

Nicholas Humphrey. A family affair. In Curious Minds: How a child becomes a scientist, ed. John Brockman, p.3-12, New York: Pantheon Books, 2004

A Family Affair

On Boxing Day, 1960, soon after breakfast, Gower Street in London was deserted. I and my grandfather, A. V. Hill, entered the Anatomy Department of University College through a side door and made our way stealthily upstairs to his laboratory. The atmosphere was morgue-like, and a musty smell of formaldehyde hung in the air. Water dripped from the lab ceiling and splashed onto an umbrella raised over the bench. A clock ticked, oddly out of tempo with the dripping; otherwise there was an eerie stillness. Grandpa removed the lid from a basin filled with live frogs, picked one out, and eyed its strong thigh muscles. He put it aside in a glass jar and called me over to admire it. The dissecting instruments and pins were waiting beside the corkboard.

I was seventeen years old. I had been reading Herman Hesse's novel *Steppenwolf*, and I thought of the Magic Theater with the strange sign on its door: "Not for Everybody." I felt (not for the first time) that I had crossed a threshold into a place from which ordinary people were excluded. But, in the novel, the theater's door bore another sign beneath the first: "For Madmen Only." I was proud to be where I was, and in this company, but I was wary too.

My grandfather had in fact chosen this day to go to work, when most normal people were still in bed sleeping off their Christmas dinners, for the sanest of reasons. Following on from the research for which he had won the 1922 Nobel Prize for medicine, he was now, at age seventy-five, conducting what he would later call his "last experiments in muscle mechanics." He had recently developed a much improved moving-coil galvanometer to measure the heat output during muscular contraction, but his new instrument was so sensitive to vibration that every car passing in the street, every footstep on the landing, created a false reading. So a day like this, which belonged only to him and me, was the ideal time to make a perfect measurement.

He could have done the experiment alone. But science for my grandfather was nothing if not a family affair, and he had long been in the habit of engaging his children and grandchildren as his assistants. This is his account of how he prepared for the Royal Institution Christmas Lectures in 1926:

Of the suggestions for my Lectures, the best came from Janet, aged eight, who proposed that I should make experiments upon her. . . .The more I thought about it, the better it seemed. Fearful experiments I would make on all my children: Polly's heart should be shown beating; and her emotions should be exposed on a screen. David should be given electric shocks till sparks came out of his hands. . . . Janet should have the movements of her stomach (there is no decency in young ladies these days) shown to the audience on a screen . Then the noises made by Maurice's heart should be made to resound like a gun all round the lecture hall . . .and he would not be content till I had promised that he also should have electric shocks.

Now, a generation later, he had called on me to help him, as part of the tradition. Research assistant or sorcerer's apprentice? A bit of both.

At lunchtime we ate the cheese and cider that were Grandpa's standard fare. The cider, pale and dry, came from a press in the village of Ivybridge in Devon, where for many years he had owned a country house on the edge of Dartmoor. Prompted by the Devon associations and the intimacy of the occasion, he told me the story of how he had been able to date precisely the day he first set foot on the moor. He and his mother had been staying for the holidays on a farm nearby. Borrowing a gun from the farmer, he had gone out to shoot rabbits. Around midday, to his complete surprise, he saw a solar eclipse developing, with the sun beginning to be swallowed by the shadow of the moon. He took the glass from his pocket watch and smeared it with the blood of a rabbit he had just killed, so that he could watch the phenomenon in safety. Many years later he verified the date in an astronomical almanac: May 28, 1900, 2:30 pm.

Grandpa never had much time for metaphysics ("the art of bamboozling people – *methodically*", he once told me). But on that morning he and I were developing an unusual bond, and now he let himself talk of things he would not normally have shared. There was a lesson in the story of the rabbit's blood and the eclipse. The sun, moon, and stars have one kind of destiny. Their times and courses are fixed by well-known laws. Newton could have predicted hundreds of years earlier exactly what would be seen at that place and time. But rabbits and boys—yes, and frogs, too—have another kind of destiny. It seems we know neither the day nor the hour wherein fateful things will happen. What laws, if any, apply to human behavior?

Ivan Pavlov, whom Grandpa had counted as a friend and had several times visited in Leningrad, believed that there would one day be a science of the mind similar in rigor to the sciences of physics and chemistry. For that matter, so did Sigmund Freud, to whom my grandfather had played host when Freud was made a Foreign Fellow of the Royal Society in

1938 and with whom he had got on surprisingly well. But what contrasting notions those two had of what science is!

Grandpa had given me, some years earlier, a framed text of Pavlov's "Bequest to the Academic Youth of Russia"—or, as it became known, Pavlov's Last Testament—written just before his death at the age of eighty-seven in 1936. This is the passage he marked out for me.

Never attempt to screen an insufficiency of knowledge even by the most audacious surmise and hypothesis. Howsoever this soap-bubble will rejoice your eyes by its play, it inevitably will burst and you will have nothing except shame. . . . Perfect as is the wing of a bird, it never could raise the bird up without resting on air. Facts are the air of a scientist. Without them you never can fly. Without them your "theories" are vain efforts.

Grandpa loved that image of the soap-bubble. Just right, or so he thought, for describing Freudian theory. Later that day, when we had returned to his study, he pulled out an essay written in 1925 by his brother-in-law, Maynard Keynes:

I venture to say that at the present stage the argument in favour of Freudian theories would be very little weakened if it were admitted that every case published hitherto had been wholly invented by Professor Freud in order to illustrate his ideas and to make them more vivid to the minds of his readers. That is to say, the case for considering them seriously mainly depends at present on the appeal which they make to our own intuitions as containing something new and true about the way in which human psychology works, and very little indeed upon the so-called inductive verifications, so far as the latter have been published up to date. . . . [Freud] deserves exceptionally serious and entirely unpartisan consideration, if only because he does seem to present himself to us, whether we like him or not, as one of the great disturbing, innovating geniuses of our age, that is to say as a sort of devil.

Huh! Didn't *that* put Freud nicely in his place!

I listened and watched and took things in. I moistened the frog's muscle with Ringer solution.

I had just left school, and the plan was for me to go to Cambridge the following October, with a scholarship to read maths and physics. I knew next to nothing about biology. But my grandfather had other ideas for me. He himself had started out as a mathematician, only later to discover the world of biophysics. Now, he implied, the next real challenge lay in the behavioral sciences. A few weeks later, he arranged for me to spend six months at the Marine Biological Laboratory at Plymouth as a lab assistant to his protégé, Eric Denton, where I could learn—at any rate, begin to learn—about life.

And so I went, and so I did.

The poet W. H. Auden wrote: “When I find myself in the company of scientists, I feel like a shabby curate who has strayed by mistake into a room full of dukes.”

Possibly none of us except a duke can know what it feels like to be born to be a duke. Quite special, I imagine: one would have a sense of intrinsic superiority, of rights of access and freedoms from restraint not allowed to ordinary people. But I do know as well as anybody what it feels like to be born into a dynasty of scientists. Quite special, I can confirm, and somewhat the same.

A. V. Hill, my mother’s father, was a scientist in the grand mold: Nobel laureate, member of parliament for Cambridge and Oxford Universities in the Churchill war administration, champion of intellectual freedoms and responsibility around the world. He played a crucial part in arranging the flight of Jewish scientists from Hitler in the years before the war, and throughout my childhood there were always visitors to my grandparents’ house in Highgate with heavy mid-European accents, twinkling smiles, excited discussion of new discoveries—and, as the years passed, more Nobel prizes of their own.

My great uncle Maynard Keynes died when I was two, but his intellectual presence hung over our family, and his wife, the Russian ballerina Lydia Lopokova, with all her Bloomsbury connections, lived on as a spritely babushka. Maynard’s brother, Geoffrey, was a surgeon and medical historian; his wife, Margaret, was a granddaughter of Charles Darwin.

My mother, Janet (she of the moving stomach), became a doctor and later – to her father’s bemusement – a psychoanalyst who worked with Anna Freud. Of her brothers and sisters, Maurice (of the resounding heart) became a geophysicist whose work was central to establishing the reality of continental drift. David (of the sparking hands) became a biophysicist, who, like his father, did research on muscle. Polly (of the exposed emotions) became one of the first economic anthropologists, who studied the workings of the West African cocoa trade. Both Maurice and David were Fellows of the Royal Society, an institution that Grandmother Hill – with six of her immediate family as fellows—came to regard as her private club.

My father, John Humphrey, was an immunologist, deputy director of the National Institute for Medical Research, who did seminal research on antibody formation. But, like others in the family, he was also deeply engaged in social and political issues. He was the founder of the Medical Campaign against Nuclear Weapons, whose offspring, the U.S.-based International Physicians for the Prevention of Nuclear War, would later win the Nobel Peace Prize.

His father, Herbert Humphrey, was an engineer and inventor. We had at home a *Vanity Fair* portrait of Grandfather Humphrey, captioned (after one of his inventions) “The Humphrey Pump”; but the invention of which, as a boy, I was secretly prouder was a one-man “manned torpedo” he designed in the First World War for use against German ships and for which he proposed himself as the first pilot – an offer that Churchill, then at the Admiralty, declined.

My grandfather’s brother, Willie, had been a brilliant mathematician at Cambridge. But he turned to the church and became a missionary in Sierra Leone, where he ran into trouble with the natives and was beheaded (and, so we always imagined, eaten). I never knew him, but I was given the telescope with which he used to watch for the mailboat coming into Freetown harbor – and along with the telescope I have a pathetic telegram, following his murder, sent by a friend back to his sister in England, saying simply: “Willie—Gravest News, More Follows.”

This sister, my great aunt Edith, had wanted to be a scientist too, but there were no openings for women at British universities in the 1890s, so she went as a doctoral student to Zurich, where she attended lectures by the great Russian chemist Dimitri Mendeleev, inventor of the periodic table. Later she became England’s first female industrial chemist. She lived till the age of a hundred and three, and was a regular presence at our dinner table.

My immediate family was a large one. At home there were seldom less than ten at any meal, and in school holidays generally more. We lived in a huge house—Scottish baronial in style, with twenty-six rooms and over an acre of garden—in Mill Hill, North London, close to my father’s research institute. I had four brothers and sisters and two orphaned cousins living at home, and another fifteen cousins within easy reach. We children went round in droves, stayed with each other in nearly unmanageable numbers, and met up regularly at my grandmother Hill’s Sunday tea parties.

For a year, in 1958, Stephen Hawking, then sixteen, came to live with us while his parents were in India. Stephen was an intense, rather quizzical schoolboy, whom I remember (from my position two years his junior) as somewhat bossy. When I saw him many years later, at his fiftieth birthday party in 1992, leading the dancing in his wheelchair, I reminded him of his efforts to teach my family to dance Highland reels (but I forbore to remind him of my more salient memory of him, marching up and down the hall of our house wielding a swagger stick and addressing an imaginary platoon of hapless schoolmates.)

As children, we lived and breathed science, though of course we didn't know this at the time. Our sprawling basement rooms were full of apparatus: prototype engines of my grandfather's, pumps and torpedoes, lathes and jigsaws, Meccano sets, photographic apparatus, Wimshurst electrical machines, microscopes, aquariums. We spent Saturdays running round the corridors of the institute. We had outings to my uncle Maurice's observatory in Cambridge. We went on trips on the research ships out of the Marine Biology Laboratory. We accompanied Stephen's family on expeditions in search of flint arrowheads in the woods at South Mimms.

But the major event of each week was the visit to my maternal grandparents, the Hills. The company at these Sunday parties usually spanned three and sometimes four generations, with my grandfather's colleagues and students invited to sit down with his offsprings' offspring—highchairs on one side, wheelchairs sometimes on the other. After a formal tea of sandwiches and cakes, the grown-ups would thankfully retire to the drawing room to talk science and politics while the children were turned out into the garden to amuse themselves (or rather the several gardens, for my grandmother Hill, who liked to have a lot of everything, had systematically bought up all the neighbouring properties).

However my grandfather would not neglect us for long. Almost every week he devised some new game or experiment: frog races, archery, kite-flying, or perhaps, if the weather was bad, a magic lantern show. On one memorable occasion, he produced a sheep's head acquired from the butcher and, placing it on the kitchen table (to the cook's great distress) he dissected it in front of us. He carefully took apart one of the eyes and held the lens up for us to look through. I gazed through this jewel, out of the kitchen window over the garden, the lawn, the swing, my grandmother's prize dahlias: a beautifully clear image, and *everything turned upside down*.

I still wonder about the effects of having grown up in such a strangely privileged environment: of having been *bounced*, as it were, into the world of science. Fifty years on, it is easy to make too much of it. Each of us is who we are and we must each have had *some* sort of childhood. Who's to say whether any particular factor carried the weight that our self-narrative now likes to attribute to it.

The "nurture assumption" has been under attack in recent years. Yet I am inclined to think in this case the causal pattern is real and undeniable. What I gained from this childhood environment was a sense of *intellectual entitlement*: a right to ask questions, to pry, to

provoke, to go where I pleased in pursuit of knowledge. As a boy I was always taken by the words on the front page of my British passport: the demand that the bearer should “pass freely without let or hindrance.” I grew up feeling I carried a similar warrant to explore anything I chose, that I could indeed safely cross into areas “Not for Everybody.”

To be a good scientist surely requires just such audacity. How else dare anyone do what a scientist is *required* to do: to challenge Nature to undress before one’s eyes? One might claim an interest in nature’s secrets on several different grounds, but nothing compares, I suspect, to the feeling that one has some kind of ancestral *droit de seigneur*.

And yet there is, I’m almost afraid to admit, a downside, too. Indeed, I have come to realize that to take these rights of access for granted may not be entirely a good thing. In my own case, the problem I now see is that I never had to *struggle* to become a scientist and never experienced any real surprise or sense of achievement at having made it. And I confess that because of this, the rights and duties of the role have not always weighed with me as seriously as they ought to. In particular, I have never known the proper worry that, if I did not watch my back—finish one project before starting another, respect academic boundaries, get the right research grants, sit on the right committees—then I might have the privileges withdrawn.

Pavlov’s Last Testament ends with a warning: “Remember that science demands from a man all his life. If you had two lives that would be not enough for you. Be passionate in your work and your searchings.” My grandfathers on both sides, like Pavlov himself, were the first of their line to enter the world of science. The passion they put into their work was the passion of scientists who daily counted their blessings for being allowed to do science—and who were determined to repay the debt with single-minded dedication. Although A.V. Hill did much else besides, his first and his last experiments were on the thermodynamics of muscular contraction.

Two generations down the line, as I look back on the somewhat random walk of my own research career – in neuropsychology, ethology, evolutionary psychology, philosophy of mind—cherry-picking the most exciting problems as I went along, I marvel at the charmed life I have had so far. But I wonder whether, in the end, having been born to be a scientist has not undercut my right to call myself a scientist at all.