

Richard (Dick) Henry Howard Barr, OBE

Pioneering Engineer and Entrepreneur

29th April 1920 – 22nd January 2021

Born in Colne, Lancashire, Dick was the youngest child of Charles Nicholson Barr and Sarah Hannah Barr. A happy childhood growing up in Normanton, Yorkshire enabled him to enjoy his love of sport, particularly cricket where he was a formidable fast bowler, an early love of golf, and a strong swimmer. After attending Normanton Grammar School, he followed his two older siblings, Charles and Winifred, to University, gaining entrance to Leeds University to study Mechanical Engineering. The outbreak of war in 1939 and the demand for graduate engineers resulted in his final two undergraduate years being compressed into 18 months and he graduated at Easter in 1941. The National war effort gave him a single minded focus and resulted in a First Class Honours Degree in Mechanical Engineering.

Immediately after his graduation, having specialised in thermodynamics, he was assigned to the airscrew manufacturer Rotol located near Gloucester. Whilst there he was asked to assess a strange prototype propellorless aircraft that was testing at a nearby airfield as it posed a threat to the Rotol business. This was the Gloster E28/39 which was using the Whittle W1 jet engine. It was the start of a lifelong involvement with the gas turbine/jet engine. His growing interest in the jet engine led first to his transfer to the Farnborough Research establishment at Pyestock, where

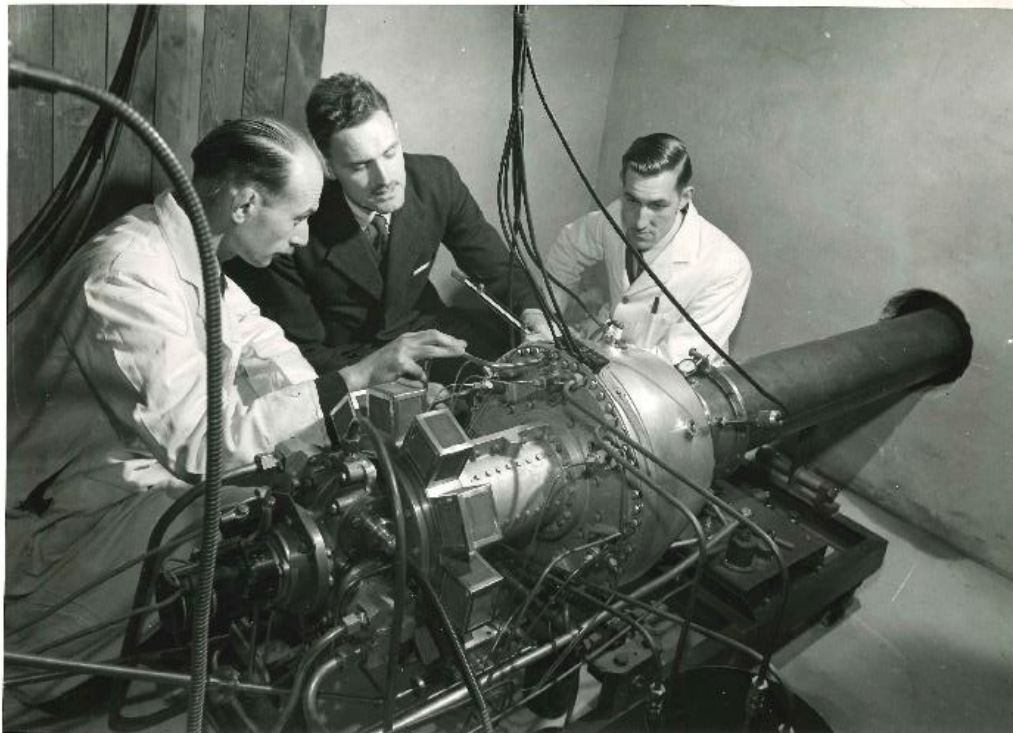
he worked on axial flow compressors and turbines, and then ultimately to Sir Frank Whittle's Power Jets team in Lutterworth. Sir Frank's engines were based around the use of a centrifugal compressor, whilst Dick's time at Rotol and Pyestock had centred around axial flow compressors. During his time at Power Jets, Dick was given the task of designing the compressor for a small turboprop engine by Sir Frank. Given the divergent design background of the two men, there emerged a compromise that had immense consequences for the remainder of Dick's working life. The "compromise" compressor had 4 or 5 stages of axial flow compressor followed by a single centrifugal stage. It had the advantage of being able to achieve a much higher pressure ratio than a single stage centrifugal but was much simpler than a multi-stage centrifugal. In April 1944 Power Jets was nationalised and amalgamated into the Royal Aircraft Establishment. As the war came to an end and the population began to focus on post war Britain, Dick too was thinking about his future career. Perhaps disillusioned by the loss of the pioneering spirit of the now nationalised Power Jets team, he considered a change of profession and began studying law.

However, it became clear that his passion was engineering, in particular, thermodynamics. Whilst the opportunities for jet engines in flight applications had all been absorbed by the UK's numerous aero engine manufacturers, Dick became convinced that there were significant opportunities for the gas turbine in other propulsion applications including road, rail, marine and power generation. He developed the conceptual design of a small 250/300 hp engine designed without the weight constraints of an aero engine. He concluded that the "compromise" axial plus centrifugal compressor with an axial flow turbine was the most attractive layout. He obtained some private finance capital from his first wife, Patricia's, uncle, William Wolsey, and William's friend, John Peress. Together with another Power Jets engineering colleague, Geoff White, the four decided to set up a company to exploit the industrial and marine applications of gas turbines. But what to call the new company? The answer came from the design concept of combining CENTRifugal and AXial compressors and so on the 9th of September 1946 CENTRAX Power Units Ltd was born.

With modest funding and no facilities this was indeed an ambitious project. Will Wolsey had a tool room within another business so this became HQ for the fledgeling activity. There were no established sources for many of the components the engine required, blading in particular, so the team set to work sculpting compressor blades using a hand pantograph. Like so many gas turbine projects that were to follow, money soon ran short. Desperate to generate some revenue, Dick and Geoff approached contacts they had in the fast emerging aero gas turbine community to see if the new found skill of making compressor blades had wider application. They found a need and, after providing a few samples, received the first production order from Napier. However, this was now at volumes well beyond the hand pantograph so a copy turning process was hurriedly developed using a milling lathe and the order was fulfilled. The ability to produce accurate and consistent blades found a ready market as the RAF migrated to the jet age. Dick was now Managing Director and the growth demanded that the business move to larger

premises which were found initially in Brentford, West London and then on to Feltham near Staines. Much of the machinery for the manufacture was rented from the Air Ministry as the business had become a critical supplier to various aero engine manufacturers. In 1950 war broke out in Korea and with it came the first large scale deployment of jet aircraft in combat roles. Compressor blade requirements continued to grow such that by 1952 Centrax had over 400 employees. The business was fast outgrowing both the space and availability of skilled labour in Feltham so the four Directors decided to move the business out of the London area. After a brief search, a development site in Newton Abbot, Devon was purchased, and the building of a factory began in 1954. Production began in 1955 and over the next few years the business was consolidated at Newton Abbot. Export markets, particularly in the USA, began to emerge which gave a solid base to the business. This enabled attention to turn to diversification and the original goal of industrial/marine gas turbines.

In the late 1950s a team was established in the equipment division to respond to numerous design and development contracts for small industrial and marine gas turbines. One contract in particular for the Italian Navy required the ability to vertically split casings so that the turbine section of the engine could be removed with the rest of the engine in situ. Still using the combination of centrifugal and axial compressors, this design became the Centrax CS600 and was further developed to power a 600-700 KW generator set. Some 300 machines were built between 1962 and 1984 providing standby power to numerous computer facilities, the power generation on HMS Exmouth, the Royal Navy's first all gas turbine warship, early CHP plants, and North Sea offshore drilling platforms.



Dick (centre) and Geoff (left) testing an early Centrax engine

Tragedy struck Centrax in 1960 when Geoff White drowned whilst on holiday in Cornwall. By this time John Peress had left the company leaving just Dick and the Chairman, Will Wolsey, remaining from the founding four. The Board was strengthened by the promotion of some key existing members of staff together with the recruitment of experienced individuals from outside of Centrax.

The 1960s was a period of expansion and diversification. The generator set necessitated a compound epicyclic gearbox so a gear cutting facility was created. This was underutilised for turbines alone so it began making forklift truck gearboxes under sub-contract. Then followed planetary axles and braking systems for large earthmoving equipment necessitating the establishment of a separate company Centrax Gears Ltd. The Newton Abbot site was running out of space so land was acquired at Heathfield near Bovey Tracey, and the first factory on what is now the Heathfield Industrial estate was built to house Centrax Gears. A range of off highway dumper trucks with the brand name Heathfield Engineering was designed, built and marketed from Newton Abbot. Perhaps this venture was with a view to gas turbine power at some point in the future. A joint venture with the Howmet corporation was established at the Newton Abbot site for the production of investment cast turbine blades. Since the mid 1950s the company's order book was increasingly becoming dominated by export markets with the consequent additional challenges including local regulations and currencies. The diversity and pressure of this large exporting group employing almost 2,000 people began to take its toll on Dick's health resulting in a serious illness in the later part of the '60s followed by major surgery and a period of recuperation.

Back to full health in the early 70s, Dick decided to rationalise the group. First the Centrax interest in the Joint Venture with Howmet was sold to Howmet who subsequently moved the business to its current site in Exeter. Then in 1973 Centrax Gears was sold to GKN. In the late 1970s his son, Richard looking to expand the product line of the Gas Turbine operation, negotiated a European distributorship for the Allison range of Industrial Gas turbines to complement the Centrax CS600.

As the 1980s began so did a rejuvenation of Centrax's innovative spirit. With his two elder sons, Robert & Richard, now increasingly leading the commercial and marketing aspects of the business, Dick increasingly reverted to his engineering roots becoming heavily involved with the team engineering new manufacturing techniques and processes necessary to address the changing market demands of the compressor blade business. Dick became Chairman of the group in 1983 when Will Wolsey stepped down and retired from business life. A new manufacturing capability was added to the blade business, this time not directed at compressor blades, but the more sophisticated machining of cast turbine blades and vanes. This combined operation subsequently became Centrax Turbine Components Ltd (CTCL). As the 1980s drew to a close, the reinvigorated sales and marketing effort led by Robert produced an exciting opportunity to manufacture the compressor blades and variable vanes of the new Allison 2100/3007 range of turboprop and turbofan engines. However, these parts had yet more challenging geometry and surface finish requirements. The engineering team with Dick's continued involvement not only produced a novel manufacturing process including the development of

unique multi-axis CNC machines, it reorganised the manufacturing process into a cellular system improving quality, reducing inventory and cutting lead times. The 2100/3007 contract was secured and CTCL remains the sole global source for these complex parts to this day. CTCL was acquired by the MB Aerospace group in 2016.

Over this same period, the gas turbine activity also made dramatic progress. The new relationship with Allison began to bear fruit with ground-breaking 2.5MW mobile generator sets followed by the first steps into the European CHP market. Guided by Richard and with Dick's full support, this business has steadily grown with most of the machines being used for continuous operation and therefore generating substantial aftermarket revenues. Allison Turbines became part of the Rolls Royce energy which in turn became part of Siemens Energy. Consequently, Centrax now builds and maintains gas turbine powered generator sets using the Siemens SGT300/400 gas turbines as well as the original Allison based units. Most are sold to export markets providing highly efficient low carbon energy solutions to high energy users across Europe, Africa, and Russia.

In spite of his role within Centrax, Dick still had time to apply his engineering ability in the medical field. He became very interested in the treatment of hydrocephalus and established strong links with the neurological teams at Addenbrooke hospital and Cambridge University. He advised on design and led the setting up of a sub-contract manufacturing capability for the production of the triple cranial access device developed by the Addenbrooke/Cambridge team. Dick strove to develop a sophisticated cranial drain valve which offered great benefits to both patient and care teams. Whilst the valve demonstrated good efficacy in laboratory trials, disappointingly it was not possible to engage with a suitable medical engineering company willing to fund the product through the necessary certification processes.

Since moving to Devon in 1954, Dick established an extensive apprenticeship programme and other training programmes including sponsored undergraduate schemes. These schemes together with the innovative and entrepreneurial spirit of the company has inspired many young engineers over the decades and the achievements of these individuals both within Centrax, but also the many who have pursued careers elsewhere even starting their own businesses is as big a tribute to Dick as the achievements of Centrax itself.

Dick was honoured with the award of an OBE in 1989, whilst the Company, under his stewardship, won Queen's Awards in 1969, 2002 & 2010. He remained as Non-Executive Chairman and rarely missed a Board meeting even into his 100th year. He leaves Centrax in good health and with the same innovative spirit that brought it all into being nearly 75 years earlier. It is now principally the Industrial Gas Turbine focused business he originally envisaged at the outset and with export sales accounting for 80-90% of its revenues.

Dick passed away peacefully at home on the 22nd January 2021 at the age of 100 after a short illness. He leaves his wife Susanne and four sons, Robert, Richard, Andrew and Christopher.