

A Rockefeller Fellow in the United States of America

Off I went in storm and seasickness on my two-week trip to New York and the New World beyond it. At Ellis Island, most passengers were detained for a while but, fortunately, a representative of the Rockefeller Foundation took me in tow. I received an expense-account book and some cash to see me through to California.

The Rockefeller Foundation's policy was to keep you on a tight string -- providing just enough money to sustain the fellow on a three-meal-a-day diet and decent lodging. Any extra adventures required one to eat less -- but German conditions had already accustomed me to that. The representatives of the Foundation were helpful and friendly; I remember Mr. Tisdale, its European ambassador, with special gratitude.

I explored New York, with its unbelievable skyscrapers and the Statue of Liberty, for two days. I also visited the Bell Telephone Laboratories -- at that time modestly housed downtown. Dr. Fletcher was the Director and Davisson and Germer had just finished their famous electron-diffraction experiment. A letter of recommendation from James Franck opened all doors and I was deeply impressed by the excellent work and the warm reception. Fifteen years later, a son each of Davidson and of Fletcher were my Ph.D. students at M.I.T.

The trip to California took eight days and nights by train and gave an overwhelming impression of the variety and beauty of this immense country. Our first major stop was at Niagara Falls -- not yet impoverished of the water that was later diverted through its power stations. It provided an unforgettable spectacle and simultaneously a useful lesson. Only one hour's time was allotted for the stop and a taxi driver persuaded me that I could see it all if he drove me. We agreed on a reasonable price, but he drove me to a lonely spot and said I would now have to pay much more or get out. Since I could not reach my train in time by walking back, I

was at his mercy. The sum requested would have broken my account. Therefore I told him that I would have to get the additional money from my baggage on the train. We saw the falls and then returned to the train. I entered while he waited outside and swiftly locked myself into a lavatory. The whistle blew, the driver stomped through the train without finding me and had to jump off. I was on my way, somewhat wiser and with my small funds still intact.

Sitting in the Pullman observation car and letting the landscape glide by -- on the way to Chicago, then through the Great Plains to the Rocky Mountains, then across the deserts, and at last along the Pacific Coast from Los Angeles towards San Francisco -- was an amazing experience. We stopped at the Grand Canyon for a whole afternoon and walked along the rim of this unbelievable chasm. My fellow passengers became friends as a result of sharing all this beauty. Detraining in San Francisco, I reached Berkeley at last by crossing the Bay via ferry past the prison-island, Alcatraz, to Oakland. The campus in Berkeley with its campanile was a lovely, welcoming sight and its faculty club, which provided me a room on arrival, remained my abode throughout the year (see Figure 36).

Rockefeller Fellow in Berkeley

Berkeley's Physics Department had at that time no strong leader. Professor Birge was well known as a theoretical molecular spectroscopist and Professor Leonard Loeb, a specialist in gas discharge research, pulled me somewhat into his orbit. The department occupied a beautiful new building, had a good shop, very nice young post-doctorate co-workers, including Bob Brode and Sam Allison, and gave me a large room for my experimental work. Anything I needed I had to design and build with the help of the shop. Commercially available items, such as vacuum pumps, had to be ordered from the East with long delivery times. California and the West in general had not yet its own industrial base.

The scientifically outstanding institute in Berkeley at that time was the Chemistry Department next door. Its director, organic chemist Gilbert Lewis, developed the theory of chemical bonding. His colleague, the inorganic chemist, Professor Hildebrand, was also excellent -- and so was the younger staff, of which Professor Latimer and Dr. Hogness were famous examples. I was very kindly accepted by all of them and started on a much too ambitious research program to measure quantitatively the ionization characteristics of mercury atoms by electron impact.

The excitation of mercury atoms had been measured quantitatively in the famous Franck-Hertz experiment, for which the authors had just received the Nobel

prize (1926). However, the probability of ionization as a function of the electron impact energy was unknown. In the experimental device that I developed, a beam of mercury atoms was intersected at right angles by an electron beam. The ions were deflected and counted and the atoms frozen out on a liquid-air trap.

The choice of such a demanding precision study reflected my youthful enthusiasm, but not to the time and means available. Still I built the equipment and got some preliminary results before I had to return to Germany.¹

Life and Adventures in California -- 1927-28

California was relatively unpopulated at the time. At its eastern boundaries, I saw vigilantes with shotguns trying to chase away immigrants who came from the drought-stricken Plain states. The beaches of the Pacific coast still had their pristine splendor, and I used to drive there with friends on weekends to hike along the rocky shore with its teeming bird and fish populations and its lovely trees and sheltered coves. We slept there overnight warmed by blazing driftwood fires (see Figures 37-39). A young lab assistant and I jointly acquired an old Chevrolet car for \$15. Its fuel was pushed into the motor by gravity instead of by a fuel pump. We therefore had to drive backwards up steeper mountainsides. But the car proved nearly indestructible. After collisions, it could be hammered into shape again. It served us for about 15,000 miles before giving up its ghost (see Figure 40).

It was assumed in California that every youngster could drive a car. Therefore, when I went to the police station in Oakland to apply for a learner's permit, I was greeted with incredulity. Instead of getting a permit, I was put into the driver's seat and told to drive down the busy street and turn around. I promptly stalled the car in the densest traffic and had to walk back. "Yes, you really cannot drive!" the sergeant said in wonderment, and gave me a learner's permit with the request to reappear in two weeks. I passed without further mishap and became typically overconfident. A motorcycle patrol pinched me for speeding and returned me to a reasonable equilibrium.

On the Berkeley campus, I frequently climbed the hillside above Strawberry Canyon after lunch. The view across the bay towards San Francisco was beautiful. In summer, a towering fog bank began to envelop the city. On the Berkeley side of the bay, new towns were laid out as a skeleton of streets with the realtors' huts in the center. Nobody bought, however, since people felt the approaching Depression in their bones (see Figure 41).

On one of these hikes I bedded myself comfortably for a nap under some poison oak. Nobody had warned me of that mischievous plant and I came down

with a miserable rash on my face. Crestfallen, I went to a machinist friend in Gilbert Lewis's Institute for help and he -- claiming special healing power -- poured a liter of liquid air over my head. The effect was ghastly: I swelled up like a baboon so that even my mother would not have recognized me, and was delivered to the hospital for eight days. While lying in bed at night, I suddenly remembered that I had left pieces of an old rubber tire boiling away in my lab in an effort to produce vacuum grease. Horrible pictures formed in my mind of how the German Rockefeller fellow burned the Institute down. I therefore crept out of the window at midnight and sneaked to the lab. Fortunately, there was no fire and I returned to bed in peace.

Later I found out that my machinist friend was slightly demented. He had once been blown through the ceiling by an exploding hydrogen liquifier.

Soon I became very good friends with Bob Brode, Sam Allison and their fiancées, as well as Harold Knauss (my car co-owner) and others. I was also on quite friendly terms with Professor Loeb and the young star from Caltech, Robert Oppenheimer, who lectured both in Pasadena and Berkeley. And then Professor Franck appeared for a lecture cycle of several months.

Opa Franck and I knew each other quite well from my attempt to teach his wife bicycle riding, from scientific discussions, and from my friendship with his daughter, Dagmar, a classmate of Marianne and student of Tante Mariechen. Thus he wrote to tell me his arrival time in San Francisco, and I decided to pick him up in style with the old Chevy and bring him back to Berkeley via ferry. This enterprise nearly ended in disaster. I met him at the train but, leaving the railroad station, we found ourselves enveloped in the dense afternoon fog. I had not been in that area before and, turning at a street corner, found myself suddenly driving on a railroad embankment. Behind us an engine whistled and shoved off freight cars, which came surging our way. Opa shouted that we should abandon the car. I shouted back that we could not afford to, the car had cost \$15, and jumped it down the embankment into a woodpile. There we landed with a crash but unhurt, and above us the ghostly silhouettes of the freight cars passed by. After bending the fenders straight, we reached Berkeley without further mishaps.

This incident cemented our friendship. Opa enjoyed riding backwards up the mountains, invited me for dinner "accidentally" when he knew I had not eaten, and took me along on expeditions to the observatories on Mt. Hamilton and Mt. Wilson. Since it was the time of prohibition, we also went with Gilbert Lewis to

his favorite "speakeasy." On one of these occasions, Opa said that he had seen a mountain lion while Lewis presented a new theory. Each did not believe the other. Lewis said that he would believe in the mountain lion if Opa would believe his theory but the trade was not consummated. The Mt. Wilson excursion proved especially interesting due to our discussions with Professor Hubble, who, at the time, was working on the red-shifts of distant galaxies and ideas of an expanding universe. Walking up that mountain in my normal cross-country style, I was suddenly stuck on a cliff and Opa -- coming up the regular trail -- crept over on his stomach to a site above and helped me over the edge. In short, we had found each other in a true friendship for life (see Figure 42).

A Christmas Expedition through Death Valley

For the Christmas vacation of 1927-28, Harold Knauss (co-owner of the car) and I decided to take a trip to Pasadena to be followed by a crossing of Death Valley. At that time only a sand track traversed that forbidding region, which is 400 feet below sea level and next to some of the highest mountains outside Alaska. Bob Brode and Sam Allison decided that, after the holidays, they would join us in a second car for the crossing.

Setting off alone, Harold and I drove down the coastline and rented a small bungalow near San Diego for the holidays and a vacation full of sunshine and ice-cold waters. Still, we swam for short periods and also drove up a mountain near Pasadena, where the woods had been decorated with electric Christmas candles and a procession of cars went up and down the steep road to enjoy the spectacle. Enchanted by the sight, I forgot about the gravity feed and the car began to stall. As I pulled it around at the intersection, the fuel came back with a rush, the right front and back wheels went up on a stone embankment, and we raced out of control down the mountain with only two wheels on the road. Fortunately a "No Parking" road sign loomed up. We crashed into it and were stopped. After assuring each other that we were still alive, I approached some boy scouts directing traffic farther below and asked them if they could do their good deed for the day by lifting us off? They did and the car limped to the nearest garage. We had it bent back into shape and were off the next morning toward Death Valley.

"Death Valley Scottie" was at that time a famous character fitting for a mystery story. He was an old miner who supposedly came out of the desert one day with lots of gold and then retreated again into the desert to build himself a house with a swimming pool at a hot spring, resisting all efforts to penetrate his secrets. We passed by his place and swam in his pool but nobody was there.

"We" was now our two-car caravan. During the day we had glaring sunshine and a wonderful view from the lowest region of the U.S.A. to the highest peaks of the Sierra Nevada mountains. During the night it was ice cold so we maintained a brush fire that brought us strange visitors. Not only various kinds of desert animals but one night several wild looking men emerged from a cave and joined us at the fire. They turned out to be old sailors who had found the life in cities too noisy and had escaped from civilization to prospect for gold. Instead of gold they had found a lead mine and every week took a truckload of ore to the nearest railroad station. The desert had slowly gotten on their nerves with its terrifying stillness, so they had acquired some chickens to break the silence.

Hiking one day for some hours, I came to a gruesome sight, a broken down buggy with a horse skeleton still in harness. An empty booze bottle turned blue-red was the only sign remaining of the driver. May he have saved his skin! (See Figure 43.)

We had not seen any other people until, in the middle of Death Valley, we had a head-on collision. We saw the other car approaching for two hours but, when we met at last, both cars slipped back into the sand-track and hit each other. With great merriment we bent each others' fenders straight and parted in friendship (see Figure 44).

More serious was an increasing grinding noise because sand had penetrated our car's gear box. We counted the miles toward civilization and prayed but broke down about ten miles before reaching the first settlement. Our friends towed us out to the first gas station but then had to leave. We were stuck two more days for repairs. When the garage owner presented his bill, we found that our pocketbooks could not cover it. I offered him my beautiful Zeiss field glass, but he would give me only two dollars for it. There we were!

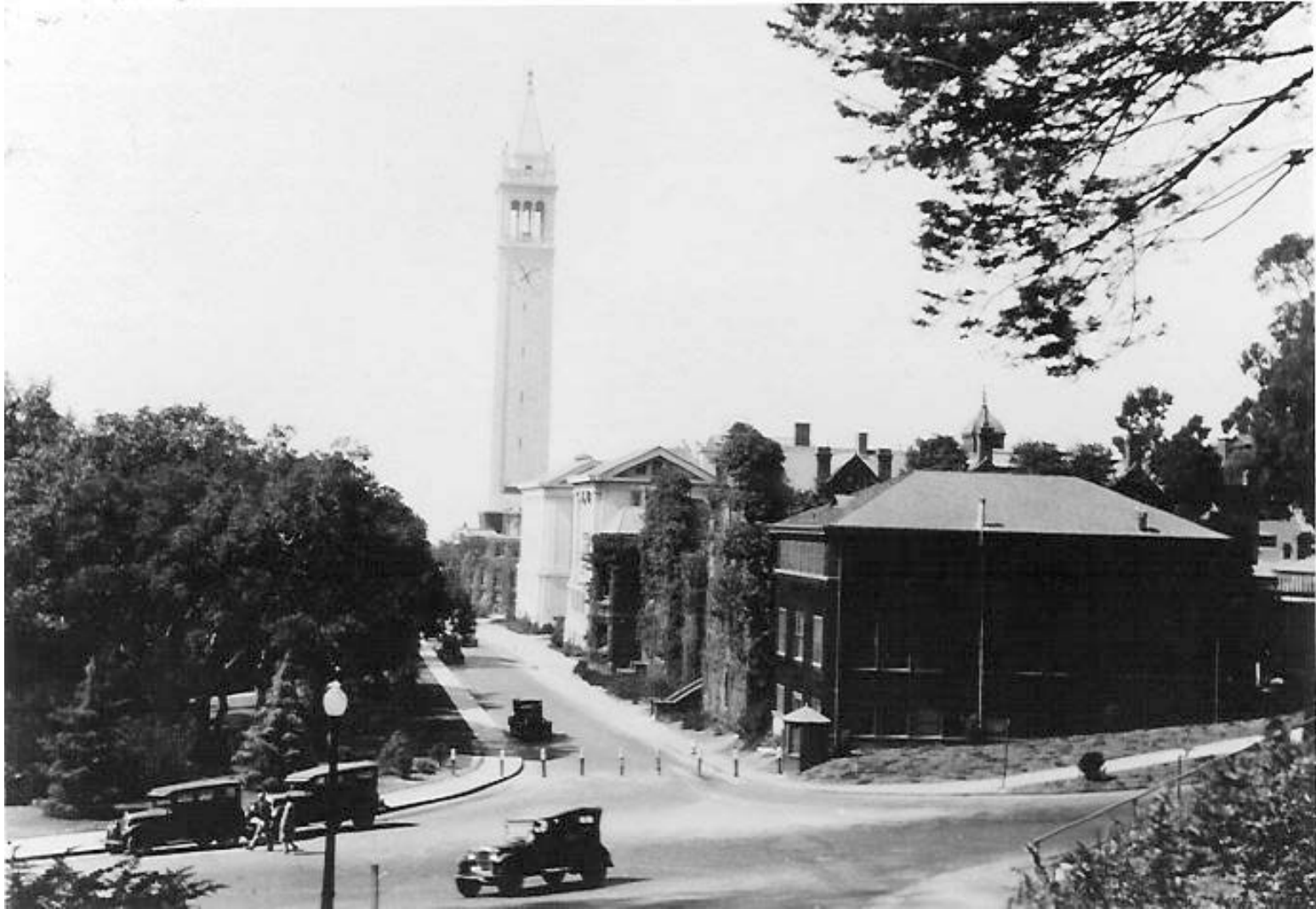
After some deliberation I sent a wire to the President of the University of California:

"I, ARTHUR VON HIPPEL, A ROCKEFELLER FELLOW AT BERKELEY, AM STUCK AT THE EXIT OF DEATH VALLEY ON ACCOUNT OF CAR REPAIRS. PLEASE WIRE SOME MONEY TO BAIL US OUT."

He did.

Endnotes: 5. A ROCKEFELLER FELLOW IN THE UNITED STATES OF AMERICA

1. A. von Hippel, *Ann. d. Phys.* 87 (1928) 1035.



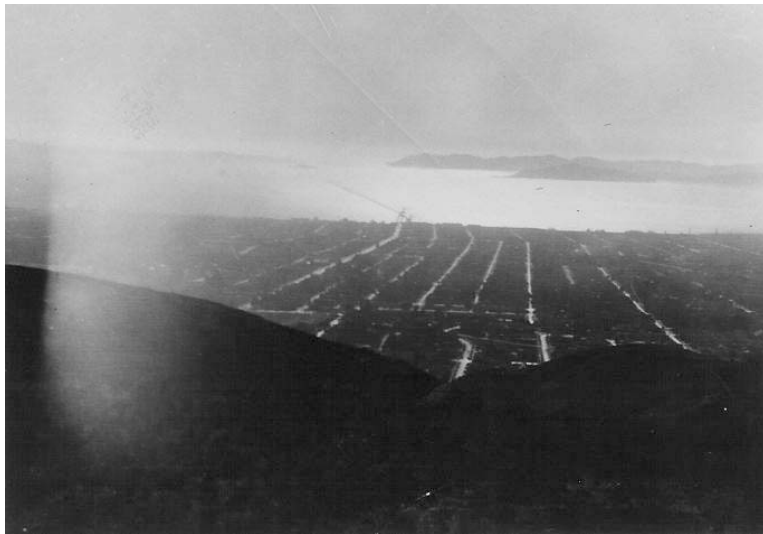
36. Berkeley in 1927



- 37. A group of friends on a California beach
- 38. Eating a hotdog at the beach
- 39. On the beach in California



40. In the \$15 Chevrolet



41. Looking down on Oakland -- laid out but not yet built



42. With Opa Franck on an expedition up Mt. Hamilton (winter 1927-28)



43. A horse and buggy that didn't make it across Death Valley



44. The \$15 Chevrolet after its passage through Death Valley