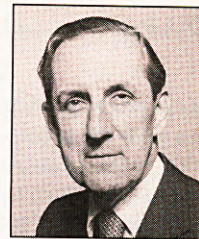


# The great insanity: Hitler and the destruction of German science

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This is the story of a nation which was pre-eminent intellectually and artistically and which, within a matter of weeks, almost destroyed itself. I confine myself to scientists because their story was the most dramatic and damaging to Germany, but it could be repeated for others, musicians especially.

In 1932, before Hitler came to power, Germany led the world in scientific achievement. Of the 99 Nobel prizes in science which had been awarded since their foundation, 33 had gone to German scientists, 18 to British, six to American. In physics German pre-eminence was unchallengeable. Einstein was only the greatest of an array of talent unparalleled in any other country—Max Planck, Werner Heisenberg, Walther Nernst, Max von Laue, James Franck, Max Born—and many others.

German scientific superiority was not fortuitous. It was built upon the Prussian educational system in which intelligence was valued above all. Choice was wide and prejudices were few. Anti-semitism, the agent of the destruction of German science (and much else) was slight and scattered. It cannot have been strong—only 1% of the German population was Jewish yet 15–20% of professors were Jews. Anti-semitism did not restrain the career of the great scientists. We think of the Prussian tradition as rigid, repressive and aggressive, and so it was in political affairs, but in its fostering of excellence and in its standards of selfless service there was a bright side. The Prussian tradition of obedience, especially in the armed forces, could only too easily be perverted by Hitler into the horror which we all know but it is essential, as Ralph Blumenuau has so well put it, not to read history backwards. There were many admirable features in the pre-Hitler German tradition, respect for learning being one.

However, there was a general authoritarianism in Germany, including German medicine. Sir Arthur Hurst, physician at Guy's and pioneer of gastroenterology, was a member of a medical travelling club which visited Germany in 1931, two years before Hitler came to power. He records a visit to a leading German hospital [1].

'We spent an hour one day in the neurological outpatient department of von Bergmann's clinic. The

physician in charge was one of his senior assistants, who held the title of Professor. He spoke of the value of "cisternal puncture" in diagnosis. Looking round for a "subject" on whom he could demonstrate, he seized an elderly woman who was sitting with a row of patients on a bench. Without washing his hands or sterilising her skin, he plunged a needle into her neck and drew off a few drops of cerebrospinal fluid. All this was done without saying a word to the woman, who turned out to be not a patient at all but the mother of one. This did not appear to trouble the professor, who seemed surprised at our lack of appreciation of his demonstration of German ruthlessness.'

Hurst comments that von Bergmann's clinic was one of the few in Germany which produced good work between the wars, 'but after Hitler came into power no further work of importance was produced even here, as the atmosphere of suspicion and unrest did not provide a satisfactory background for research'.

## Germany since 1918

How is it possible that such a developed and cultured country as Germany should fall into the abyss of Hitlerism? To make an attempt at answering this question we must go back a few years.

Germany had been shaken to its roots by defeat in the first world war. To the German public this was completely unexpected. The fighting throughout the war had been in France and Belgium, never in Germany, so it was inconceivable in those days of desperately slow military movement in which advances were measured in yards, that an army could be defeated when it had not even been pushed back to its own frontiers. In March 1918, a German offensive nearly reached the Channel, which would have been decisive. It just failed, and four months later came the Allied attack which in a few weeks finished off the overstretched German army.

Because the defeat was so sudden and unexpected there had to be some explanation. Conspiracy theories emerged immediately—the German army had not lost the war, it had been stabbed in the back by the civilians. For 'civilians' read Jews and Bolsheviks and you have Hitler's theory on which, with the help of violence or the threat of violence, he rode to victory. Anti-semitism was an essential part of his policy. For others it may have been either more or less important

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as a means of gaining power; for Hitler it was the *purpose* of gaining power. He always meant to destroy the Jews, as he had made clear in *Mein kampf*, written ten years earlier. In his 'Will', written a few days before his end, Hitler urged his successors to be yet more ruthless to the Jews—this after he had killed six-million of them.

Hitler's anti-semitism came into action as soon as he came to power (perfectly legally) on 30 January 1933. Within weeks Jews were expelled, required to resign or induced to do so. (All universities were under the state, so all scientists were civil servants.) The more far-seeing had anticipated what would happen. Einstein, for example, refused to return to Germany from the USA but stayed in Belgium and breathed defiance from there. For those who were inside Germany it was not easy to know what to do. They could see danger, of course, but many people thought that now Hitler was in power he would become more moderate, as most politicians do when they achieve office. And even if Hitler did not simmer down, surely he could not last. Governments in Germany since the end of the war had been unstable and shortlasting. Most people did not realise that the State itself was now criminal. Even if the danger was clear, what should the Jews in Germany do? Emigration meant loss of job and security, and transferring to another country—if one could find a job—meant another culture, another language.

In one sense the Jews were lucky. For them there was no choice; their lives gradually became impossible, they had to go. The great Heisenberg, he of the Uncertainty Principle, who was not a Jew, said he 'almost envied his friends' who were Jews and therefore had to leave. But he, like Max Planck, thought that protest was futile and that he should stay to protect what science he could—leaving could be seen, or represented, as treacherous. In doing so he lost the respect (then or later) of many of his colleagues, especially of his mentor Niels Bohr. For the scientists the way ahead was often easier than for non-scientists. Science being international, the more senior figures were known abroad; they had travelled and had personal knowledge and contacts, so that at least they knew where to look. For other professionals, and still more for the general citizenry, it was much harder.

Some of the Jewish scientists left at once, some tried to stick it out, some—but very few—protested and are greatly to be honoured for doing so.

So did some non-Jews. Martin Stobbe, a young physicist returning to Göttingen from a year's research at Bristol, gave the lectures that should have been given by expelled Jewish colleagues. But he rebelled against the Nazi decrees and resigned, destroying his career in Germany. He was the more courageous because he had not yet established himself, and indeed found it difficult to get a job and never did make a career in physics.

Marthe Vogt, daughter of a respected German professor of physiology, was in England doing research in

pharmacology when the Nazis took over. She, too, was non-Jewish but was so disgusted with the Nazis that she sent her passport back to the German embassy. She became a famous pharmacologist at Cambridge and was elected FRS. She now lives with her sister in San Diego.

One of the best-known scientists who, though non-Jewish, immediately resigned and left the country was Erwin Schrödinger, who won the Nobel prize for physics ten months after Hitler's arrival. He went to Austria but resigned again five years later when the Nazis took that country over, and moved to Dublin. His book, *What is life?*, published in 1944 stimulated many biologists to think afresh about their subjects and was part of the intellectual background to the discovery of the role of DNA. His was the idea that chromosomes are the script of orders for development.

Another who did protest was Otto Kraye. He was an assistant professor of pharmacology in Berlin. When Philipp Ellinger, a full professor in Düsseldorf, was dismissed, Kraye was offered his place, a brilliant chance for a man of 34. But Kraye had no doubt what he should do. He wrote to the Prussian minister of education:

'... The primary reason for my reluctance is that I feel the exclusion of Jewish scientists to be an injustice, the necessity of which I cannot understand, since it has been justified by reasons that lie outside the domain of science. I therefore prefer to forego this appointment, though it is suited to my inclinations and capabilities, rather than having to betray my convictions, or that by remaining silent I would encourage an opinion about me that does not correspond with the facts.'

Kraye was instantly dismissed and forbidden to enter any government academic institution or to use any library.

The story has a happy ending. Kraye went to England where he resumed working with his old friend Wilhelm Feldberg, and then, via the American university in Beirut, to the USA. After a few years he was appointed full professor of pharmacology at Harvard, perhaps the top chair in America in that field. There was an irony even then—some leading American pharmacologists objected to Harvard appointing a foreigner rather than an American.

In the very early days it was just possible to find a public outlet for scientists' dissent, but that was soon shut off completely and for ever. In Göttingen University, the leading mathematics centre in the world, three Jewish professors reacted in three different ways. James Franck wrote a public protest and left; Richard Courant tried to stay but couldn't; Max Born silently slipped away. None had any impact, they might as well not have lived for all the effect their actions had on the Nazis or, as far as one can tell, on the public. The Nazis were happy that they had rid the universities of the Jews. The Minister of Education asked the one remaining mathematics professor of Göttingen, David



Hilbert: 'Well, how is mathematics in Göttingen now that it is *Juden-frei*?' 'Mathematics in Göttingen?' Hilbert replied, 'There really is none.'

The Nazis were impervious to what they were doing to their own country. Max Planck, the leader of German science, went to Hitler himself, who said: 'Our national policies will not be revoked or modified even for scientists. If the dismissal of Jewish scientists means the annihilation of contemporary German science, then we shall do without science for a few years'.

### The British response

Academics outside Germany, especially in Britain, saw the danger at once and went into action. One of the leaders was William Beveridge, head of the London School of Economics. He was in Vienna when the first newspaper announcement of academic dismissals in Germany appeared. He had already decided to act when he was approached by a very remarkable man, Leo Szilard, a young Jewish physicist from Hungary who had been working in Berlin and who got out of Germany at once. He tried to persuade his parents to leave too; they refused, and were later lost. He was a restless genius who saw ahead of his colleagues in his thinking on the atomic bomb. His idea was to set up a university in Switzerland for refugee scholars, but he soon saw that Beveridge's idea of organising support for them to come to British and other universities was better.

Thanks to Beveridge, the Academic Assistance Council (AAC)<sup>2</sup> was born in April 1933, within three months of the crisis bursting over the heads of the Jews. Leading scientists and other academics were brought in. Lord Rutherford, the man who 'split the atom' and a recent president of the Royal Society, was elected president and A V Hill, another Nobel prizewinner, secretary with Beveridge. To join this distinguished group a secretary was appointed, Tess Simpson. She became the mainstay of the AAC for many years before, during, and after the war. The great scientists rescued by the AAC spoke of her (and still speak of her) with admiration and love. To her they were her children. What a family!

They advertised their existence and raised money, so that as the academics poured over from Germany they could give them a maintenance salary (£250 a year for a married couple, £180 for a single person—not much, but enough to live on) until they could find jobs here or in the USA. This help went only to those refugee scholars who had established themselves or were likely to do so. Less able refugees were advised to go into industry, where they generally did well, often earning more than the academics.

The reaction from British universities was immediate and generous. Academics here often knew personally many of those who had been thrown out of Germany. Gowland Hopkins OM PRS, discoverer of

vitamins, knew of young Hans Krebs's work and was determined to help him. He found a place for him in his laboratory at Cambridge. Krebs immediately felt the difference in atmosphere from that in Germany.

'It was in Hopkins' laboratory that I saw for the first time and at close quarters some of the characteristics of what is sometimes referred to as "the British way of life". The Cambridge laboratory included people of many different dispositions, connections and abilities. I saw them argue without quarrelling, quarrel without suspecting, suspect without abusing, criticise without vilifying or ridiculing, and praise without flattering,' Krebs wrote [2].

The welcome came not only from academic colleagues but also from ordinary people. Mrs Thea Lachmann, mother of Peter Lachmann, the present biological secretary of the Royal Society and a Fellow of this College, described her arrival in England [3].

'At Croydon airport the customs control asked: "Anything to declare?" I looked baffled and the official, trying to be helpful explained: "Anything you have bought in the last year?" As we were only allowed to take 10 marks each with us I had tried to spend as much of our money as I could on things we might need in the future, so every single item of our luggage was brand new and I said so. The customs official looked at Heinz's bandaged hand and asked: "Where do you come from?" "From the concentration camp." The official went silently from one of our many cases to the next and passed them without a further word.'

Francis Simon's story is a paradigm of what happened to so many academics in those days. He had seen the danger of Hitler long before 1933. Indeed, when he went to the USA for a year's research in 1931 he insisted on his wife and daughter moving to Switzerland while he was away. He worked in the department of the great Walther Nernst, discoverer of the Third Law of Thermodynamics, in Breslau, a famous centre of low-temperature physics. Nernst was a friend of F A Lindemann, professor of natural philosophy ('physics' in plain English) at Oxford. His object in life was to build up the Clarendon laboratory at Oxford to rival the Cavendish laboratory at Cambridge, which was perhaps the best physics department in the world. When Hitler came to power Lindemann saw his chance. He got into his chauffeur-driven Rolls Royce and headed for Germany, calling at the various physics departments which he knew well from having worked in Germany before the first world war. 'Have you got anyone for me?' he asked. Nernst had—besides Francis Simon there were H G Kuhn, Kurt Mendelssohn, Heinz London, and Nicholas Kurti<sup>3</sup>, all first-rate physicists. Lindemann raised money from ICI and brought them all to Oxford. The result was a huge boost for Oxford physics. If it did not raise the Clarendon to the level of the Cavendish, it certainly closed the gap. Lindemann's highly effective efforts were driven not so much by goodwill to German colleagues in distress as by sheer professional competitiveness. It



is a nice touch that when Lindemann (later Lord Cherwell) retired in 1956, Simon succeeded him in the chair<sup>4</sup>.

There is another nice side-note to the story of Lindemann and Simon. Simon said years later that nothing had touched him more than being elected to Fellowship of the Royal Society of London in March 1941, at the very height of the blitz. He could not imagine such a thing happening to a foreign scientist, especially an 'enemy', in Germany—Einstein had, after all, been forced out of the corresponding society there, the Prussian Academy of Sciences, in 1933.

### Biologists

I have spoken so far largely of physicists, but as physicians we are perhaps even more concerned with biologists, of whom Hans Krebs was, or became, the most distinguished. When Krebs left Germany in June 1933 he was highly promising but had not yet achieved anything like his later fame. In December 1932, Krebs's dean at Freiburg university had written of him that he showed 'not only outstanding scientific ability but unusual human qualities . . . his recent scientific work, especially the paper on the synthesis of urea . . . has established his international reputation . . . it is one of the classics of medical research.' A few weeks later the same dean sent him a curt note saying that he had been placed on leave until further notice. In two more months he was gone from Germany; Cambridge and England were the gainers.

Max Perutz came from Austria in 1936, although the extreme anti-semitic pressure there did not come until Hitler's invasion in March 1938. Perutz has been in Cambridge, adorning the place and science ever since. His great support over the many years when he was working on the crystallography of haemoglobin came from Lawrence Bragg, Rutherford's successor as professor of physics in Cambridge (patron also of Watson and Crick). If Perutz had not been a Jew he would not have *had* to leave Austria (although I suspect he would have left anyway; the Nazi approach to life was not to his taste). If Perutz had not been a foreigner<sup>5</sup> when war began he might have been recruited into the British army, where he would not have had quite such good opportunities for research as in the Cavendish laboratory. 'If . . .' This story is full of 'ifs'; one of the most dramatic and enticing relates to the atomic bomb, and I shall come to that later.

When I was an undergraduate at Cambridge in 1940–42, several of our teachers were refugees. One I came to know well then, and even better 40 years later, was Wilhelm Feldberg. He must be known to thousands of Cambridge medical students as well as to neurophysiologists all over the world. He had come to England in the 1920s, ostensibly to work with Henry Dale at Mill Hill. But the real reason, he told me (tongue halfway to his cheek), was to get away from his family in Berlin. There was a strong, and to Feldberg

and his new wife an oppressive, family tradition that they should spend every weekend with his family. He wanted to break the custom but did not want to hurt their feelings. 'Why don't we go to England?' said Katherine, so they went and the custom was broken. In those two years Feldberg worked with Dale on chemical neurotransmission, work for which Dale and Otto Loewi later won the Nobel prize. Feldberg's contribution was to devise the eserinated leech preparation which was an exquisitely sensitive indicator of acetylcholine concentration.

Feldberg's wife died in England many years later. He married again but his second wife died after two years. He had lost his son. He had lost his job and his country. At the end of all this he once said to me: 'I have been incredibly lucky'.

It was that sort of zest for life coupled with self-deprecating humour that was so attractive to the British. Feldberg's humour under stress was best exemplified by his dismissal from his post in the physiology department in Berlin a few weeks after Hitler came to power. He was summoned one morning by the director of the institute. 'Feldberg, you must be out of here by midday'. 'But', said Feldberg, 'I can't. I have just started an experiment.' He finished the experiment, left, and never returned. Not knowing what to do, he went to see the Berlin representative of the Rockefeller Foundation, which had been a generous supporter of German research for years. 'Feldberg? Feldberg?' the man said. 'I seem to know that name,' and rummaging through his voluminous papers (many Jewish scientists had approached him) he said, 'Yes, here it is. I have a message from Sir Henry Dale saying if you are in trouble you are to come to him in London. He has a place for you.' Thus resumed the highly productive collaboration of Dale and Feldberg to the great advantage of neurophysiology, not to mention many students of physiology, medicine and life.

What Feldberg was to Cambridge, Hugh Blaschko was to Oxford, although he, too, had been to Cambridge at first. When I was an undergraduate there he was a physiology demonstrator working, as I discovered later, for no salary. His work on transmission in the sympathetic nervous system earned him an FRS, which Feldberg also received, as well as the admiration of the scientific world and the love of everyone who met him. Both these wonderful men lived into their 90s.

A colleague of Hugh Blaschko's at Oxford was the pharmacologist Edith Bülbring, another refugee who became FRS. Her dismissal from her job in Germany epitomises all that was evil in the Nazi regime. She was Jewish. She had a job as a junior doctor in the children's hospital in Berlin. One day a boy was admitted with diphtheria. The membrane was growing across his larynx. He had to have a tracheostomy. Edith sent to the ENT department for a surgeon. There was nobody there—all the staff were Jewish and all had been dismissed. Edith had never done a tracheostomy,



but a nurse in the department had assisted at operations and knew how it was done. She helped Edith, the operation was done and the boy's life was saved. Soon afterwards she was summoned to the hospital director's office. 'Miss Bülbring, we have just learned that you are Jewish.' Edith burst out laughing; she was euphoric, it was not every day that she saved a life by herself. 'Miss Bülbring, this is no laughing matter, you must leave the hospital at once.'

I wonder what happened when the next child with diphtheria was admitted?

Albert Neuberger FRS was professor of biochemistry at St Mary's and is a Fellow of this College. He is a loveable man with a beautiful voice and a family full of talent. He presented himself to Tess Simpson at the AAC in 1933 and was soon on his professional way to the top.

He tells how his mother and grandmother were still in Germany on *Kristallnacht* in November 1938, when they were attacked by a mob not of hooligans but of lawyers, chemists, and other professional neighbours and colleagues. Only two years after he had left he went back to Germany feeling (though not yet being) British, and he behaved accordingly. He demanded *The Times* in his hotel and when it did not appear made a fuss. Afterwards he thought he might have been a little rash but it worked, as a display of confidence so often does.

Hermann Lehmann, of blood group fame, was another refugee scientist who became a Fellow of this College, the Royal Society and Christ's College. He was rescued by Gowland Hopkins OM PRS and helped by Sherrington OM PRS, so he had quite a good pedigree. After Cambridge he went to Bart's, named a haemoglobin after the place and went back to Cambridge. The story is told about him (but so it is about others, eg Kapitza) that when he left Cambridge he was told to leave his white coat behind the lab door ready for when he came back.

I have spoken of scientists rather than clinicians. Our record with regard to our medical colleagues was much less good. They were treated in a way that trade unions treat those whom they see as interlopers or competitors. They were usually required to requalify and to work, for the most part, in lowly jobs. This attitude of the BMA is perhaps understandable, if not admirable. In later years several of the medical refugees did make their mark in British medicine, one in particular.

## Two doctors

Ludwig Guttman was a neurosurgeon. After Hitler came to power he went on working in the Jewish hospital in Breslau, doing what he could to care for his patients. He became famous and was often called to see celebrities in Germany and abroad. On one such trip to Lisbon he returned by way of England, where

he saw Hugh Cairns at Oxford. Soon afterwards, he left Breslau for Oxford.

The Guttmanns and their two young children had a long and tedious journey, arriving at Harwich in high wind and sleet. They were standing outside in a queue when an immigration officer saw the two children and called the family in, saying that children should not be kept outside in such weather. This was not how the Guttmanns had been treated by officials in Germany. Mrs Guttman was so moved she burst into tears, and Guttman said the remark had restored his faith in humanity.

Guttman had no British medical degree, he was not personally popular, and when the war started it was not clear what clinical work he could do—until, with the opening of the Second Front in view, there was a need for someone to take charge of the hundreds of cases of paraplegia which were expected to follow the invasion. Nobody wanted to take on this duty—the prospect was depressing, as paraplegics died within about a year from infection of the bladder and bedsores. George Riddoch, head of neurology in the Emergency Medical Service, asked Guttman to take on the job, which he did with the ferocious determination that characterised all his work. He insisted on two-hourly turning of the patients, day and night, and was in the wards at all hours to see that his orders were obeyed. Results began to improve at once. Later, at the stimulation of others, he mobilised his patients and devised the famous paraplegic games which gave hope and meaning to life for thousands who would otherwise be desperate. While doing this clinical work he noticed the effect on blood pressure and skin colour of bladder catheterisation, and that it varied according to the level of the spinal transection. Thus, with David Whitteridge, he worked out the level of spinal reflexes and contributed greatly to the knowledge of the physiology of the spinal cord. At the age of 75 he was elected FRS.

As I read his character, his success was due to just those qualities which we call German and find unattractive—utter determination in intellectual and clinical work, whose underside was a selfishness which made him an unloveable colleague, doctor and family man. Unloveable he may have been, but a contributor to the welfare of men he certainly was.

A poignant story is that of Cornelius Medvei, endocrinologist and medical historian. Born in Hungary, he worked in Vienna and by 1938 was a rising star in the university medical department. Hitler came, he left. His wife, who was not Jewish, would not come with him. He went to Bart's, then the most conservative of British medical institutions, where the dean, Sir Girling Ball, had the wit to take him. He has been there, on and off, ever since. Although he was a mainstay of the endocrine unit and often acted as its head, he was never made a consultant. He has been President of the Section of Endocrinology of the Royal Society of Medicine and has written the definitive



history of endocrinology. After the war his first wife, still in Austria, asked to come back to him. She was too late, he had married an English girl with whom he was blissfully happy until she died in 1990.

This is the only case I know of a non-Jewish wife refusing to go with her husband to exile (or vice versa).

I have mentioned only a few of the hundreds of scientists who came to this country to our advantage and to Germany's loss. This is not a comprehensive account of their achievements. They were great. Of German scientific refugees in the Hitler period, no fewer than 16 later won Nobel prizes and 54 were elected to the Royal Society.

Their rescue was the result of a highly effective effort on the part of the AAC and others, with background support from the British government. Some people criticised the action of the British in taking in these scientists as a cheap way of harvesting talent. Kurt Mendelssohn wrote: 'The helping hand which the scholars of Britain, and later also of America, extended to the Jewish exiles has often been represented as a shrewd move on the part of those countries to secure for themselves first-rate scientists at low cost. Nothing could be further from the true facts, and it is the duty of those who benefited by the manifestation of academic solidarity to repudiate this explanation emphatically. Nobody would expect men like Haber or Freud, who were both old and sick when they came to England, to make great contributions. Einstein, too, had passed the stage of his great achievements and the same was true for most of the scientists who already had a world reputation when they had to leave Germany. The great majority of the scientific emigrants were young and unknown people. Those who later made worth-while contributions were able to do so because their host countries generously gave them the chance that Germany denied them' [4].

Mendelssohn added: 'While the world was trying to shut its eyes to the growth of totalitarianism, the scholars of Britain set up a silent monument in honour of the achievements of the human mind. But for their understanding and willing sacrifice, the heritage of German science and learning might have perished without trace'.

Most scholars came first to England. Later many went to other countries, especially the USA. American science was switched on by the influx of European scientists, and amplified by the news of the second world war. But it is easy to forget that the first staging station of most of the refugees was Britain. In the early years the USA took fewer scientists—the slump was bad in America and academic jobs, as well as others, were hard to find. There was a natural hesitation to accept new entrants, and in some cases this may have been fortified by anti-semitism.

In the end, as so often with public actions, the effect of the German persecution on Jewish academics was the opposite of that intended. So far from destroying

German science, it scattered it to the advantage of recipient countries. 'The new Diaspora covered the world. From England to Australia, from America to India, there was hardly a university which did not give shelter and a place to work to the displaced scholars. They, in turn, did all they could by teaching and research to repay the hospitality they were receiving. Around groups of them, or even individuals, there sprang up new schools, recruited from the local students who, in turn, carried forward the heritage of all that had been good and useful in German academic life. Far from destroying the spirit of German scholarship, the Nazis spread it all over the world. Only Germany was the loser,' Mendelssohn wrote [4].

Many of the scholars actually found the forced need of having to start their career again a stimulus, and were even grateful for the jolt their careers had received. This was in addition to the advantage they also found in the open, friendly, critical world of science in the democratic countries compared to the stern and structured atmosphere of German universities.

### Sons of their fathers

Thanks to Hitler, we gained not only many great scientists but also their descendants. Several leading figures in the academic life of this country are here because their fathers were expelled from Germany. I will mention only five who are Fellows of this College and of the Royal Society.

Sir Hans Kornberg FRS, professor of biochemistry at Cambridge and Master of Christ's College, who in a brilliant children's Christmas lecture in the College in 1988, explained metabolism in terms I could understand. 'If you take a biscuit, break it in two and give one half to a dog it becomes more dog, and the other half to a man it becomes more man'.

Sir Walter Bodmer FRS, is head of the Imperial Cancer Research Fund and of the British end of the Human Genome Project.

Peter Lachmann FRS, whom I have already mentioned, seems to have recovered well from being obliged to unwrap his Christmas present for his sister by the customs man when the family left Berlin in 1938. He gave a marvellous Langdon Brown Lecture in 1986.

(A predecessor as biological secretary of the Royal Society was Sir Bernard Katz, Nobel laureate, himself a refugee from Germany who came to work with A V Hill at University College, London and never left. He was attracted to Hill not only by his scientific interests but also by his character. In a lecture on the international status and obligation of science published in *Nature*, Hill had severely criticised the Nazi treatment of German scientists. Afterwards he was attacked by Johannes Stark, Nobel prizewinner and quasi-fuehrer of German physics. Hill retorted that contributions were now pouring in to the Academic Assistance



Council, he did not know whether because of his own efforts or Stark's; if the latter, he thanked Stark warmly. This tone of lightheartedness and contempt Katz found irresistible<sup>6</sup>).

Another Fellow of the Royal Society and of this College is Gus Born, son of the great Max, who did a thing I would never have done. He gave up a chair at Cambridge—to come to London, first King's, now Bart's, and is still scientifically fizzing at the age of 73.

We can also lay claim to Sir Gus Nossal, although he landed in Australia where he directs the Walter and Eliza Hall Institute. He gave the Lilly lecture here in 1980.

Two others have been especially important to clinical medicine and this College.

George Alberti, professor of medicine at Newcastle, is the second cousin twice removed of a Nobel prizewinner, Otto Stern. Stern started work with Einstein in Prague where discussions on theoretical physics were held in a café attached to a brothel. Stern is described, as his descendent might be, as 'blessed with perpetual good humour. Cautious scientific arguments would be brushed aside in the most affable manner since he knew beforehand that he would be right'.

Finally, Robert Mahler, who has just retired as editor of this *Journal*, a man of immense intelligence and achievement which he does his best to conceal. He actually got the better of Hans Krebs by showing that muscle can synthesise glycogen from lactate, which Krebs had said was impossible.

### The bomb

I said that a big 'if' in this story relates to the atomic bomb. Three of the Jewish refugees, Leo Szilard, Eugene Wigner and Edward Teller, persuaded Einstein to write to President Roosevelt in August 1939, just a few days before the outbreak of war, to warn him that a new explosive device, infinitely more powerful than anything known before, was now a real possibility. Roosevelt took up the idea but progress was at first slow, one reason being that no one could see how to build a weapon that was small enough to use. Most estimates of the size of an atomic bomb were about 40 tons. The realisation that this was not so came in a curious way.

The scientific refugees in Britain had not, with very few exceptions, been naturalised by 1939—the process took five years and in most cases there had not been time. As they were still 'foreigners' they were excluded from secret work—'secret' then meant radar—there were even rooms and floors in their own laboratories which were closed to foreign scientists. So they turned their thoughts to other things—to atomic energy—Francis Simon, Otto Frisch, and Rudolph Peierls among them. One day in 1940 in Birmingham, where they both worked, Frisch asked Peierls: 'How much U235 would be needed to make an atomic

bomb?' Peierls, a theoretical physicist, later professor at Oxford, had not thought seriously about the problem. But he did now. He did the calculation very quickly and came back to Frisch with the answer: 'About one pound'<sup>7</sup>. They stared at each other; Peierls says he was 'frightened'. From then on things moved. The British government, having been about to abandon the idea of a bomb, now started to take the possibility seriously, and when they did, so did the Americans, with the results we all know [5].

If the Anglo-Americans could make an atomic bomb, what about the Germans? Some great physicists were still there, Heisenberg in particular. Was there any way of finding out, or at least guessing, whether they were building one? Peierls had a simple idea. If the Germans were making a bomb, all their best physicists would be working on it. They would be doing nothing else and they would all have to be working together in one place, just as Anglo-American scientists did at Los Alamos. Peierls suggested scanning the German scientific literature available through neutral countries to see if the leading physicists were still publishing, and from their own departments. They were, so they were not working on the bomb.

But suppose those Jewish physicists—Einstein, Szilard, Simon, Franck, Frisch, Peierls, Lise Meitner, and dozens of others—had not been forced out of Germany, what then? Would Germany have got the bomb first? Would she have won the war just when she was losing it?

Germany could probably never have done it. The industrial and intellectual effort needed to build the atomic bomb stretched even the United States, with all its wealth, territory, and immunity from air attack. But the fact that the world escaped that appalling danger is due—in part—to the fanatical anti-semitism of Hitler's Great Insanity.

### Acknowledgements

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Library of the College, Wellcome Trust, Wolfson College, Oxford, Bodleian Library, Oxford, Rockefeller Foundation, Miss Tess Simpson, The Society for the Protection of Science and Learning, Professor Peter Lachmann FRS, Mrs Mary Blaschko, Sir Rudolf Peierls FRS, Professor Albert Neuberger FRS, Dr Cornelius Medvei, Mr Charles Perrin, Lady Simon, Dr Max Perutz OM FRS, Mrs Frank Loeffler, Sir Hans Kornberg FRS, Sir Bernard Katz FRS, and Mrs Jean Havill.

### Notes

<sup>1</sup> *The Times*, 26 October 1994.

<sup>2</sup> Later the Society for the Protection of Science and Learning.



- <sup>3</sup> Kurti described how when he arrived in Oxford he liked the place and said: 'I don't see any need to leave here'—and he hasn't!
- <sup>4</sup> But a sad postscript that Simon died a month later.
- <sup>5</sup> Perutz was, I think, the only refugee to be naturalised during the war. This was because he was working on a secret project of my father's, who was on Lord Mountbatten's staff at Combined Operations. Perutz had to go to Canada. The Canadians would not let him in as an 'enemy alien'. Within the hour he was naturalised and he went. So I can claim a remote part in capturing this great man for Britain.
- <sup>6</sup> So do I.
- <sup>7</sup> A slight but unimportant under-estimate.

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## Editor's Note

Dr Pyke was invited to give the same lecture in Germany at Münster University by Professor E Nieschlag FRCP, director of the Institute of Reproductive Medicine, on 8 May 1995; Professor Nieschlag chose that date to coincide with the 50th anniversary of VE day—a most eloquent gesture.

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