

# ICWES ONE TO NINE

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## INTRODUCTION

In the 'Sixties', with the increasing interest in nondiscrimination and equal opportunity in the Western world, conferences concerning the role of women in the scheme of things were not unusual, and the position of women in science and engineering, where women professionals had little visibility except in the USSR, was (and still is) a favourite subject for discussion and analysis. However, as Aileen Cavanaugh, then President of the United States' Society of Women Engineers said at the official opening, in 1964, of the First International Conference of Women Engineers and Scientists held in New York, (ICWES 1), such debates, "had taken place for far too long without the benefit of facts, and most often by people - including both men and women - who had never met a woman Engineer or Scientist." So, when I was invited to address the Japanese Forum of Women Engineers on the subject of "Women Engineers and Scientists Worldwide" I naturally turned to the published reports and proceedings of that Conference and the following eight such Conferences, which have taken, place between 1964 and 1991. I was fortunate enough to be able to attend seven out of the nine, and preparing this gave me great satisfaction as I looked back and tried to put into perspective what I have learned from those Conferences about women engineers and scientists worldwide.

## HISTORICAL BACKGROUND TO ICWES

The First International Conference of Women Engineers and Scientists took place in New York City whilst the great World Fair was in progress and the World Fair Organisers declared June 15 1964 to be Women Engineers and Scientists Day. The World Fair made a great impact on the Conference: various exhibits were visited on the first day of the Conference including General Motors Futurama and Behind the Scenes and Second Mobil Exhibit. The second day was devoted to technical tours including Bell Labs and the new Research Center of IBM. The third day we got down to business. The Conference had taken as its theme "Focus for the Future - Developing Engineering and Scientific Talent". Its aims (to quote Aileen Cavanaugh yet again) were "to look at the future technological needs of a peaceful world, define those areas of endeavour in which our scientifically inclined and inventive youth of today - boys and girls alike can find their opportunities for service to their fellow men of tomorrow".

The Conference brought together more than 400 delegates from 32 nations to exchange information and to create new patterns and new plans for the activities of women engineers and scientists. In her keynote address *Df*. Lillian Gilbreth, a renowned management consultant who, with her husband, pioneered the study of time and motion, which became so important in Industrial Engineering at that time, said "we have come together to focus our attention on the future needs of the world. We shall try, through pooling our diverse experiences, to estimate what those needs will be and then to consider ways in which we can best contribute to those needs."

The Technical programme consisted of six sessions. The first session considered the requirements for engineering and scientific manpower to meet the challenge of sustaining the expanding population of the world, and the technical services needed in support thereof. The following three sessions established the specific types of scientific and engineering talent needed, describing the state of the world in the major areas of human need, namely, food and water, clothing and shelter, heat and power, communications and transportation. Session Five covered the current status of women engineers and scientists and information was published about Australia and New Zealand, Europe, Iran, Japan, North America, the Philippines, South and Central America, Syria, Turkey and the USSR. Session 6 was in the form of a symposium on "Developing Engineering and Scientific Talent", at which various eminent people were invited to contribute statements as a basis for discussion. There is no report of the discussion as such, but a summary statement emerged from the Conference which pointed out the many ways in which science and engineering

Were contributing to improved world living conditions, and the possibility of achieving the outstanding potential of the future by co-operation. Also emphasized was the inadequate supply of trained personnel to implement future world needs. Finally, the Conference resolved:

1. To encourage each participant to report about the Conference in her home country or region.
2. To encourage women to increase their participation in the professional societies in their countries.
3. To encourage women to enter the field(s) of engineering and science) and to improve their qualifications not only during their student days but throughout their professional life.
4. To maintain the central file of women engineers and scientists used for this Conference and enlarge it as much as possible.

So ended the First International Conference of Women Engineers and Scientists. It was attended by a delegation from the UK of some 22 engineers and scientists, who were so inspired that on their return they persuaded the Women's Engineering Society in the UK to host a second such Conference. This took place in the University City of Cambridge in 1967 the technical theme chosen was "The Application of Technology to World Food Problems".

The inaugural address was given by Dorothy Hollingsworth OBE, a chemist and Head of the Food Science Advice Branch of the Ministry of Agriculture, Fisheries and Food. - Her address was entitled "Nutritional Goals in a World Context", and in it she traced the growth of thought on the application of nutritional knowledge to the problem of feeding populations. Experiences in the UK since the beginning of this century were used to illustrate certain general principles. International action in matters of food started with the League of Nations concept in the 1930s of "the marriage of health and agriculture". This was followed by the setting up in 1945 of the Food and Agricultural Organisation of the United Nations for the purpose of raising nutritional levels and standards of living worldwide. Twenty years on and it was clear that the difficulties were even more daunting than anticipated, and a food crisis of staggering proportion was predicted by 1985 unless the rich nations drastically increased aid to poor nations for food and population control programmes. This address provoked much discussion and formed a stimulating introduction to the ensuing sessions on "Enough for everyone", "The Use of Power in Agriculture", "Increasing Food Production" and "Future Trends".

Again, there was a second theme - "The Woman Professional Engineer" and Jo Webb, an American chemical engineer and author gave the opening. Address, entitled "Science versus the Humanities - a harmful dichotomy". She put forward the hypothesis that science and the humanities are not separate and unrelated, but are subclasses of philosophy. She traced the division between the rational and the intuitive approaches to an understanding of life, through the ages to the present day. She expressed the view that changes in education to emphasise the importance of both modes of thinking were imperative, as was the need for, and satisfaction to be found in, social responsibility combined with professional commitment. Jo Webb also reported on a survey, which she had carried out in which she invited 34 people from different countries to complete a questionnaire about women engineers. She pointed out that professionally qualified women engineers were in a striking minority in every country in the world one in three in the USSR, one in one thousand in the USA. Her questionnaire was an attempt to collect information about women engineers on a common basis, something that the first ICWES had failed to do.

Most importantly, during the Conference a meeting of delegates was held to discuss the possibility of further cooperation between women engineers and scientists. In addition to delegates representing Supporting Societies from France, Italy, Japan, USA and UK, there was one delegate from each country, and a few interested observers. After a lengthy discussion, the major points, which emerged, were as follows:

1. There was an unanimous desire for the continuation of International Conferences of Women Engineers and Scientists.
2. However it was agreed that, although an international secretariat to organise the Conferences was desirable, the cost would be prohibitive. Each Conference would therefore build upon its predecessors and self help, and enthusiastic volunteers would provide the necessary workers. Even so a host organisation would be very necessary.
3. A Conference representative in each country was desirable who would organise her own voluntary supporting and fund-raising sub-committee.
4. Three years was a reasonable gap between Conferences.
5. The Conference venue should move round the world.
6. Conference participation should be truly world wide and a great effort should be made to secure the attendance of delegates from all countries

A third Conference was mooted for 1970, and a small international committee was entrusted with the task of ensuring the continuity of the Conferences. Its members were drawn from Africa, Asia, Europe, Latin America, the Middle East and North America. The Chairman was Isabel Hardwich from the UK, the Honorary Secretary of the ICWES 2 Organising Committee.

So ICWES was well and truly launched!

ICWES 2 was the first Conference to introduce "The Bringing of Greetings Ceremony". On the eve of the Conference delegates were invited to attend in national costume, and each country delivered greetings to the host country. This was followed by a "get to know you" party. Of course, we English are at a great disadvantage when it comes to national costume, and rely on the Scottish and the Welsh to represent the

United Kingdom. However with countries such as Austria, Brazil, Ghana, India, Iran and of course Japan, to mention just a few; it was a most colorful evening, and the UK delegates were put in the shade.

ICWES 2 vied with ICWES I in providing a wide range of visits, some technical and some cultural (taking Jo Webb's comments on unification to heart). Based as we were in the City of Cambridge, using the facilities of the University, we were able to tour some of the historic colleges and enjoy such differing pleasures as an organ recital in King's College chapel, and a demonstration of Morris dancing - a ritual English folk dance symbolizing death and rebirth, performed by groups of white-clad men wearing bells and carrying sticks and handkerchiefs. The host Society also gave its *own* party in the historic town of Bury St. Edmunds where, in the Athenaeum, the 18th Century assembly room where Dickens used to give readings, we "treated" the delegates to a full-blown demonstration of the Scottish pipes, and haggis for supper. An additional attraction was the post Conference tour of the Irish Republic. All in all, the Conferences are a golden opportunity for delegates to learn more about the heritage of the host, as well as getting to know each other.

### THE ICWES SERIES

So, ICWES 1 and 2 were a great success involving 374 and 313 delegates respectively, 87 from 32 overseas countries at ICWES I and 191 from 35 overseas countries at ICWES 2.

The third ICWES was held in Turin, Italy, in 1971 this time with 233 delegates, 188 from overseas. They discussed "Planning for Progress" and "Women's Professional and Family Duties". The Opening took place in the Royal Palace, Palazzo Madama. The Inaugural address, given by Professor Andrea Ferrari Toniolo examined and analysed five points relating to the deep links existing between technical and human progress. 69 papers were presented on various topics Energy Sources, Communication and Transport, Computer Technology, Housing, Town and Community Planning, Industrial Production and Human Engineering. The second theme, "Women's Professional and Family Duties" attracted a further 28 papers.

It was at this Conference that the meeting of delegates, in addition to choosing Poland as the host country for ICWES 4, discussed the format of the Conferences. Clearly some delegates felt that time should be allowed for more detailed consideration of the topics, for example by working groups. Some would have preferred less time to be spent on the papers (which should preferably not be too specialised) and more time in discussion. However it was appreciated that the large number of papers could provide a greater opportunity to learn how other countries resolved their problems also that some organisations would not support delegates if the theme were too narrow. In practice each of the three Conferences was quite different from one another.

Again, the program included the possibility of visiting places of historic interest and beauty as well as of technical interest. Particularly memorable was the visit to the historical motor museum which was followed, after a luncheon provided by the Fiat Company, by a trip round their manufacturing facility where the UK delegates were particularly interested to see women and men working together on the production lines. This was something you would not have seen in England at that time!

Four years later found us in Cracow, Poland - the first time for many of us "behind the iron curtain". Again more than 30 countries were represented and there were 148 foreign delegates in a total of 618. The themes were "New Techniques in the Service of Mankind" and "Contemporary Sociological Problems of Women Engineers and Scientists". The Opening address was delivered by the Scientific Secretary of the Polish Academy of Sciences and President of the Council of the Polish Federation of Engineering Associations, Professor Jan Kaczmarek. He told us that in Poland "women accounted for 46% of the labour force. They constituted 39% of manpower with University education, 54% with secondary school vocational education and 70% with general education. 50% of medical doctors were women, 91 % dentists and 83% pharmacists. They account for 31 % of the University teaching staff. They are active in light industry, food and agricultural industry as well as in printing, electro-technical and chemical industries. They play a more and more important role in the scientific life of the country. They are awarded about 25% of all university degrees". Not surprisingly, 50 of the 106 papers were given by Poles.

At the Delegates meeting, where 32 countries were represented, the Chairman put forward the aims of ICWES as: *Firstly*, to bring together professional women engineers and scientists worldwide. *Secondly* to encourage the use of technology for the betterment of life, and *Thirdly* to consider how to increase the participation of women in this. These aims were adopted, and although slightly differently worded are still the aims today. In discussing the host country for ICWES 5 it was recorded that "There was a general feeling that Japan would be an ideal venue". (There were six Japanese delegates present at ICWES 4). However the Japanese representative regretted she was unable to commit the Society of Japanese Scientists. In the event no definite offer to host ICWES 5 was forthcoming. After the Conference an offer was received from France and accepted by postal ballot among the delegates.

Rouen, the ancient capital of Normandy situated on the River Seine, became the venue for ICWES 5, and it was at this Conference that the meeting of national representatives confirmed the aims of ICWES, and laid down Guidelines which included the composition of the Delegates meeting and its purpose (mainly to decide the host for the next Conference). They also regularised the ICWES Continuity Committee set up

At ICWES 2. Their responsibilities are to encourage organizations to put forward proposals to host the next ICWES, and, once the host is agreed to assist in the dissemination of its details. These guidelines can only be amended at the Delegates meeting. Some minor amendments have been made in ensuing years. Finally, the offer to the meeting by India to host the sixth ICWES in 1978 was unanimously accepted.

The theme chosen for ICWES 5 - Technology and Freedom - included a session on "Information of women on scientific and industrial careers and their training in these careers", as well as sessions entitled "Industrialized production - wherefore?" "From the transfer of technology to industrial cooperation" and "Responsibilities of the Research Scientist". At the close it was emphasized that engineers and scientists have not only a responsibility to their professions but also to the public. This responsibility is of the utmost significance to women scientists and engineers, who are in a better position to convey their knowledge to a seldom well-informed public and to help all women to realize they should not be unconcerned with a world ruled by technology but have a part to play in it.

1981 took us to Bombay to discuss "Science, Technology and Society". The Conference was opened by Indira Gandhi, the Prime Minister. It was a great thrill to meet one of the few women Prime Ministers in the world. There was a large delegation from India, mainly from academia and research institutes and many of the papers they presented were highly specialised and concerned with very specific research problems. Only 18 papers were offered by delegates from overseas, of whom there were 55 in all. Many of these took the opportunity to extend their stay following the Conference, and to learn more about this fascinating continent.

In 1984 ICWES returned to the USA, to Washington D.C. with its museums, galleries, historical monuments and of course the White House. The theme was "Technology - an International Bridge"; its aims were to reduce the gaps in understanding and knowledge among the peoples of the world. Not only was it run in conjunction with the US Society of Women Engineers' National and Student Conferences, but the extensive programme of talks was arranged in three parallel sessions covering 15 topics, ranging from Defence, through Technology and Society to Transportation and Our Planet Earth. There were also sessions on Undergraduate Education, and Women in Engineering and Science, Ana for those papers, which did not fit into any of 14 topics there was a "Pot Pourri" session. Industry was very much to the fore at the Conference, running recruitment evenings and participating in an exhibition. Professional development workshops were available most afternoons, proving a great attraction to the younger delegates. Technical and other tours abounded usually at least six to choose from every afternoon! We were spoiled for choice...

1987 took us to the Ivory Coast - the theme "Science, Technology and Development". The Conference was opened by the Head of State, preceded in procession by a group of Kings and Chieftains resplendent in beautiful robes and carrying golden carved staffs and maces. The theme was explored at plenary sessions, and working parties met to discuss "Science and Women", "Communication and Transfer of Technology", "Science and Development" and "Sciences and Techniques". Recommendations from the working parties emerged at the final plenary session. Visits were made to the Port Authority, palm nut plantations and a power station. The Conference ended with a buffet banquet, with African dancers and fireworks, and an enormous ICWES iced cake!

And so to ICWES 9 - hosted by the Women's Engineering Society (UK) at the University of Warwick in Coventry, England in 1991. The theme was "Communication" and topics included Transport, Satellites and Telecommunications, Basic Sciences, Information Transfer, Technology Transfer, Education, Career Development and Gender issues and Demographics, i.e. the education, training, employment and status of women engineers and scientists worldwide. It attracted 466 delegates including 139 from 41 other countries.

On the first evening a "Bringing of Greetings" ceremony was held followed by a party in the form of an Old English Fayre, which included stalls providing such Old English delicacies as Game pie, Syllabub and Mead (a honey-based drink), and entertainment from Morris Dancers and a Jazz band. We were honoured by the "visit" of the famous Lady Godiva who in the 11th Century rode naked through the marketplace of Coventry in order to persuade her husband to reduce the taxes he had imposed on the town.

Needless to say a variety of tours, technical and social, were made available, and, learning from the Washington experience, a career guidance and training seminar was held for the younger delegates. With a view to increasing the number of girls interested in engineering, AND to tell our delegates more about our country, the opportunity was taken to hold an exhibition in parallel with the Conference with stands from industry, government and educational and professional organizations. A series of educational events was also held during the week to which local schools were invited and in which delegates were also able to participate. These included a WISE (Women into Science and Engineering) bus, (a travelling exhibition offering hands-on experience), part of a project organized by the Engineering Council and the Equal Opportunities Commission to tell schoolgirls about Science and Engineering. Also a lecture for schoolchildren organized by the Institution of Mechanical Engineers was given by the Post Office. This was attended by some 1000 pupils, who also visited the exhibition.

The delegates meeting, held on the Thursday, appointed the new ICWES Continuity Committee. They agreed that subject to their scrutiny of detailed proposals, the Nigerian offer to host ICWES 10 in 1994 be accepted. However, because of political

Instability in Nigeria, the Continuity Committee was NOT able to confirm the acceptance of the Nigerian offer. Fortunately Hungary stepped into the breach and offered to host ICWES 10 in 1996. So what can we learn from the ICWES series so far in terms of its stated aims?

Firstly the figures of attendance and of countries represented show that our first aim, that women active in the fields of engineering and science shall know each other worldwide, is being achieved (see Table 1). More needs to be done to promote the Conference worldwide, and to help us all to keep in touch. However, a lot has been learned also in terms of getting to know MORE about each other, and this I will discuss again under the section "The status of women engineers and scientists".

Secondly, the themes chosen have been wide ranging and, in line with our second aim, have enabled us to consider and discuss areas where technology can be used for the betterment of life. Not only has this encouraged a large number of papers, and attracted large audiences, but also the papers have provided an impressive record of the growing technical contributions made by women in these particular areas over the last 27 years

This is of course, by example, impinges on our *third aim* - that the participation of women in engineering and science shall be increased. In addition many of the papers in the sociological sessions discussed the different ways in which countries are tackling the problem of the shortage of women engineers and scientists, and the waste of talent that this implies.

Table 1.

## INTERNATIONAL CONFERENCES OF WOMEN ENGINEERS AND SCIENTISTS (ICWES)

	Year	No. Of Delegates	No. Of Countries
ICWES 1 (Focus on the Future)      USA	1964	374(87)	32
ICWES 2                      UK (Application of Technology to World Food Problems) (The Woman Professional Engineer)	1967	313(191)	35
ICWES 3                      ITALY (Planning for progress)	1967	233(188)	32
ICWES 4                      POLAND (Contemporary Sociological problems of Women Engineers and Scientists) (New Techniques in the Service of Mankind)	1975	618(148)	30
ICWES 5                      FRANCE (Technology and freedom)	1978	146(103)	30
ICWES 6                      INDIA (Science, technology & society)	1981	394(55)	17
ICWES 7                      USA (Technology- An international bridge)	1984	1204*(54)	9
ICWES 8                      IVORY COAST (Science technology & development)	1987	221(51)	21
ICWES 9                      UK (Communication)	1991	466(139)	42

( )=Overseas

+ = Combined with SWE Students Conference

**WOMENS  
ENGINEERING  
SOCIETY** incorporated in 1920

