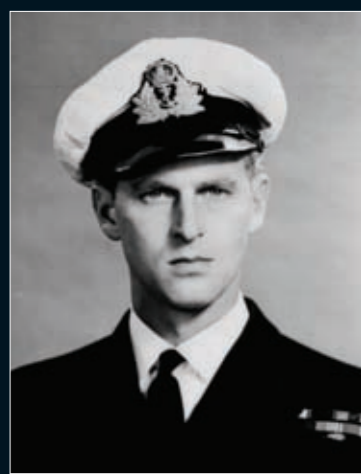


PROMOTING ENGINEERING

Prince Philip has taken a great personal interest in the development of engineering in the UK. Early impressions formed whilst in the Navy have stimulated his active support of the profession since. The Duke of Edinburgh writes for *Ingenia* about the promotion of engineering and the importance of encouraging and developing future engineers.



Lieutenant Philip Mountbatten R.N. pictured whilst in South East Asia during a 1944/45 tour of duty © Press Association

I experienced my first exposure to engineering when I joined the Royal Navy as a Cadet in 1939. We were required to keep a 'Midshipman's Journal' in which we recorded our daily activities from our instructional courses to life at sea as Midshipmen. My Journal includes several engineering drawings – which shows that I must have been paying attention to that part of the course.

The Navy has, of course, its own branches of professional engineers to look after the complicated propulsion, weapons and domestic machinery in a warship but their successes and tribulations are, equally, very much the concern of the Executive branch. Without the engines, and all the other machinery, a warship would not be able to fulfil its duties. This applies just as much to the nation as a whole. The complete

infrastructure of national life is in the hands of engineers.

When you come to think of it, the contribution of British engineers, particularly from the 18th century onwards, is quite remarkable: mines, canals, dams, railways, bridges, sewage works and the very earliest machine driven ships. Not only in this country but all over what was the British Empire, and in many other countries around the world; much of this was achieved by self-taught engineers.

As has so often happened to other professions in the past, the engineers very soon formed themselves into specialist institutions to ensure that their members achieved, and maintained, proper professional standards. There are currently 36 such bodies in the United Kingdom.

It was only in 1962 that any attempt was made to bring the various branches of

engineering into any sort of collaboration. Thirteen of the major engineering institutions formed themselves into the Engineering Joint Council, which was granted a Royal Charter in 1965, and became the Council of Engineering Institutions (CEI).

For some reason, which I cannot recollect, I was invited to become President of this new Council. One of the main reasons for creating the CEI was the need to tackle the thorny problem of establishing the appropriate qualifications required to be recognised as a Chartered Engineer in any of the engineering Institutions.

CREATING A NATIONAL ACADEMY

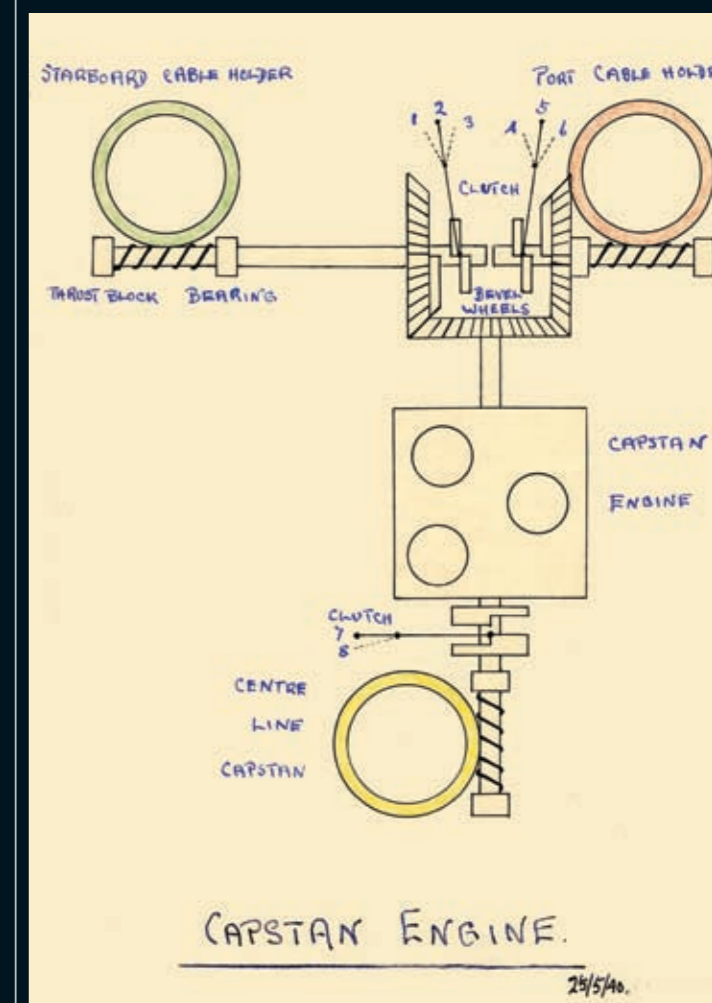
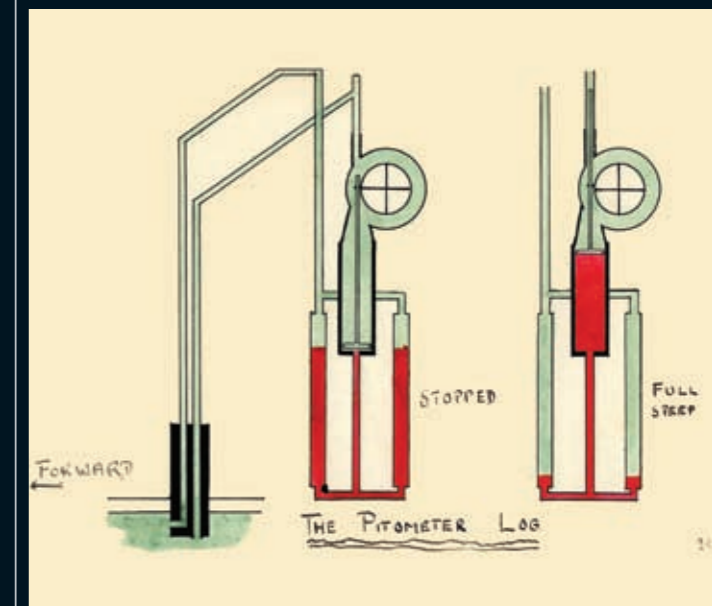
It was also about this time that the status of engineers in society as a whole became a lively topic for discussion. The suggestion was that engineers

Without the engines, and all the other machinery, a warship would not be able to fulfil its duties. This applies just as much to the nation as a whole. The complete infrastructure of national life is in the hands of engineers.

did not enjoy the same respect as scientists, academics, and other professions. This led to the proposal that a body along the lines of the Royal Society should be established for distinguished engineers. Indeed, Professor Meredith Thring, of Queen Mary College, proposed the creation of a Royal Society of Engineers.

This idea did not find much favour with the Royal Society itself, which, instead, proposed to elect more engineers to its Fellowship. It seemed to me that this was equally unsatisfactory, since the engineers would always be in a minority. Any solution would also have to have the support of the CEI. I therefore

FROM A MIDSHIPMAN'S JOURNAL



Engineering drawings showing a Capstan Engine and Pitometer Log, from HRH Duke of Edinburgh's Midshipman's Journal. By kind permission

proposed that the Council itself should establish a Fellowship of engineering, with Fellows elected from across the whole engineering profession. This came into being on 11 June 1976, when 126 of Britain's leading engineers gathered at Buckingham Palace for the inaugural meeting. Lord Hinton, as Chairman of the CEI, became President. This body gradually distanced itself from the CEI until in 1992 it decided to become completely independent and change its title to The Royal Academy of Engineering.

MAINTAINING STANDARDS

The creation of the CEI seemed to trigger the creation of a whole

new set of engineering bodies. First came the Engineering Council UK, which was required to regulate the qualifications for entry, and progress through the engineering profession. This was followed in 2001 by the creation of the Engineering and Technology Board, which was formed to promote the vital role of engineers and engineering in society.

One of the serious bones of contention for the CEI was the problem of establishing a clear line of professional advancement from operative, or apprentice, to the jealously guarded title of Chartered Engineer.

The present situation is that the Engineering Council recognises three levels of professional qualification;

Chartered Engineer (CEng), Incorporated Engineer (IEng), and Engineering Technician (EngTech). It lays down the educational and professional qualifications needed to achieve these designations. For CEng, the Engineering Council require an educational base equivalent to Level 6, Masters Degree, and for EngTech, the educational base should be equivalent to Level 4/5, typically HNC/HND. Over the last five years, the proportion of engineers registering as CEng has gradually dropped to below 70%, while those registering as IEng has been steady at around 10%, and those registering as EngTech has risen to over 20%.

Within the engineering industries, there appears to

have been a growing anxiety about the recruitment and training of apprentices. It has been suggested that the decline in apprenticeships may well be due to the conversion of so many technical colleges into polytechnics and universities. However, it is also possible that the decline in the number of young people seeking apprenticeships is related to the consequent huge growth of university places, the pressure on young people to seek places in universities, and the great variety of less demanding subjects being offered.

A generation ago, only 8% of school-leavers went to universities. The figure today is 42%. The result is that, out of a school-leaving population of some five million, there were only about 20,800 Level 2 Engineering Apprentices who completed their training in 2007-08, while the very modest total of some 15,000 Level 3 Advanced Engineering Apprentices completed their training in 2006-07.

BECOMING AN ENGINEER

One of the common objectives of all the engineering institutions, The Royal Academy of Engineering, and the regulating bodies, is to encourage more young people to take up engineering at the level appropriate to their educational qualifications. The fact remains that engineering is the driving force behind all technological advances, and that it plays an immensely important part in the improvement in social conditions. Furthermore, engineering is probably the greatest wealth-creator in our whole society.

I am also convinced that young people are more likely



Prince Philip is shown a surgical device that re-aligns fractures of the tibia by members of an engineering team from Staffordshire University. He met the finalists for the MacRobert Award at The Royal Academy of Engineering's Awards evening in June 2007

On 11 June 1976, the Duke of Edinburgh hosted the inaugural gathering of the Fellowship of Engineering at Buckingham Palace. The Duke is flanked by Earl Mountbatten of Burma (left) and Lord Hinton of Bankside (right), who became the Fellowship's first President



to start a career in engineering if they can see a clear line of professional advancement right through from an unskilled operative, or an enthusiastic amateur, to the status of Chartered Engineer. There are encouraging signs. The technician entry route is proving increasingly attractive, and now accounts for about 20% of the annual registrations with the Engineering Council. However, the total number of prospective engineers, who by following the direct route to registration as a Chartered Engineer through university courses remains static at around 5,000 to 6,000, year-on-year.

The present system certainly ensures a thorough grounding in engineering for all those who have a burning ambition to become professional engineers but I suspect that it may not attract those who enjoy using their manual skills to make things, or even just to repair things.

Many of our pioneering engineers started without any

formal training but they had a passion, and a talent, for invention and development. There can be no doubt that opportunities are still there but the system does not seem to be able to cope with the 'hands on' enthusiast, who has no immediate interest in academic qualifications. The challenge is to entice them on to the ladder of professional advancement. Better skills and wider knowledge enable greater achievements.

PIONEERS IN ENGINEERING

I think that a classic example of such a native genius is John Harrison. Born in 1693, the son of a carpenter, he became a self-taught clockmaker, who, by 1762, had designed and built such an accurate marine chronometer that it could be used by ships to determine, for the first time, their longitude on long ocean passages. The same sort of initiative is alive today.

In 1969 Ronald Hickman wrote to tell me that he had

designed and built an 'all-purpose workshop bench' which he called a 'Workmate'. His problem was that he could not find anyone to manufacture it. We eventually persuaded the firm Black & Decker to take it on and it was launched in 1973. It immediately gained a Design Council award and it has remained a bestseller ever since. This year, 30 years after he patented the original concept, the winner of the 2009 Prince Philip Designers Prize is Andrew Ritchie for his, almost single-handed, design and manufacture of the highly successful Brompton Folding Bicycle.

There are also examples of distinguished engineers who have climbed the professional ladder and made a distinguished contribution without following a university education. Doug Oakervee FREng, who recently retired as Executive Chairman of Crossrail, and is a past President of the Institution of Civil Engineers, started his career as an



Prince Philip meets engineering students from Imperial College on his visit to the Constructionarium at Bircham Newton in 2006. The Constructionarium enables students to spend a week building sizeable scale model versions of existing structures onsite © Imperial College, London

As the ever-growing human population consumes more and more of the earth's natural resources, it is going to take all the ingenuity of inventors, engineers and designers to maintain the rate of improvements in the developed societies and to bring better standards of living to more and more people in the less prosperous countries of the world.

apprentice joiner in 1957. Through night school and day release he obtained an HNC and HND. During his career he has been responsible for great engineering works, including the construction of Hong Kong's new Chek Lap Kok airport. His career illustrates how valuable a combination of academic and practical skills can be to achieve success in major engineering projects.

As the ever-growing human population consumes more and more of the earth's natural resources, it is going to take all the ingenuity of inventors, engineers and designers to maintain the rate of improvements in the developed societies and to bring better standards of living to more and more people in the less prosperous countries of the world. If this is to be achieved during the 21st century, the challenges for the professional institutions and the Academy will be to make sure that bright young people, whatever their background, who aspire to do something creative and fulfilling with their lives, can achieve their ambition through engineering.

Copyright reserved