

Frederick Alexander Lindemann I

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later **Lord Cherwell**

(*b.* Baden-Baden, Germany, 5 April 1886; *d.* Oxford, England, 3 July 1957)

physics.

Lord Cherwell's father was A. F. Lindemann, a wealthy Alsatian engineer who became a British subject after the [Franco-Prussian War](#); his mother, Olga Noble, was American and of Scottish descent. He was educated in Scotland and Germany, and took his Ph.D. with Nernst in 1910. Together they formulated the Nernst-Lindemann theory of specific heats, and at the same time Lindemann derived his formula relating the [melting point](#) of a crystal to the amplitude of vibration of its atoms.

He returned to Britain in August 1914 and joined the Royal Aircraft Establishment to work on problems of flight. Aircraft at that time were prone to spin uncontrollably, often crashing fatally. Lindemann worked out the relevant theory, showed how to recover an aircraft from a spin, and made the first tests of the theory himself. Despite defective eyesight, he had already learned to fly.

In 1919, backed by his friend Henry Tizard, whom he had met in Nerast's laboratory, Lindemann was appointed Dr. Lee's professor of experimental philosophy at Oxford and head of the Clarendon Laboratory. The laboratory was then moribund, for almost no research had been done during its fifty years of existence, Lindemann started the long fight to build it up, often against the prejudice of the classical tradition at Oxford; and in 1933 he strengthened it by giving hospitality to Jewish emigrés from Germany, led by Franz Simon,

During this period he had become the friend of [Winston Churchill](#), and from 1932 the two fought to awaken Britain to the German threat and to the need—and hope—for effective air defense. Here, unhappily, he quarreled with Tizard, who had returned to this field. Ostensibly the quarrel was over priorities, but there was a deeper conflict of personalities, and from 1933 to 1939 Lindemann was in eclipse.

The return of Churchill to the Admiralty brought Lindemann forward as his scientific adviser, a relationship maintained after Churchill became [prime minister](#) in 1940. Lindemann advised him over the entire fields of science and economics. Although the two men were apparently very different (Lindemann was aloof, a vegetarian, and a total abstainer), each respected the complementary qualities in the other and they had essentials in common—courage, humor, and a love of language. And while Churchill had excelled at polo, Lindemann was outstanding at tennis; he had won the European championship in Germany in 1914 and later competed at Wimbledon.

Lindemann's wartime advice was sometimes controversial, but the fact that it was sought and accepted signified a changed attitude in the British government. For the first time since the brilliant exception of [Lyon Playfair](#) in the nineteenth century, a scientist had a direct voice in national affairs. This change was effected mutually by Churchill and Cherwell, who had been ennobled in 1941 and appointed paymaster general in 1942.

Cherwell returned to Oxford in 1945 but was again with Churchill as paymaster general from 1951 to 1953 and accompanied him to summit meetings. He was primarily responsible for establishing the [Atomic Energy](#) Authority, and when this was assured he returned to Oxford. He retired from his chair in 1956 but continued to influence Churchill's thought, especially regarding technology. The two wanted to establish in England an institution similar to MIT but tradition proved too strong and a compromise was reached in founding a new college at Cambridge, Churchill College, intended especially to promote technology.

Lindemann's wide interests in physics were reflected in the Lindemann electrometer (in which he perceived the advantages of reducing instrument size), Lindemann glass for transmitting X rays, the Dobson-Lindemann theory of the upper atmosphere, indeterminacy, chemical kinetics, and, with Aston in 1919, the separation of isotopes. While serving as paymaster general during [World War II](#), he proved the prime-number theorem by a new argument. The task of building up the Clarendon Laboratory in a difficult environment took effort that would otherwise have earned him a greater place in personal research; but his ideas illuminated many fields of physics at the pioneering stage. Beyond this, his achievements lie in the success of the laboratory and in the help that he gave Churchill.

BIBLIOGRAPHY

See *The Physical Significance of the Quantum Theory* (London, 1931).

For information on Lindemann's work, see Lord Birkenhead, *The Prof in Two Worlds* (London, 1961); R. R. Harrod, *The Prof* (London, 1959); and G. P. Thomson, "[Frederick Alexander Lindemann](#), Viscount Cherwell 1886-1957," in *Biographical Memoirs of Fellows of the Royal Society*, 4(1958), 45.

Both Birkenhead and Thomson give complete bibliographies.

R. V. Jones