COURTESY OF THE DOCUMENTATION CENTRE OF AUSTRIAN RESISTANCE.

A ward in the Am Spiegelgrund clinic in Vienna, in the 1940s.

AUTISM

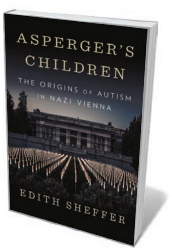
Hans Asperger's Nazi collusion

Simon Baron-Cohen absorbs the grave revelations in a study on a paediatrician enmeshed in autism's history.

The Austrian paediatrician Hans Asperger has long been recognized as a pioneer in the study of autism. He was even seen as a hero, saving children with the condition from the Nazi killing programme by emphasizing their intelligence. However, it is now indisputable that Asperger collaborated in the murder of children with disabilities under the Third Reich.

Historian Herwig Czech fully documented this in the April 2018 issue of *Molecular Autism* (a journal I co-edit; see H. Czech *Mol. Autism* **9**, 29; 2018). Now, historian Edith Sheffer's remarkable book *Asperger's Children* builds on Czech's study with her own original scholarship. She makes a compelling case that the foundational ideas of autism emerged in a society that strove for the opposite of neurodiversity.

These findings cast a shadow on the history of autism, already a long struggle towards accurate diagnosis, societal acceptance and support. The revelations are also causing debate among autistic people, their families, researchers and clinicians over whether the diagnostic label of Asperger's syndrome should be abandoned.



Asperger's Children: The Origins of Autism in Nazi Vienna
EDITH SHEFFER
W. W. Norton (2018)

In 1981, psychiatrist Lorna Wing published the paper in *Psychological Medicine* that first brought Asperger's clinical observations to the attention of the English-speaking medical world, and coined the term Asperger's syndrome (L. Wing *Psychol. Med.* **11**, 115–129; 1981). A decade later, in the book *Autism and Asperger Syndrome* (1991), developmental psychologist Uta Frith translated into English the 1944 treatise by Asperger in which he claimed to have discovered autism.

Finally, in 1994, the American Psychiatric Association (APA) recognized the diagnosis of Asperger's syndrome in the fourth edition of its *Diagnostic and Statistical Manual* (*DSM*). The syndrome is characterized by strengths such as unusually deep, narrow interests, and challenges in social communication and interaction, in people with average IQ or above and no history of language delay. (In the 2013 revision of the *DSM*, the APA deleted Asperger's syndrome in favour of a single category, autism spectrum disorder.)

In digging anew into the deeper historical context of Asperger's work, Sheffer fills in parts of the story anticipated in John Donvan and Caren Zucker's history of autism, *In a Different Key* (2016; see B. Kiser *Nature* **530**, 159; 2016), which referred to Czech's early findings. Sheffer reveals how the Nazi aim of engineering a society they deemed 'pure', by killing people they saw as unworthy of life, led directly to the Holocaust.

With insight and careful historical research, Sheffer uncovers how, under Hitler's regime, psychiatry — previously based on compassion and empathy — became part of an effort to classify the population of Germany, Austria and beyond as 'genetically' fit or unfit. In the context of the 'euthanasia' killing programmes, psychiatrists and other physicians had to determine who would live and who would be murdered. It is in this context that diagnostic labels such as 'autistic psychopathy' (coined by Asperger) were created.

Sheffer lays out the evidence, from sources such as medical records and referral letters, showing that Asperger was complicit in this Nazi killing machine. He protected children he deemed intelligent. But he also referred several children to Vienna's Am Spiegelgrund clinic, which he undoubtedly knew was a centre of 'child euthanasia', part of what was later called Aktion T4.

This was where the children whom Nazi practitioners labelled 'genetically inferior' were murdered, because they were seen as incapable of social conformity, or had physical or psychological conditions judged undesirable. Some were starved, others given lethal injections. Their deaths were recorded as due to factors such as pneumonia.

Sheffer argues that Asperger supported the Nazi goal of eliminating children who could not fit in with the *Volk*: the fascist ideal of a homogeneous Aryan people.

Both Czech and Sheffer include details on two unrelated children, Herta Schreiber and Elisabeth Schreiber, and their referral letters, signed by Asperger. In these, the paediatrician justifies Herta's referral to Am Spiegelgrund because she "must be an unbearable burden to the mother"; and ▶

Elisabeth's, because "in the family, the child is without a doubt a hardly bearable burden". These provide proof that he effectively signed their death warrants.

Nearly 800 children were killed in Am Spiegelgrund. Asperger went on to enjoy a long academic career, dying in 1980.

Both *Asperger's Children* and Czech's paper converge on the same conclusion. Personally, I no longer feel comfortable with naming the diagnosis after Hans Asperger. In any case, this is a category rendered moot in the most recent edition of the *DSM* (used in the United States). European nations will follow this diagnostic lead in 2019, with the 11th edition of the *International Classification of Diseases*.

The future use of the term, of course, is a discussion that must incorporate the views of autistic people. Many take pride in the term Asperger's syndrome as part of their identity, feeling it refers to their personality and cognitive style, which obviously do not change simply because of historical revelations. They might not, therefore, want a change. Others have already written about switching to using 'autism' (or autism spectrum disorder, or autism spectrum condition) to describe their diagnosis.

For brevity and neutrality, I favour the single term autism. However, because of the considerable heterogeneity among autistic people, I think it could be helpful for them and their families — together with autism researchers, clinicians and relevant professionals — to discuss whether subtypes should be introduced.

"The future use of the term Asperger's syndrome is a discussion that must incorporate the views of autistic people."

When Wing coined the term Asperger's syndrome, none of us was aware of Hans Asperger's active support of the Nazi programme. As a result of the historical research by Sheffer and Czech, we now need to revise our views, and probably also our language. *Asperger's Children* should be read by any student of psychology, psychiatry or medicine, so that we learn from history and do not repeat its terrifying mistakes. The revelations in this book are a chilling reminder that the highest priority in both clinical research and practice must be compassion. ■

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BIOTECHNOLOGY

Blood, sweat, tears and biotech

Eric Topol extols a gripping account of the rise and fall of US medical-testing company Theranos.

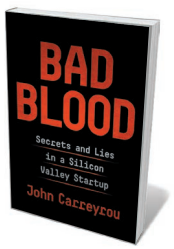
Few scandals have so gripped both the health-care and technology industries as the seismic rise and fall of blood-testing company Theranos. In *Bad Blood*, acclaimed investigative journalist John Carreyrou, who broke the story in 2015, presents comprehensive evidence of the fraud perpetrated by Theranos chief executive Elizabeth Holmes. Specifically, Holmes and the company's former president Ramesh 'Sunny' Balwani raised more than US$700 million through "elaborate, years-long fraud in which they exaggerated or made false statements about the company's technology, business, and financial performance", as the US Securities and Exchange Commission put it in March this year.

By the time Carreyrou's *Wall Street Journal* story and a long chain of follow-ups had led to regulators closing down Theranos's labs in 2016, nearly 1 million lab tests had been run in California and Arizona. A significant proportion of these were erroneous; all had to be voided. An untold number of people were harmed by the erroneous results: some underwent unnecessary procedures, received misdiagnoses of serious conditions and experienced emotional turmoil.

Carreyrou presents the scientific, human, legal and social sides of the story in full. Although some of it was previously reported in his extensive coverage, he unveils many dark secrets of Theranos that have not previously been laid bare.

The company's alluring goal, which changed as it evolved, was to quickly analyse a drop of blood for hundreds of different assays, at a fraction of prevailing costs. Collected in 'nanotainers' and allegedly tested in a diagnostic 'miniLab' the size of a microwave oven, the method was publicized as revolutionizing an industry that hadn't changed for decades. Holmes, who idolized Apple entrepreneur Steve Jobs, called it "the iPod of health care".

As a child in the 1990s in the United States, Holmes declared that she wanted to be a billionaire when she grew up. By age 30, she had achieved her goal. Highly intelligent, she had been accepted in 2002 to study chemical engineering at Stanford University in California as a President's Scholar, a prestigious programme that comes with a grant. She dropped out in her second year to start Real-Time Cures, the Palo Alto-based company that became Theranos and operated for 15 years.



Bad Blood: Secrets and Lies in a Silicon Valley Startup
JOHN CARREYROU
Knopf (2018)

Carreyrou explores Holmes's talents and liabilities. Driven, and with an exceptional gift for selling ideas, she built up a board of high-level political figures, such as former secretaries of state George Shultz and Henry Kissinger, former secretary of defence William Perry, Marine Corps general (now secretary of defence) James 'Mad Dog' Mattis, and former senator Sam Nunn. Investors included media magnate Rupert Murdoch; partners numbered supermarket giant Safeway and pharmacy chain Walgreens. Channing Robertson, a professor of Holmes's at Stanford, was a board member and adviser to the company. In 2015, Holmes was recognized by then-president Barack Obama as a US ambassador for global entrepreneurship. The same year, vice-president Joe Biden sang her praises at a launch of the miniLab (which Carreyrou uncovers as completely fake; the lab was not operational at the time).

All the while, as Carreyrou reports, Holmes was lying about the nanotainer, contracts with the pharmaceutical industry and assay validation. She made false statements to the US Federal Drug Administration (FDA) and to the US government agency that regulates blood-testing labs, the Centers for Medicare and Medicaid Services. And she claimed that Theranos was being used on the battlefield in Afghanistan, saving soldiers' lives.

Holmes described the miniLab as "the most important thing humanity has ever built". But at best, the lab could do