the train a day or two before the first lecture seemed natural to me.

Mathematical methods of physics was an ideal course for me to teach. It was what I had done during the war — apply mathematics to physics. I knew which methods were *really* useful, and which were not. I had lots

here!" I tried it; they were rather soft. I was tired of walking around, and if the pile of leaves hadn't been right under a streetlight, it would have been perfectly all right. But I didn't want to get into trouble right away. Back at Los Alamos people had teased me (when I played drums and so on) about what kind of "professor" Cornell was going to get. They said I'd get a reputation right off by doing something silly, so I was trying to be a little dignified. I reluctantly gave up the idea of sleeping in the pile of leaves.

We wandered around a little more, and came to a big building, some important building of the campus. We went in, and there were two couches in the hallway. The other guy said, "I'm sleeping here!" and collapsed onto the couch.

I didn't want to get into trouble, so I found a janitor down in the basement and asked him whether I could sleep on the couch, and he said "Sure."

The next morning I woke up, found a place to eat breakfast, and started rushing around as fast as I could to find out when my first class was going to be. I ran into the physics department: "What time is my first class? Did I miss it?"

The guy said, "You have nothing to worry about. Classes don't start for eight days."

That was a *shock* to me! The first thing I said was, "Well, why did you tell me to be here a week ahead?"

"I thought you'd like to come and get acquainted, find a place to stay and settle down before you begin your classes."

I was back to civilization, and I didn't know what it was!

Professor Gibbs sent me to the Student Union to find a place to stay. It's a big place, with lots of students milling around. I go up to a big desk that says HOUSING and I say, "I'm new, and I'm looking for a room."

The guy says, "Buddy, the housing situation in Ithaca is tough. In fact, it's so tough that, believe it or not, a *professor* had to sleep on a couch in this lobby last night!"

I look around, and it's the same lobby! I turn to him and I say, "Well, I'm that professor, and the professor doesn't want to do it again!"

My early days at Cornell as a new professor were interesting and sometimes amusing. A few days after I got there, Professor Gibbs came into my office and explained to me that ordinarily we don't accept students this late in the term, but in a few cases, when the

applicant is very, very good, we can accept him. He handed me an application and asked me to look it over.

He comes back: "Well, what do you think?"

"I think he's first rate, and I think we ought to accept him. I think we're lucky to get him here."

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"Yes, but did you look at his picture?"

"*What possible difference could that make?*" I exclaimed.

"Absolutely none, sir! Glad to hear you say that. I wanted to see what kind of a man we had for our new professor." Gibbs liked the way I came right back at him without thinking to myself, "He's the head of the department, and I'm new here, so I'd better be careful what I say." I haven't got the speed to think like that; my first reaction is immediate, and I say the first thing that comes into my mind.

Then another guy came into my office. He wanted to talk to me about philosophy, and I can't really quite remember what he said, but he wanted me to join some kind of a club of professors. The club was some sort of anti-Semitic club that thought the Nazis weren't so bad. He tried to explain to me how there were too many Jews doing this and that — some crazy thing. So I waited until he got all finished, and said to him, "You know, you made a big mistake: I was brought up in a Jewish family." He went out, and that was the beginning of my loss of respect for some of the professors in the humanities, and other areas, at Cornell University.

I was starting over, after my wife's death, and I wanted to meet some girls. In those days there was a lot of social dancing. So there were a lot of dances at Cornell, mixers to get people together, especially for the fresh-

men and others returning to school.

I remember the first dance that I went to. I hadn't been dancing for three or four years while I was at Los Alamos; I hadn't even been in society. So I went to this dance and danced as best I could, which I thought was reasonably all right. You can usually tell

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when somebody's dancing with you and they feel pretty good about it.

As we danced I would talk with the girl a little bit; she would ask me some questions about myself, and I would ask some about her. But when I wanted to dance with a girl I had danced with before, I had to *look* for her.

"Would you like to dance again?"

"No, I'm sorry; I need some air." Or, "Well, I have to go to the ladies' room" — this and that excuse, from two or three girls in a row! What was the matter with me? Was my dancing lousy? Was my personality lousy?

I danced with another girl, and again came the usual questions: "Are you a student, or a graduate student?" (There were a lot of students who looked old then because they had been in the army.)

"No, I'm a professor."

"Oh? A professor of what?"

"Theoretical physics."

"I suppose you worked on the atomic bomb."

"Yes, I was at Los Alamos during the war."

She said, "You're a damn liar!" — and walked off.

That relieved me a great deal. It explained everything. I had been telling all the girls the simple-minded, stupid truth, and I never knew what the trouble was. It was perfectly obvious that I was being shunned by one girl after another when I did everything

perfectly nice and natural and was polite, and answered the questions. Everything would look very pleasant, and then *thwoop* — it wouldn't work. I didn't understand it until this woman fortunately called me a damn liar.

So then I tried to avoid all the questions, and it had the opposite effect: "Are you a freshman?"

"Well, no."

"Are you a graduate student?"

"No."

"What *are* you?"

"I don't want to say."

"Why won't you tell us what you are?" "I don't want to. . ." — and they'd keep talking to me!

I ended up with two girls over at my house and one of them told me that I really shouldn't feel uncomfortable about being a freshman; there were plenty of guys my age who were starting out in college, and it was really all right. They were sophomores, and were being quite motherly, the two of them. They worked very hard on my psychology, but I didn't want the situation to get so distorted and misunderstood, so I let them know I was a professor. They were very upset that I had fooled them. I had a lot of trouble being a young professor at Cornell.

Anyway, I began to teach the course in mathematical methods in physics, and I think I also taught another course — electricity and magnetism, perhaps. I also intended to do research. Before the war, while I was getting my degree, I had many ideas: I had invented new methods of doing quantum mechanics with path integrals, and I had a lot of stuff I wanted to do.

At Cornell, I'd work on preparing my courses, and I'd go over to the library a lot and read through the *Arabian Nights* and ogle the girls that would go by. But when it came time to do some research, I couldn't get to work. I was a little tired; I was not interested; I couldn't do research! This went on for what I felt was a few years, but when I go back and calculate the timing, it couldn't have been that long. Perhaps nowadays I wouldn't think it was such a long time, but then, it seemed to go on for a *very* long time. I simply couldn't get started on any problem: I remember writing one or two sentences about some problem in gamma rays and then I couldn't go any further. I was convinced that from the war and everything (the death of my wife) I had simply burned myself out.

I now understand it much better. First of all, a young man doesn't realize how much time it takes to prepare good lectures, for the first time especially — and to give the lectures, and to make up exam problems, and to check that they're sensible ones. I was giving good courses, the kind of courses where I put a lot of thought into each lecture. But I didn't realize that that's a lot of work! So here I was, "burned out," reading the *Arabian Nights* and feeling depressed about myself.

During this period I would get offers from different places — universities and industry — with salaries higher than my own. And each time I got something like that I would get a little more depressed. I would say to myself, "Look, they're giving me these wonderful offers, but they don't realize that I'm burned out! Of course I can't accept them. They expect me to accomplish something, and I can't accomplish anything! I have no ideas. . ."

Finally there came in the mail an invitation from the Institute for Advanced Study: Einstein. . . Von Neumann. . . Weyl. . . all these great minds! *They* write to me, and invite me to be a professor *there!* And not just a regular professor. Somehow they knew my feelings about the Institute: how it's too theoretical; how there's not enough *real* activity and challenge. So they write, "We appreciate that you have a considerable interest in experiments and in teaching, so we have made arrangements to create a special type of professorship, if you wish: half professor at Princeton University, and half at the Institute."

Institute for Advanced Study! Special exception! A position better than Einstein, even! It was ideal; it was perfect; it was absurd!

It *was* absurd. The other offers had made me feel worse, up to a point. They were expecting me to accomplish something. But this offer was so ridiculous, so impossible for me ever to live up to, so ridiculously out of proportion. The other ones were just mistakes; this was an absurdity! I laughed at it while I was shaving, thinking about it.

And then I thought to myself, "You know, what they think of you is so fantastic, it's impossible to live up to it. You have no responsibility to live up to it!"

It was a brilliant idea: You have no responsibility to live up to what other people think you ought to accomplish. I have no responsibility to be like they expect me to be.

It's their mistake, not my failing.

It wasn't a failure on my part that the Institute for Advanced Study expected me to be that good; it was impossible. It was clearly a mistake — and the moment I appreciated the possibility that they might be wrong, I realized that it was also true of all the other places, including my own university. I am what I am, and if they expected me to be good and they're offering me some money for it, it's their hard luck.

Then, within the day, by some strange miracle — perhaps he overheard me talking about it, or maybe he just understood me — Bob Wilson, who was head of the laboratory there at Cornell, called me in to see him. He said, in a serious tone, "Feynman, you're teaching your classes well; you're doing a good job, and we're very satisfied. Any other expectations we might have are a matter of luck. When we hire a professor, we're taking all the risks. If it comes out good, all right. If it doesn't, too bad. But you shouldn't worry about what you're doing or not doing." He said it much better than that, and it released me from the feeling of guilt.

Then I had another thought: Physics disgusts me a little bit now, but I used to *enjoy* doing physics. Why did I enjoy it? I used to *play* with it. I used to do whatever I felt like doing — it didn't have to do with whether it was important for the development of nuclear physics, but whether it was interesting and amusing for me to play with. When I was in high school, I'd see water running out of a faucet growing narrower, and wonder if I

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could figure out what determines that curve. I found it was rather easy to do. I didn't *have* to do it; it wasn't important for the future of science; somebody else had already done it. That didn't make any difference: I'd invent things and play with things for my own entertainment.

So I got this new attitude. Now that I *am* burned out and I'll never accomplish anything, I've got this nice position at the university teaching classes which I rather enjoy, and just like I read the *Arabian Nights* for pleasure, I'm going to *play* with physics, whenever I want to, without worrying about any importance whatsoever.

Within a week I was in the cafeteria and some guy, fooling around, throws a plate in the air. As the plate went up in the air I saw it wobble, and I noticed the red medallion of Cornell on the plate going around. It was pretty obvious to me that the medallion went around faster than the wobbling.

I had nothing to do, so I start to figure out the motion of the rotating plate. I discover that when the angle is very slight, the medallion rotates twice as fast as the wobble rate — two to one. It came out of a complicated equation! Then I thought, "Is there some way I can see in a more fundamental way, by looking at the forces or the dynamics, why it's two to one?"

I don't remember how I did it, but I ultimately worked out what the motion of the mass particles is, and how all the accelerations balance to make it come out two to one.

I still remember going to Hans Bethe and saying, "Hey, Hans! I noticed something

interesting. Here the plate goes around so, and the reason it's two to one is. . ." and I showed him the accelerations.

He says, "Feynman, that's pretty interesting, but what's the importance of it? Why are you doing it?"

"Hah!" I say. "There's no importance whatsoever. I'm just doing it for the fun of it." His reaction didn't discourage me; I had made up my mind I was going to enjoy physics and do whatever I liked.

I went on to work out equations of wobbles. Then I thought about how electron orbits start to move in relativity. Then there's the Dirac Equation in electrodynamics. And then quantum electrodynamics. And before I knew it (it was a very short time) I was "playing" — working, really — with the same old problem that I loved so much, that I had stopped working on when I went to Los Alamos: my thesis-type problems; all those old-fashioned, wonderful things.

It was effortless. It was easy to play with these things. It was like uncorking a bottle: Everything flowed out effortlessly. I almost tried to resist it! There was no importance to what I was doing, but ultimately there was. The diagrams and the whole business that I got the Nobel Prize for came from that piddling around with the wobbling plate. □

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