

during the industrial revolution the Civil Engineers was the first group of engineers to form the body that became the Institution of Civil Engineers. This attracted all, except military (there were no others), engineers until 1847 when it is claimed that the Institution of Civil Engineers refused to admit to membership George Stephenson who designed and built the first commercial railway engine. A splinter group of mechanical engineers broke away and formed the Institution of Mechanical Engineers. Whether this is true or not there was certainly a practical reason for the break-away. That was because the railways were starting to compete with the canals and engineers formed themselves into two camps, the Civils designing the canals and the Mechanicals the railways. Since then other groups have followed suit to accommodate specialist interest stretching from heavy transport based societies to energy orientated bodies not overlooking the scientific.

May I turn now to the Institute of Marine Engineers upon which, as I have said, I draw upon as the basis for this Paper? I do this without apology in that in so doing tracing the struggles of the early and maturing days we may learn from them and take the best developments from those days. It was formed in 1889 in the wake of the broader based societies serving not only the civil and mechanical but also the electrical fields.

The Merchant Shipping Act 1854 established rules for the registration, navigation and safe operation of British Merchant ships and encompassed foreign merchant ships using British ports. The Act also established the systems of examination for, and using of, certificates of competency for masters and mates under the control of the Board of Trade. The Merchant Shipping Act Amendment Act of 1862 extended the range of the principal Act of 1854 by requiring that every steam ship which was required by the 1854 Act to have a master possessing a certificate from the Board of Trade should also have an engineer or engineers possessing a certificate or certificates from the Board of Trade. This initiated some degree of control over the safety of ships at sea by the certification system of both the navigating and engineering personnel. The formation of a professional society soon (in historical terms) afterwards was a natural happening. The Institute's origins were literally rooted in the ashes of a trade union formed and foundering in 1888. Two of the enthusiasts of that group were included in the four who actually spearheaded the foundation of the Institute. Their wish was to get together to discuss common problems and it is difficult today to imagine how little technical information was available to the marine engineer nearly one hundred years ago.

THE LEARNED SOCIETY

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Introduction

The title of this Paper is general but in its writing I have drawn heavily on my own experience of the particular. I believe this not to be restricting: so many new societies seem to follow very much the traditional ways of those formed many years ago. The purposes are the same; the methods updated.

Before looking ahead it is interesting to look to the past to try to see why so many institutions and guilds formed in the United Kingdom and other countries even five hundred years ago have not altered.

The human race seems to like to form itself into groups of people with common interests either to protect their trade; to pass on knowledge; to play sport or even to indulge in politics.

Background

In London in the 14th century trade guilds were formed of leathersmiths, candlemakers and grocers, etc. These guilds are still in existence today, although their members do not necessarily practice, or are able to practice, the particular art. Later in the 19th century

The early discussions show that members thought that boilers operated better on salt water than fresh water, presumably because the salt helped to seal the leaks! Propeller shafts frequently broke because they were forged from scrap lengths of wrought iron and the forging heat failed to penetrate the centre of the shaft. These were the days before the metallurgist and decisions were taken more by guesswork than from technical knowledge. They had in mutual support to find the answer to their collective problems. They also used this facility to discuss future developments of their art. This original idea to have a place to meet to discuss their technical problems, and thereby hopefully to resolve them, was carried out with tremendous enthusiasm.

Looking up the early records shows that in that enthusiasm there were some splendid digressions from engineering such as :-

1891 - "The Influence that mountains have on the Health, Wealth, Political Independence, Habits and Pursuits of Mankind".

1889/1890 - "Scientific Tri-unities" - A Philosophical Paper introducing a wide range of scientific disciplines - with the intention of persuading young engineers to broaden their minds.

A selection from the lists for 1907/8 includes :-

A lecture on "Self-help"

A lecture on "External Perception"

"The Doctrine of Descartes"

"The Religiousness of Knowledge"

"The Pillar of Cloud" (talking about the Israelites' emigration from Egypt

Some debate on these (or some of these and perhaps mind broadening) subjects today would be just as appropriate as then and would it not be instructive to read the two discussions side by side!

Growth of the Institute into the twentieth century was steady but undramatic up to the period of the First World War when having been the occupier of rented

accommodation in the East End of London near the old London Docks a purpose-built institution building was designed just within the City Boundaries near the Tower of London and opened in 1914. A comment perhaps on the quaintness of those days was the provision of a number of public rooms, including a lecture hall to accommodate 200 people (and it was frequently filled) but the only office accommodation was one room some 10 foot square! This demonstrated how much of the work was done voluntarily. In fact the first paid secretary took up duty in 1921. thirty-three years after the date of foundation.

The 1939/45 War came and went: the headquarters had been vacated but was not seriously damaged although all around acres of buildings in the City of London disappeared; threads were picked up again in 1945, by which time it was appreciated that the building was doomed to demolition by hand of man despite the survival in the War, because of road developments on the northern side of the Thames to link the West End and Dockland areas. In the emotional aftermath of the War a Memorial concept was proposed by which a new headquarters would be built, not only to serve the interests of the Institute (with adequate public rooms and office accommodation), but also to act as a Memorial to those who died in the Royal and Merchant Navies in the recently concluded confrontation. Suffice to say the idea caught on and the project became well supported by individuals and industry, and of course in those days shipping and its attendant industries were booming. It made it possible to design, build and occupy the new building by 1957. The building was far larger than the Institute needed but the rest of the accommodation was let commercially. Being in the heart of the City, surrounded by commodity houses ranging from money and insurance to shipping and metals, the Institute was placed in a very strong financial position. This enabled the first strategic plan to be laid for development based on the realisation that future usefulness and prosperity lay in extending the services and widening the sphere of operation. This is as true today as it was then. If we ought to have learnt one thing it is that the right service, at the right price and availability, is the formula for success today. Perhaps without conscious realisation this established a line of thought which whilst in the first place might almost have been selfish, has turned out to be to the advantage of a great many people. Technical coverage was widened; the library was classified; special subject groups were created and a positive attitude to recruitment was initiated. Geographically in ten years or so a world-wide network of decentralised branches was founded to take the services to members as they could not come to them.

For the rest of the 50's and into the 60's and up to the oil crises of 1974, expansion was quite dramatic, showed by the quadrupling of the membership, the formation of branches all over the world at its peak numbering 48 including one, and eventually two, in the U S A.

The Present Day

The above developments were all most encouraging and set a base for what was then the future, but where are we today? The United Kingdom in company with other countries finds itself with a somewhat illogical spread of Institutions a number of which have serious financial problems. Some of the 'wrong' ones will survive as they are financially strong, and I do not condemn financial strength, whereas those that depart may leave a subject gap. There is also the danger that some will become too big and, if they fail to cater for their internal strong minority groups, will break up to accommodate people who are only interested in narrow specialist fields. In this context, it seems illogical and bad for industry, that there are separate institutions for mechanical and electrical engineers, for example in the UK, as in industry there is no hard and fast demarcation between the two specialisations. The marine industry suffers from the same diversification as there are four Institutions involved in the United Kingdom and several more elsewhere in the world including as one, a much respected body, the Society of Naval Architects and Marine Engineers. The amalgamation of the naval architects and marine engineers in the United Kingdom which may shortly take place will ameliorate the problem and will also cater for subjects for technical consideration being broadened and coverage of the information services being extended. As the world shrinks and as an industry continues to be under pressure, is it not possible to contemplate the closest possible collaboration between institutions of different national bases in the interests of better service to a smaller total number of subscribers?

More recently, with the aid of the electronic age, institutions are at the centre of a network of enquirers as referred to later in this paper and it is to this area that it behoves us to address ourselves today.

So far I have referred to things that happened almost accidentally in the formation of societies based on a need for knowledge. Beside that, however, has grown up over the last fifty years at least, an educational base which reflects a much more positive approach. During the thirties in the United Kingdom, universities were few and therefore degree courses for many were non-existent. Such as they existed the arts, law,

medicine dominated with engineering trailing behind. It is hardly surprising therefore that something had to be found to fill the need of engineers in industry working to better themselves and their industries. This was helped enormously by many institutions setting up their own degree level examinations which could be taken after part-time study. Associate Membership of well-known bodies became a hall mark of professional competence and knowledge. This step alone probably did more for the development of institutions in Great Britain than any other single element. The position in other countries varies widely with in some cases no responsibility for accreditation - this being in the hands of State or provincial registering authorities, to others, notably Australia and New Zealand, where certain memberships have been taken as a measure of a man's earning power. Over the last 35 years during which I have been associated with the Institute a great deal has been learnt from the above developments. I will now describe some of the other fields of involvement of the professional society, from which again one can make some assessment of where its future might lie and the services to those who are employed in or involved in any way in business dependent on the shipping industry.

Why Join an Institute?

There are many different reasons why engineers join an institute which include some "don't knows". Surely the main reasons (not necessarily in order of importance because from nation to nation and reader to reader, they will be different) are :-

- i) Attendance at technical meetings to improve ones knowledge, meet colleagues and discuss common problems on neutral ground.
- ii) Obtaining technical information, mailing lists and books on loan.
- iii) To obtain a qualification which involves both theoretical and practical experience which is valued by industry. The qualification is of considerable use when job hunting and may well one day lead to registration and the right to practise as in many countries other than the United Kingdom.
- iv) Codes of professional conduct may be laid down for its members and those who contravene these rules can be struck off the register. This

code is of particular use to consultants and their customers as it discourages the use of 'cowboys' and enables a customer to choose a reliable consultant.

- v) Making contacts for commercial as well as professional purposes.
- vi) Using the social events organised by headquarters and branches or sections for entertaining customers and returning hospitality.

The Way Ahead

I see a continuing need for societies and institutions in the engineering profession although in a changing form. Firstly, and most important, they must be strong financially as without adequate finance they will be restricted in what they can undertake, will fail to attract good staff and end up by being ineffective.

Secondly, I see the need for a single Institution representing an industry. In the United Kingdom, as I have said, we have four or five which cover the whole of the marine and offshore industries: not perhaps the best example of my thesis.

The larger institutions hopefully will re-organise themselves into divisions so that each division covers an industry. The present state where three or four institutions cover the same industry must go as also will the general type of conference which covers several industries or subjects. The present system is wasteful of resources, illogical and not effective. No better is this shown than when institutions try to inform and perhaps influence government and inter-governmental bodies.

Thirdly, and most important, institutions will continue to provide a neutral platform for the discussion of technical problems. There is a fundamental need to ensure that technical contributions to public authorities in the interests of greater safety, efficiency and environmental control must be seen to be the best technical answer untarnished by sectional selfish interest. In the era of the salesman the customer today is bombarded with claims, often without proof, that equipment will out-perform the machinery being supplied by a competitor and it is difficult for the customer to make an objective decision. Recently I heard a lawyer state that lawyers were the only

professional body in existence today as they always put their client before themselves, even if it meant rejecting unnecessary work and a loss of fees. Whilst I do not accept that lawyers are the only professionals, I think there is an important role for the learned society to provide an unbiased platform for debate.

Fourthly, there is a 10-15 year failure cycle in the marine industry which is considerably shorter in high technology fields. By this I mean that the industry is liable to repeat the same mistakes every 10 to 15 years because key personnel change jobs. There will, therefore, be a continuing need to record and discuss problem areas and failures so that one can continue to learn from the mistakes of predecessors. We forget our past at our peril just as much as we fail if we do not take account of the future in getting policies right.

Publishing and Information Services

Journals must cover the future requirements in such a way that the task is divided up to accommodate the up-to-date technical development, publications of a more research and technical nature, technical books and monographs of specific subjects, together with perhaps a weekly journal of business news and less technical matters, but which nevertheless has a specific concern.

The traditional information function has provided a centre for the collection of printed material within the institution's discipline originally of its own creation. This led to further acquisitions from which some societies have taken steps to exploit library collections. Methods of exploitation include offering enquiry services, market research, publishing directories and literature guides, providing reports and information packages and developing computer data bases. These innovations have taken place against the background of a growing information industry.

Information, usually stored on computers, is bought and sold in much the same way as any other commodity. The effect of this growing industry on the societies themselves has been to decentralise information collection and dissemination. Many of the enquiry services offered by societies make use of on-line retrieval services and, at the same time, the literature output of societies is entered into data bases, either directly into their own data base, or indirectly into commercial systems.

Societies which make use of automated information retrieval systems can call on a much broader 'knowledge base' than their own collection. Those societies which have developed their own data base can offer access to suitably equipped users in remote locations.

The collections held by learned societies must be considered as a national resource. Wider availability of the information held by societies would greatly benefit industry. Access to appropriate information has been identified as a major factor in the commercial and technical progress of a company.

The way ahead for the wider availability of information must lie with the computer. There is no difference in principle between the British Prestel system (or in the marine sector, Seaview) and the more widely used data bases offered by hosts such as Dialog in the U S A or Pergamon-Infoline in the United Kingdom. The form of access and presentation varies with the information to be communicated.

What is the learned societies' role in the information industry? Learned societies have always been information providers; information has been disseminated through meetings, conferences, publications and enquiry services.

The learned society should continue to provide information and will do so using computer technology as the medium. Those societies which place a greater emphasis on consuming rather than producing, information in automated systems will be in danger of losing their role as information providers and with this their future usefulness and credibility.

The cost of entering the high technology sector of the information industry is high. Many organisations have received financial support for the early years of a project from governments or international bodies such as the EEC. Governments which contribute in this way recognise the unique position of learned societies.

Experience with automated systems has shown that the "end-users" of the information appreciate the speed of reply, the vastly expanded range of data provided, and the form in which it is presented. Information retrieved from computer data bases seems to have caught the public imagination in a way in which conventional techniques have not. The education of users should be facilitated by the readily marketable image that information technology carries with it.

Government support in the United Kingdom has been directed towards systems of the viewpoint type which represents an attempt to make the data base directly accessible to the "end-user". The drastically simplified language and data format have been designed to this end. However, technical data bases (of which there are several hundred), require special training and a basic knowledge of information science for successful operation. It is likely that there will always be a role for information specialists and intermediary services.

The growth of the information industry has brought with it a change in attitude. Information now has a value which is quantifiable.

Acquisition of information is now an item which appears in the budgets of many companies embarking on new projects. The awareness of the value of information, not in a philosophical or educational sense, but in pounds and pence is spreading through industry. The information industry is still in its formative years, and the learned societies have a part to play in its formation and to get a dividend from participation. If they do not grasp this opportunity it will go somewhere else to their own loss in terms of capitalising on opportunity.

Professional Duty

Looking at the professional sector there must clearly be a need with so many independent countries being interdependent in the marine field, for the rationalising and extending of the various countries' qualifying and registering actions: this to ensure the greater safety for individuals and goods being moved from one country to another by sea. The professional societies, being non-political, non-aligned, non-partisan provide an excellent neutral ground upon which to base these discussions on mutual professional concern, and in so doing they must work closely with international organisations such as I M O and more specifically in Europe the EEC. For example in its attempts to control pollution as well as safety I M O has had to draw on all kinds of information sources and specialist people and the learned society can readily provide a distillation of many and various proposals.

Illustrating this there are in the United Kingdom three levels of technical responsibility in the engineering profession which are identified by the titles Chartered Engineer and two levels of Technical Engineer. These three levels of expertise are dependent upon, and interact with, one another and are supported by the practical skills of craftsmen.

In general terms Chartered Engineers provide the innovative and creative input, Technician Engineers interpret the work and ideas of Chartered Engineers and contribute particularly to the practical element of the team effort.

Each category of engineer has specialised education and training needs and these are provided by the University, the Polytechnic, the Colleges of Technology and by the training facilities within industry. Educational standards for each level are prescribed by institutions working corporately but this is today under severe scrutiny. Registers are kept by the corporate body and engineers wishing to register must have satisfactorily completed education, training and professional experience laid down. The future value of such registration could have a substantial effect on job procuring.

At a time of recession and low economic growth, and with the consequential cut back in education and training, the learned society has a vital role to play across the whole range of engineering disciplines. My earlier comment on cycles seems to apply here in that the dependence in the thirties on societies may well recur as the availability of cash for centralised adult education deteriorates. Do not overlook that services provided by voluntary self financing bodies reduces the financial load on State resources.

Survival of industry and economic recovery throughout the world will be heavily dependent upon the engineer and it is for individual institutions to stimulate and encourage governments and industry to recognise this fact and to highlight the need for sufficient qualified engineers at all levels to be educated and trained to meet the growing needs of industry as recession recedes.

In addition to monitoring and setting standards for further and higher education the learned society has a responsibility to encourage higher standards of technological literacy within the secondary and tertiary education systems and to promote a better understanding of the contribution that engineering makes to the life and prosperity of the nation. Liaison with educationalists, careers officers and the provision of a careers advisory service for young people must therefore feature prominently in the work of the society.

Education and training is a continuing process throughout the professional life of the engineer. The learned society meets this requirement to some extent by providing a forum where the interchange of information and ideas can take place and by publishing technical papers, journals

and books as mentioned earlier. There is, however, an increasing need to promote mid-career development and to update the training of engineers to enable them to cope with advances in technology and to provide the new skills and knowledge that they require as they progress through their careers. The introduction of the World Maritime University in Malmo will make a valuable contribution in this regard to engineers pursuing careers in the marine industry. This new educational establishment is to provide the international community with organised short and medium term courses in various specialist fields for top-level maritime experts spanning teaching and lecturing, examining and surveying, technical management and administration, accident investigation and port management.

The great encouragement given today to mobility of labour means that the lot of those who wish, or have, to move from country to country or, in some cases, from province or state within a country, must be made easier. A better understanding - nay tolerance - of others' methods of education, training and registration is needed and the professional society - particularly one with a knowledge of other countries' conditions - is well able to advise and also to take positive action with engineering federations and inter-governmental agencies to this effect. The Treaty of Rome is an excellent example.

Legislative

Shipping by its very nature is international and relies heavily on international co-operation and understanding. In developing the Convention on Standards of Training, Certification and Watchkeeping and related resolutions I M O has secured effective worldwide education and training standards for seafarers. Maritime education and training will, as a result, be linked to international standards which will embrace all three categories of professional engineers and, as mentioned above, it is for the learned societies to help to bring nations together in the development and recognition of international qualification.

National and international quasi-government organisations can be offered advice from a technical standpoint to those who, through no fault of their own, very often have little or no technical knowledge. Such advice can only strengthen the quality of the resultant legislation or advisory requirements.

Management

The future management of the more sophisticated and larger organisations will in my view, and it is not a view with which everybody will agree, put a great strain on the democratic type of management evident today. It is perhaps a contradiction in terms and certainly unpalatable to many to suggest that in an era of high cost and economic uncertainty, the democratic processes which have made the free world what it is might be found "too expensive to tolerate", particularly in small specialised technical societies. There is always a tendency for the proportion of overhead costs to rise as size diminishes. Under these circumstances there develops a great need for dependence on voluntary labour from within the ranks of membership. Where this is channelled into the technical advisory role all is fine, but where it makes up for a lack of paid management it is not so good. Control and purpose become blurred and this, despite the best of intentions, may make the reversing of the circumstances of contraction more difficult to eradicate. It must therefore be necessary if these societies are to flourish that the executives are encouraged to take and in fact are given much greater responsibility and, of course, be accountable for that responsibility. Nowhere is this more evident than in the inadequate use or handling of money, and sadly so often today the first requirements of any society are not to carry out its pre-determined function but just to get its money right. There are many old and respected organisations which have failed to heed this dictum and as a result are finding themselves in very serious financial straits from which some may never recover and some of them that do will never look quite the same again. Whilst talking about the financial aspects I believe it behoves organisations to realise that they cannot continually put up subscriptions (and I know that many individuals are subsidised by employers), because if people have to pay their own subscriptions (wholly or in part) and in a multi-interest society they have to join more than one institution, they may find they will have to drop one or the other, maybe disaster; in fact in many cases the reverse because there are not many institutions which do not subsidise, and some very heavily, their members' services. How this cash is to be made up varies from the investment of the accrued surpluses from better days to establishing substantial commercial activity. This latter need not conflict with the primary objectives of the institution. Properly applied investment can not only support the organisation financially: it can improve its image considerably in

this modern competitive world. For example the Institutes has excellent relationships with the many countries establishing new training academies for would-be seafaring personnel. This is the result of not only consultative work but practical support in the supply of technical books for students and library reference works in many parts of the world. From this it follows that institutions which ignore the change in patterns in trade, the change in countries which develop new shipowning and shipbuilding and ship repairing industries do so at their peril because there is nothing sacred in information centres remaining where they have been for the last 100 years unless that centre demonstrates that it is as useful in the new circumstances as it has been in the old.

Communications and contact with people are therefore vital and one of the more fluent ways of doing this is by participating in trade exhibitions with a good public relations back-up, as I have discovered particularly over the last 10-12 years.

I believe that from this it is clearly established that the passive role of the past decades whereby people came to the institutions has gone and the more active, outward-looking and commercially-orientated attitude is the need of today because one must take ones services to where they are wanted and not expect the reverse to happen.

CONCLUSION

I think from what I have said it is clear that I have faith in the future need of engineering institutions to exist in the service of their professions. This is particularly so in the technical field because of the continuing need to expand technical services and invention in both the developed and the under-developed countries.

Looking at the way institutions work today in under-developed countries makes one realise how the older societies probably functioned in the days of the industrial revolution and the decades that followed. If it had not been for the learned society and of course the commercial technical journals, the ability to have communicated would not have existed. This further underlines my faith in the future although, as I have suggested, its form may be very different in that I believe firstly it will be dictated by financial considerations leading to commercial competence, and then establishing how the primary technical activities can be planned and executed. I also

see a greater need for national groups of societies to have facilities for formal and informal discussions in the interests of solving the problems which arise between different nations and, as I have said earlier, one example of this is the extending of educational systems, training policies and licensing to practice. This sort of activity is immensely helped by establishing an international forum for the purpose. This need not necessarily be cumbersome or over-burdened with bureaucracy.

One idea was that a forum might be provided for societies to meet, perhaps every other year, to discuss the subjects to which I have referred. The purposes of such an international body might be to provide facilities :-

- a) to improve the inter-relationship between institutes and to create such an inter-relationship where none now exists,
- b) to try to establish a greater mutual understanding and acceptance of training schemes, academic qualifications and national registration requirements from one country to another,
- c) to integrate where possible the learned society activity which in the positive sense would remove some of the existing competition for audiences for conferences organised by a wide variety of organisations including those with solely a commercial target,
- d) to enhance the stature of the organisations and therefore the individual members thereof,
- e) to provide a forum for advice to national governments and inter-governmental organisations.

There are quite a substantial number of institutions and societies interested in the marine field (although some only so as part of broader responsibility), particularly in Western European countries. A recent count indicated that there were some thirty organisations which might be interested, which is quite a manageable number. The idea has not actually proceeded very far and I welcome this opportunity to mention it in that in my list of thirty there are included representatives from those societies represented in the audience today.

It is on this note of much wider collaboration in the future that I end this paper, hoping that the seed will fall on fertile ground and be taken up by other societies in the spirit in which it is proposed.

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