Should you go to an interview with Professor Frisch, head of the Nuclear Group, and holder of the Jacksonian chair of Natural Philosophy, two things are likely to happen; you will have a drawing made of you—something between a portrait and a caricature, with the relevant information scribbled on a corner, a drawing that eventually lands up in a file or a waste-paper basket, depending on its merits—and, if you are considering entering his group, you will be asked what instrument you play. The room? Painted blue-grey; a very comfortable chair; a desk covered with papers; a large table piled with more papers; on the wall an intriguing drawing by his wife of a boy with a huge sombrero; pictures of Lise Meitner, Blackett and Bohr, not only as physicists, but as friends—the latter, in fact, studying a Tippetop. And Professor Frisch rocking on a chair not meant for it.

Not exactly what you would expect at the hub of an institution inhabited by people who, as hearsay has it, talk in formulae. No, not very characteristic. Not a trace of modern technocracy, alpha double-plus-ness or arrogance. An atmosphere about the man that you might have encountered in Plato’s Academy, near St. Francis or round the potter on the Nile—serene, clear, dry, balanced, in spite of many bouts of ‘flu and frequent trains and buses to catch—for Sweden, London or shopping.

Otto Robert Frisch was born on the first day of October 1905 in a home where the influence of the arts and of Jewish intellect was strong—his mother a concert pianist and his father a painter, who had had to take over the printing business which, with the law, had been the traditional family occupation. He grew up in his native city, Vienna, the k.u.k. capital of an Empire undermined, more noticeably so than physics, which only four years before had received Planck’s Quantum, and, in the same year, 1905, the theory of Relativity. His childhood was happy and uncomplicated, his mind inwardly active and constantly occupied; his mother taught him the piano, but mathematics he discovered for himself (and therefore was better at the latter). In 1927 he left the University and Vienna for Berlin, having obtained his doctorate by investigating what electron-beams do to rock-salt. At Berlin Lise Meitner, his aunt, was Professor and working with Hahn at the Kaiser-Wilhelm-Institut; Dr. Frisch joined the Reichsanstalt*. Undoubtedly the strongest and most important influence on his life was that of his intelligent and beautiful aunt, his senior by 27 years. It

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* Equivalent to the Bureau of Standards.
was she who played with him when he was a child, who was vigilant over his academic progress, and who bullied him when he had not read up the latest literature. This relationship has grown into something more than family bond or fellowship in *materia scientiae*, though having its roots in both.

In 1930 Stern called him to Hamburg as his Assistant. Three very busy years followed, yielding some half-dozen major papers, the most important of them containing the discovery and measurement of the anomalous magnetic moment of the proton. But then things grew worse in Germany; Hitler came to power, and Professor Frisch (having been dismissed under the racial laws) left, first for London, as soon as he had hurriedly completed a cherished experiment, and eventually to Copenhagen to Niels Bohr, the man who gave every kind of help to the many German refugees.

And now The Story. The story of a Christmas holiday, in 1938, with Lise Meitner in West Sweden, where the most puzzling news arrived from Hahn; he had found barium amongst the decay products of uranium. It took Lise Meitner some time to get Frisch to listen, intent as he was on his own work, but then, gradually, between argument and calculation, the idea of the excited uranium atom forming a waist and breaking up, the idea of fission took shape. Back in Copenhagen Niels Bohr was informed and left for America. Very shortly Frisch found the direct experimental evidence for the fission, and the paper was composed on the phone to Lise Meitner in Stockholm. After the publication of Hahn's findings, Bohr released the news in January 1939, at a conference, and thereby created a sensation; for while he was still speaking people slipped out to find the experimental evidence. But they found it too late; for Frisch had it already. Bohr fought vigorously for his priority, and this led to the myth that Professor Frisch is Bohr's son-in-law. There might have been more foundation for it if either Professor Frisch had been married at the time, or Niels Bohr had had a daughter.

In November 1943, after a short stay in Birmingham and the invention of the Kicksorter in Liverpool, he joined the atomic bomb project, and, with only a few dozen scientists as fellow-passengers, set out in H.M.S. Andes, unescorted, to Los Alamos in New Mexico. Those were rich years: the work was fascinating and highly secret; the landscape of great beauty; the company most interesting. The elite of nuclear physicists, chemists and engineers were gathered on one spot with their wives, completely cut-off from the outer world, and, as a consequence, a very lively and cultured life evolved, particularly as the work was a forbidden topic in gatherings where the ladies were present. The mountains afforded splendid climbing and skiing.

For a period he acted as group-leader at the critical assemblies, on one occasion by sheer presence of mind saving the life of a colleague and his own. Later he changed to the "Dragon Assembly," an idea characteristically his. A lump of fissile material of just-under-critical size is prepared in the shape of a squat, hollow cylinder; it can be made over-critical by putting extra fissile material in the hole; it then explodes. But this explosion may be triggered-off and immediately inhibited again, all within a tiny fraction of a second, by letting a core of the substance drop through the hole. Feynmann's comment was: "Just like tickling the tail of a dragon." Innumerable times Professor Frisch was asked what would happen if the core got stuck. "It won't, I made a careful kinematic design." And to those who knew him it was clear that the mechanical contraption was safe.

The war over, Professor Frisch came back to England as head of the Nuclear Section in Harwell, where Commissar Frisch was a well-known figure, trotting in knee-boots over the muddy ground. But only for a year, for he was called to the Professorship at Cambridge, and elected a Fellow of Trinity. The reasons for this liaison are not strictly clear, for he was not a Trinity man from birth. It must have been his self-portrait in a letter to Sir Lawrence Bragg; his hobby: "lying in the sun"; his contribution to science: "helping to build the Copenhagen Cyclotron, by inventing a number of gadgets which later had to be removed."

Only now, settled down in Cambridge, after a long life of travel, did he think fit to marry, to set up house, and to have children, who are now seven and five, and who are convinced that their father can make anything, except a synchrotron driven by rubber bands; which, after all, is not too far from being the truth.

Has this life-story been able to convey very much? A man's collection of air- and rail-tickets presents a fairly patchy portrait at best. But perhaps a vague impression of the versatility and roundness of the man has come across, of his physics proper, of his gift for gadgeteering in the laboratory and at home, ("Daddy, make us a little something"), of his interest and curiosity in mathematics pure, of his constant delight in his music (which has improved a great deal beyond his somewhat metronomical approach during his schooldays), of his attachment to landscape, and, enveloping all, of his tender love for his family and human beings.

But one very important facet has so far been
omitted. The first half of Professor Frisch's life was mainly devoted to research, and he did hardly any teaching, though even as a boy he liked to explain things. But after the war he was struck by the ignorance on the part of his friends (and of a dealer in fish he once talked to) of what nuclear physics is all about. So he sat down to write a reasonably easy book about it. It was no best-seller itself, but it started a long series of popular talks, broadcasts and articles, a film-script, and even picture-books for children, composed with great care and a lot of work. You may think that odd, somewhat off the line and better left to the small fry. It is not.

The development of physics during Professor Frisch's lifetime has been enormous, and has led to an ever greater estrangement between the common and the scientific minds. Were it not for their macroscopic and apparently beneficial effects on, or even creation of, technology, the activity and language in the laboratory might easily give the impression of large-scale witch-craft. Yet, as it happens, the scientific way of thinking has become the dominant mode of the time and science is being used increasingly as the basis, or the justification, of theories on baby-foods, education, sex and religion. So, until the laboratories are destroyed, or the scientists sent in a rocket to stay with Dr. Anti-Wu, or until the gulf between the public and the scientific mind is bridged by making knowledge a common possession, that is, knowledge not only of facts, but about methods and the extent of their application, we shall have an unhealthy state of mental dependence and of uncritical acceptance of anything labelled "ex lab."

Here is the point where perhaps the most important work that Professor Frisch has done lies. In his many popular works he has again and again set about translating into exoteric language the subject and methods of physics. And do not think that is easy—certainly not if it is to be properly done. He himself tells the story of Niels Bohr, who, after watching his son and successor Aage Bohr arguing for some time, interrupted: "No, that's not right. You're not thinking; you're merely being logical." It is this former faculty that is required, together with the vast range of knowledge and the command of language that Professor Frisch possesses. It is difficult enough to learn and practice physics, but it is far more difficult to teach it, and even more so to teach it to the laity; Professor Frisch's lucidity as a lecturer is well-known to many of us.

He is not proud of all these achievements—they are done out of sheer interest or conviction of their necessity. But he is proud of a successful caricature of Sir Edward, or of being asked to play the solo part of a Mozart piano concerto.